Investigating neuroinflammation in schizophrenia: a proton magnetic resonance spectroscopy (^{1}H-MRS) and cytokine study

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DECLARATION

I, ***Antoinette Burger***, hereby declare that the work on which this dissertation/thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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Abstract

Introduction: There are similarities in the phenomenology and psychobiology of schizophrenia and methamphetamine psychosis, with evidence of alterations in glutamatergic function in both conditions, and of involvement of inflammatory pathways in schizophrenia and methamphetamine abuse. Few studies have directly compared glutamatergic and inflammatory metabolites in thalamo-cortical circuitry across schizophrenia and methamphetamine-induced psychosis or assessed the relationship between such metabolites and inflammatory markers in either disorder. This study aimed to 1) compare glutamatergic and neuroinflammatory metabolites in thalamo-cortical circuitry in schizophrenia and methamphetamine-induced psychosis, and 2) to investigate associations between glutamatergic metabolites, neuroinflammatory metabolites, and peripheral cytokine levels in both disorders.

Methods: One hundred and sixteen participants were recruited – 44 with schizophrenia, 34 with methamphetamine-induced psychosis, and 38 healthy controls. All participants underwent a magnetic resonance imaging scan, which included magnetic resonance spectroscopy with voxels located in the anterior cingulate cortex (ACC) and left thalamus as well as a chemical-shift imaging 2-dimensional slice. Neurometabolites obtained included glutamatergic metabolites (glutamate (Glu), glutamine (Gln) and glutamate plus glutamine (Glx)) and neuroinflammatory metabolites (*myo*-inositol (mI), *n*-acetyl-aspartate (NAA), and *n*-acetyl aspartate plus *n*-acetyl-aspartyl glutamate (NAA+NAAG)). Absolute metabolite concentrations are reported. Serum cytokine concentrations were measured. For group differences, parametric data were analysed with one-way analysis of variance and non-parametric data analysed with Kruskal Wallis tests, followed by relevant post-hoc tests. Associations were determined using Spearman's rank-order coefficient. Significant associations were followed by comparison of correlations of independent samples.

Results: There were no differences between neurometabolites in schizophrenia and healthy controls. The methamphetamine-induced psychotic disorder group had lower relative *n*-acetyl-aspartate plus *n*-acetyl-aspartyl glutamate in left dorsolateral prefrontal cortex and left frontal white matter, compared to healthy controls. In schizophrenia, positive associations were found between absolute glutamatergic metabolites and absolute inflammatory metabolites in the anterior cingulate cortex (*n*-acetyl-aspartate with glutamate, lower *n*-acetyl-aspartate with *n*-acetyl-aspartyl glutamate plus glutamate, *myo*-inositol with glutamate, *myo*-inositol with glutamate plush glutamine). Several positive relationships were found in mI between different brain areas of the thalamo-cortical circuitry in the methamphetamine-induced psychosis group.

Conclusion: In schizophrenia, the associations between lower glutamatergic and lower neuroinflammatory metabolites suggest dysfunction in neuronal tissues in the glutamate-glutamine cycle within the thalamo-cortical circuit. In methamphetamine-induced psychosis, lower NAA+NAAG/Cr+PCr in the left dorsolateral prefrontal cortex and left frontal white mattersuggest compromised neuronal integrity associated with chronic disease progression. Furthermore, in this group the associations of mI between brain areas in the thalamo-cortical

circuit suggest that neuroinflammatory pathways in this circuit are dysfunctional. Taken together, there may be important differences in the neurobiology of schizophrenia and methamphetamine-induced psychosis.

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List of abbreviations

2D	Two-dimensional	MAP	Methamphetamine-induced psychosis
3D	Three-dimensional	MEGA-PRESS	Meshcher-Garwood point resolved spectroscopy
ACC	Anterior cingulate cortex	mI	*Myo*-inositol
ANOVA	Analysis of variance	mPFC	Medial prefrontal cortex
AMPAR	a-amino-3-hydroxy-5-methylisoxazole- 4-propionic acid receptors	MPRAGE	Magnetisation prepared rapid acquisition gradient echo
CGI-S	Clinical global impression severity scale	MRI	Magnetic resonance imaging
CHESS	Chemical shift selective saturation	MTSD	Maryland trait and state depression scale
CON	Healthy controls	NAA	*n*-acetyl-aspartate
Cr	Creatine	NAAG	*n*-acetyl-aspartylglutamate
Cr+PCr	Creatine with phosphocreatine	NAA+NAAG	*n*-acetyl-aspartate with *n*-acetyl-aspartylglutamate
CRLB	Cramer-Rao lower bound	nii	Nifty
CSF	Cerebral spinal fluid	NMDAR	N-methyl-D-aspartate receptors
CSI	Chemical-shift imaging	MRSParVolCo	Magnetic resonance spectroscopy partial volume correction
CUBIC	Cape Universities Body Imaging Center	PANSS	Positive and negative syndrome scale
DLPFC	Dorsolateral prefrontal cortex	PFC	Prefrontal cortex

DSM-IV-TR	Diagnostic and Statistical Manual version 4 – text revision	pg/ml	Picograms per millilitre
DTI	Diffusion tensor imaging	PRESS	Point resolved spectroscopy
EDTA	Ethylenediaminetetraacetic acid	PVC	Partial volume correction
FEP	First episode psychosis	ROI	Region of interest
Fisher's LSD	Fisher's least significant difference test	rs-fMRI	Resting-state functional magnetic resonance imaging
fMRI	Functional magnetic resonance imaging	SCID	Structured clinical interview for DSM-IV-TR Axis 1 disorders
FOV	Field of view	SCZ	Schizophrenia
FWM	Frontal white matter	SNr	Substantia nigra pars reticulata
GAF	Global assessment of functioning	STAI-Y1	Spielberger state-trait anxiety inventory
Glu	Glutamate	STEAM	Stimulated echo acquisition mode
Gln	Glutamine	sTNFR1	Soluble tumour necrosis factor receptor 1
Glx	Glutamate with glutamine	sTNFR2	Soluble tumour necrosis factor receptor 2
GM	Gray matter	SVS	Single voxel spectroscopy
GPi	Globus pallidus interna	TNF-α	Tumour necrosis factor alpha
^{1}H-MRS	Proton magnetic resonance spectroscopy	TE	Echo time

HIV	Human immunodeficiency virus	TR (^{1}H-MRS)	Repetition time
HREC	Human research ethics council	TR	Treatment resistant
IFN-γ	Interferon gamma	UHR	Ultra-high risk
IL-1β	Interleukin 1 beta	VAPOR	Variable power radiofrequency pulses with optimised relaxation delays
IL-8	Interleukin 8	vmPFC	Ventromedial prefrontal cortex
IL-10	Interleukin 10	VOI	Voxel of interest
J-coupled	Scaled-coupled	VP	Ventral pallidum
KMSK	Kreek-McHugh-Schluger-Kellogg scale	VTA	Ventral tegmental area
KR	Kainate receptors	WM	White matter
MA	Methamphetamine		

Chapter 1 - Introduction

The similarities in symptomology between schizophrenia (SCZ) and methamphetamine-induced psychotic disorder (MPD) have been documented since 1958 [1]. Both disorders are characterised by psychotic episodes that include positive, negative and impairment in cognition [2]. Positive symptoms experienced by patients with SCZ include delusions and hallucinations, while negative symptoms include anhedonia, blunted affect, apathy, and poor thought and speech content. Patients diagnosed with SCZ and MPD often experience difficulty with activities of daily living [3]. The impairment in cognition in patients with SCZ and MPD are considered a cluster of general symptoms which include lack of judgement and insight, poor memory and attention span, difficulty with organising their thoughts, and decision-making [3,4]. MAP has been proposed to be a biological model for SCZ as it is difficult to distinguish between the two disorders due to the substantial overlap in symptoms [15–17].

The longest standing hypothesis of the underlying factor of SCZ is that of dopaminergic dysregulation [8]. One theory has proposed that presynaptic striatal dopaminergic function is increased by subcortical hyperdopaminergic function [9]. Another theory proposes two independent mechanisms of the dopamine theory: 1) there is a phasic release of dopamine as a result of dopamine neuron firing, and 2) sustained release of dopamine which is regulated by afferent prefrontal cortical transmission [10]. A third theory is that dysfunction of the dopaminergic system is considered to be within the mesolimbic pathway, however research has shown that the nigrostriatal pathway is greatly involved in dopamine dysregulation in SCZ [11]. This might explain the conflict in the literature of whether D2 receptors function appropriately with antipsychotic medication [9]. Another weakness of this theory is that increased dopamine levels were not detected in the cerebral spinal fluid or blood serum of patients with SCZ where increased levels of dopamine were detected in the brain [9]. There does not appear to be consensus in the literature of exactly what mechanism within the dopaminergic system is associated with the aetiology of SCZ.

The mechanistic theory proposed to underlie the presentation of MAP is postulated to be via the dopaminergic system. The effects and consequences of methamphetamine abuse include evidence of brain injury and neurotoxicity, with research into the underlying mechanisms of these effects being an important research focus across the world [12]. Methamphetamine appears to initiate its action through the dopaminergic system, specifically the nigrostriatal, which consists of the direct and indirect pathways, mesolimbic and mesocortical pathways [13]. Cortical glutamatergic activation through the activation of the dopaminergic system enhances glutamate signalling in the cortex [13]. Glutamate concentration is increased in the striatum [14] and prefrontal cortex [15] during methamphetamine intoxication, through activation of the dopaminergic system [16]. The nigrostriatal and mesolimbic pathways are responsible for the glutamatergic signal increase, while the mesocortical pathway is responsible for the dopaminergic signal increase to the cortex [13]. Excessive excitation of both glutamate and dopamine in the cortex during methamphetamine intoxication could possible overpower GABAergic neurons through disruption of both systems, resulting in the manifestation of psychotic symptoms [13,17].

Further to the similarities between the two disorders as described above, there is evidence of alterations in glutamatergic function in both conditions [13,18–20], and of involvement of inflammatory pathways in SCZ [21–25] and MA abuse [26–28], through measurement of neurometabolites using proton magnetic resonance spectroscopy (^{1}H-MRS) studies. One of the proposed underlying neurobiological dysfunctions reported in SCZ and MA abuse[1] is neuro-excitotoxicity through the upregulation of neurotransmitter glutamate (Glu) [14–16,29–31]. In recent research, neuroinflammation, as indicated by increased myo-inositol (mI), lower *n*-acetyl-aspartate (NAA), and higher concentrations of peripheral cytokines has also been suggested as a potential underlying factor in SCZ [22–25,32] and MA abuse [26–28]. Several brain areas investigated form part of the thalamo-cortical circuitry; however, no studies have directly investigated glutamatergic and neuroinflammatory pathways in the thalamo-cortical circuit in both disorders. This study aimed to investigate glutamatergic and neuroinflammatory pathways in the thalamo-cortical circuitry in patients with chronic SCZ and MA-induced psychosis.

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[1] MA abuse includes MA abuse, MA dependence and MA abstinence.

1.1 Glutamatergic dysregulation

The glutamatergic cycle is integral for healthy neurotransmission in the brain, and glutamate is involved in normal synaptic transmission as well as long-term potentiation and depression [33], within the brain [19]. There are various pathways responsible for the synthesis of glutamate in the brain. In SCZ, one of the pathways responsible for the synthesis of glutamate is via the glutamate-glutamine cycle [34–37]. As neurons lack the necessary enzymes required for glutamate synthesis, it draws on glial cells, specifically astrocytes, for supply of the precursor enzymes of the glutamate-glutamine cycle [38,39]. Astrocytes contain glutamine, which is released to presynaptic terminals and metabolised to glutamate [40]. Glutamate in the presynaptic terminal is rapidly taken up and stored in synaptic vesicles [40]. When an action potential reaches the presynaptic terminal, voltage-gated calcium channels are opened through depolarisation, which results in an influx of calcium into the presynaptic terminal [41]. The influx of calcium causes fusion of the synaptic vesicles with the presynaptic membrane and glutamate is released into the synaptic cleft [33,41]. Glutamate in the synaptic cleft binds to ionotropic receptors on the postsynaptic membrane [33,40,41]. Ionotropic glutamate receptors located on postsynaptic membranes are ligand-gated channels where the channel is opened by glutamate binding [18], and are subdivided into N-methyl-D-aspartate receptors (NMDAR), a-amino-3-hydroxy-5-methylisoxazole- 4-propionic acid receptors (AMPAR) and kainate receptors (KR) [18,19,42]. When glutamate neurotransmission is dysregulated through a dysfunction in the glutamate-glutamine cycle, specifically at the NMDAR, excessive glutamate signalling occurs [19]. Preclinical studies and positron emission tomography (PET) and single-photon emission computed tomography (SPECT) studies report hypofunction of N-methyl-D-aspartate receptors (NMDAR), associated with glutamate excitotoxity, in SCZ [43–47], while animal models and culture studies show that MA leads to increased expression of NMDAR, associated with lower Glu concentrations [44,47,48]. Excessive glutamate results in an overload of intracellular calcium in postsynaptic neurons, which activates calcium-dependent proteases and phospholipases and lead to the production of free radicals, which are toxic [18]. This process is referred to as glutamate excitotoxity, which can be toxic and kill neurons [18]. Glutamate excitotoxicity has been associated with several neurodegenerative diseases such as Alzheimer’s Disease, Parkinson's Disease, multiple sclerosis, SCZ [18,19,49–53] and has also been implicated in MA abuse and MAP [13,20]. The suggestion of glutamate excitotoxicity in MA abuse and MAP is not consistent with results from PET/SPECT studies. PET/SPECT studies are limited to MA abuse and not MAP, which could account for the discrepancies in results.

Dysregulation of the glutamatergic neurotransmission through increased concentrations of glutamatergic compounds, using ^{1}H-MRS, have been reported in the prefrontal [54,5556] and anterior cingulate [30,57] cortices, and left thalamus [58] in patients with SCZ and MA abuse [30,31], while increased levels of glutamine have also been associated with the severity of psychotic symptoms [30]. The explanation for the report of increased glutamatergic compounds could lie in the proposition that development of psychotic symptoms are related to disruption of the ionotropic glutamate receptor function, specifically decreased NMDAR function [3,59] and overstimulation of AMPAR and KR [49], resulting in increased glutamate in the synaptic space [59]. The brain areas involved in glutamatergic dysregulation are implicated in the thalamo-cortical circuitry. (Table 1)

1.2 Thalamocortical circuitry

The thalamus has return projections to the prefrontal cortex (PFC), including the dorsolateral prefrontal cortex (DLPFC) and anterior cingulate cortex (ACC) [60–62]. The ACC and DLPFC each form their own, albeit overlapping, circuit with the thalamus, and both circuits pass through frontal white matter (FWM) [60] (Figure 1). The ACC is considered a major locus of pathology in SCZ [63] and is critical for the neural networks responsible for the regulation of cognition [21]. The DLPFC, on the other hand, is implicated in executive functioning and problem solving [64]. In the DLPFC, decreased neuron size, altered neuronal density, and a decrease in dendrites, synapses and dendritic spine density have been reported in SCZ [65,66].

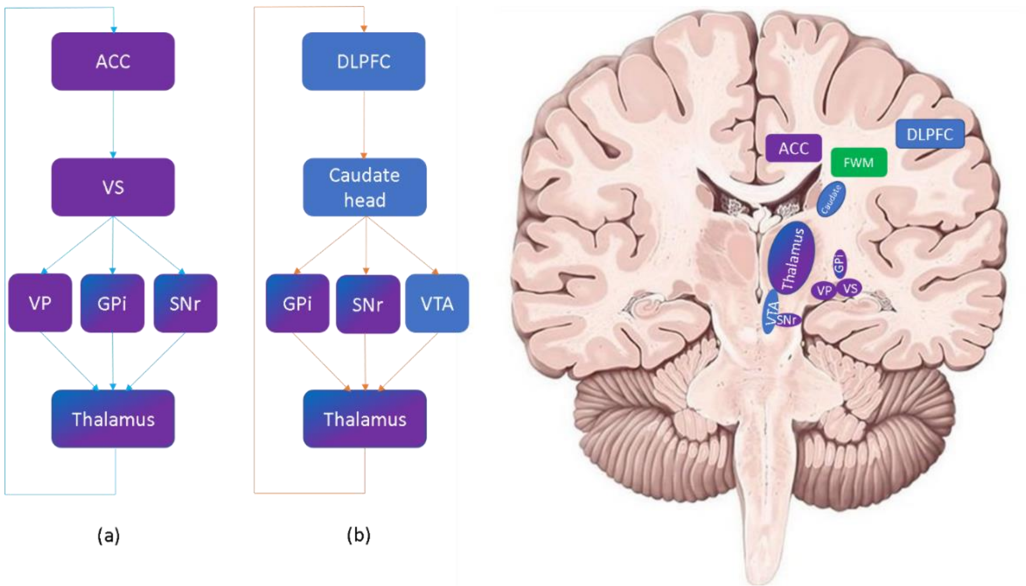


Figure 1 – Normal thalamocortical circuitry in the human brain

FWM, known to be associated in the pathophysiology of SCZ and MA abuse, forms an integral part in thalamo-cortical circuitry in both the ACC-thalamus and DLPFC-thalamus circuits. Dysfunction in FWM contributes to problems with synchronisation and connectivity in the brain [67–70]. White matter integrity is integral for healthy signalling in the brain, and abnormalities, specifically changes in oligodendrocyte structures and myelin proteins, are commonly described in SCZ [71]. FWM dysfunction has been reported in long-term MA abstinence [28], and it can be hypothesised that FWM would be dysfunctional in chronic MAP. Dysfunction in FWM in SCZ and MA abuse has been associated with demyelination and neuroinflammation by means of glial proliferation [28,72,73].

Several histopathological abnormalities in post-mortem tissue of the thalamus have been found in SCZ. Not only is decreased thalamic volume consistently reported, but also a decrease of up to 40% in neuron number, as well as decreased neuronal density of up to 35% [3]. These decreases could account for the synaptic degeneration and abnormal signal intensity distribution reported in the thalamus in SCZ [3]. The communication from the thalamus to the ACC and DLPFC is suggested to be disrupted with decreased synaptic connectivity in the ACC and DLPFC, resulting in dysfunction in the thalamo-cortical circuit between the thalamus and ACC and thalamus and DLPFC (Figure 2).

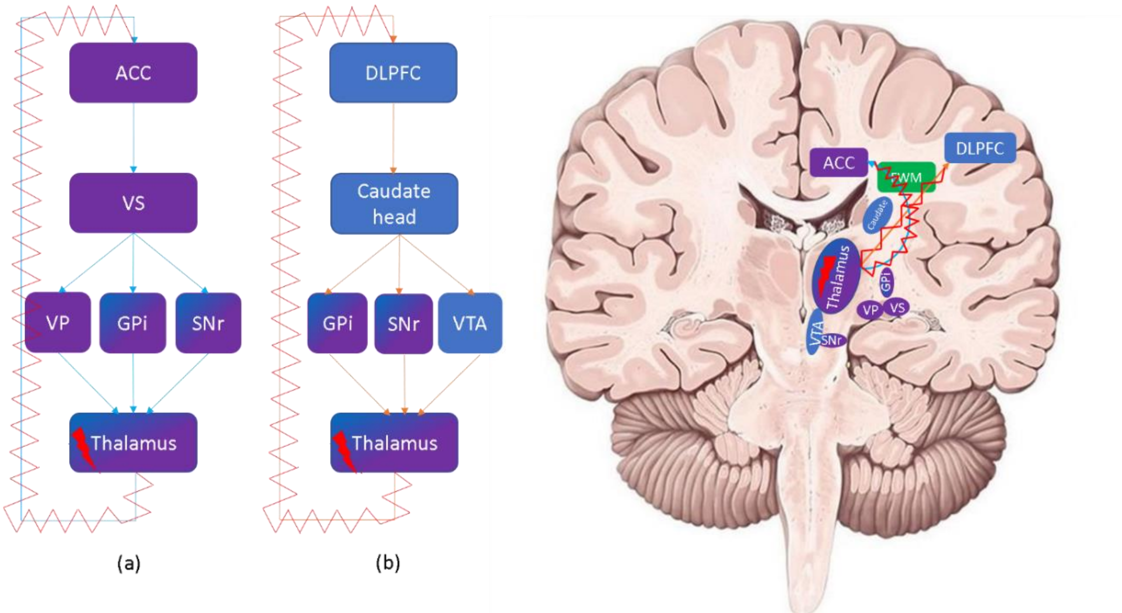


Figure 2 – Disrupted thalamo-cortical circuitry in schizophrenia

MA dependence has been reported to affect the thalamo-cortical circuit at the ventral striatum (VS) and caudate [74,75]. The ventral tegmental area (VTA), adjacent to the substantia nigra pars reticulata (SNr) has also been reported to be dysfunctional with MA abuse [76]. The ACC-thalamus circuit appears to be disrupted at the VS, whereas the dysfunctional caudate and VTA could cause disruption of the DLPFC-thalamus circuit. When one brain area, integral in thalamo-cortical circuitry, is dysfunctional the entire circuit is proposed to be disrupted. If there is overlap between brain areas in the two thalamo-cortical circuits, it is possible that both circuits would be disrupted. Disruption in the thalamo-cortical circuit has been proposed to have a significant negative impact on structural integrity, decreased synaptic number and size of prefrontal cortical projection neurons, as well as decreased energy metabolism in the DLPFC and ACC [65,66]. (Figure 3)

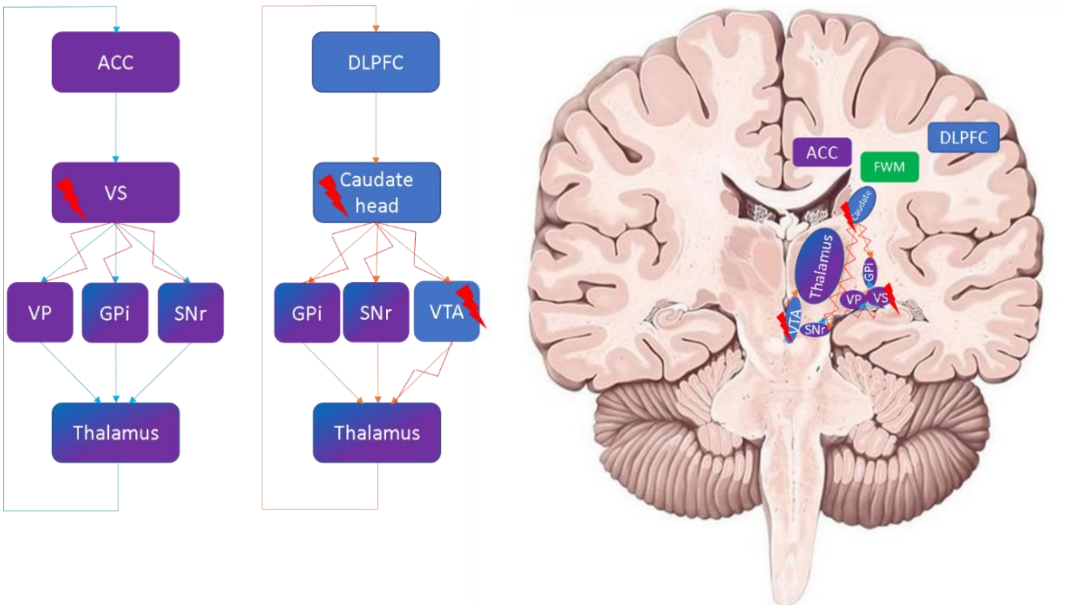


Figure 3 – Disrupted thalamo-cortical circuitry in methamphetamine psychosis

Even though SCZ and MAP present with similar clinical symptomology the area of dysfunction within the thalamo-cortical circuitry is vastly different. It could be argued that dysfunction of both thalamo-cortical circuits, due to overlapping brain areas implicated in the two disorders, could explain the similarities in symptomology between the two disorders. Evidence is lacking in supporting this hypothesis. The question that arises is whether glutamate excitotoxicity, neuroinflammation, or a combination of disruption in the two pathways could account for the presentation of psychosis. Evidence suggestive of neuroinflammation, that specifically affects the thalamo-cortical circuitry, has been proposed as possible underlying mechanism in psychosis in general, as well as in the clinical presentation of SCZ and MAP [72].

1.3 Neuroinflammation

Neuroinflammation has emerged in recent research studies of SCZ [22–25,32] and long-term MA abuse [27,28,73]. Neuroinflammation occurs primarily through microglial activation [77–79] and cytokine activation [80], both of which have been reported to be involved in psychotic states [81]. An increase of pro-inflammatory cytokines due to microglial activation have been found in the blood, cerebral spinal fluid and brain tissue of preclinical and post-mortem SCZ human studies [82,83].

It is widely accepted that neurometabolite changes often precede structural changes in the brain [84]. Through measurement of neurometabolites associated with neuroinflammation (higher *myo*-inositol, associated with lower *n*-acetyl-aspartate and *n*-acetyl-aspartate (NAA) with *n*-acetyl-aspartyl-glutamate (NAA+NAAG)) in specific brain areas implicated in the pathophysiology of SCZ and MAP (anterior cingulate cortex, dorsolateral prefrontal cortex, frontal white matter, left thalamus), it is possible to determine changes and abnormalities, related to neuroinflammation, on a metabolic level, providing deeper insight into these changes. Functional magnetic resonance imaging (fMRI) have been utilised to investigate neuropsychological changes, through functional networks associated with language processing and executive functioning, which have been reported to be compromised in SCZ and MA abuse [85]. Disruption in functional connectivity networks has also been proposed to be involved in the language processing difficulties SCZ patients experience [86]. A lack of communication between the anterior cingulate cortex (ACC) and other brain areas have been reported, which could account for the impairment in cognitive functionality observed in patients with SCZ and MA abuse [87]. Disruption in functional connectivity networks in the frontotemporal area of the brain has been associated with auditory hallucinations [88]. Diffusion tensor imaging (DTI) measures white matter integrity which is integral for healthy signalling in the brain, and could account for the behavioural symptoms and impaired cognitive functioning that are observed in both SCZ and MA abuse [89,90]. Structural magnetic resonance imaging studies report smaller total brain volume in SCZ [91,92], with specific smaller cortical volume in the frontal lobes which could potentially indicate reduced synapses and glial cells [93,94]. In addition, cortical thinning has also been reported, which has been associated with severity of the symptoms experienced by individuals diagnosed with SCZ [95]. The above methods are all valuable in investigating the neurobiological changes in SCZ and MA abuse, although they all investigate structural changes. Through measurement of neurometabolites associated with suggested neuroinflammation in specific brain areas where structural abnormalities in the thalamo-cortical circuitry in SCZ and MA abuse have been noted, it is possible to determine changes, abnormalities and proposed neuroinflammation on a metabolic level, providing deeper insight than the neuroimaging methods described above.

Proton magnetic resonance spectroscopy (^{1}H-MRS) is one of the few techniques that can assess the chemical composition of *in vivo* brain tissue, including neurometabolite concentrations associated with neuroinflammation [72]. Brain metabolite concentrations, which accurately indicate neuronal and glial density, can be measured with ^{1}H-MRS. Glial density, which reflects activated microglia and astrocytes, have been associated with higher levels of *myo*-inositol (mI), a marker of neuroinflammation [72]. Higher mI when accompanied by lower concentrations of *n*-acetyl-aspartate (NAA), a neuronal marker, an indication of neuronal injury and neuroinflammation [72].

The interaction between peripheral cytokines and neurometabolite makers of proposed neuroinflammation, specifically in schizophrenia (SCZ) and methamphetamine-induced psychotic disorder (MAP), is yet to be investigated in humans. However, in vivo neurometabolite markers suggestive of neuroinflammation as well as measurement of peripheral cytokines in isolation support relationships between these two measures of neuroinflammation. It is suspected that neurometabolites and cytokines, in addition to independently exerting changes, also interact to exert altering effects on thalamo-cortical circuitry leading to the presentation and persistence of psychosis.

1.4 Proton magnetic resonance spectroscopy (^{1}H-MRS)

Proton magnetic resonance spectroscopy (^{1}H-MRS) is a non-invasive magnetic resonance imaging technique that provides *in vivo* data on the concentration of several ^{1}H-MRS neurometabolites. ^{1}H-MRS is the most common spectroscopy method used and allows the measurement of neurometabolites associated with glutamatergic excitotoxicity (Glu, Gln, Glx) and neuroinflammation (mI, NAA, NAA+NAAG) (Figure 4).

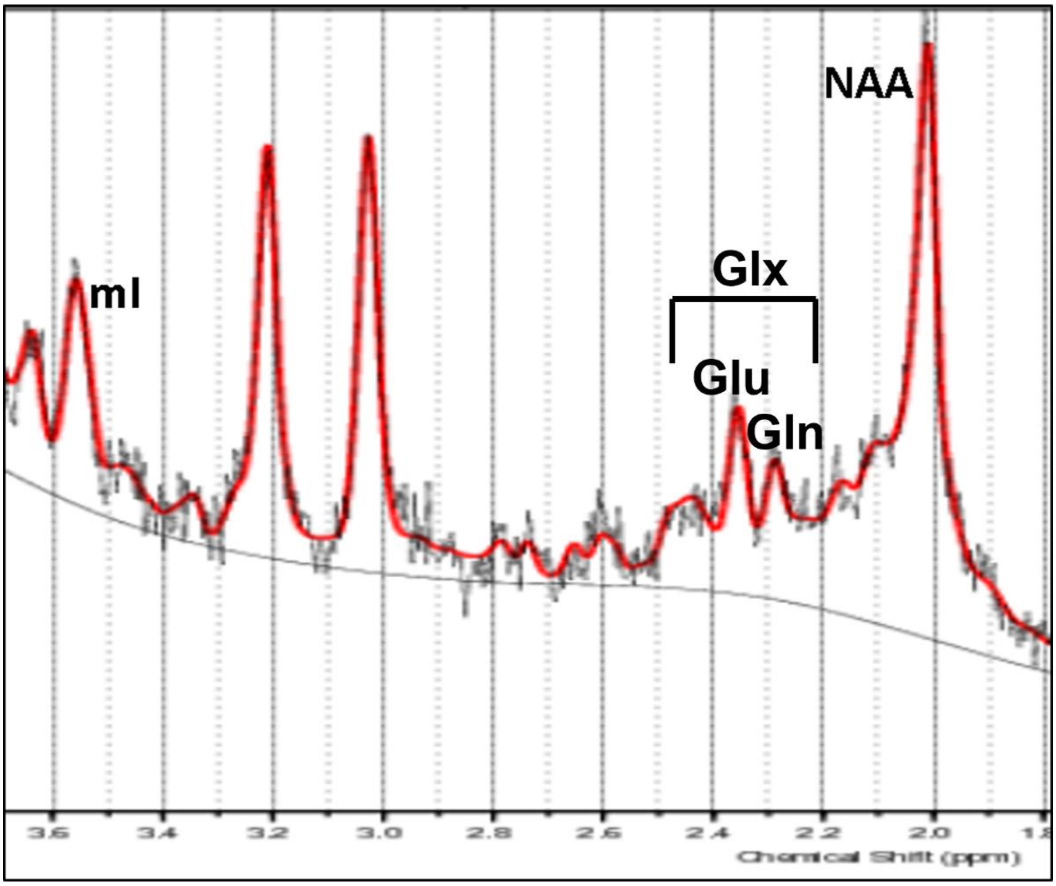


Figure 4 – Proton magnetic resonance spectroscopy (^{1}H-MRS) spectrum indicating the peaks for myo-inositol (mI), glutamate (Glu), glutamine (Gln), glutamate with glutamine (Glx) and n-acetyl-aspartate (NAA).

1.4.1 Glutamate

Glutamate (Glu) is an excitatory neurotransmitter and plays a critical role in brain function and brain metabolism [96]. Neurotransmitters are essential for the communication between neurons and are released from a presynaptic terminal into a synaptic cleft [97]. Neurotransmitters are bound to postsynaptic receptors which depolarises the neuron. This binding can cause metabolic changes within the brain. The level of glutamate in the synaptic cleft must be kept low to prevent excessive excitation that can injure and kill susceptible neurons. Rapid replacement of a glutamate released from a presynaptic terminal is another requirement of effective neurotransmission [98]. Glutamate is rapidly taken up into astrocytes, where it is converted to glutamine (Gln). Glutamine is released to neurons which then forms glutamate through mitochondrial glutaminase and is used for neurotransmission [97]. The astrocytic uptake of glutamate and release of glutamine, as well as the neuronal uptake of glutamine and release of glutamate is known as the glutamate-glutamine cycle [99]. Glutamate with glutamine (Glx) are closely linked in the glutamine-glutamate cycle of neurotransmission [100,101]. Excessive excitation of glutamate has been associated with neuronal injury and death [97].

The glutamate excitotoxicity hypothesis is one of the proposed underlying neurobiological factors of SCZ and MAP. No studies have investigated the neuroinflammatory processes in the thalamo-cortical circuitry in SCZ and MAP, although a recent study found evidence suggestive of neuroinflammation in MA abstinence [26] and needs further investigation.

Glutamatergic dysfunction is exerted through a different pathway in MA abuse. MA initiates its action through the dopaminergic system, specifically the nigrostriatal pathway, which consists of the direct (mesolimbic) and indirect (mesocortical) pathways [13]. Striatal dopaminergic cells receive input from the cortex [16] to express NMDAR during MA intoxication [102] resulting in excessive excitation of glutamate in the striatum [14] and prefrontal cortex [15], which reportedly result in psychotic symptoms [13,17]. (Table 2)

Table 1 – Proton magnetic resonance spectroscopy studies investigating glutamate in schizophrenia

Author	Psychiatric diagnosis	MRS acquisition method	Brain area/s investigated	Metabolite/s investigated	Method	Acute / Chronic	Changes found	Association with mood symptoms
Chen et al. 2017[56]	Schizophrenia	MEGA-PRESS	Left DLPFC, vmPFC, ACC	Glu, Gln, Glu:NAA+NAAG; Gln:NAA+NAAG,	SVS	Acute, medication-naive	Higher Glu and lower Gln in SCZ in vmPFC; Glu:NAA+NAAG and Gln:NAA+NAAG in vmPFC showed significant between-group differences	
Brandt et al. 2016[103]	Schizophrenia	STEAM	dorsal ACC	Glu	SVS with PVC	Chronic	Inverse correlation between Glu and age for patients, not controls; patients under 40 had higher Glu than controls; trend for lower Glu in patients over age 40 compared to controls	
Gallinat et al. 2016[104]	Schizophrenia	PRESS	ACC	Glu	SVS with PVC	Chronic	Lower ACC Glu in SCZ; significant relationship between ACC Glu and duration of illness	Negative correlation between CGI-S and Glu in ACC in SCZ
Mouchlianitis et al. 2016[105]	Schizophrenia - treatment resistant (TR) vs treatment responsive	PRESS	ACC	Glu:Cr, Glx:Cr	SVS with PVC	Chronic	11% higher Glx:Cr and Glx/Cr in TR group	
Bustillo et al. 2014[30]	Schizophrenia	PRESS	ACC	Gln	SVS with PVC	Chronic	Increased Gln in SCZ group, also with increasing age; Gln:Glu ratio increased in SCZ group and increased with age	Gln as well as Gln:Glu ratio positively correlated with positive symptoms
Coughlin et al. 2015[106]	Schizophrenia	PRESS	ACC, right DLPFC	Glx:Cr	SVS with VAPOR water suppression	Chronic	Disruption of positive correlation between NAA: Cr and Glx:Cr in DLPFC in patients with SCZ; decoupling of NAA and Glx in the	

							frontal cortex of patients with SCZ.	
Falkenberg et al. 2014[107]	Schizophrenia	PRESS	dorsal ACC	Glu:Cr	SVS with PVC	Chronic	Lower Glu in left ACC of SCZ patients	
Natsubori et al. 2013[108]	Ultra-high risk for psychosis (UHR), First episode psychosis (FEP), Chronic SCZ	STEAM	mPFC	Glx:Cr	SVS with PVC	UHR, FES, Chronic	Decreased Glx in chronic SCZ; In chronic SCZ - reduced NAA significantly correlated with reduced Glx	
Rowland et al. 2012[109]	Schizophrenia	PRESS	ACC	Glx:Cr	SVS with PVC	Chronic	Lower Glx:Cr in ACC in SCZ	
Reid et al. 2010[110]	Schizophrenia/Schizoaffective disorder	PRESS	dorsal ACC	Glx:Cr,	SVS with CHESS	Chronic	Dysfunctional NAA:Cr and Glx:Cr correlation	
Ongur et al. 2008[111]	Schizophrenia, bipolar disorder type 1	J-coupled PRESS	ACC, parieto-occipital cortex	Gln:Glu	SVS with PVC	Chronic	Trend for increased Gln:Glu in SCZ overall - not brain area specific	
Tayoshi et al. 2008[112]	Schizophrenia	STEAM	ACC, left basal ganglia	Glu	SVS with PVC	Chronic	Lower Glu in SCZ in ACC; Gln in ACC was higher in males in SCZ and CON; Glu in ACC	

							lower in SCZ males compared to CON males	
Theberge et al. 2003[58]	Schizophrenia	STEAM	ACC, left thalamus	Glu, Gln	SVS with PVC	Chronic	Lower Glu and Gln in ACC in SCZ and higher Gln in left Thal in SCZ	

MEGA-PRESS - MEshcher-Garwood Point RESolved Spectroscopy; STEAM - STimulated Echo Acquisition Mode; PRESS - Point RESolved Spectroscopy; J-coupled – scaled coupled; DLPFC – dorsolateral prefrontal cortex, vmPFC – ventromedial prefrontal cortex; ACC – anterior cingulate cortex; Glu – glutamate, Gln – glutamine; Glx – glutamate with glutamine; NAA – n-acetyl-aspartate; Cr – creatine; Cr+PCr – creatine with phosphocreatine; SVS – single voxel spectroscopy; PVC – partial volume correction; VAPOR – Variable Power radiofrequency pulses with Optimized Relaxation delays; CHESS – CHEmical Shift Selective saturation; SCZ – schizophrenia; CON – control group

Table 2 – Proton magnetic resonance spectroscopy studies investigating glutamate in methamphetamine psychosis

Author	**Psychiatric diagnosis**	**MRS acquisition method**	**Brain area/s investigated**	**Metabolite/s investigated**	**Method**	**Acute / Chronic**	**Changes found**	**Association with other variables**
Bakhshinezhad et al. 2021[54]	MA abuse	PRESS	ACC, DLPFC, basal ganglia	Glx:Cr	SVS	Chronic	Higher Glx:Cr in DLPFC in MA users	N/A
Su et al. 2020 (a)[113]	MA abuse	PRESS	Left DLPFC	Glx:NAA	SVS with PVC	Chronic	No Glx:NAA changes found.	N/A
Su et al. 2020 (b)[114]	MA abuse	PRESS	Left DLPFC	Glx	SVS with PVC	Chronic	No Glx changes found.	A negative correlation was seen between Glx and withdrawal (months)
Tang et al. 2018[115]	MA abstinence	PRESS	Bilateral inferior frontal cortex, insula	Glx	SVS with PVC	Acute abstinence	Lower Glx in right inferior cortex in MA users; Glx in left insula was higher in males.	Negative correlation between Glx in right insula and Beck Depression Inventory and State anxiety on the STAI Y1.
Burger et al. 2018[73]	MA abstinence	PRESS	ACC, DLPFC, FWM	Glu:Cr+PCr, Glx:Cr+PCr	CSI	Acute and short-term abstinence	No Glu or Glx changes were found.	No correlations found with drug use variables.

White et al.2018[57]	Healthy individuals	PRESS	Dorsal ACC	Glu	SVS with PVC	Healthy individuals	After administration of MA to healthy individuals, Glu in females was significantly higher.	
Wu et al. 2018[55]	MA abuse	PRESS	mPFC	Glu:Cr+PCr	SVS	Chronic	Higher Glx:Cr+PCr in MA users	No correlations found with drug use variables or anxiety scores.
O'Neill et al. 2015[116]	MA abuse	PRESS	Posterior cingulate, precuneus, bilateral inferior frontal cortex	Gln	SVS with PVC	Acute	Lower Glx in meth group in posterior cingulate, precuneus and right inferior frontal cortex; Glx in posterior cingulate was negatively correlated with years of meth abuse	Beck Depression Inventory negatively correlated with Glx in right inferior cortex
Crocker et al. 2014[117]	FEP, MA abuse, MAP	STEAM	mPFC	Glu	SVS with PVC	Acute	Lower Glu in MA abuse group compared to FEP and CON; failed Glu:NAA relationship in FEP and MA	Meth group had higher PANSS scores than CON, but lower than FEP - in line with mild illness in SCZ
Howells et al. 2014[118]	MA abuse, MA abstinence, MAP	PRESS	ACC, DLPFC, FWM	Glu:Cr+PCr, Glx:Cr+PCr	CSI	Short-term to long-term	No change in Glu or Glx concentrations were found in any of the groups.	No correlations were found between PANSS scores or drug use variables.

Sung et al. 2013[119]	MA abuse	PRESS	Midfrontal gray matter	Glx:Cr+PCr	SVS	Short-term to long-term	No change in Glx concentrations were found.	N/A
Ernst & Chang 2008[120]	MA abstinence	PRESS	ACC, FWM, basal ganglia	Glx	SVS with PVC	Short-term to long-term	Lower ACC Glx in short-term abstinence; Duration of abstinence positively correlated with Glx in ACC and FWM, with a negative correlation with long-term abstinence; Negative relationship between craving symptoms and ACC Glx	N/A

MA – methamphetamine; MAP – methamphetamine psychosis; Point RESolved Spectroscopy; STEAM - STimulated Echo Acquisition Mode; PRESS - Point RESolved Spectroscopy; DLPFC – dorsolateral prefrontal cortex, mPFC – medial prefrontal cortex; ACC – anterior cingulate cortex; FWM – frontal white matter; Glu – glutamate, Gln – glutamine; Glx – glutamate with glutamine; NAA – n-acetyl-aspartate; Cr – creatine; Cr+PCr – creatine with phosphocreatine; SVS – single voxel spectroscopy; PVC – partial volume correction; VAPOR – Variable Power radiofrequency pulses with Optimized Relaxation delays; CON – control group; FEP – first episode psychosis; STAI Y1 – Spielberger State-Trait Anxiety Inventory

1.4.2 *Myo*-inositol

Myo-inositol (mI) has been determined to act as a marker of glial cells, with an increase in glial cell number suggesting neuroinflammation [72]. mI is synthesised primarily in glial cells and found in higher concentrations in glial cells [121] than in neurons [122]. It plays an important role in osmoregulatory functioning of glial cells [123,124]. Higher concentrations of mI in the brain has been associated with glial proliferation [121] or an increase in glial cell size [125], both of which are suggestive of neuroinflammation [72,126]. mI is also present in cell membrane and myelin sheath structures, with increased membrane turnover or damage to myelin sheath structures reported to result in higher concentrations of mI [127]. Glial dysfunction, and subsequent increase in mI concentration, has been strongly implicated in the pathophysiology of schizophrenia [128,129] as well as several neuroinflammatory disorders such as multiple sclerosis and human immunodeficiency virus [72].

Post-mortem studies in SCZ associated increased microglial density with acute psychosis [128,129]. One study using ^{1}H-MRS in acutely-ill patients with SCZ reported higher concentrations of mI in the thalamus and left parietal white matter [130], with another study reporting lower mI concentrations in the anterior cingulate cortex in patients with SCZ [112]. Significantly lower mI concentration could indicate damage to myelin sheath structures and even cell death [131]. Three studies report no mI changes in the thalamus, prefrontal cortex and hippocampus [132], left frontal and temporal lobes and thalamus [133], and left ACC and left thalamus [58] (Table 3). The evidence suggestive of neuroinflammation due to microglial activation in the thalamus, and subsequent PFC brain areas, is consistent with the hypothesis that neuroinflammation causes disruption of the thalamo-cortical circuitry in SCZ. The effect of antipsychotic medication as well as different brain areas investigated could account for the discrepancy in results observed. There is, however, a need for understanding the effect of neuroinflammation, through mI, on the brain of patients with SCZ.

Three studies report on mI concentration changes in MA abstinence. all three studies report higher mI concentration in the ACC in MA abstinence (acute to long-term abstinence) [27,28,73]. This could possibly indicate that the ACC-thalamus circuit in the thalamo-cortical circuitry is disrupted. The specific location of initial disruption, however cannot be accurately reported, as the brain areas proposed to be disrupted in

MA abuse [74,76] were not included in the present study. Lower mI in left FWM was reported in short-term abstinence [73], contradicting the current hypothesis, while higher mI in FWM was reported in long-term abstinence [28] as with the studies reporting higher mI in the ACC in MA abstinence [27,28,73].

Table 3 – Proton magnetic resonance spectroscopy studies investigating myo-inositol in schizophrenia

Author	**Psychiatric diagnosis**	**MRS sequence**	**Brain area/s investigated**	**measurement reported**	**Method**	**Acute / Chronic**	**Changes found in relevant thalamocortical circuitry?**	**Clinical scale correlates**
Chiappelli et al. 2015[21]	Schizophrenia	STEAM	medial prefrontal ACC	mI	SVS with PVC	Chronic	Lower mI in patients with depressive mood symptoms; age was positively correlated with mI levels	mI was inversely correlated with MTSD trait and state depression scores; mood stabiliser medication was associated with lower mI
Ongur et al. 2008[111]	Schizophrenia, bipolar disorder type 1	J-coupled PRESS	ACC, parieto-occipital cortex	mI	SVS with PVC	Chronic	No mI changes reported.	
Tayoshi et al. 2008[112]	Schizophrenia	STEAM	ACC, left basal ganglia	mI	SVS with PVC	Chronic	Lower mI in SCZ in ACC; mI in ACC all lower in SCZ males compared to CON males	
Theberge et al. 2003[58]	Schizophrenia	STEAM	ACC, left thalamus	mI	SVS with PVC	Chronic	Positive correlation between mI and age in CON in left Thal.	
Auer et al. 2001[130]	Schizophrenia	PRESS	Thalamus, parietal white matter	mI	SVS with PVC	Chronic	Trend for increased mI in Thal in SCZ; Increased mI in white matter in SCZ.	

MEGA-PRESS (MEshcher-Garwood Point RESolved Spectroscopy) is often used to measure glutamate, glutamine and GABA through modification of the echo time between RF pulses via scalar coupling. STEAM (STimulated Echo Acquisition Mode) signal is obtained from protons that have reacted to three 90°

applied concurrently with three orthogonal gradients. PRESS (Point RESolved Spectroscopy) is the dominant method used for ^{1}H-MRS and is a multi- echo technique to obtain spectral data. ACC – anterior cingulate cortex; MTSD – Maryland Trait and State Depression scale; PVC – partial volume correction; SVS – single voxel spectroscopy.

Table 4 – Proton magnetic resonance spectroscopy studies *investigating* myo-inositol in methamphetamine dependence / abstinence

Author	**Psychiatric diagnosis**	**MRS sequence**	**Brain area/s investigated**	**Metabolite/s investigated**	**Method**	**Acute / Chronic**	**Changes found**	**Clinical scale correlates**
Burger et al. 2018[73]	MA abstinence	PRESS	ACC, DLPFC, FWM	mI:Cr+PCr	CSI	Acute and short-term	Higher mI in right ACC, Over time: increased mI in right ACC; decreased mI in left FWM	
Sung et al. 2007[28]	MA abstinence	PRESS	FWM, midfrontal gray matter	mI	SVS with PVC	Short-term to long-term	Higher mI in meth group in both areas	
Ernst et al. 2000[27]	MA abstinence	PRESS	Midfrontal gray matter, right FWM, basal ganglia	mI	SVS with PVC	Short-term	Higher mI in ACC	

PRESS (Point RESolved Spectroscopy) is the dominant method used for ^{1}H-MRS and is a multi-echo technique to obtain spectral data. ACC – anterior cingulate cortex; CSI – chemical shift imaging; DLPFC – dorsolateral prefrontal cortex; FWM – frontal white matter; PVC – partial volume correction; SVS – single voxel spectroscopy.

1.4.3 N-acetyl-aspartate

N-acetyl-aspartate (NAA) is the second most abundant amino acid [106] and one of the most concentrated molecules in the human brain, which makes it one of the most reliable markers for neuronal health or integrity [134]. The NAA peak as measured by ^{1}H-MRS consists of NAA, smaller contributions of other acetylated compounds [134]. NAA is synthesized in neuronal mitochondria and is then either used for synthesis of *n*-acetyl-aspartyl-glutamate (NAAG), which is important in the modulation of neurotransmitter release, in neurons or transported to oligodendrocytes for myelination and energy production [134].

NAA is very sensitive to injury and disease [134], suggesting that changes in NAA concentrations may provide insight to disease progression in SCZ and MAP. A strong correlation between NAA and neuronal health has been reported [134], and decreased concentration of NAA has been associated with lower mitochondrial energy production and neuronal loss [135,136]. Decreased concentration of NAA has subsequently been associated with compromised neuronal metabolism [134–136], as well as decreased neuronal density [27]. When lower NAA is found in combination with increased mI, it is also regarded as a marker of proposed neuroinflammation [72]. Lower NAA in the ACC [30,109,111,137–141], the medial prefrontal cortex [108], the dorsolateral prefrontal cortex [106,110], and the thalamus [130,142,143] has been reported in long-term disease progression of SCZ (Table 5). These findings are consisted with the hypothesis of neuroinflammation resulting in disruption of the thalamo-cortical circuit in SCZ.

In MA abstinence, acute to long-term, lower NAA is consistently reported in the DLPFC, ACC and FWM (Burger et al., 2018; Ernst et al., 2000; Nordahl et al., 2002, 2005; Salo et al., 2007). One study investigated NAA changes in MAP and MA abstinence (acute to long-term) and report lower NAA in the right ACC and right DLPFC in both groups when compared to control group [118]. This is supportive of the current hypothesis that, in the MAP group, lower NAA is associated with neuroinflammation, resulting in disruption of the thalamo-cortical circuit. Lower NAA appears to be synonymous with SCZ as well as MA abstinence and MAP, with several relationships with symptomology, duration of illness, duration of MA use, as well as duration of abstinence from MA being apparent (Table 6).

Several relationships with the Positive and Negative Syndrome Scale (PANSS), a scale to measure symptom severity in SCZ [4], were observed in previous ^{1}H-MRS studies. NAA in the right rostral ACC also showed a negative correlation with the PANSS negative symptom scale [140]. Another study found a negative correlation between NAA:Cho in the ACC and blunted affect (N1) on the negative symptom scale of the PANSS [137]. Several significant correlations were found between NAA concentrations and drug use variables. Negative relationships were found between NAA in FWM [27] and left ACC [118] and duration of methamphetamine use. The age of initial methamphetamine use showed a positive relationship with NAA+NAAG in the right ACC and a negative relationship with NAA in left FWM in participants with MAP [118]. NAA in frontal gray matter and FWM negatively correlated with cumulative methamphetamine dose [28]. Duration of abstinence negatively correlated with NAA and NAA+NAAG in bilateral ACC and NAA+NAAG in left DLPFC [118], and NAA in frontal gray matter [28]. These relationships illustrate the symptom severity and effects due to thalamo-cortical circuit dysfunction as a result of neuroinflammation in MA abuse / psychosis, specifically in the ACC-thalamus circuit.

The higher mI and lower NAA reported in SCZ, and MA abuse are consistent with the hypothesis of neuroinflammation and subsequent thalamo-cortical circuit dysfunction. It is hypothesised that MA abuse serves as a reliable proxy for MAP, and that the neuroinflammation and thalamo-cortical circuit dysfunction identified in MA abuse will be observed in MAP. Investigating neurometabolite markers of inflammation together with peripheral markers of inflammation could provide further valuable insight into understanding neuroinflammation and thalamo-cortical circuit dysfunction in both SCZ and MAP.

Table 5 – Proton magnetic resonance spectroscopy studies that investigated *n*-acetyl-aspartate in schizophrenia

Author	**Psychiatric diagnosis**	**MRS sequence**	**Brain area/s investigated**	**Metabolite/s investigated**	**Method**	**Acute / Chronic**	**Changes found**	**Clinical scale correlates**
Bustillo et al. 2014[30]	Schizophrenia	PRESS	ACC; Voxel size: 20x20x30mm	NAA	SVS with PVC	Chronic	NAA was lower in SCZ group	
Natsubori et al. 2013[108]	Ultra-high risk for psychosis (UHR), First episode psychosis (FEP), chronic SCZ	STEAM	mPFC: Voxel size	NAA, Glx	SVS with PVC	UHR, FES, Chronic	Decreased NAA in Chronic SCZ	
Rowland et al. 2013[109]	Schizophrenia	MEGA-PRESS	ACC, centrum semiovale (CS)	NAAG	SVS with PVC	Chronic	In CS - NAAG decreased in SCZ while increased in CON; Younger SCZ group had higher NAAG than younger CON group	Greater negative symptom severity associated with higher NAAG in CS but not ACC
Hardy et al. 2011[147]	Schizophrenia	PRESS	ACC	NAA	CSI with PVC	Chronic	Lower mean NAA in rostral ACC in SCZ	
Jessen et al. 2011[138]	Schizophrenia	PRESS	ACC, left frontal lobe; voxel size ACC	NAA, NAAG	SVS with PVC	Chronic	Increased NAAG/NAA and trend for NAAG increase in ACC; decreased NAA in ACC; No metabolite group differences in frontal lobe	In frontal lobe, NAAG correlated inversely with PANSS negative scale and PANSS total score

Reid et al. 2010[110]	Schizophrenia/Schizoaffective disorder	PRESS	dorsal ACC	NAA/Cr	SVS with CHESS	Chronic	Trend for decreased NAA/Cr in SCZ	
Browne et al. 2008[142]	Schizophrenia	PRESS	Thalamus	NAA	SVS with PVC	Chronic	Markedly lower NAA in SCZ than CON	
Ongur et al. 2008[111]	Schizophrenia, bipolar disorder type 1	J-coupled PRESS	ACC, parieto-occipital cortex	NAA	SVS with PVC	Chronic	Significantly lower NAA in ACC in SCZ	
Tayoshi et al. 2008[112]	Schizophrenia	STEAM	ACC, left basal ganglia	NAA	SVS with PVC	Chronic	Lower NAA in SCZ males compared to CON males; NAA in left basal ganglia lower in males than females in SCZ	
Crespo et al. 2007[139]	Schizophrenia, bipolar disorder type 1	PRESS	ACC	NAA:Cr, NAA:Cho	SVS with PVC	Chronic	SCZ patients had lower NAA:Cho than controls	
Wood et al. 2007[140]	Schizophrenia	PRESS	dorsal ACC, rostral ACC	NAA	SVS with PVC only if correlation was greater than 0,2	Chronic	Lower NAA in bilateral voxels of both regions in SCZ	Positive correlations on PANSS between right dorsal NAA and Activation factor, and right rostral NAA and negative syndrome factor.
Theberge et al. 2003[58]	Schizophrenia	STEAM	ACC, left thalamus	NAA	SVS with PVC	Chronic	Negative correlation between NAA in	

							left Thal and duration of illness.	
Yamasue et al. 2002[137]	Schizophrenia	PRESS	ACC; voxel size	NAA:Cr, NAA:Cho	SVS with PVC	Chronic	Lower NAA:Cho in SCZ	Negative correlation between NAA:Cho and blunted affect (N1) score on PANSS
Auer et al. 2001[130]	Schizophrenia	PRESS	Thalamus, parietal white matter	NAA, NAA:Cho, NAA:Cr	SVS with PVC	Chronic	Lower NAA, NAA:Cho and NAA:Cr in SCZ	
Deicken et al. 2000[143]	Schizophrenia	PRESS	Bilateral mediodorsal thalamus	NAA, NAA:Cr	SVS	Chronic	Lower NAA and NAA:Cr in both left and right Thal	
Delamillieure et al. 2000[148]	Schizophrenia	STEAM	Bilateral thalamus	NAA:Cr	SVS	Chronic	Negative correlation with age and NAA:Cr in SCZ	
Deicken et al. 1997[141]	Schizophrenia	PRESS	ACC	NAA/Cho, NAA/Cr	SVS	Chronic	Lower NAA concentration in patients with SCZ	

MEGA-PRESS (MEshcher-Garwood Point RESolved Spectroscopy) is often used to measure glutamate, glutamine and GABA through modification of the echo time between RF pulses via scalar coupling. STEAM (STimulated Echo Acquisition Mode) signal is obtained from protons that have reacted to three 90° applied concurrently with three orthogonal gradients. PRESS (Point RESolved Spectroscopy) is the dominant method used for ^{1}H-MRS and is a multi echo technique to obtain spectral data. J-coupled PRESS another scalar coupling technique that uses interactions between neuclei and electrons to determine spectral data. Cho – choline; Cr – creatine; CS – centrum semiovale; CSI – chemical shift imaging; mPFC – medial prefrontal cortex; NAA – n-acetyl-aspartate; PVC – partial volume correction; SVS – single voxel spectroscopy.

Table 6 – Proton magnetic resonance spectroscopy studies investigating *n*-acetyl-aspartate in methamphetamine abuse / psychosis

Author	**Psychiatric diagnosis**	**MRS sequence**	**Brain area/s investigated**	**Metabolite/s investigated**	**Method**	**Acute / Chronic**	**Changes found**	**Clinical scale correlates**
Burger et al. 2018[73]	Methamphetamine abstinence	PRESS	ACC, DLPFC, FWM	NAA:Cr+PCr, NAA+NAAG:Cr+PCr	CSI	Acute and short-term	Lower NAA and NAA+NAAG in left DLPFC in acute abstinence; Lower NAA+NAAG in right ACC, lower NAA and NAA+NAAG in left DLPFC; Over time: lower NAA and NAA+NAAG in right ACC, lower NAA and NAA+NAAG in right FWM	
Crocker et al. 2014[117]	First episode psychosis (FEP), Methamphetamine addiction (MA), Methamphetamine-induced psychosis	STEAM	mPFC; ; voxel size	NAA	SVS with PVC	Acute	Lower NAA in MA group compared to FEP and CON	Meth group had higher PANSS scores than CON, but lower than FEP - in line with mild illness in SCZ

Howells et al. 2014[118]	Methamphetamine addiction, methamphetamine-induced psychosis	PRESS	ACC, DLPFC, FWM	NAA:Cr+PCr, NAA+NAAG:Cr+PCr	CSI	Acute to medium-term	Lower NAA and NAA+NAAG in right ACC and DLPFC in MAP and MA dependent group compared to CON; MA dependent group: duration of abstinence negatively correlated with NAA and NAA+NAAG in bilateral ACC; and left DLPFC NAA+NAAG.	
Salo et al. 2011[149]	Methamphetamine abstinence	PRESS	ACC, primary visual cortex	NAA:Cr	SVS with PVC	Short-term to long-term	Lower NAA:Cr in ACC in short-term abstinence	
Salo et al. 2007[144]	Methamphetamine abstinence	PRESS	ACC, primary visual cortex	NAA:Cr	SVS with PVC	Long-term	Lower NAA:Cr in ACC of meth users	
Nordahl et al. 2005[146]	Methamphetamine abstinence	PRESS	ACC	NAA:Cr	SVS with PVC	Short-term to long-term	Lower NAA:Cr in ACC regardless of duration of abstinence	

Nordahl et al. 2002[145]	Methamphetamine abstinence	PRESS	ACC, visual cortex, dorsolateral prefrontal white matter, ventrolateral prefrontal white matter;	NAA:Cr	SVS	Short-term	Lower NAA:Cr in ACC; Ventrolateral prefrontal white matter showed negative correlation between age and NAA:Cr	
Ernst et al. 2000[27]	Methamphetamine abstinence	PRESS	Midfrontal gray matter, right FWM, basal ganglia	NAA	SVS with PVC	Short-term	Lower NAA in basal ganglia and FWM; FWM NAA correlated negatively with lifetime meth use	

STEAM (STimulated Echo Acquisition Mode) signal is obtained from protons that have reacted to three 90° applied concurrently with three orthogonal gradients. PRESS (Point RESolved Spectroscopy) is the dominant method used for ^{1}H-MRS and is a multi-echo technique to obtain spectral data. ACC – anterior cingulate cortex; Cr – creatine; Cr+PCr – creatine with phosphocreatine; FWM ; frontal white matter; mPFC – medial prefrontal cortex; NAA – n-acetyl-aspartate; NAA+NAAG – n-acetyl aspartate with n-acetyl-aspartylglutamate; PVC – partial volume correction; SVS – single voxel spectroscopy

1.5 Peripheral immune markers in schizophrenia (SCZ) and methamphetamine-induced psychotic disorder (MAP)

Peripheral immune markers can be measured through determination of cytokine levels. Increased cytokine expression as a result of microglial activation, specifically interleukin 1-beta (IL-1β), tumour necrosis factor-alpha (TNF-α), interferon-gamma (IFN-ɣ), interleukin 8 (IL-8) and decreased concentrations of interleukin 10 (IL-10) has been found in the blood, cerebral spinal fluid (CSF) and brain tissue in preclinical and post-mortem human studies of SCZ [82,83,150] indicating neuroinflammation. Cytokines from the periphery enter the brain through the choroid plexus where the blood brain barrier is permeable due to inflammation [81]. In the brain, cytokines bind to receptors on glial cells and neurons [81,151], and can have profound effects on neuronal activity and neurotransmission in the brain [81]. Cytokines are divided into two groups – pro-inflammatory and anti-inflammatory cytokines. Pro-inflammatory cytokines, i.e., IL-1β, IL-8, TNF-α, IFN-ɣ, are involved in the upregulation reactions of inflammatory responses and are produced by activated macrophages (Zhang & An, 2007). Anti-inflammatory cytokines, i.e. IL-10, on the other hand, consist of immunoregulatory molecules and counteract or control the pro-inflammatory response (Zhang & An, 2007).

Cytokines have been proposed to be involved during psychotic states as IL-1β , TNF-α, IFN-ɣ, IL-8 and IL-10 are all reported to be elevated during acute psychosis [81]. IL-1β however is reported to return to normal concentrations outside of psychotic state, whereas TNF-α, IFN-ɣ, IL-8 remain elevated even in remission [82]. It is proposed that IL-1β, TNF-α, IFN-ɣ can therefore reflect neuroinflammation, and subsequent disruption in thalamo-cortical circuitry.

1.5.1 Tumour Necrosis Factor alpha (TNF-α)

Increased TNF-α, a pro-inflammatory cytokine (Clark, 2007), concentration is a result of activated microglia [80,153] and has both homeostatic and pathophysiological roles [154,155]. TNF-α exerts regulatory function on vital physiological processes in the healthy central nervous system [156]. During pathological states, large amounts of TNF-α is released by astrocytes and microglia, resulting in a neuroinflammatory response [154,157].

Its two soluble receptors, sTNFR1 and sTNFR2, are reported to be increased in plasma and serum, making TNF-α a marker for inflammation [153].

TNF-α is very prominent in SCZ as it contributes to the progression of the inflammatory response and is reported to be elevated in psychotic and remission states of SCZ [82,150]. The involvement of microglia in the excitotoxicity of MA is widely known [158,159] with persistent microglial activation still present after long-term abstinence from MA [28,160]. A single high dose of MA has been shown to increase TNF-α in the brain in animal models.

Increased concentrations of TNF-α also compromise oligodendrocytes, a type of glial cell associated with myelin production [161,162]. Compromised myelin production has been associated with FWM dysfunction in MA abuse [26–28] and lower mI concentrations [131] reported in some SCZ studies [32,112]. Another important role player in the myelination of axons of neurons is NAA, which is also found in oligodendrocytes [163]. Inflammation caused by activated microglia may be involved in the disease progression of SCZ through damaging of oligodendrocytes and subsequent decrease in NAA [164].

The majority of studies investigating TNF-α in SCZ report an increase of TNF-α in SCZ [165–169], however, there are studies that report a decrease of TNF-α in SCZ [170–172]. Studies investigating TNF-α levels as a result of microglial activation after MA administration are limited to preclinical studies [158,159,173–175].

1.5.2 Interferon-gamma (IFN-ɣ)

Interferon-gamma (IFN-ɣ) is a pro-inflammatory cytokine and has been reported to be increased in SCZ, specifically in acute psychosis [150] Interferon-gamma (IFN-ɣ) and has been recognised as the primary mediator of innate as well as adaptive immunity by activating macrophages [176]. IFN-ɣ is activated under pathological conditions and promotes cytotoxic activity [177]. Bioactivity of IFN-ɣ is a prerequisite in inflammatory states [178] and has been reported to activate major histocompatibility complex class II molecules in the brain [179]. MHC class II molecules are expressed by microglia and astrocytes and are critical for initiation of the immune response to a pathogen [179].

Downregulated IFN-ɣ, an indication of decreased neuronal expression and dendritic cell marker loss has been reported in chronic SCZ [180]. Decreased neuronal expression through neuroinflammation, resulting in decreased neuronal integrity and viability, can be associated with lower NAA concentrations reported in the DLPFC, ACC, thalamus and FWM in both SCZ and MA abuse.

1.5.3 Interleukin 1-beta (IL-1β)

IL-1β has various potentiating effects on cell proliferation, cell differentiation and function of the innate immune response [177]. IL-1β initiates and heightens immune and inflammatory responses, and subsequently mediates inflammatory disease states [177].

Interleukin 1-beta (IL-1β) is a powerful pro-inflammatory cytokine that is significantly increased in SCZ [150]. Increased IL-1β, together with increased TNF-α, both associated with inflammation as well as neuroinflammation, have been reported in patients with SCZ in acute relapse (Wang et al., 2014). The combined increase in these two cytokines have also been associated with negative symptoms in SCZ [182]. Significantly overexpressed IL-1β, an indication of inflammation, has been reported in patients with chronic SCZ [183,184], while upregulated IL-1β expression has also been associated with methamphetamine-induced neurotoxicity [185]. Negative symptoms on the PANSS have also shown a positive relationship with NAA in the ACC in SCZ and MA abuse [137,138,140].

1.5.4 Interleukin 8 (IL-8)

IL-8 is a mediator of inflammation [186] and induced by TNF-α, bacteria, viral products, cellular stress, and stimulatory agents [187]. Increased IL- 8 has been reported in SCZ [166,188,189], MA abuse [190], and MA exposure [191–194]. One preclinical study reported an association between higher IL-8 concentrations and higher N-methyl-d-aspartate (NMDA), which could be an indication of increased Glu as NMDA mediates the regulation of Glu in the glutamate-glutamine cycle [195]. Studies of IL-8 in SCZ and MA exposure are limited to analysis of blood in humans and preclinical studies. Current understanding of the influence of IL-8 on SCZ and MAP is limited and no definite associations with neurometabolites can be made.

1.5.5 Interleukin 10 (IL-10)

IL-10 is considered to be the hallmark marker for adaptive immunity and is activated in response to a specific pathogen [196]. It has been suggested to inhibit expression of pro-inflammatory cytokines and acts as an anti-inflammatory mediator [197], as well as an important modulator of inflammatory response in the central nervous system [198]. IL-10 is, subsequently considered to be upregulated in its role in adaptive immunity, promoting survival of neurons and glial cells by blocking the effects of proapoptotic cytokines and promoting signals for cell survival [198]. IL-10 has been implicated in SCZ as well as in the severity of psychosis in general [180]. A recent post-mortem study has reported significantly decreased IL-10 in the prefrontal cortex of patients with chronic SCZ [199,200]. IL-10 concentrations have also been reported to decrease after exposure to MA in preclinical studies [173,201]. Results from previous work are limited to post-mortem and preclinical studies. A decrease of IL-10 as well as an inverse correlation with the negative and cognitive sections of the PANSS, have been reported in acute psychosis [202]. Decreased IL-10 indicates an inability to suppress pro-inflammatory cytokine synthesis, thereby promoting inflammation by TNF-α, IFN-ɣ and IL-1β.

There are indications of associations between cytokines and neurometabolites, suggestive of neuroinflammation, in SCZ and MA abuse. Research into cytokines in these two disorders are few and have not been associated with ^{1}H-MRS in living humans. The hypothesised associations in SCZ and MAP remain speculative as research is limited to preclinical studies in SCZ, and MA abuse.

1.6 Aims

This study had two primary aims. First, to firstly assess thalamo-cortical dysfunction through neuro-excitotoxicity and neuroinflammation by measuring glutamatergic (Glu, Gln, Glx) and neuroinflammatory (mI, NAA, NAA+NAAG) metabolites in SCZ and MAP. The first hypothesis of this aim was that higher concentrations of Glu would be found in the ACC, DLPFC and FWM in the SCZ group, compared to healthy controls. The second hypothesis was that higher mI concentrations, with lower NAA concentrations, would be found in the ACC and left thalamus of the MAP group, compared to healthy controls. Secondly, this study aimed to investigate associations between glutamatergic metabolites, neuroinflammatory metabolites, and peripheral cytokine levels in both disorders to determine whether neuro-excitotoxicity, neuroinflammation, or both conditions are affecting the thalamo-cortical circuitry of SCZ and MAP. It was hypothesised that associations between neurometabolites and peripheral cytokines would differ between the two groups, with the SCZ group showing associations between glutamatergic metabolites and peripheral cytokines and the MAP group showing associations between neuroinflammatory metabolites and peripheral cytokines. The methods used to obtain the data for analyses will be discussed in the next chapter.

Chapter 2 - Methodology

2.1 Research design and ethical considerations

2.1.1 Research design

This study followed a cross-sectional design with three participant groups – participants with a diagnosis of schizophrenia (SCZ), participants with a diagnosis of methamphetamine-induced psychotic disorder (MAP), and a socio-demographic matched control group (CON). Participation in the study took place over two separate mornings no more than 10 calendar days apart. The first day of participation comprised of blood draw for cytokine analysis, confirmation of diagnosis and completion of quantitative clinical scales. The second day of participation included a magnetic resonance imaging (MRI) brain scan as well as completion of quantitative subjective questionnaires on the day of scanning. Participants were reimbursed for transport, and as participants were requested to not eat breakfast on the two days of participation. Snack packs were provided after completion of the blood draw on the first day and after completion of the brain imaging morning.

2.1.2 Ethical approval

The study was approved by the Human Research Ethics Committee, Faculty of Health Sciences of the University of Cape Town – HREC Reference Number: 062/2017. This study formed part of an umbrella project titled Modelling neuroinflammation in schizophrenia: A magnetic resonance imaging, electroencephalography, and cytokine study – HREC Reference Number: 413/2016. Hospital clearances for Groote Schuur Hospital and Valkenberg Hospital were obtained and renewed yearly. This study was conducted in accordance with the Declaration of Helsinki [203].

2.1.3 Consent

On the first day of participation, all participants were required to complete an informed consent, which described all the study procedures in easily understandable language. All procedures were also explained to each participant by the researcher conducting the informed consent, and participants were able to ask questions if anything was unclear. Through providing consent, participants confirmed their voluntary agreement to participate in this study. (Refer to Appendix A)

2.1.4 Risk to participants

There was minimal risk to participants. Each participant received a study code which was used instead of their names, to ensure de-identification. Only the blood draw posed a slight risk to participants, but all care was taken to ensure that participants were at minimal risk and clinicians performed blood draw. All participants were carefully screened during the consent process prior to undergoing brain imaging to ensure the safety of the participants. It was ensured that patients did not experience claustrophobia or had any foreign material in their bodies which could interact with the magnetism of the MRI, including medical implants or aesthetics. In addition, on the day of brain imaging, the Cape Universities Body Imaging Center (CUBIC) safety screening checklist was conducted, overseen by MRI radiographer. Clinical referral was available if needed, including any clinical concern which surfaced with participation in the current study, e.g., mental distress or incidental findings.

2.2 Recruitment

2.2.1 Participant identification and recruitment

The aim of the study was to recruit 105 participants between the ages of 20 and 50. Thirty-five (35) participants with a diagnosis of schizophrenia, 35 with a diagnosis of methamphetamine-induced psychosis and 35 healthy control participants appropriately matched for age, years of education and race. The number of participants recruited exceeded the aim to a total of 116 participants, and 44 participants with a diagnosis of schizophrenia, 34 with a diagnosis of methamphetamine-induced psychosis, and 38 healthy control participants appropriately matched for age, years of education and race. The clinical participants were recruited from Valkenberg Hospital and Groote Schuur Hospital catchment areas and were stable outpatients. Patient records, with diagnoses matching that of schizophrenia or methamphetamine-induced psychosis were drawn from these central hospitals, and then screened for eligibility against the criteria stipulated in the study research protocol. Potential suitable participants were telephonically contacted and invited to come for the first day of the study, all measures and procedures were explained during the telephonic conversation. Healthy controls were recruited from the same catchment area as the schizophrenia and methamphetamine-induced groups. Recruitment was done through local advertisements. Healthy controls were appropriately matched for age and race. It was aimed to match healthy controls and the patient groups by sex; however, this was not entirely possible. (Appendix A).

2.2.2 Inclusion and exclusion criteria

2.2.2.1 General inclusion and exclusion criteria

Participants were excluded during screening for chronic medical illnesses known to affect metabolic processes (e.g., hyper/hypo thyroidism, diabetes type I or II, etc.), illnesses where the immune system is dysfunctional or compromised (e.g., HIV, lupus). Major brain trauma, brain injury, or brain surgery which resulted in hospitalisation or loss of consciousness also resulted in exclusion from study participation. If a participant presented clinically during diagnostic interview with intellectual disability, the individual was also excluded from the study. These criteria were applicable to all participants. Additionally, female participants were excluded if there was current or recent pregnancy, or if they were breastfeeding.

Additional screening for MRI brain imaging for all participants included ensuring that participants were not claustrophobic or had any form of foreign material in their bodies which could interfere with the MRI scanning process. Foreign materials included any metal implants or bullet fragments, medical device implants, excessive upper body tattooing or body piercings.

2.2.2.2 Inclusion and exclusion criteria pertaining to patients with schizophrenia

Exclusion criteria that specifically pertained to the participant group with a diagnosis of schizophrenia included the presentation of psychosis due to a medical condition or substance use/abuse. If participants with a diagnosis of schizophrenia presented with a diagnosis of other psychosis related to a mood component, e.g., schizoaffective disorder, bipolar disorder type I, major depressive disorder, psychosis not otherwise specified, etc., they were excluded from the study. Participants with schizophrenia who had past or current use of methamphetamine were included ensuring the use did not coincide with development or presentation of psychotic episode. Dependence or abuse of drugs other than nicotine, alcohol or cannabis resulted in exclusion from the study.

2.2.2.3 Inclusion and exclusion criteria pertaining to patients with methamphetamine- induced psychosis

Methamphetamine-induced psychotic disorder was confirmed as diagnosis when the first and all further psychotic episodes corresponded with methamphetamine use. Participants were excluded if there was a known familial history of schizophrenia or potential psychosis related illness. Participants with a diagnosis of methamphetamine-induced psychotic disorder were excluded if they presented with past or current dependence or excessive abuse of drugs other than methamphetamine, nicotine, alcohol, or cannabis. In cases where the initial diagnosis was due to substance abuse other than methamphetamine, the participant was excluded.

2.2.2.4 Inclusion and exclusion criteria pertaining to control participants

If control participants met the criteria for an Axis 1 disorder as per the Diagnostic and Statistical Manual IV – Text Revision (DSM-IV-TR) Structured Clinical Interview For DSM-IV-TR Axis I Disorders (SCID) Non-Patient edition, it resulted in exclusion from participation in the study. A known or suspected family history of psychotic illness also resulted in exclusion from the research study. Past or current dependence or excessive abuse of drugs other nicotine, alcohol or cannabis resulted in exclusion from the study.

2.3 Diagnostic confirmation

The Structured Clinical Interview for DSM-IV TR Axis I Disorders (DSM-IV TR SCID) Patient and Non-patient Editions of January 2007 (First et al. 2007) were conducted by persons trained and experienced in the administration of the SCID for research purposes on the first day of study participation. The SCID patient edition was used for individuals, identified during the screening process as diagnosed with schizophrenia or methamphetamine induced psychotic disorder, to confirm that the diagnosis was correct. The SCID non-patient edition was used for control participant to confirm that there was no personal or familial history of mental illness, specifically psychotic disorders.

2.4 Quantitative clinical scales

Quantitative clinical scales were conducted by clinically trained researchers, to measure current psychiatric symptomology and severity. Clinical scales were conducted in patient groups and control participants.

2.4.1 Positive and Negative Syndrome Scale (PANSS)

The Positive and Negative Syndrome Scale (PANSS), a 30-item, 7-point Likert scale, was developed to determine the presence and severity of psychopathology symptoms experienced by the individual. The positive syndrome scale consists of 7 items that measure positive symptoms, and similarly the negative syndrome scale consisting of 7 items measure negative symptoms. The remaining 16 items serve as a general psychopathology scale [204]. The positive and negative syndrome scales each has a minimum score of 7 and maximum score of 49, whereas the general psychopathology scale has a minimum score of 16 and maximum score of 112. The total score for a participant is calculated by adding the scores of each scale together. (Appendix B)

2.4.2 Clinical Global Impression Severity Scale (CGI-S)

The Clinical Global Impression Severity scale (CGI-S) is a measure based on eight items of the PANSS – three positive symptoms (P1 – Delusions; P2 – Conceptual disorganisation; P3 – Hallucinatory behaviour), three negative symptoms (N1 – Blunted affect; N4 – Passive/apathetic social withdrawal; N6 – Lack of spontaneity and flow of conversation), and two general psychopathology symptoms (G5 – Mannerism and posturing; G9 – Unusual thought content) to determine the severity of illness in patients with schizophrenia. The CGI-S is measured on an 8-point scale of severity [205]. A score of 0 would indicate that the person was not assessed on the CGI-S. The scoring ranges from a score of 1 that indicates 'normal, not at all ill' to a score of 7 indicates 'among the most extremely ill patients. (Appendix C)

2.4.5 Global Assessment of Functioning (GAF)

The Global Assessment of Functioning (GAF), a global measure of functioning, ranges from positive mental health to severe psychopathology [206]. It is a generic measure that determines the degree of mental illness through determining the individual's psychological, social and occupational functioning [207,208]. The GAF is scored on a scale of 0 – 100 in intervals of 10. A score of 91-100 would indicate 'Person has no problems OR has superior functioning in several areas OR is admired and sought after by others due to positive qualities', whereas a score of 0-10 would indicate 'Persistent danger of harming self or others OR persistent inability to maintain personal hygiene OR person has made a serious attempt at suicide'. (Appendix D)

2.5 Quantitative subjective questionnaires

Additional non-clinical subjective questionnaires were included as potential co-variates of general and behavioural aspects, which will allow for improved interpretation and understanding of the neurobiology investigated.

2.5.1 Kreek-McHugh-Schluger-Kellogg Scale (KMSK)

The Kreek-McHugh-Schluger-Kellogg Scale (KMSK) was developed as a quick assessment instrument to quantify substance abuse based on self-report from the participant [209]. In development of the KMSK, it was measured against the SCID for axis I disorders, and proved to be robust in determining the presence or absence of dependence of each specific drug [209]. Aspects that were measured with this scale include the frequency, duration, amount of drug use at the time of the participant's life when he/she used the drug(s) the most. The KMSK was utilised to assess participants' lifetime use of nicotine, alcohol, cannabis, methamphetamine, cocaine, and heroin. (Appendix E)

2.6 Proton magnetic resonance spectroscopy (^{1}H-MRS)

2.6.1 Magnetic resonance imaging protocol

Participants were scanned on a Siemens Skyra 3 Tesla scanner with a 70cm open bore design [210], located at the Cape Universities Body Imaging Center (CUBIC). A Siemens

32-channel head coil was used, which has been reported to be optimised for high resolution neuroimaging [211]. A high resolution Magnetization Prepared Rapid Acquisition Gradient Echo (MPRAGE) sequence structural image [212] was acquired using the following parameters: TR = 2530 ms, graded TE = 1.53, 3.21, 4.89, 6.57 ms, flip angle = 7°, FOV= 256 mm, slice thickness = 1.0 mm, 160 slices, scan time 6:39. The images obtained from this sequence were used to do a three-dimensional (3D) reconstruction to place the single voxel spectroscopy (SVS) voxels and chemical shift imaging (CSI) voxel grid. Single voxel spectroscopy allows for the obtaining of absolute as well as relative metabolite concentration in a specific brain area. It is an advantageous technique as it has a short acquisition time but is limited to one brain area at a time. CSI, on the other hand, allows for the investigation of the standard neurometabolites in multiple brain areas with one slice and uses smaller, more sharply defined voxels to ensure correct placement within the region of interest (ROI), limiting heterogeneity of tissue reported from. A disadvantage of CSI is that it is time consuming due to phase encoding being used to localise metabolites in the ROI. It remains, however, a very robust technique for obtaining relative metabolite concentrations in multiple brain areas.

2.6.2 Scanning protocol

The scanning protocol was initialised with a localiser to ensure correct placement of the MPRAGE structural image and was followed by the MPRAGE structural image sequence. During the reconstruction of the MPRAGE structural image in 3D for acquisition of the ^{1}H-MRS sequences, a resting-state functional MRI (rs-fMRI) was obtained. This sequence did not form part of the current thesis. Following the rs-fMRI sequence, the ^{1}H-MRS CSI slice was obtained. The CSI slice was followed by acquisition of the single voxel spectroscopy sequences. First was the single voxel located in the anterior cingulate cortex (ACC) with water reference, using parameters TE = 30 ms and TR = 2000 ms, second was the single voxel located in the ACC optimised for glutamate and glutamine separation, with water reference using parameters TE = 80 ms and TR = 2000 ms. Third, the single voxel located in the left thalamus with water reference were obtained, using parameters TE = 30 ms and TR = 2000 ms. The full scanning protocol is contained in Appendix F.

2.6.3 Chemical shift imaging (CSI)

The ^{1}H-MRS 2D slice was first positioned on the MPRAGE structural image with standard reconstruction of the sagittal plane, finer positioning of the slice was achieved with the axial and coronal reconstructions. The 2D CSI ^{1}H-MRS slice was acquired (PRESS, TE = 30 ms, TR=2000 ms, Hamming filter, 2 averages, delta =−2.7 ppm delta frequency, weighted phase encoding, FOV = 256 × 256 mm, voxel size 10 × 8 mm, thickness 15 mm, automated CHESS water suppression, scan time 10:52). The slice was positioned to include, bilaterally, the dorsolateral prefrontal cortex (DLPFC), anterior cingulate cortex (ACC), frontal white matter (FWM) located between the DLPFC and ACC. This slice has been used by our research group and has been proven to be robust for extraction of neurometabolites in the identified brain areas [73,118] (Figures 5 and 6). Standard neurometabolites were measured with CSI included *n*-acetyl aspartate (NAA), *n*-acetyl-aspartate with *n*-acetyl-aspartyl-glutamate (NAA+NAAG), glutamate (Glu), glutamate with glutamine (Glx), *myo*-inositol (mI), glycerophosphocholine with phosphocholine (GPC+PCh), and creatine with phosphocreatine (Cr+PCr). For the purpose of this study, only metabolites related to neuroinflammation (NAA, NAA+NAAG and mI) are reported.

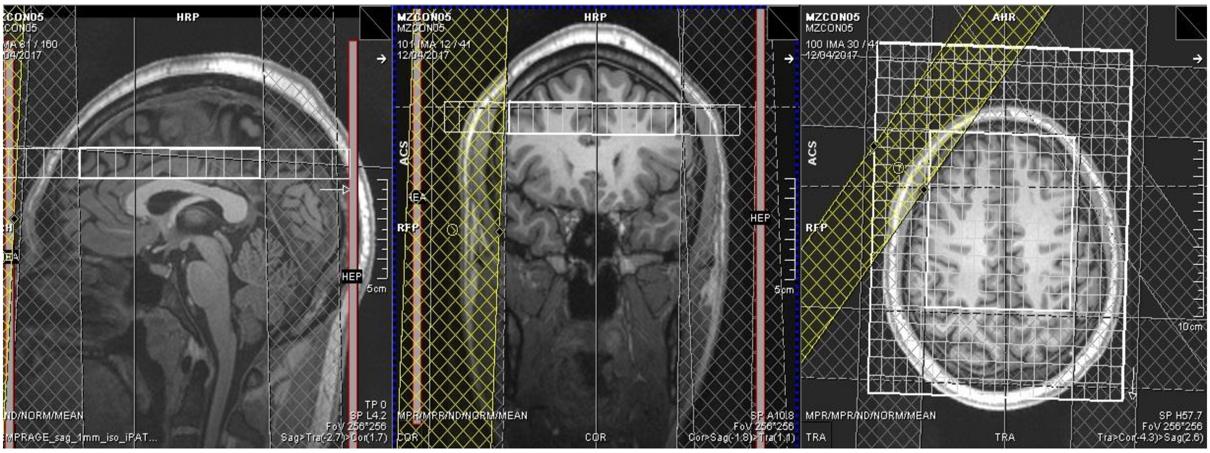
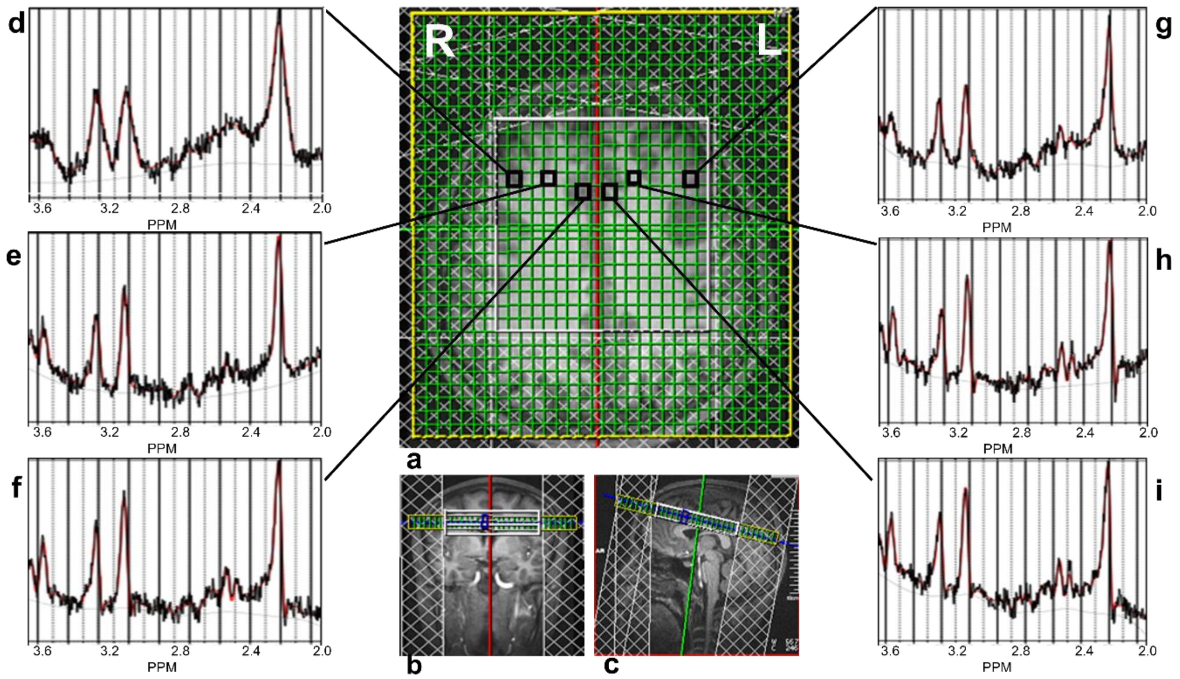


Figure 5 – Positioning of the chemical shift imaging (CSI) slice on the high-resolution structural image.



Representative ¹H-MRS chemical shift imaging brain slice orientation on 3 planes (a – axial, b – coronal, c – sagittal) and LCModel spectra of VOIs which included: (d & g) bilateral dorsolateral prefrontal cortices (DLPFC), (e & h) bilateral frontal white matter (FWM) and (f & i) bilateral anterior cingulate cortices (ACC).

2.6.4 Single voxel spectroscopy (SVS)

Single voxel spectroscopy (SVS) of the ACC and left thalamus were acquired for standard metabolites (PRESS, TE = 30 ms, TR = 2000 ms, 128 averages, delta = -2.6 ppm delta frequency, VOI 20 x 20 mm with a thickness of 15mm, scan time 4:40, with unsuppressed water MRS spectra for the same volume, two averages were acquired). An additional SVS sequence was acquired for the ACC, with parameters optimised for glutamate / glutamine separation [213]. The parameters used for this sequence were similar to that of the sequence for standard metabolites, except for the echo time, which was increased to 80 milliseconds (PRESS, TE = 80 ms, TR = 2000 ms, 128 averages, delta = -2.6 ppm delta frequency, VOI 20 x 20 mm with a thickness of 15mm, scan time 8:56, with unsuppressed water MRS spectra for the same volume, two averages were acquired).

The ACC voxel was placed to include primarily gray matter at the anterior cingulate cortices across both hemispheres, and above the anterior portion of the head of caudate. Placement of the voxel for the ACC was first positioned on the sagittal plane with finer positioning of the voxel on the axial and coronal planes. (Figure 6).

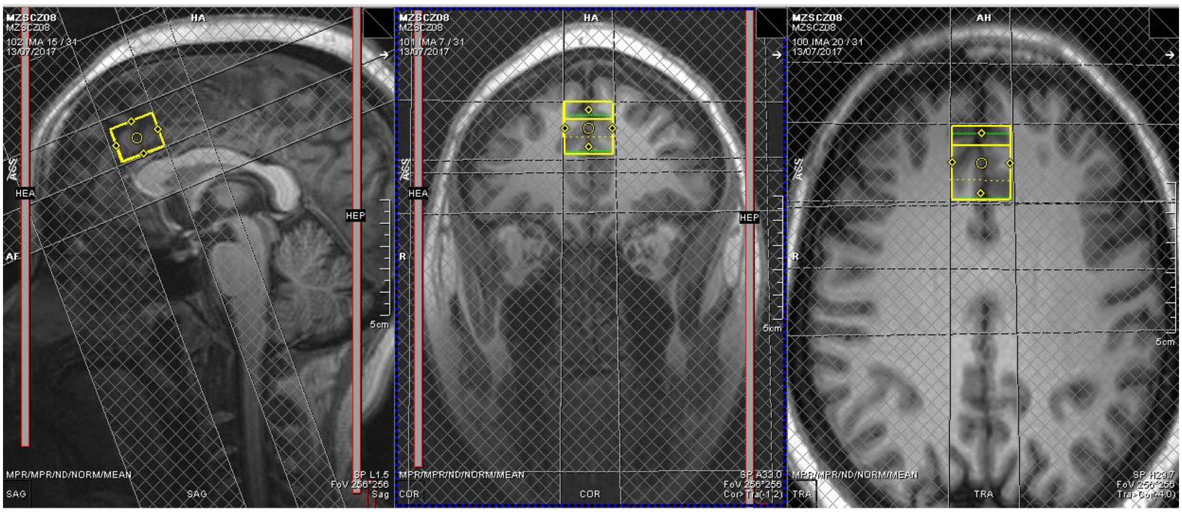


Figure 6 – Placement of the anterior cingulate cortex (ACC) single voxel on the high-resolution structural image.

The second voxel was positioned in the left thalamus. As with the ACC voxel, positioning of the left thalamus voxel was first positioned on the sagittal plane, with finer positioning on the axial and coronal planes. It was ensured that the voxel did not include any portions of ventricles. The placement of the voxel is complex due to the shape of the thalamus. (Figure 7).

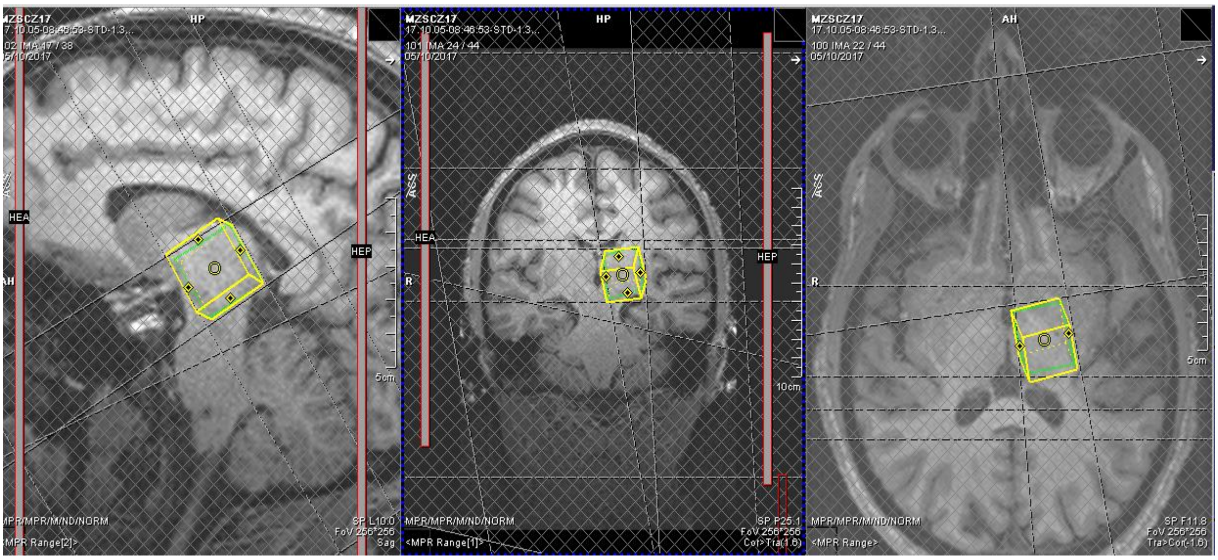


Figure 7 – Placement of the left thalamus single voxel on the high-resolution structural image.

2.6.5 Participant positioning

Participants were positioned in a supine position on the scanner bed. The radiographer did the head positioning, and centre positioning of the head was done with the scanner's laser beam. The participant's head was stabilised with NoMoCo cushions on either side of the head. After ensuring the participant's head was centred and stabilised, the top part of the coil was positioned over the participant's head. Again, centring was checked and once satisfied of the head position, a mirror was placed on the head coil to enable to participant to see the television screen at the back of the scanner on which a white cross on a black background was displayed. The participant had to look at the cross for the first 20 minutes of the scan. Stabilising pillows were placed underneath the participant's knees and under the shoulders to ensure comfort. A stabilising strap was placed over the thighs to ensure comfort of the participant through relaxing their legs against the strap. The above stabilising measures were implemented to minimise movement (Appendix F).

2.7 Processing of ^{1}H-MRS data

2.7.1 Chemical shift imaging

2.7.1.1 Visual inspection and processing of data

LCModel [214] Version 6.2-1L is a Linux-based program for analysis of magnetic resonance spectroscopy data. With chemical shift imaging, specific voxels to be analysed – in this study rows 8 to 25 and columns 9 to 25 corresponded with the field of interest – are selected, and LCModel analyses these voxels in one multi-voxel run. LCModel analyses metabolite spectra between 3.85 ppm and 0.2 ppm to include the standard metabolites included in this study. Once the data was loaded into LCModel, a preview was performed (Figure 8), and a screenshot taken of the preview, which was then compared with the screenshot from the scanner taken on the day of scanning to ensure that the correct voxels in each brain area were chosen for analysis. These comparisons were printed, and voxels of interest highlighted manually.

LCModel obtains starting estimates and possible constraints for first-order phase correction as well as the referencing shift from the inner voxels, per voxel, to the outer voxels to allow for improved analyses [215]. Eddy-current correction and water scaling are often ineffective with chemical shift imaging data and is rarely done. Both require an unsuppressed water reference file to be acquired immediately before or after the water-suppressed file to obtain absolute metabolite concentrations. This is usually not done for chemical shift imaging, as chemical shift imaging is used to obtain metabolite ratios rather than absolute metabolite concentrations. Metabolites are reported in relation to Cr+PCr.

2.7.1.2 Extraction of data – chemical shift imaging

Once visual inspection (Figure 8) was completed, each voxel that was identified in the visual inspection was extracted from the Excel file from LCModel processing. Data from the Excel file was then inspected to ensure that the Cramer Rao Lower Bound (CRLB) of each metabolite of interest was below 20%, which is the standard for reliably reporting metabolite concentration quantification [105,214,216]. Additionally, it was ensured that the CRLB for the Cr peak was below 5% to further ensure the reporting of reliable and accurate data. Once the data in the Excel file was quality controlled, the relative concentration (to creatine + phosphocreatine) of each metabolite – *n*-acetyl-aspartate, *n*-acetyl-aspartate with *n*-acetyl-aspartyl-glutamate, *myo*-inositol, glutamate, glutamate with glutamine and glycerophosphocholine with phosphocholine – were manually extracted into an Excel spreadsheet for each participant and each of their voxel of importance.

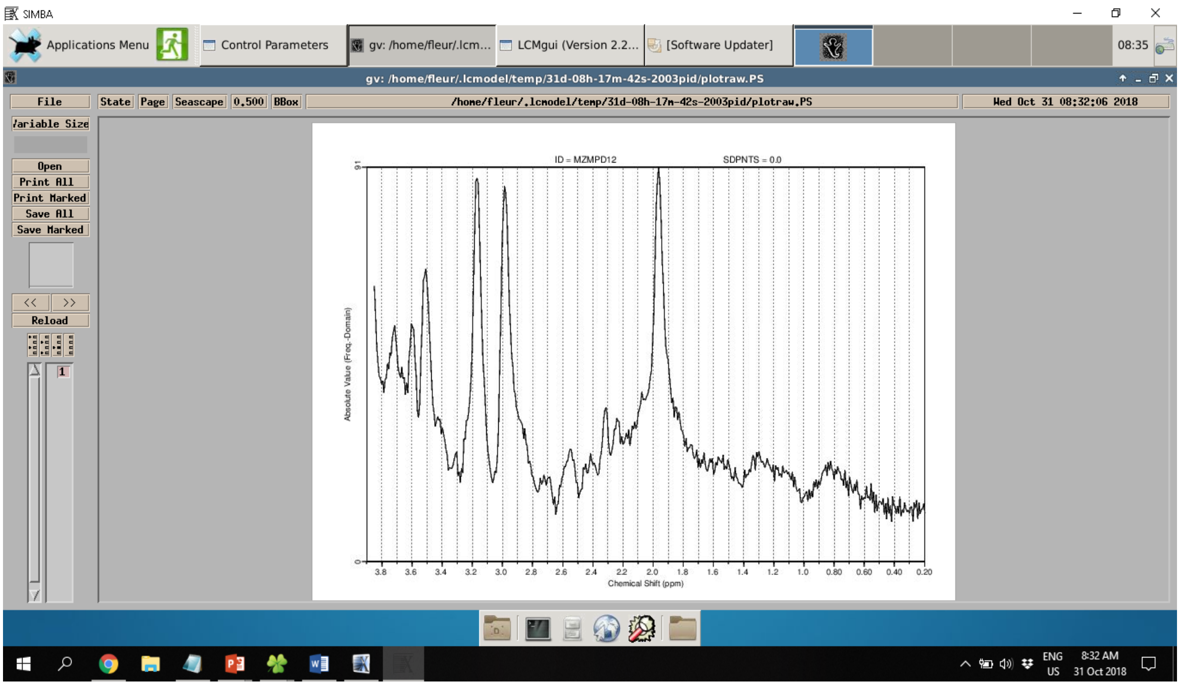


Figure 8 – Visual inspection of proton magnetic resonance spectroscopy spectrum on LCModel.

2.7.2 Single voxel spectroscopy

2.7.2.1 Extraction of absolute concentrations and partial volume correction of single voxel spectroscopy

To obtain absolute metabolite concentrations partial volume correction was performed. This was achieved with combination of LCModel [215] and MRSParVolCo [217] software. Spectra were phase corrected in LCModel by using the unsuppressed water reference file obtained directly after the SVS acquisition. Water content in brain tissue varies according to tissue type, with cerebral spinal fluid containing a greater concentration of water compared to gray matter and white matter. However, most metabolites are found in gray and white matter [218]. It is therefore important to correct for tissue water concentration to obtain the most accurate quantification of metabolites. This correction is done through partial volume correction (PVC).

Partial volume correction (PVC) has five consecutive steps which allows for the absolute quantification of metabolites. The first step is to convert each participant's structural imaging files (160 files), received from the scanner in DICOM (dcm) format, to a single file in NIFTI (nii) format. This is done through the "DICOM import" function in SPM12 [219], which runs in Matlab [220]. Once these file conversions have been completed, segmentation of the whole brain is done using the single nii file of each participant, creating a mask of gray matter (GM), white matter (WM and cerebrospinal fluid (CSF) for each participant. The mask created during segmentation is then used to create masks, using a custom code that runs in Matlab, for each SVS voxel file of each participant – this mask contains the specific location of each voxel, as well as the GM, WM, and CSF in each of the voxels. A mask is created for the ACC (TE30, TR2000), ACC (TE80, TR2000) and left thalamus (TE30, TR2000) voxels for each participant. The SVS masks are grouped by voxel, i.e., ACC (TE30, TR2000), ACC (TE80, TR2000) and left thalamus (TE30, TR2000) into a single file (gm2 file), and each file contains all the participants' data for that specific voxel.

To accurately report the absolute quantification of metabolites, the results from the first four steps of MRSParVolCo is combined with the results from LCModel. Both the water-suppressed and unsuppressed water reference files are used in this process, with eddy-current correction and water scaling turned on in the LCModel user interface. Data output was received via LCModel in an Excel file as well as a postscript file. The postscript file, which is the visual representation of the data in the Excel file, was ensured to match with the preview done in LCModel. These values were then inspected to ensure that the Cramer Rao Lower Bound (CRLB) of each metabolite of interest was below 20%, the standard for reliably reporting relative metabolite concentration quantification [105,214,216], to ensure good quality data. Again, as with relative chemical shift imaging data it was ensured that the CRLB for the Cr peak was below 5% to further ensure the reporting of reliable and accurate data. The data were manually extracted to Excel spreadsheets where all participants' data were collected by specific metabolite. A metabolite matrix file was created in Excel for each metabolite, the participant order matching that of the gm2 file. These matrix files were created for each metabolite for each voxel, e.g., NAA for ACC (TE30, TR2000), NAA for ACC (TE80, TR2000) and NAA for left thalamus (TE30, TR2000).

Once the absolute metabolite quantification results from MRSParVolCo and LCModel are combined, the final step in the process is to run the PVC code in Matlab to obtain the partial volume corrected metabolite concentrations. The code is run three times to include the three voxels - ACC (TE30, TR2000), ACC (TE80, TR2000) and left thalamus (TE30, TR2000). The code asks for the scan parameters (TE and TR values), each metabolite's matrix file for the specific voxel, and the gm2 file. The output file generated by the code provides the input data, the gm2 mask, as well as the corrected metabolites. The corrected metabolites are the absolute metabolites in each specific voxel.

2.8 Peripheral cytokine acquisition and processing

2.8.1 Acquisition and pre-processing

Blood draw was completed on the first day of participation through peripheral venepuncture by a registered clinician. Forty-eight (48) millilitres of blood were obtained. For plasma, twenty-seven (27) millilitres of blood were collected in three vacutainer tubes, of nine (9) millilitre capacity, containing ethylenediaminetetraacetic acid (EDTA) to prevent blood clotting. Fourteen (14) millilitres of blood were collected in two vacutainer serum tubes of seven (7) millilitre capacity), containing silica to accelerate clotting, of 7 millilitre capacity. Serum samples were kept at room temperature for 30 minutes to allow clotting before processing. Samples were transported to the Institute of Child Health laboratory at the Red Cross War Memorial Children's Hospital where it was centrifuged at approximately 2600 g for 10 minutes at 4°C. Samples were aliquoted into cryovials containing 1.5 millilitres each, and was labelled with participant numbers and was stored immediately at -80°C. (Appendix G)

2.8.2 Processing

In preparation for processing of the samples to obtain cytokine data, one cryovial of serum per participant was thawed on ice to ensure that the integrity of the samples remain intact. Once thawed, 500µl serum was extracted and centrifuged for 10 minutes at 2000 revolutions per minute (RPM). Thereafter, 100µl of the supernatant was pipetted into clearly marked Eppendorf tubes and stored at -80℃. The remaining spun down serum was discarded. On the day of processing of the samples, the samples were thawed on ice, centrifuged to remove particles before analyses, and then processed with the Milliplex MAP high sensitivity multiplex assay (HSTCMAG28SK07) for cytokines interleukin 1-beta (IL-1β), interleukin 8 (IL-8), interleukin 10 (IL-10), tumour necrosis factor-alpha (TNF-α) and interferon-gamma (IFN-ɣ). Standards, controls, and samples were added in duplicate to appropriate wells, which contained assay buffer and beads. Plates were incubated overnight at 4 °Celsius on an orbital shaker at 800 rpm. After the plates were washed three times, detection antibodies were added to each well and incubated on an orbital shaker at 800 rpm at room temperature for two hours. Following the incubation, the plates were washed and Streptavidin-Phycoethrin was added to each well, followed by incubation on an orbital shaker at 800 rpm for 30 minutes at room temperature. After the final incubation period, the plates were washed and read on a Luminex Bio-Plex 200 System. All plates were analysed simultaneously on the same day. The ranges of the R^2 values for the standard curves were between 0.996 and 1, and the intra-assay coefficient of variation for the markers were <14%. Cytokine concentrations are reported as pg/ml. Refer to Appendix H for detailed description of the processing of the cytokines.

Chapter 3 - Glutamatergic excitotoxicity, neuroinflammation and thalamocortical circuit dysfunction in schizophrenia and methamphetamine-induced psychosis

3.1 Introduction

Evidence of glutamatergic dysfunction, associated with glutamate excitotoxicity due to upregulation of neurotransmitter glutamate (Glu) has been reported in schizophrenia (SCZ) and methamphetamine-induced psychosis (MAP) [13,18,19,221]. The glutamatergic pathway has been shown, through preclinical, positron emission tomography (PET) and proton magnetic resonance spectroscopy ($^{1}H-MRS$) studies, to be disrupted in SCZ [18,19,49–53] and MA abuse [13,221] at the N-methyl-D-aspartate receptors (NMDAR), causing hypofunction of NMDAR, and resulting in excessive Glu signalling [18,19,42]. Involvement of neuroinflammatory processes, using proton magnetic resonance spectroscopy (^{1}H-MRS) measuring *myo*-inositol, a marker of neuroinflammation in the brain [72], and peripheral cytokines, have been reported in SCZ [21–25] and MA abuse [26–28]. Some of the brain areas investigated in these studies are involved in the thalamo-cortical circuitry, specifically between the thalamus and the anterior cingulate cortex (ACC) [32,63], and the thalamus and dorsolateral prefrontal cortex (DLPFC) [64]. The ACC is involved in the regulation of cognition [21], whereas the DLPFC is associated with executive functioning and problem solving [64]. Dysfunction of frontal white matter (FWM), involved in both thalamo-cortical circuits, have been reported in SCZ [71] and MA abuse [28]. Both circuits have been implicated in the phenomenology of SCZ [3] and MA abuse [74–76].

Positron emission tomography (PET), single-photon emission computed tomography (SPECT) and preclinical studies in SCZ show hypofunction of N-methyl-D-aspartate receptors (NMDAR) [44,53,222,223], while animal models and culture studies show that MA leads to increased expression of NMDAR [13,224–226]. PET studies in long-term MA abstinence report significantly decreased dopamine transporter density in cortical and subcortical brain areas, which results in an increase in dopamine [227–231] and subsequently glutamate (Glu) [232]. One study, using PET, reported normalisation of dopamine transporters in long-term abstinence from MA, which contradicts previous findings [233]. The authors speculated whether this contradictory finding was attributed to recovery of dopamine transporters or adaptation of the dopaminergic system over time [233]. Proton magnetic resonance spectroscopy (^{1}H-MRS) studies of glutamatergic function in SCZ show contradictory results, with some studies reporting higher Glu [30,56,58,103,105,111] and other reporting lower Glu [58,104,107,108,112].. ^{1}H-MRS studies of microglial activation in schizophrenia show contradictory results with *myo*-inositol (mI) [21,58,111,112,130], a neuroinflammatory marker [72], while studies consistently report lower *n*-acetyl-aspartate concentration (NAA) [30,58,108–112,130,137–143,147,148], a marker of neuronal integrity, in the prefrontal cortex in SCZ. The results of lower NAA are indicative of damage to neuronal integrity and viability, whereas the results of mI in SCZ are not clear whether neuroinflammation is present. Studies of glutamatergic function in MA abuse and MAP are not clear on whether glutamatergic function is implicated in the prefrontal cortex in MA abuse and MAP, with some studies reporting higher Glu [54,55,57], some studies reporting lower Glu [115–117,120], and several studies reporting no glutamatergic metabolite changes [26,113,114,118,119]. In MAP, higher concentration of mI [26–28] with lower concentration of NAA [26,27,117,118,144–146,149] in the prefrontal cortex are consistently reported, albeit not in the same studies.

In SCZ, studies of peripheral cytokines report higher concentrations of Tumour Necrosis Factor alpha (TNF-α) [82,150,153], Interleukin 1-beta (IL-1β) [150,181,182], and Interleukin 8 (IL-8) [166,188,189,234]. Higher concentrations of TNF-α and IL-1β have been associated with NAA [163,164,181] changes and also active psychosis in schizophrenia [181], while IL-8 has been associated with an increase in NMDAR [188]. Lower concentrations of Interferon-gamma (IFN-ɣ) [180] and interleukin-10 (IL-10) [199,200] are also reported in schizophrenia. Downregulated IFN-ɣ, an indication of decreased neuronal expression and dendritic cell marker loss and can be associated with lower NAA concentrations [180] that have been reported in the DLPFC, ACC, FWM and thalamus in schizophrenia. Lower concentrations of IL-10 have been implicated in post-mortem studies of schizophrenia [199,200]. Higher concentrations of TNF-α, IL-1β [185] and IL-8 [190–194] have also been reported in MA toxicity, with TNF-α and IL-1β associated with lower concentrations of NAA [137,138,140]. Higher concentrations of IL-8 have been associated with an increase in withdrawal symptoms [190]. Lower concentrations of IFN-ɣ and IL-10 [173,201] have also been reported in MA abuse, which can be associated with decreased neuronal integrity [180].

The proposed area of dysfunction in the thalamo-cortical circuitry in each disorder is vastly different, yet the clinical presentation is very similar. In SCZ, the primary disruption of the thalamo-cortical circuit is proposed to be at the thalamus, affecting both the thalamus-ACC and thalamus-DLPFC circuits [3]. MA has been reported to affect the ventral striatum, caudate and central tegmental area in the thalamo-cortical circuit [74–76] resulting in disruption of the thalamus-ACC (ventral striatum and caudate) and thalamus-DLPFC (ventral tegmental area) circuits. It could be argued that since the entire circuit is disrupted due to the dysfunction of certain, however different, brain areas, that the similar symptomology could be explained. Evidence is lacking, however, to support this hypothesis. The question that arises is what neurobiologically leads to the disruption of these pathways which leads to the presentation of psychosis. It has been proposed, due to neurometabolic changes observed in the ACC and thalamus, that neuroinflammation and/or neuro-excitotoxicity could be an underlying mechanism in psychosis in general, as well as in the presentation of SCZ and MAP.

This study aimed to first, compare glutamatergic and neuroinflammatory metabolites in thalamo-cortical circuitry in SCZ and MAP using ^{1}H-MRS. It was hypothesised that Glu will be higher in the ACC, DLPFC and FWM of SCZ compared to healthy controls, and that higher mI and lower NAA concentrations would be found in the ACC and left thalamus of MAP compared to healthy controls. Second, this study aimed to investigate associations of glutamatergic metabolites and neuroinflammatory metabolites with peripheral cytokine levels in both disorders to determine whether neuro-excitotoxicity, neuroinflammation, or both conditions are affecting the thalamo-cortical circuitry of SCZ and MAP. It was hypothesised that associations between neurometabolites and peripheral cytokines would differ between the two groups, with the SCZ group showing associations between glutamatergic metabolites and peripheral cytokines and the MAP group showing associations between neuroinflammatory metabolites and peripheral cytokines.

3.2 Material and methods

3.2.1Participants

Seventy-three (73) participants were recruited. Twenty-seven (27) participants had a diagnosis of schizophrenia, 21 participants had a diagnosis of methamphetamine-induced psychosis and 25 healthy control participants (Table 1). Even though a total of 116 participants were recruited for this study, the single-voxel spectroscopy data of only 73 participants were adequate for inclusion in analyses for this chapter. Please refer to Chapter 2 – Methodology for full participant screening methods.

Table 1 – Demographic, drug use and clinical questionnaire data

	Schizophrenia (SCZ)		**Methamphetamine-induced psychosis (MAP)**		**Control (CON)**	
	n=27		**n=21**		**n=26**	
	Male n=22;	**Female n=5**	**Male n=17**	**Female n=4**	**Male n=13**	**Female n=13**
	Mean	**StDev**	**Mean**	**StDev**	**Mean**	**StDev**
Age	30,14	5,85	27,97	4,87	30,34	5,96
Height	1,72	0,09	1,69	0,08	1,68	0,09
Weight	70,88	14,08	65,53*	16,08	77,55	17,74
Years of education - school	9,89	2,12	9,38	2,56	11,65#	0,86
Years of education - post school	0,28	0,91	0,55	1,08	1,1**	1,45
Duration of current diagnosis (years)	8,81	54,31	4,76	3,74	~	~
Number of psychotic episodes	3,48	2,05	2,26	1,33	~	~
Has used methamphetamine	15 of 44		34 of 34		2 of 38	
Onset of methamphetamine use (years)	22,73	6,27	18,26*	5,55	17,5	4,95
Duration of methamphetamine use (months)	35,29	43,54	105,97#	53,48	1,04	1,36
Duration of abstinence from methamphetamine (months)	32,1	42,32	6,4*	12,32	114	76,37
PANNS positive scale score	12,3#	5,15	10,47#	4,89	7,14	0,43
PANSS negative scale score	15,3#	6,39	13,74#	9,12	7,11	0,32
PANSS general psychopathology scale score	22,39#	6,91	20,41#	5,7	16,4	0,85
PANSS total score	49,98#	15,24	44,97#	16,92	29,81	5,26
CGI-S score	3,24#	1,09	2,68#	1,39	1	0
GAF score	61,98	12,51	66,94	17,34	90,03#	6,54

KMSK Alcohol lifetime - Frequency score	2,03	1,5	2,07	1,44	2,06	1,07
KMSK Alcohol lifetime - Duration score	1,82	1,35	2	1,13	2,14	0,96
KMSK Alcohol lifetime - Amount score	2	1,83	3,04*	1,87	3	1,52
KMSK Alcohol lifetime - Total score	5,16	4,13	7,09	3,63	7,44	2,75
KMSK Tobacco lifetime - Frequency score	3,66	2,11	4,17*	1,37	2,31	2,25
KMSK Tobacco lifetime - Duration score	2,24	1,3	2,7*	0,75	1,58	1,44
KMSK Tobacco lifetime Amount score	2,33	1,77	2,61*	1,62	1,41	1,69
KMSK Tobacco lifetime - Total score	8,11	4,98	9,64	3,07	5,24	5,13
KMSK Cocaine lifetime - Frequency score	0,24	0,59	1,03*	1,88	0,17	0,61
KMSK Cocaine lifetime - Duration score	0,26	0,64	0,7*	1,12	0,14	0,54
KMSK Cocaine lifetime - Amount score	0,3	1,05	1,04	2,08	0,33	1,2
KMSK Cocaine lifetime - Total score	0,76	2,19	2,54*	4,68	0,64	2,21
KMSK Heroin lifetime score - Frequency score	0,05	0,23	0,67@	1,32	0	0
KMSK Heroin lifetime score - Duration Score	0,08	0,36	0,6@	1,13	0	0
KMSK Heroin lifetime score - Amount score	0	0	0,27**	0,69	0	0
KMSK Heroin lifetime score - Total score	0,05	0,33	1,53@	2,97	0	0
KMSK Cannabis lifetime - Frequency score	2,92	2,54	3,7@	2,45	1,42	1,87
KMSK Cannabis lifetime - Duration score	1,66	1,42	2,1*	1,27	1,03	1,23
KMSK Cannabis lifetime - Amount score	1,73	2,02	2,52*	2,1	1	1,44
KMSK Cannabis lifetime - Total score	5,57	5,91	8,08**	5,54	3,21	4,36
KMSK Methamphetamine lifetime - Frequency score	1,43	1,97	4,03#	1,27	0,17	0,56
KMSK Methamphetamine lifetime - Duration score	0,97	1,28	2,76#	0,58	0,17	0,56
KMSK Methamphetamine lifetime - method score	1,3	1,51	3#	0	0,33	0,96
KMSK Methamphetamine lifetime - Total score	3,7	4,52	9,79#	1,54	0,67	2

Table 1 The methamphetamine-induced psychosis group had lower weight than the schizophrenia and control groups ($p<0.05$); the control group had higher levels of school ($p<0.05$) and post school ($p<0.01$) education than the schizophrenia and methamphetamine-induced psychosis groups; the methamphetamine-induced psychosis group had earlier onset of methamphetamine use compared to the schizophrenia group ($p<0.05$), longer duration of methamphetamine use ($p<0.0001$) and shorter duration of abstinence from methamphetamine than the schizophrenia and control groups; the schizophrenia and methamphetamine-induced psychosis groups scored

higher than the control group on the PANSS positive scale score ($p<0.0001$), PANSS negative scale score ($p<0.0001$), PANSS general psychopathology scale score ($p<0.0001$); PANSS total score ($p<0.0001$) and CGI-S score ($p<0.0001$); the control group scored higher than the methamphetamine-induced psychosis and schizophrenia groups on the GAF ($p<0.0001$); the methamphetamine-induced psychosis group scored higher than the schizophrenia and control groups on the KMSK Alcohol lifetime amount score ($p<0.05$), KMSK Tobacco lifetime frequency score ($p<0.05$), KMSK Tobacco lifetime duration score ($p<0.05$), KMSK Tobacco lifetime amount score ($p<0.05$), KMSK Cocaine lifetime frequency score ($p<0.05$), KMSK Cocaine lifetime duration score ($p<0.05$), KMSK Cocaine lifetime total score ($p<0.05$), KMSK Heroin lifetime frequency score ($p<0.001$), KMSK Heroin lifetime duration score ($p<0.001$), KMSK Heroin lifetime amount score ($p<0.01$), KMSK Heroin lifetime total score ($p<0.001$), KMSK Cannabis lifetime frequency score ($p<0.001$), KMSK Cannabis lifetime duration score ($p<0.05$), KMSK Cannabis lifetime amount score ($p<0.05$), KMSK Cannabis lifetime total score ($p<0.01$), KMSK Methamphetamine lifetime frequency score ($p<0.0001$), KMSK Methamphetamine lifetime duration score ($p<0.0001$), KMSK Methamphetamine lifetime method score ($p<0.0001$) and KMSK Methamphetamine total score ($p<0.0001$).

CGI-S - Clinical global impression of illness severity scale; KMSK - Kreek-McHugh-Schluger-Kellogg scale

** - $p<0.05$; ** - $p<0.01$; $^{@}$ - $p<0.001$; $^{\#}$ - $p<0.0001$*

3.2.1 Imaging procedures

Full imaging protocol and processing of single-voxel spectroscopy data is discussed in Chapter 2 – Methodology and Appendix F.

3.2.2 Processing of ^{1}H-MRS SVS data

Processing of ^{1}H-MRS SVS data was completed with methods described in Chapter 2 – Methodology.

3.2.2 Cytokine processing

Cytokine processing was completed as per description in Chapter 2 – Methodology and Appendix H.

3.3 Statistical analysis

Statistical analyses were performed using Statistica [235]. All data were tested for normality using the Shapiro-Wilks test. Parametric data were analysed with one-way analysis of variance (ANOVA) and non-parametric data analysed with Kruskal Wallis and Chi square tests. Significant results were followed by Fisher's LSD post hoc test for parametric data and Dunn's Q post hoc test for non-parametric data. Significance for statistical analyses was set at $p<0.05$. Relationships between neurometabolite data and other variables as well as relationships between neurometabolites, cytokines and other variables were analysed with Spearman Rank Order correlation, significance set at Spearman's $R > \pm 0.60$, $p<0.01$. Significant correlations underwent further testing with comparison of correlations of independent samples [236].

3.4 Results

3.4.1 Demographic and clinical variables

The healthy control group had higher levels of school ($H_{(2;115)}=26.20$, $p<0.0001$) and post school ($H_{(2;111)}=12.64$, $p<0.01$) education compared to the SCZ and MAP groups. (Table 1)

3.4.2 Drug use variables

The MAP group had earlier onset of MA use ($H_{(2;51)}=6.96$, $p<0.05$), had longer duration of MA use ($H_{(2;50)}=20.20$, $p<0.0001$) and short duration of abstinence from MA ($H_{(2;50)}=6.96$, $p<0.05$) compared to the SCZ group. (Table 1)

3.4.3 Clinical questionnaires

The SCZ and MAP groups scored higher than the healthy control group on the PANSS positive scale ($H_{(2;113)}=43.11$, $p<0.0001$), PANSS negative scale ($H_{(2;113)}=54.64$, $p<0.0001$), PANSS general psychopathology scale ($H_{(2;113)}=42.10$, $p<0.0001$), PANSS total scale score ($H_{(2;113)}=57.33$, $p<0.0001$), and CGI-S ($H_{(2;114)}=69.13$, $p<0.0001$). The healthy control group scored higher than the SCZ and MAP groups on the GAF ($H_{(2;114)}=60.60$, $p<0.0001$). There were no significant between-group differences on clinical questionnaires, which assess clinical symptomology and illness severity, between the SCZ and MAP groups. (Table 1)

3.4.4 Kreek-McHugh-Schluger-Kellogg scale (KMSK) scores

The MAP group scored higher than the SCZ and healthy control groups on the KMSK Alcohol lifetime amount score ($H_{(2;81)}$=6.00, $p<0.05$). The MAP and SCZ groups scored higher than the health control group on the KMSK Tobacco lifetime frequency score ($H_{(2;103)}$=12.37, $p<0.01$). The MAP group scored higher than the healthy control group on the KMSK Tobacco lifetime duration ($H_{(2;103)}$=10.98, $p<0.01$), KMSK Tobacco lifetime amount ($H_{(2;97)}$=8.16, $p<0.05$), and KMSK Tobacco lifetime total ($H_{(2;97)}$=10.15, $p<0.01$) scores. The MAP group scored higher than the SCZ and healthy control groups on the KMSK Cocaine lifetime frequency ($H_{(2;103)}$=8.61, $p<0.05$), KMSK Cocaine lifetime duration ($H_{(2;103)}$=8.33, $p<0.05$), KMSK Cocaine lifetime total ($H_{(2;100)}$=6.28, $p<0.05$), KMSK Heroin lifetime frequency($H_{(2;103)}$=14.75, $p<0.001$), KMSK Heroin lifetime duration ($H_{(2;103)}$=14.61, $p<0.001$), KMSK Heroin lifetime amount ($H_{(2;102)}$=12.49, $p<0.001$), and KMSK Heroin lifetime total ($H_{(2;102)}$=17.18, $p<0.001$) scores. The MAP and SCZ groups scored higher than the healthy control group on the KMSK Cannabis lifetime frequency score ($H_{(2;103)}$=14.62, $p<0.001$). the MAP group scored higher than the healthy control group on the KMSK Cannabis lifetime duration ($H_{(2;103)}$=11.37, $p<0.01$), KMSK Cannabis lifetime amount ($H_{(2;87)}$=8.72, $p<0.05$) and KMSK Cannabis lifetime total ($H_{(2;87)}$=10.77, $p<0.01$) scores. The MAP and SCZ groups scored higher than the healthy control group on the KMSK Methamphetamine lifetime frequency score ($H_{(2;101)}$=56.16, $p<0.0001$). The MAP group scored higher than the SCZ and healthy control groups on the KMSK Methamphetamine lifetime duration ($H_{(2;101)}$=56.99, $p<0.0001$), KMSK Methamphetamine lifetime method ($H_{(2;101)}$=49.96, $p<0.0001$) and KMSK Methamphetamine lifetime total ($H_{(2;101)}$=58.03, $p<0.0001$) scores. (Table 1)

3.4.5 Neurometabolites

No significant metabolite concentration differences were found in the SCZ or MAP groups, compared to healthy controls. (Table 2)

Table 2 – Neurometabolite concentrations across the three groups

Statistics of neurometabolites and peripheral cytokines						
	Schizophrenia group		Methamphetamine-induced psychosis group		Healthy control group	
	Mean	StDev	Mean	StDev	Mean	StDev
Neurometabolites - anterior cingulate cortex (single voxel)						
Glutamate*	3,025	1,002	3,513	1,055	3,479	1,007
Glutamate with glutamine*	3,751	1,231	4,262	1,256	4,134	1,200
n-acetyl-aspartate	2,371	1,003	2,978	1,250	2,962	1,135
n-acetyl-aspartate with *n*-acetyl-aspartyl-glutamate	2,660	0,954	3,270	1,299	3,246	1,138
Myo-inositol	3,888	0,631	4,614	1,618	4,236	0,845
Neurometabolites - left thalamus (single voxel)						
n-acetyl-aspartate	3,336	1,270	3,118	1,246	3,440	1,361
n-acetyl-aspartate with *n*-acetyl-aspartyl-glutamate	3,548	1,372	3,628	1,518	3,889	1,453
Myo-inositol	2.615	0,556	2,387	0,667	2,951	0,696

**Glutamate and Glutamate with glutamine concentrations were obtained using an echo time of 80ms, which is different from the rest of the neurometabolites which were obtained using an echo time of 30ms. See Chapter 2 – Methodology for detailed description.*

3.5 Associations

3.5.1 Demographic variables and neurometabolites

In the MAP group, a positive relationship was found between years of school education and thalamic NAA+NAAG (Spearman's R=0.63, p<0.01). (Table 3)

3.5.2 Kreek-McHugh-Schluger-Kellogg scale (KMSK) and neurometabolites

In the MAP group, KMSK Alcohol lifetime amount was positively associated with thalamic NAA+NAAG (Spearman's R=0.68, p<0.01). (Table 3)

3.5.3 Cytokines and neurometabolite variables

No associations between cytokines and neurometabolites were found in the SCZ and MAP groups, compared to healthy controls.

3.5.4 Glutamatergic and neuroinflammatory metabolites

In the SCZ group, positive associations were found between ACC Glu and ACC NAA (Spearman's R=0.69, p<0.0001), ACC NAA+NAAG (Spearman's R=0.62, p<0.001) and ACC mI (Spearman's R=0.78, p<0.0001). ACC Glx was also positively associated with ACC mI (Spearman's R=0.60, p<0.01). (Figure 3)

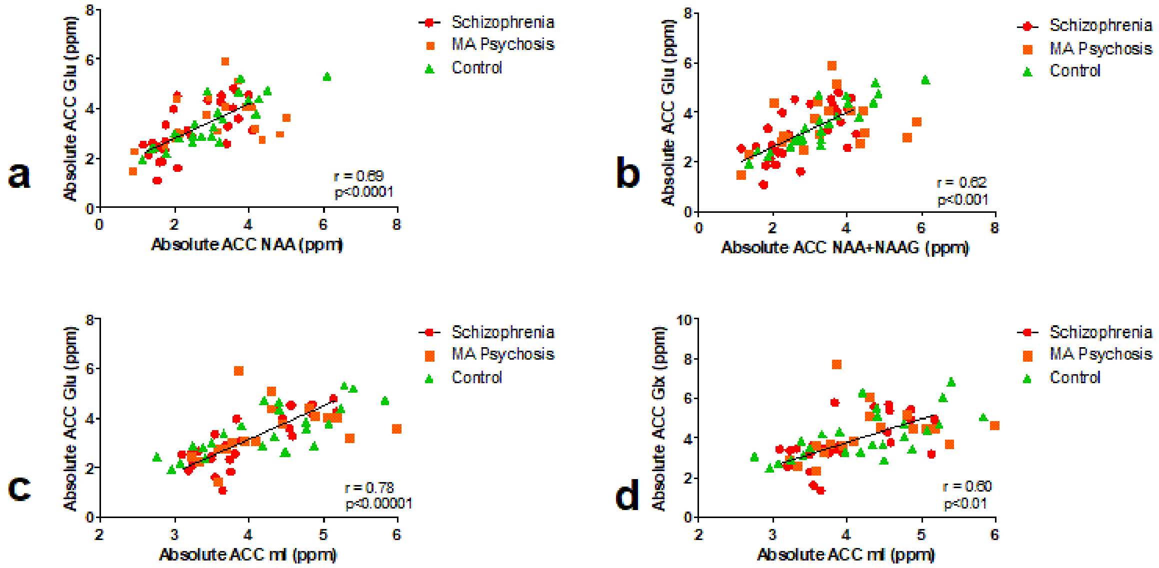


Figure 3 Positive associations were seen between glutamate in the anterior cingulate cortex (ACC) and a) n-acetyl-aspartate (NAA) (p<0.0001), b) n-acetyl-aspartate with n-acetyl-aspartyl-glutamate (NAA+NAAG) (p<0.001), and c) myo-inositol (mI) (p<0.0001) in the anterior cingulate cortex (ACC). D) Glutamate with glutamine (Glx) was positively associated with myo-inositol (mI) in the anterior cingulate cortex in the schizophrenia group (p<0.01).

In the MAP group, ACC Glu was positively associated with left thalamic NAA+NAAG (Spearman's R=0.61, p<0.01). (Figure 4)

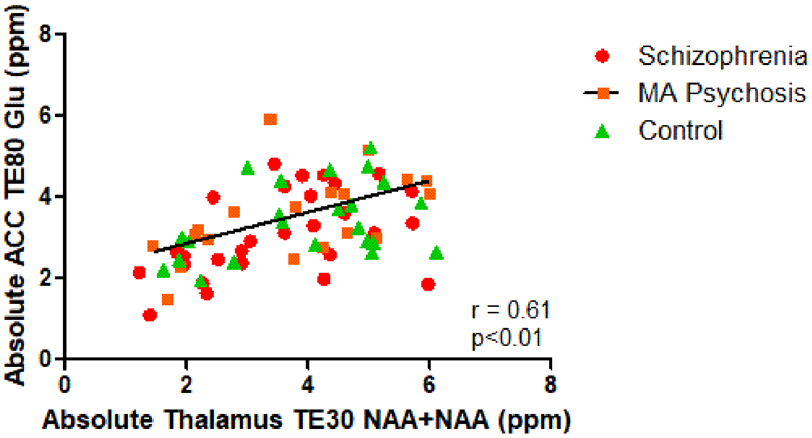


Figure 4 A positive association was seen between glutamate in the anterior cingulate cortex (ACC) and n-acetyl-aspartate with n-acetyl-aspartyl-glutamate (NAA+NAAG) in the left thalamus.

Table 3 – Significant associations with comparison of correlations of independent samples

				Comparison of correlation of independent samples			
Schizophrenia group				**With MAP**		**With CON**	
Variable 1	Variable 2	Spearman's R	p-value	Fisher Z	p-value	Fisher Z	p-value
Absolute ACC NAA	Absolute ACC Glu	0,69	p<0,0001	1,39	n/s	-1,35	n/s
Absolute ACC NAA+NAAG	Absolute ACC Glu	0,62	p<0,001	1,15	n/s	-2,30	n/s
Methamphetamine-induced psychosis group				**With SCZ**		**With CON**	
Variable 1	Variable 2	Spearman's R	p-value	Fisher Z	p-value	Fisher Z	p-value
Years of school education	Absolute thalamic NAA+NAAG	0,63	p<0,01	1,78	n/s	4.21	n/s
KMSK Alcohol lifetime amount	Absolute thalamic NAA+NAAG	0,68	p<0,01	2,42*	p<0,01	1,90	n/s
Absolute thalamic NAA+NAAG	Absolute ACC Glu	0,61	p<0,01	0,62	n/s	1,01	n/s

Table 2 – The positive association between KMSK Alcohol lifetime amount and absolute thalamic NAA+NAAG was significant between the methamphetamine-induced psychosis and schizophrenia groups (p<0.01).

3.6 Discussion

The main findings of this dissertation were 1) The SCZ and MAP groups did not show any between group neurometabolite differences, compared to healthy controls, 2) associations were found between glutamatergic and neuroinflammatory metabolites in the ACC in the SCZ group, and between glutamatergic metabolites in the ACC and neuroinflammatory metabolites in the left thalamus in the MAP group.

The lack of significant differences between ^{1}H-MRS metabolite findings and associations between metabolites and peripheral cytokine concentrations in SCZ and MAP groups, compared to healthy controls, could be attributed to the chronic use of antipsychotic medicine in these patients. Antipsychotic medicine has been reported to increase metabolic activity in the thalamus [237], reduce neuroinflammation and normalise metabolites over time [238], and have shown partial effectiveness in reversing NMDAR dysfunction [239] in patients with SCZ.

The associations of years of school education and absolute NAA+NAAG in the left thalamus in the MAP group is consistent with previous work reporting lower levels of education in MA abuse [113,115,190]. The lack of significant associations between metabolites and PANSS, CGI-S and GAF scores [21,30,104,109,115–117,137,138,140] in both disorders, and with MA use variables in MAP [114], is notable as it's not consistent with previous literature, and could be attributed to the use of antipsychotic medication by both groups. It is, however, consistent with a previous study within the same catchment area, where no significant associations between clinical or drug use variables were found [118]. Positive associations were found between the KMSK Alcohol lifetime amount score and absolute NAA+NAAG in the left thalamus of the MAP group. The association between increased alcohol consumption and lower NAA compounds is consistent with prior work in studies investigating alcohol abuse [240–244]. Increased alcohol consumption has been reported in MA abuse [190], not in MAP.

The positive associations between glutamatergic and neuroinflammatory metabolites in the ACC in SCZ suggest that there may be important relationships between these pathways in this disorder, specifically in the thalamo-cortical circuitry. The positive relationship between lower concentrations of NAA, NAA+NAAG and lower Glu, metabolites which are linked through the glutamate-glutamine cycle, could reflect dysfunction in neuronal tissues [106,108]. Studies on the dysfunctional relationship between NAA, NAA+NAAG and Glu are few and further research is needed to fully understand this relationship. The brain areas investigated in the present study form part of the thalamo-cortical circuitry [60–62] and previous studies, limited to post-mortem [3], structural magnetic resonance imaging and imaging techniques to assess neurocognitive functioning (PET/SPECT [43–46] and fMRI, did not specifically investigate the thalamo-cortical circuit [3]). Reporting these associations using ^{1}H-MRS, a technique that can detect neurobiological changes, provides novel insight into the neurobiology of schizophrenia. Two previous studies report on dysfunction between relative NAA and Glu concentrations [106,245], with both studies reporting positive relationships between NAA and Glu concentrations in healthy controls, but not in SCZ patients. The finding of the present study could indicate, even though the metabolite concentrations are still lower than that of the healthy control group, that there is some normalisation or adaptation in the relationship between NAA and Glu in chronic SCZ.

A positive association was found between glutamatergic metabolites in the ACC and neuroinflammatory metabolites in the left thalamus in MAP. This association could indicate that the thalamocortical-circuitry in MAP is affected by glutamate excitotoxicity, through upregulation of Glu, as well as increased NAA turnover, through higher concentrations of NAA+NAAG. NAA and Glu are closely linked through the glutamate-glutamine cycle and could indicate a dysfunctional relationship between Glu and NAA in the ACC-thalamus circuit through excitotoxicity. The indication of neuronal tissue dysfunction in SCZ is consistent with previous work, however previous studies did not report specifically on the influence of these metabolites in the thalamo-cortical circuitry. The suggestion of a dysfunctional Glu and NAA relationship, possibly indicating excitotoxicity in the thalamo-cortical circuit in MAP is consistent with some previous work. This finding in MAP needs more exploration in future research due to the lack of associations found between cytokines and metabolites, and the lack of significance found with comparison of correlations with the SCZ and healthy control groups to support a hypothesis of neuroinflammation.

In summary, this is the first study to investigate the relationship between glutamatergic and neuroinflammatory metabolites in brain areas within the thalamo-cortical circuitry in both disorders. This study also provides novel insight into the psychobiology of chronic SCZ and MAP, specifically pertaining to disruption of the thalamo-cortical circuitry. The findings show a dysfunctional relationship between Glu and NAA in brain areas related to the thalamo-cortical circuitry in both disorders. In the SCZ group, lower concentrations of these metabolites are reported, suggestive of neuronal dysfunction specifically in the ACC, whereas in the MAP group higher concentrations are reported, suggestive of excitotoxicity. This highlights similarities as well as differences in the psychobiology of SCZ and MAP and provides a deeper understanding of the long-term disease progression of both disorders. The second aim of this thesis, specifically investigating neuroinflammation, will be discussed in chapter 4.

Chapter 4 - Investigation of neuroinflammation in the thalamocortical circuit in schizophrenia and methamphetamine-induced psychosis

4.1 Introduction

The involvement of neuroinflammatory pathways has been reported in recent studies of schizophrenia (SCZ) [22–25,32] and long-term methamphetamine (MA) abuse[2] [27,28,73] through activation of microglia [77–79] and increased concentrations of peripheral cytokines [80]. Higher concentrations of *myo*-inositol (mI) is consistent with microglial activation and neuroinflammation [121,125]. Higher concentrations of mI have been reported in MA abuse [27,28,73], with lower [21,112] or no changes [58,111] in mI concentrations in frontal brain areas in SCZ [63] and MA abuse [87]. Higher mI concentrations are consistent with decreased neuronal integrity, through lower concentrations of *n*-acetyl-aspartate (NAA) concentrations [72], with the combination of higher mI and lower NAA consistent with neuronal injury [72]. Lower NAA concentrations have been consistently reported in SCZ [30,58,108–112,130,137–143,147,148], and MA abuse [27,73,118,144–146,149] and methamphetamine-induced psychosis (MAP) [117,118]. Frontal brain areas implicated in SCZ and MA abuse include the anterior cingulate cortex (ACC), involved in neural networks implicated in cognition [21] and the dorsolateral prefrontal cortex (DLPFC), involved in executive functioning and problem-solving [64]. The ACC and DLPFC have return projections to the thalamus and form two overlapping circuits [60–62], with frontal white matter (FWM) being integral in both circuits [67,68]. Dysfunction in FWM integrity has been reported in SCZ [71] and MA abuse [28]. Studies investigating mI are limited to MA abuse, with no proton magnetic resonance spectroscopy (^{1}H-MRS) studies reporting mI changes in methamphetamine-induced psychosis (MAP). No studies to date have investigated neuroinflammatory metabolites specifically in the thalamo-cortical circuitry.

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[2] The term MA abuse is used to describe methamphetamine abuse, dependence, and abstinence.

Cytokines, markers of inflammation due to microglial activation [80] have been associated with SCZ and MA abuse and have been found in blood, cerebral spinal fluid and brain tissue in preclinical studies, and post-mortem brain tissue in human patients with SCZ [82,83]. Preclinical and post-mortem studies of SCZ and MA abuse report upregulation of pro-inflammatory cytokines tumour necrosis factor-alpha (TNF-α), interleukin 1-beta (IL-1β) , interleukin 8 (IL-8) interferon-gamma (IFN-ɣ), and lower concentrations of interleukin 10 (IL-10), an anti-inflammatory cytokine [180,199,200]. Studies investigating cytokines in human blood have not been associated with neuroimaging studies, especially not ^{1}H-MRS studies investigating neuroinflammatory metabolites in the thalamo-cortical circuitry.

This study aimed first, to investigate neuroinflammatory metabolites in the thalamo-cortical circuitry in SCZ and MAP. It was hypothesised, that in SCZ that higher mI and lower NAA concentrations would be found in the thalamus and ACC, lower mI concentrations in the DLPFC, consistent with previous literature of increased microglial activation and neuroinflammation in the ACC and thalamus [128,129], and compromised neuronal tissue in the DLPFC [65,66]. In MAP, it was hypothesised that higher mI and lower NAA concentrations, associated with neuroinflammation, would be found in the thalamus and ACC, as MA has been reported to disrupt the thalamo-cortical circuit at the ventral striatum [74,75], which is part of the ACC-thalamus circuit. Second, the study aimed to investigate associations between neuroinflammatory metabolites in the thalamo-cortical circuitry and peripheral cytokines. It is expected that positive associations between neuroinflammatory metabolites and peripheral cytokines will be found in both disorders.

4.2 Material and methods

4.2.1Participants

Ninety-eight (98) participants were recruited. Thirty-six participants had a diagnosis of schizophrenia, 28 participants had a diagnosis of methamphetamine-induced psychosis and 34 healthy control participants (Table 1). Even though a total of 116 participants were recruited for this study, the single-voxel spectroscopy data of only

98 participants were adequate for inclusion in analyses for this chapter. The full screening protocol is discussed in Chapter 2 – Methodology.

Table 1 – Demographic, drug use and clinical questionnaire data

	Schizophrenia (SCZ) n=36		Methamphetamine-induced psychosis (MAP) n=28		Control (CON) n=34	
	Male n=28	Female n=8	Male n=22	Female n=6	Male n=19	Female n=15
	Mean	StDev	Mean	StDev	Mean	StDev
Age	29,58	5.29	27,71	4,74	30,65	5,85
Height	1,71	0,09	1,67	0,15	1,68	0,09
Weight	71,11	14,18	66,9	16,34	75,91	16,65
Years of education - school	10,11	1,91	9,57	2,5	11,65#	0,88
Years of education - post school	0,25	0,87	0,59	1,12	0,93*	1,33
Duration of current diagnosis (years)	8,42*	4,4	5,19	3,99	~	~
Number of psychotic episodes	3,33	2,05	2,29	1,33	~	~
Has used methamphetamine	13 of 36		28 of 28		2 of 34	
Onset of methamphetamine use (years)	22,31	5,47	18,07*	5,65	17,5	4,95
Duration of methamphetamine use (months)	57	41,32	104,29*	49,94	24,04	33,88
Duration of abstinence from methamphetamine (months)	38,08	42,31	7,65*	13,34	114	76,37
PANNS positive scale score	12,7#	4,81	10,75#	5,2	7,13	0,42
PANSS negative scale score	14,89#	6,32	14,25#	9,84	7,09	0,3
PANSS general psychopathology scale score	21,81#	6,98	20,64#	6,12	16,44	0,88

PANSS total score	48,86#	15,34	46,07#	18,33	30,66	1,31
CGI-S score	3,32#	1,09	2,71#	1,49	1	0
GAF score	61,97#	12,3	67#	18,7	89,73	6,74
KMSK Alcohol lifetime - Frequency score	2,09	1,48	2,19*	1,42	2,03	1,09
KSMK Alcohol lifetime - Duration score	1,8	1,33	2,11	1,09	2,12	0,98
KMSK Alcohol lifetime - Amount score	2,03	1,82	3,18	1,79	2,88	1,51
KMSK Alcohol lifetime - Total score	5,4	4,06	7,41	3,36	7,28	2,79
KMSK Tobacco lifetime - Frequency score	3,69**	2,05	4,21**	1,34	2,29	2,24
KMSK Tobacco lifetime - Duration score	2,26	1,27	2,68**	0,77	1,59	1,44
KMSK Tobacco lifetime Amount score	2,42**	1,76	2,65**	1,57	1,34	1,6
KMSK Tobacco lifetime - Total score	8,24**	4,9	9,73**	3,01	5,16	5,02
KMSK Cocaine lifetime - Frequency score	0,23	0,59	1,11**	1,93	0,18	0,63
KMSK Cocaine lifetime - Duration score	0,26	0,65	0,75**	1,14	0,15	0,56
KMSK Cocaine lifetime - Amount score	0,32	1,08	1,12	2,14	0,35	1,23
KMSK Cocaine lifetime - Total score	0,76	2,24	2,73*	4,8	0,68	2,27
KMSK Heroin lifetime score - Frequency score	0,03	0,17	0,71@	1,36	0	0
KMSK Heroin lifetime score - Duration Score	0,03	0,17	0,64@	1,16	0	0
KMSK Heroin lifetime score - Amount score	0	0	0,29**	0,71	0	0
KMSK Heroin lifetime score - Total score	0,06	0,33	1,64@	3,05	0	0
KMSK Cannabis lifetime - Frequency score	2,91	2,51	3,93@	2,37	1,32	1,74
KMSK Cannabis lifetime - Duration score	1,69	1,41	1,5**	1,23	1	1,21
KMSK Cannabis lifetime - Amount score	1,79	2,02	2,5**	2,1	0,97	1,43
KMSK Cannabis lifetime - Total score	5,75	5,92	8,65**	5,38	3,03	4,17

KMSK Methamphetamine lifetime - Frequency score	1,34	1,96	4,04#	1,37	0,18	0,58
KMSK Methamphetamine lifetime - Duration score	0,86	1,2	2,89#	0,78	0,18	0,58
KMSK Methamphetamine - method score	1,2	1,47	3#	0,57	0,35	0,98
KMSK Methamphetamine - Total score	3,4	4,4	9#	2,38	0,71	2,05

Table 1 The healthy control group had higher levels of school ($p<0.0001$) and post school ($p<0.05$) education than the schizophrenia and methamphetamine-induced psychosis groups; the schizophrenia group had a longer duration of current diagnosis (years) than the methamphetamine-induced psychosis group ($p<0.05$), the methamphetamine-induced psychosis group had earlier onset of methamphetamine use compared to the schizophrenia group ($p<0.05$), longer duration of methamphetamine use ($p<0.05$) than the healthy control group, and shorter duration of abstinence from methamphetamine than the schizophrenia and control groups $p<0.05$); the schizophrenia and methamphetamine-induced psychosis groups scored higher than the control group on the PANSS positive scale score ($p<0.0001$), PANSS negative scale score ($p<0.0001$), PANSS general psychopathology scale score ($p<0.0001$); PANSS total score ($p<0.0001$) and CGI-S score ($p<0.0001$); the control group scored higher than the methamphetamine-induced psychosis and schizophrenia groups on the GAF ($p<0.0001$); the methamphetamine-induced psychosis group scored higher than the control groups on the KMSK Alcohol lifetime amount score ($p<0.05$); the schizophrenia and methamphetamine-induced psychosis groups scored higher on the KMSK Tobacco lifetime frequency score ($p<0.01$); the methamphetamine-induced psychosis group scored higher than the healthy control group on the KMSK Tobacco lifetime duration score ($p<0.01$); the schizophrenia and methamphetamine-induced psychosis groups scored higher than the healthy control group on the KMSK Tobacco lifetime amount ($p<0.01$) and KMSK Tobacco lifetime total ($p<0.01$) scores; the methamphetamine-induced psychosis group scored higher than the schizophrenia and healthy control groups on the KMSK Cocaine lifetime frequency ($p<0.01$), KMSK Cocaine lifetime duration score ($p<0.01$), KMSK Cocaine lifetime total score ($p<0.05$), KMSK Heroin lifetime frequency score ($p<0.001$), KMSK Heroin lifetime duration score ($p<0.001$), KMSK Heroin lifetime amount score ($p<0.01$), and KMSK Heroin lifetime total score ($p<0.001$); the methamphetamine-induced psychosis group scored higher than the control group on the KMSK Cannabis lifetime frequency score ($p<0.001$), KMSK Cannabis lifetime duration score ($p<0.01$), KMSK Cannabis lifetime amount score ($p<0.01$), KMSK Cannabis lifetime total score ($p<0.01$); the methamphetamine-induced psychosis group scored higher than the schizophrenia and healthy control groups on the KMSK Methamphetamine lifetime frequency score ($p<0.0001$), KMSK Methamphetamine lifetime duration score ($p<0.0001$), KMSK Methamphetamine lifetime method score ($p<0.0001$) and KMSK Methamphetamine total score ($p<0.0001$).

PANSS – Positive and Negative Syndrome Scale; CGI-S - Clinical global impression of illness severity scale; KMSK - Kreek-McHugh-Schluger-Kellogg scale

4.2.1 Imaging procedures

Full imaging procedures, chemical shift imaging (CSI) and single voxel spectroscopy (SVS) placement is described in Chapter 2 – Methodology and Appendix F.

4.2.2 Processing of ^{1}H-MRS CSI and SVS data

Processing of ^{1}H-MRS data is explained in Chapter 2 – Methodology.

4.2.3 Cytokine processing

Cytokine processing was done as per description in Chapter 2 – Methodology and Appendix G.

4.3 Statistical analysis

Statistical analyses were performed using Statistica [235]. All data were tested for normality using the Shapiro-Wilks test. Parametric data were analysed with one-way analysis of variance (ANOVA) and non-parametric data analysed with Kruskal Wallis and Chi square tests. Significant results were followed by Fisher's LSD post hoc test for parametric data and Dunn's Q post hoc test for non-parametric data. Significance for statistical analyses was set at $p<0.05$. Relationships between neurometabolite data and other variables as well as relationships between neurometabolites, cytokines and other variables were analysed with Spearman Rank Order correlation, with significance set at Spearman's $R > \pm0.06$ and $p<0.01$. Significant correlations underwent further testing with comparison of correlations of independent samples [236].

4.4 Results

4.4.1 Demographic and clinical variables

The healthy control group had higher levels of school ($H_{(2;98)}=21.42$, $p<0.0001$) and post school ($H_{(2;98)}=8.34$, $p<0.05$) education compared to the SCZ and MAP groups. There were no significant between-group differences on clinical questionnaires, which assess clinical symptomology and illness severity, between the SCZ and MAP groups. (Table 1)

4.4.2 Drug use variables

The MAP group had earlier onset of MA use ($H_{(2;43)}$=6.49, $p<0.05$) than the SCZ group, had longer duration of MA use (F=3.91, $p<0.05$) compared to the healthy control group, and short duration of abstinence from MA ($H_{(2;42)}$=7.23, $p<0.05$) compared to the SCZ group. (Table 1)

4.4.3 Clinical questionnaires

The SCZ and MAP groups scored higher than the healthy control group on the PANSS positive scale ($H_{(2;96)}$=42.19, $p<0.0001$), PANSS negative scale ($H_{(2;96}$=46.11, $p<0.0001$), PANSS general psychopathology scale ($H_{(2;96)}$=32.63, $p<0.0001$), PANSS total scale score ($H_{(2;96)}$=48.27, $p<0.0001$), and CGI-S ($H_{(2;97)}$=61.20, $p<0.0001$). The healthy control group scored higher than the SCZ and MAP groups on the GAF ($H_{(2;97)}$=51.20, $p<0.0001$). (Table 1)

4.4.4 Kreek-McHugh-Schluger-Kellogg scale (KMSK) scores

The MAP group scored higher than the healthy control group on the KMSK Alcohol lifetime amount score ($H_{(2;77)}$=6.10, $p<0.05$). The MAP and SCZ groups scored higher than the health control group on the KMSK Tobacco lifetime frequency score ($H_{(2;97)}$=13.56, $p<0.01$). The MAP group scored higher than the healthy control group on the KMSK Tobacco lifetime duration ($H_{(2;97)}$=10.99, $p<0.01$); the SCZ and MAP groups scored higher than the healthy control group on the KMSK Tobacco lifetime amount ($H_{(2;91)}$=10.54, $p<0.01$), and KMSK Tobacco lifetime total ($H_{(2;91)}$=12.14, $p<0.01$) scores. The MAP group scored higher than the SCZ and healthy control groups on the KMSK Cocaine lifetime frequency ($H_{(2;97)}$=9.76, $p<0.01$), KMSK Cocaine lifetime duration ($H_{(2;97)}$=9.40, $p<0.01$), KMSK Cocaine lifetime total ($H_{(2;94)}$=7.32, $p<0.05$), KMSK Heroin lifetime frequency ($H_{(2;97)}$=17.66, $p<0.001$), KMSK Heroin lifetime duration ($H_{(2;97)}$=17.67, $p<0.001$), KMSK Heroin lifetime amount ($H_{(2;97)}$=12.84, $p<0.01$), and KMSK Heroin lifetime total ($H_{(2;97)}$=17.78, $p<0.001$) scores. The MAP and SCZ groups scored higher than the healthy control group on the KMSK Cannabis lifetime frequency score ($H_{(2;97)}$=15.73, $p<0.001$). the MAP group scored higher than the healthy control group on the KMSK Cannabis lifetime duration ($H_{(2;97)}$=12.24, $p<0.01$), KMSK Cannabis lifetime amount ($H_{(2;82)}$=9.35, $p<0.01$) and KMSK Cannabis lifetime total ($H_{(2;82)}$=11.64, $p<0.01$) scores. The MAP group scored higher than the SCZ and healthy control groups on the KMSK Methamphetamine lifetime frequency score ($H_{(2;97)}$=51.40, $p<0.0001$). KMSK Methamphetamine lifetime duration ($H_{(2;97)}$=52.07, $p<0.0001$), KMSK Methamphetamine lifetime method ($H_{(2;97)}$=44.69, $p<0.0001$) and KMSK Methamphetamine lifetime total ($H_{(2;97)}$=53.00, $p<0.0001$) scores. (Table 1)

4.4.5 Neurometabolites

The MAP group had lower NAA+NAAG/Cr+PCr in the left DLPFC (Chi square=6.21; $p<0.05$) and left FWM ($H_{(2;97)}$=7.32; $p<0.05$) compared to the control group. No other significant metabolite concentration differences were found. (Figure 3, Table 2)

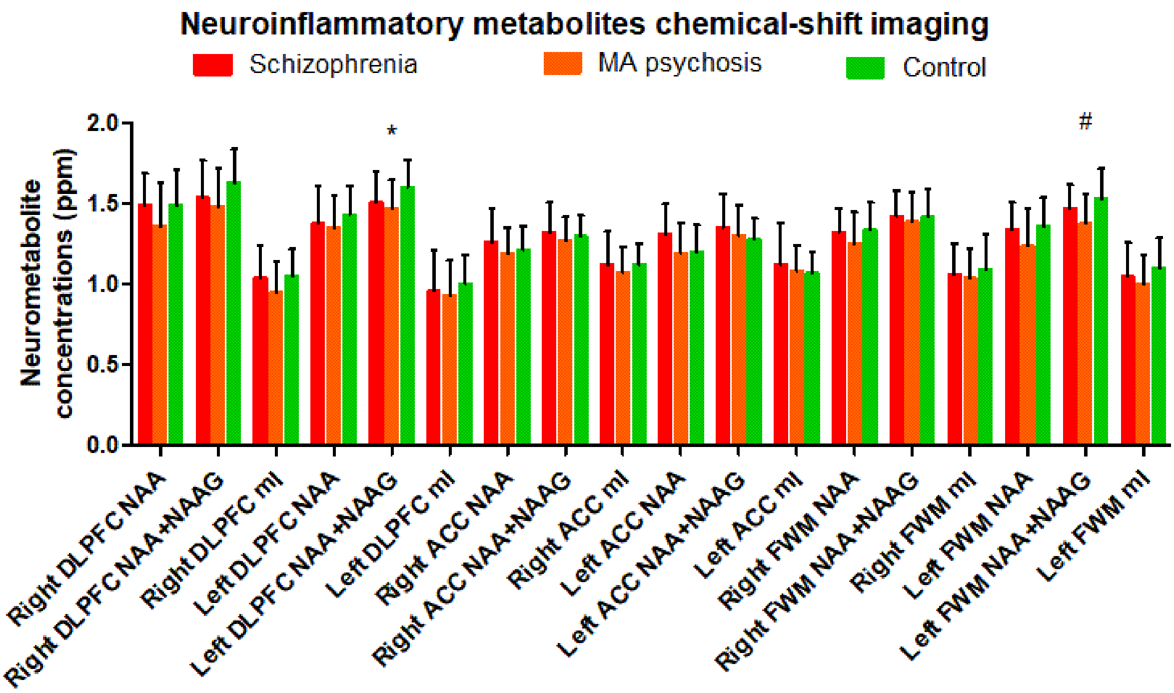

Figure 3 The methamphetamine-induced psychosis group had lower absolute n-acetyl-aspartate with n-acetyl-aspartyl-glutamate (NAA+NAAG) in the left dorsolateral prefrontal cortex (DLPFC) (p<0.05) and left frontal white matter (FWM) (p<0.05) compared to the control group. Neurometabolite concentrations are reported as parts per million (ppm).

NAA – n-acetyl-aspartate; mI – myo-inositol; ACC – anterior cingulate cortex

Table 2 – Neurometabolite concentrations of all brain areas across the three groups

Statistics of neurometabolites and peripheral cytokines						
	Schizophrenia group		Methamphetamine-induced psychosis group		Healthy control group	
	Mean	StDev	Mean	StDev	Mean	StDev
Neurometabolites relative to creatine with phosphocreatine (chemical-shift imaging)						
Right anterior cingulate cortex n-acetyl-aspartate	1,263	0,209	1,197	0,160	1,212	0,154
Left anterior cingulate cortex n-acetyl-aspartate	1,308	0,186	1,186	0,186	1,199	0,171
Right anterior cingulate cortex n-acetyl-aspartate with n-acetyl-aspartyl-glutamate	1,316	0,195	1,307	0,152	1,300	0,129
Left anterior cingulate cortex n-acetyl-aspartate with n-acetyl-aspartyl-glutamate	1,354	0,207	1,331	0,184	1,275	0,130
Right anterior cingulate cortex *myo*-inositol	1,119	0,208	1,086	0,164	1,119	0,127
Left anterior cingulate cortex *myo*-inositol	1,122	0,264	1,074	0,184	1,071	0,127
Right dorsolateral prefrontal cortex n-acetyl-aspartate	1,489	0,201	1,383	0,267	1,491	0,220
Left dorsolateral prefrontal cortex n-acetyl-aspartate	1,434	0,233	1,411*	0,201	1,478	0,182
Right dorsolateral prefrontal cortex n-acetyl-aspartate with n-acetyl-aspartyl-glutamate	1,537	0,230	1,529	0,232	1,629	0,210
Left dorsolateral prefrontal cortex n-acetyl-aspartate with n-acetyl-aspartyl-glutamate	1,505	0,195	1,529	0,181	1,600	0,166
Right dorsolateral prefrontal cortex *myo*-inositol	1,044	0,202	0,955	0,188	1,053	0.171
Left dorsolateral prefrontal cortex *myo*-inositol	0,965	0,195	0,963	0,214	1,003	0,181
Right frontal white matter n-acetyl-aspartate	1,322	0,147	1,280	0,192	1,339	0,166
Left frontal white matter n-acetyl-aspartate	1,340	0,168	1,259	0,226	1,358	0,181
Right dorsolateral prefrontal cortex n-acetyl-aspartate with n-acetyl-aspartyl-glutamate	1,416	0,164	1,427	0,178	1,420	0,170
Left frontal white matter n-acetyl-aspartate with n-acetyl-aspartyl-glutamate	1,468	0,150	1,390*	0,178	1,529	0,190
Right frontal white matter *myo*-inositol	1,058	0,193	1,082	0,185	1,087	0,181
Left frontal white matter *myo*-inositol	1,050	0,207	1,002	0,182	1,104	0,190

** The methamphetamine-induced psychosis group had lower absolute n-acetyl-aspartate with n-acetyl-aspartyl-glutamate (NAA+NAAG) in the left dorsolateral prefrontal cortex (DLPFC) ($p<0.05$) and left frontal white matter (FWM) ($p<0.05$) compared to the control group.*

4.5 Associations

4.5.1 Demographic variables and neurometabolites

In the MAP group, a positive association was found between years of school education and thalamic NAA+NAAG (Spearman's R=0.63, p<0.01. (Table 2)

4.5.2 Kreek-McHugh-Schluger-Kellogg scale (KMSK) and neurometabolites

In the MAP group, KMSK Alcohol lifetime amount was positively associated with thalamic NAA+NAAG (Spearman's R=0.68, p<0.01). (Table 2)

4.5.3 Cytokines and neurometabolite variables

No significant relationships were found between peripheral cytokines and neurometabolites.

4.5.4 Neuroinflammatory metabolites between brain areas

In the MAP group positive associations were found between mI in the left thalamus and mI/Cr+PCr in the left (Spearman's R=0.64, p<0.01) and right (Spearman's R=0.65, p<0.01) ACC (Figure 4).

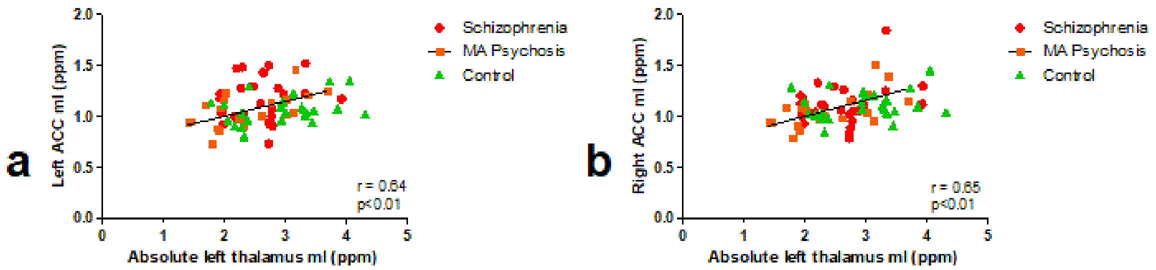

Figure 4 Positive associations were found in the methamphetamine (MA)-psychosis group between 1) absolute thalamic myo-inositol (mI) and myo-inositol (mI) in the left anterior cingulate cortex (p<0.01), and b) myo-inositol (mI) in the right anterior cingulate cortex (p<0.01).

Table 3 – Significant associations with comparison of correlations of independent samples

				Comparison of correlations of independent samples			
Methamphetamine-induced psychosis group				**With SCZ**		**With CON**	
Variable 1	Variable 2	Spearman's R	p-value	Fisher Z	p-value	Fisher Z	p-value
KMSK Alcohol lifetime amount	Absolute thalamic NAA+NAAG	0,68	p<0,01	2,42*	p<0,01	1,90	n/s
Years of school education	Absolute thalamic NAA+NAAG	0,63	p<0,01	1,77	n/s	4.21	n/s
Absolute thalamic mI	Left ACC mI/Cr+PCr	0.64	p<0.01	2.50*	p<0.01	1.54	n/s
Absolute thalamic mI	Right ACC mI/Cr+PCr	0.65	p<0.01	2.03	n/s	1.73	n/s

Table 2 –In the methamphetamine-induced psychosis (MAP) group, the following positive associations were found: KMSK Alcohol lifetime amount score and absolute ($p<0.01$) *n-acetyl-aspartate with n-acetyl-aspartyl-glutamate (NAA+NAAG) in the left thalamus, , years of school education and absolute n-acetyl-aspartate with n-acetyl-aspartyl-glutamate (NAA+NAAG) in the left thalamus* ($p<0.01$)*, absolute myo-inositol (mI) in the left thalamus and relative myo-inositol (mI) in the left** ($p<0.01$) *and right* ($p<0.01$) *anterior cingulate cortex (ACC).*

KMSK – Kreek-McHugh-Schluger-Kellogg scale; Cr+PCr – creatine with phosphocreatine; CON – healthy control group

4.6 Discussion

The main findings of this dissertation were 1) The SCZ group did not show any between group neurometabolite differences, compared to healthy controls, 2) The MAP group had lower NAA+NAAG/Cr+PCr in the left DLPFC and left FWM, as well as higher mI/Cr+PCr in the left thalamus, 3) associations between glutamatergic and neuroinflammatory metabolites in the ACC in the SCZ group, and between glutamatergic metabolites in the ACC and neuroinflammatory metabolites in the left thalamus in the MAP group.

The lack of a significant differences between ^{1}H-MRS metabolite findings in SCZ group relative to healthy controls could be attributed to the chronic use of antipsychotic medicine in these patients. Antipsychotic medicine has been shown to normalise metabolites over time [238].

The finding of lower NAA+NAAG/Cr+PCr in the left DLPFC and left FWM in the MAP group is consistent with prior work in MA abuse [27,117,118,144–146,149] and MAP [118] and could indicate compromised neuronal health, density and metabolism [134–136]. This is the second study investigating NAA compounds in MAP, with the previous study not mentioning duration of diagnosis [118]. This study investigated neuroinflammatory metabolites in MAP with chronic disease progression, and this finding could indicate that neuronal integrity remains compromised over time. This is an important aspect which adds to current literature aiming to understand the neurobiology of MAP.

The lack of significant associations between peripheral cytokines and neuroinflammatory metabolites in the SCZ and MAP groups could be associated with the use of antipsychotic medication. Antipsychotics have been shown to be an effective treatment for both SCZ and MAP [246–250], as well as reducing inflammation in the brain [238]. Further research, supported by neuroimaging methods such as PET/SPECT and functional MRI, is needed to determine whether antipsychotic medication use results in true normalisation of neurometabolites or whether there is an adaptation in neuronal functioning within the brain, reflecting normalisation of neurometabolites.

The associations between years of school education and absolute NAA+NAAG, and years of post-school education and NAA+NAAG/Cr+PCr in the left thalamus in the MAP group has been previously reported in studies investigating ^{1}H-MRS in MA abuse [113,115,190]. The lack of significant associations between metabolites and PANSS, CGI-S and GAF scores [21,30,104,109,115–117,137,138,140] in both disorders, and with MA use variables in MAP [114], is contradictory to previous literature, and could be the result of antipsychotic medication use by both groups. One previous study also reported no significant associations between clinical or drug use variables were found [118]. The associations found between the KMSK Alcohol lifetime amount score and NAA+NAAG in the left thalamus of the MAP group is consistent with studies investigating alcohol abuse [240–244]. Increased alcohol consumption has not been reported in MAP, only in MA abuse [190].

In the MAP group, the associations of mI between different brain areas in the thalamo-cortical circuitry are interesting. Higher thalamic mI was positively associated with higher mI in the left and right ACC, suggesting neuroinflammation in the thalamus-ACC circuit in chronic MAP. Higher concentrations of mI have been associated with neuroinflammation through microglial activation [72]. MA has been shown to disrupt the thalamo-cortical circuit at the ventral striatum, within the ACC-thalamus circuit [74,76]. Subsequently, the dysfunction seen in the ACC and left thalamus could be a result of dysfunction of another area in the circuit, which provides direction for future research. Higher concentrations of mI have been reported in MA abstinence [27,28,73], however no studies have been reported in MAP or within the thalamo-cortical circuitry. These associations provide great insight into the neurobiology and disease progression of MAP. However, too few studies have been done in MAP to allow for full understanding of the effect of mI and whether the associations found in this investigation does indeed represent neuroinflammation.

In summary, this study provides new insight into the chronic disease progression, specifically pertaining to neuronal integrity, in MAP. The associations found in mI between different brain areas in SCZ and MAP suggest that neuroinflammatory processes could be involved in chronic disease progression of both disorders and are consistent with the hypothesis that neuroinflammation would be involved in both disorders. The lack of finding lower NAA compounds in SCZ and in more brain areas in MAP does not support the hypothesis that decreased neuronal integrity and health would be found in all the brain areas investigated. The findings do provide insight to the psychobiology and disease progression in SCZ and MAP, which has not been reported elsewhere.

Chapter 5 - Discussion

Table 1 - The main findings of this dissertation.

Finding	Brain areas investigated	^{1}H-MRS metabolites investigated	Possible implication(s)
No significant neurometabolite group differences were observed in the SCZ group, compared to healthy control group.	ACC (single voxel), left thalamus (SVS), bilateral DLPFC (CSI), bilateral ACC (CSI), bilateral FWM (CSI)	NAA, NAA+NAAG, mI, NAA/Cr+PCr, NAA+NAAG/Cr+PCr, mI/Cr+PCr	1) Use of antipsychotic medication, 2) neuroinflammation exacerbated during active psychosis and relapse.
Lower NAA+NAAG/Cr+PCr in left DLPFC and left FWM in MAP group compared to control group.	Bilateral DLPFC (CSI), bilateral ACC (CSI), bilateral FWM (CSI)	NAA/Cr+PCr, NAA+NAAG/Cr+PCr, mI/Cr+PCr	Decreased neuronal integrity that persists over time into chronic disease progression in the DLPFC-thalamus circuit.
Positive associations between glutamatergic and neuroinflammatory metabolites in the ACC in the SCZ group	ACC (single voxel), left thalamus (SVS)	Glu, Glx, NAA, NAA+NAAG, mI	Dysfunction of the relationship between NAA and Glu in the glutamate-glutamine cycle and could indicate neuronal dysfunction and possible excitotoxicity in the thalamo-cortical circuitry in MAP.
Positive relationships between mI in the left thalamus and mI/Cr+PCr in bilateral ACC	ACC (single voxel), left thalamus (SVS), bilateral DLPFC (CSI), bilateral ACC (CSI), bilateral FWM (CSI)	NAA, NAA+NAAG, mI, NAA/Cr+PCr, NAA+NAAG/Cr+PCr, mI/Cr+PCr	Novel finding of higher mI, supporting neuroinflammation hypothesis, between brain areas in the thalamo-cortical circuitry in MAP.

The use of antipsychotic medication could explain the lack of significant differences in between-group ^{1}H-MRS metabolite findings and associations between metabolites and peripheral cytokine concentrations in the SCZ group. Antipsychotic medicine has been reported to increase metabolic activity in the thalamus [237], with patients medicated for an average of 7 years having greater metabolic activity in the striatum and thalamus compared to patients treated with antipsychotic medication for one year [237]. The use of antipsychotic medication has also been shown to reduce neuroinflammation and normalise metabolites over time [251–253] in patients with SCZ. Antipsychotic medication appears to exert its effect through the dopaminergic system, specifically dopamine receptors [3,254], which in turn reduces neurometabolite concentrations as the dopaminergic and glutamatergic pathways are interlinked. Antipsychotic medication has also been shown to decrease proinflammatory cytokines [255], causing a reduction of inflammation as well as normalisation of associated neurometabolites. Even though inflammation could be reduced through the use of antipsychotic medication, cognitive symptoms remained impaired [3], which provides direction for further research, supported by neuroimaging methods such as PET/SPECT and functional MRI, as well as cognitive assessment to determine whether antipsychotic medication use results in true normalisation of neurometabolites or whether there is an adaptation in neuronal functioning within the brain, reflecting normalisation of neurometabolites.

Another school of thought is that neuroinflammation and psychosis do not occur simultaneously, but that neuroinflammation could precede the onset of active psychosis in SCZ [256]. Cytokines could also be associated with symptom severity, peaking during acute psychosis and relapse, and would therefore not remain at a steady concentration [257–259]. Understanding the role cytokines play in the clinical course of SCZ and MAP is becoming increasingly important. There has been no research in MAP that addresses this school of thought described above and provides a direction for future research.

Lower NAA+NAAG/Cr+PCr in the left DLPFC and left FWM in the MAP group is consistent with previous work in MA abuse [26,27,117,118,144–146,149] and short- to medium term disease progression in MAP [118]. Lower NAA compounds are associated with a decrease in neuronal health, density, and metabolism in the DLPFC [27,134–136]. Lower NAA concentrations in the DLPFC have been reported in long-term disease progression in SCZ [106,110]. No studies have reported on long-term disease progression in MAP, and with MAP being considered a biological model for SCZ, this is an important finding to further understanding of the neurobiology of chronic MAP. This finding is consistent with the hypothesis that lower NAA compounds would be found in the frontal brain areas in MAP. This finding provides deeper understanding of how long-term disease progression of MAP affects the psychobiology of the disorder, through neuronal health in frontal brain areas within the thalamus-DLPFC circuit.

The positive associations between glutamatergic and neuroinflammatory metabolites in the ACC in the SCZ group suggest that important relationships exist between these pathways, specifically in the thalamo-cortical circuitry, in this disorder. NAA, NAA+NAAG and Glu are connected through the glutamate-glutamine cycle, and lower concentrations of all three neurometabolites could indicate neuronal dysfunction [125,134] in the ACC. Lower NAA compounds are associated with decrease in neuronal health and viability [27,134–136] and has been reported in long-term disease progression in SCZ [106,110]. Glutamate is an excitatory neurotransmitter, and lower concentrations of this metabolite could be harmful to the brain, as neurotransmission would be negatively affected [260]. Together, compromised neuronal health combined with compromised neurotransmission could have a serious effect on the brain of patients with chronic SCZ, and could result in cognitive deficits often seen in patients with SCZ. These associations could also indicate a dysfunctional relationship between NAA compounds and Glu, however studies investigating this relationship are few [106,117] and further research is required to fully understand its role in SCZ.

A positive association was found between higher concentrations of Glu in the ACC and higher NAA+NAAG concentrations in the left thalamus in MAP. NAA turnover is coupled to Glu turnover in the glutamate-glutamine cycle, and this finding could indicate a dysfunctional relationship between Glu and NAA in the ACC-thalamus circuit through excitotoxicity. Higher concentrations of NAA has been associated with a compromised communication system between neurons and glial cells, and continuous disruption could result in progressive deterioration in neural function in the central nervous system [261]. Significantly increased concentrations of Glu has been associated with neuronal injury and death [97]. The combination of higher concentrations of NAA and Glu appears to be dangerous and could have detrimental effects on the functioning of the brain in patients with MAP. The suggestion of a dysfunctional Glu and NAA relationship, possibly indicating excitotoxicity in the thalamo-cortical circuit in MAP is consistent with some previous work. This finding in MAP needs more exploration in future research due to the lack of associations found between cytokines and metabolites, and the lack of significance found with comparison of correlations with the SCZ and healthy control groups to support a hypothesis of neuroinflammation.

The positive associations of higher mI, supporting the hypothesis of neuroinflammation in MAP, between different brain areas of the thalamo-cortical circuitry in MAP are interesting and novel. Previous studies investigating mI in MA abuse reported higher mI concentrations in prefrontal brain areas [26–28]. This is the first study to directly compare mI between brain areas associated with the thalamo-cortical circuit, and to report possible neuroinflammatory pathways in MAP, which provides significant insight into the psychobiology and long-term disease progression of MAP. This finding should be interpreted with caution as too few studies have investigated mI in MAP, and it provides direction for future research to fully delineate the effects of mI on the thalamo-cortical circuitry in MAP.

Taken together, there may be important differences between the neurobiology of SCZ and of MAP. Evidence of compromised neuronal integrity and metabolism in the thalamo-cortical circuitry appear apparent in MAP, whereas there appears to be a novel relationship between neuro-excitotoxicity and neuroinflammation in the thalamo-cortical circuitry in SCZ. This is supported by the associations found between higher concentrations of mI between different brain areas within the thalamo-cortical circuit. A dysfunctional association found between Glu and NAA in the ACC in SCZ could indicate neuronal dysfunction, however, this relationship is not fully understood. Previously, glutamatergic upregulation was reported in schizophrenia, together with compromised neuronal integrity. The associations of mI between different brain areas in SCZ and MAP could be an indication of neuroinflammatory processes that may be involved in the disease progression of both disorders. The combination of metabolites measured in brain areas associated with the thalamo-cortical circuitry, as well as the association between cytokines and metabolites, have not been found before. This provides new insight into the neurobiological dysfunction in both disorders, suggesting that there are neurobiological underpinnings of both disorders not previously reported. These findings could provide better understanding of the psychobiology of both disorders.

5.1 Limitations

Several limitations deserve emphasis. First, the sample size of the two separate studies was relatively small, but the findings from these studies provide future research opportunities. Second, the study design did not allow for analyses of the full cohort. Third, the hypotheses were only partially supported, and could be a result of low power to detect group differences following correction for multiple comparisons. Fourth, use of antipsychotic medication use was obtained through self-report and was unreliable (Table 2). Subsequently, it could not be used in statistical analyses to control for use of antipsychotic medication. Fifth, studies of substance abuse are almost invariably confounded by selective disclosure and polysubstance use. The KMSK questionnaire was used to obtain drug-use data but remains a self-report questionnaire. It also does not include all drugs of abuse that could possibly be relevant in this specific cohort. Sixth, some of the participants in this study, especially in the MAP group, have previously used cocaine, heroin, methaqualone and mandrax, which could have caused neurobiological changes at that time. It is extremely difficult to find MA users who use only MA. Seventh, participants were not tested for cocaine, heroin, marijuana or mandrax use, which may have influenced the findings. Eighth, the effect of alcohol and nicotine could potentially have influenced neurometabolite concentrations, as participants did not cease their alcohol or nicotine use during the study. Ninth, it is known that both schizophrenia and methamphetamine-induced psychosis are more prevalent amongst males. However, it was difficult to recruit male healthy controls from the same catchment area as the SCZ and MAP groups. Tenth, the findings of this study are mostly associations between neurometabolites and between brain areas within the thalamo-cortical circuitry. It is not fully understood what happens at a cellular level within the brain, which does not allow for complete interpretation of the findings. The lack of understanding of causal relations limits the understanding of these associations.

Table 2 – Antipsychotic medication use in the schizophrenia and methamphetamine-induced psychosis groups

Medication			
Diagnosis	**Sex**	**Medication prescribed**	**Compliance / Relevant information**
Schizophrenia group			
SCZ	Male	None reported	Could not remember prescribed medications
SCZ	Male	Not using medication prescribed	Not compliant
SCZ	Male	Olanzapine 10mg twice daily, Sodium Valproate 200mg daily	Reported adherent
SCZ	Male	Risperidone 3mg twice daily, Zuclopenthixol depot 200mg monthly, Promethazine 25mg at night	Reported adherent
SCZ	Female	Olanzapine 10mg twice daily, Diazepam 5mg twice daily, Sodium Valproate 500mg twice daily	Reported adherent
SCZ	Male	Olanzapine 10mg at night, Orphenadrine 50mg twice daily	Reported adherent
SCZ	Male	Risperidone 3mg twice daily, Orphenadrine 50mg twice daily	Reported adherent
SCZ	Male	Risperidone 3mg in the morning	Reported adherent
SCZ	Female	Haloperidol 0.5mg at night, Lorazepam 1mg twice daily	Reported adherent
SCZ	Male	Risperidone 2mg at night	Reported adherent
SCZ	Male	Olanzapine 20mg at night	Reported adherent
SCZ	Male	Risperidone 3mg twice daily	Reported adherent
SCZ	Male	Clozapine 150mg in the morning and 250mg at night, Sodium Valproate 800mg twice daily	Reported adherent
SCZ	Male	Clozapine 400mg at night	Reported adherent
SCZ	Female	None reported	Could not remember prescribed medications
SCZ	Female	Quetiapine 300 mg and 750mg, both at night	Medication reporting inaccurate and unreliable
SCZ	Male	None reported	Could not remember prescribed medications
SCZ	Male	None reported	Could not remember prescribed medications
SCZ	Male	Olanzapine 15mg once daily, Citalopram 20mg once daily	Reported adherent
SCZ	Male	Clozapine, Depot monthly, Sodium Valproate	Unreliable reporting

SCZ	Female	Olanzapine 20mg at night, Flupentixol depot 20mg monthly	Reported adherent
SCZ	Male	Clozapine 100mg twice a day, Sodium Valproate 500mg in the morning and 1000mg at night	Reported adherent
SCZ	Male	Risperidone 4mg once daily	Reported adherent
SCZ	Male	Olanzapine 10mg at night, Zuclopenthixol depot 50mg monthly, Fluoxetine 20mg in the morning	Reported adherent
SCZ	Male	Flupentixol depot 20mg monthly, Amitriptyline 25mg at night, Sodium Valproate 300mg twice daily	Reported adherent
SCZ	Male	Risperidone, Lorazepam 10mg in the morning and 20mg at night, Sodium Valproate 500mg twice daily, Orphenadrine depot 30mg monthly	Unreliable reporting of Risperidone dosage, reported adherent to medication regime
SCZ	Female	Risperidone 2mg once daily, Orphenadrine 50mg once daily	Reported adherent
SCZ	Male	Clozapine and monthly depot were prescribed	Not compliant
SCZ	Male	Haloperidol 4mg once daily, Orphenadrine 50mg twice daily, Fluoxetine 20mg once daily	Reported adherent
SCZ	Male	Risperidone 1mg in the morning and 2mg at night, Sodium Valproate 700mg twice daily	Reported adherent
SCZ	Female	Chlorpromazine 200mg in the morning and 300mg at night, Zuclopenthixol depot 400mg monthly	Reported adherent
SCZ	Male	Risperidone 1mg daily	Reported adherent
SCZ	Male	Flupentixol 10mg twice daily	Reported adherent
SCZ	Male	Risperidone 1mg twice daily, Antipsychotic depot monthly	Unable to report name of depot
SCZ	Female	Clozapine	Unable to report dosage
SCZ	Male	Not using medication prescribed	Not compliant
SCZ	Male	Risperidone 1.5mg twice daily	Reported adherent
SCZ	Male	Clozapine 300mg at night	Reported adherent
Methamphetamine-induced psychosis group			
MAP	Female	Risperidone 1mg in the morning and 2mg at night	Not compliant

MAP	Male	None reported	Reports not to be on medication, unreliable
MAP	Male	Risperidone 1mg in the morning, Sodium Valproate 300mg twice daily	Reported adherent
MAP	Male	Risperidone 1mg in the morning and 3mg at night, Orphenadrine 150mg once daily, Sodium Valproate 1200mg twice daily	Reported adherent
MAP	Male	None reported	Reports not to be on medication, unreliable
MAP	Male	Risperidone 1mg in the morning and 2mg at night, Sodium Valproate 500mg in the morning and 300mg at night	Reported adherent
MAP	Male	None reported	Reports not to be on medication, unreliable
MAP	Male	None reported	Reports not to be on medication, unreliable
MAP	Female	Haloperidol 1000mg twice daily	Reported adherent
MAP	Male	Olanzapine 10mg once daily, Sodium Valproate 800mg twice daily	Reported adherent
MAP	Male	Risperidone 2mg once daily	Reported adherent
MAP	Male	None reported	Reports not to be on medication, unreliable
MAP	Female	None reported	Reports not to be on medication, unreliable
MAP	Male	None reported	Reports not to be on medication, unreliable
MAP	Male	Haloperidol 7.5mg at night, Sodium Valproate 700mg twice daily	Reported adherent
MAP	Male	None reported	Reports not to be on medication, unreliable
MAP	Male	None reported	Reports not to be on medication, unreliable
MAP	Male	None reported	Reports not to be on medication, unreliable
MAP	Female	None reported	Reports not to be on medication, unreliable
MAP	Female	None reported	Reports not to be on medication, unreliable
MAP	Male	Olanzapine 5mg at night	Reported adherent
MAP	Male	Risperidone 4mg at night, Orphenadrine 50mg twice daily	Reported adherent
MAP	Female	Fluphenazine decanoate depot 40mg monthly, Orphenadrine 50mg once daily	Reported adherent
MAP	Female	Risperidone 3mg at night	Reported adherent
MAP	Male	Haloperidol 12.5mg twice daily, Orphenadrine 50mg twice daily	Reported adherent
MAP	Male	Not adherent	Reports not to be on medication, unreliable
MAP	Male	Haloperidol 2.5mg twice daily	Reported adherent
MAP	Male	Risperidone 1mg twice daily, Phenylene 15mg twice daily	Reported adherent
MAP	Male	Haloperidol 2.5mg twice daily	Reported adherent

MAP	Male	None reported	Reports not to be on medication, unreliable
MAP	Male	Risperidone 4mg at night	Reported adherent

5.2 Directions for future research

This study provides several directions for future research. First, ^{1}H-MRS studies investigating glutamatergic metabolites could be done with PET/SPECT scans, which can determine NMDAR function in chronic SCZ and MAP. A combination of these neuroimaging methods could provide more in-depth insight into the neurobiology of glutamate function or dysfunction in both disorders. Second, the effect of antipsychotic medicine on glutamatergic and neuroinflammatory pathways in SCZ and MAP could be investigated and compared with medication naive SCZ and MAP patients. Further investigation could be supplemented with other neuroimaging methods such as PET/SPECT and functional MRI, as well as with neurocognitive assessment to determine whether cognition improves over time with the use of antipsychotic medication. Third, a study similar to the present study, comparing medication naive, medicated early diagnosis, in chronic SCZ and MAP could provide valuable insight into the changes that occur in the various stages of disease progression in both disorders. Fourth, investigating the effects of higher mI concentrations on thalamo-cortical brain areas in MAP would provide better understanding of whether it is indeed related to neuroinflammation. Lastly, it is important to gain insight into where MA disrupts the thalamo-cortical circuit using neuroimaging methodology. Studies using PET/SPECT might be able to provide insight into which specific brain areas are dysfunctional, and whether this corresponds with current theories.

5.3 Conclusion

This study provides new insight into the disease progression chronic MAP with the finding of lower concentrations of NAA+NAAG/Cr+PCr in MAP. Lower NAA+NAAG, representative of compromised neuronal integrity has only been reported previously in MA abuse and abstinence. This finding in MAP supports the findings of previous work primarily in MA abuse. In MAP, research is extremely limited and mostly only included studies on MA abuse and MA abstinence. This is the first study to investigate neuroinflammatory metabolites in brain areas within the thalamo-cortical circuitry in MAP. This study also provides novel insight into the psychobiology of chronic MAP, specifically pertaining to disruption of the thalamo-cortical circuitry.

Associations between lower Glu and lower NAA and NAA+NAAG suggest dysfunction of neuronal tissue causing disruption of the glutamate-glutamine cycle within brain areas in the thalamo-cortical circuitry in SCZ. It appears that the thalamo-cortical circuitry is disrupted in both disorders neuroinflammation through higher concentrations of mI between different brain areas in the thalamo-cortical circuitry. This highlights similarities as well as differences in the psychobiology of SCZ and MAP and provides a deeper understanding of the long-term disease progression of both disorders. The findings from this study provides direction for future studies, which could, with further investigation into metabolite changes in the thalamo-cortical circuitry using larger cohorts, influence clinical treatment of the two disorders.

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Appendix A - Participant information sheet and consent form

UNIVERSITY OF CAPE TOWN

Modelling neuro-inflammation in schizophrenia:

A magnetic resonance imaging,

electroencephalography, and cytokine study

RESEARCH STUDY

UCT FHS HREC Ref no. 413/2016

Participant information sheet

Your body protects itself from harm through activation of your immune system, e.g. when you have a cold/flu your body's immune system works really hard to kill off the germs that make the cold/flu.

How the immune system works has been shown to change when you have a mental illness. We don't understand how it works in these illnesses. This research study will look at your immune system, by drawing blood and analyzing your immune system. Then we will scan your brain and record from your brain to see if what is in your blood is related to what is in your brain to understand mental illness better. This information may help researchers to develop better medication for people with mental illness.

We are recruiting 105 people, 70 of which have a diagnosis of either schizophrenia or methamphetamine-induced psychotic disorder. Then we are recruiting 35 people from similar backgrounds. All people who participate need to be within the ages of 20 and 50 years old.

***

You cannot participate if you have any of the following: *chronic medical illness that is known to interfere with metabolic processes (e.g. hyper/hypo-thyroidism, diabetes type I or II, etc.) or immune dysfunction or immune system is compromised (e.g. HIV, TB, lupus, etc.); major brain trauma, brain injury, or brain surgery which resulted in hospitalization or* *clinical examination; clinical appearance of mental retardation; female participants will be excluded if there is current or recent pregnancy, or if they are breastfeeding.*

Additional criteria for participants with a diagnosis of schizophrenia: Participants will be excluded from the study if they present with psychosis due to a medical condition or substance abuse/use.

Additional criteria for participants with a diagnosis of methamphetamine-induced psychotic disorder if applicable: *Participants will be included if they have a history of MA dependence and MA- induced psychotic disorder; participants will be excluded from the study if they present with a current or past substance dependence or excessive abuse other than MA or nicotine or alcohol (e.g. cannabis, methaqualone, MDMA (ecstasy) or cathinone).*

Additional criteria for the control group if applicable: *Control participants should have no known family history of psychotic illness; participants should not meet the criteria for an axis 1 disorder as per SCID tool.*

***

1st Research morning

08h30-13h30, may finish earlier @ Department of Psychiatry, UCT, Groote Schuur Hospital

The first morning, starting @ 8h30, we will take you through this form and will ask you to sign the end of this document if you would like to be part of this research study. Then we will draw blood from your arm, we will draw less than 50ml of blood – which is a similar amount that you find in a deodorant bottle (Figure 1). **It is very important that you don't have breakfast that morning.** Bruising may occur around the needle site, a day or two after, so please do not be alarmed by this if it occurs. After we have drawn your blood we will give you snacks and a cool drink for breakfast.

Figure 1 How much blood is drawn

Then you are interviewed, we ask you lots of questions, about your life and how you feel. This is a lot of talking but if you need a short break at any time you can do this. After this, no later than 13h30, we will give you a R100 grocery voucher for Pick 'n Pay and R50 cash which is towards you traveling to us and back home.

***

2nd Research morning

08h30-12h30, may finish earlier @ Department of Psychiatry, UCT, Groote Schuur Hospital

The second morning, which has to happen within the next 10 days, includes the brain scan, the brain recordings, and a few more questions. Again we will start @ 8h30, but will be finished sooner before 12h30. When you come in we will ask for a saliva (spit) sample (Research to show them the device and how it works). Afterwards we will give you snacks and cool drink, you can have breakfast before you come to us. We will also give you a R200 grocery voucher for Pick 'n Pay and R50 cash which is towards your traveling to us and back home.

How do we scan your brain?

The brain scan that we will perform is called a magnetic resonance imaging or MRI scan. You lie on a bed and are put into the scanner for less than 1 hour.

You are checked to see whether you are okay in the scanner by a radiographer. He/she will check whether you have any kind of metal in your body and ask general health questions.

You are put on a hospital gown in a change room.

You lie down on the scanner bed once you are comfortable. Then a mask is clicked in over your face. Then the scanner bed moves into the tunnel.

It is so important that you lie still in the scanner, else we don't get a good scan of your brain and can't use it – so make sure you are comfortable before you move into the tunnel.

****The MRI scanner makes a lot of noise so you will be given ear protection. You will still hear the scanner and all the weird noises it makes but your ears will be protected from the noise the scanner makes. ****

How do we record from your brain?

The brain recording that we will do is called an electroencephalography or EEG. You sit in front of a screen and you have a cap, like a swimming cap, put on your head. This cap records from you and nothing goes into you from the equipment we use. This record takes less than 1 hour.

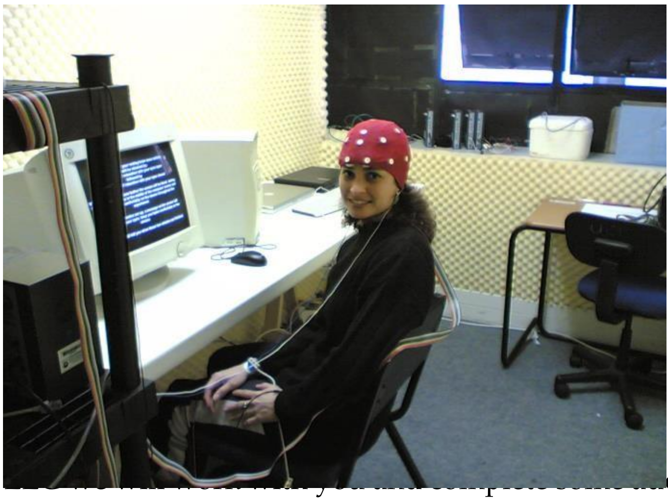
You are checked to find out whether you have had or have a family member with epilepsy – this is when the brain has a storm of activity.

You sit down in front of the screen

You have a cap put on you and other wires are attached, we only record from you – nothing goes into you.

Then you relax and complete some tests which you do your best at completing.

The EEG record does not make any noise, but you do need to sit and be relaxed during the record



After the MRI and EEG we will work with you and complete some additional questions, that are related to your drug use, experiences during childhood, and some other questions about who you are and whether you worry about different things.

It is important to note that all necessary regulations are and will be followed, including adherence to human research guidelines as stipulated in the Declaration of Helsinki (World

Medical Association, 2008). The protocol has been approved by the University of Cape Town's Human Research Ethics Committee (UCT HSF HREC). All necessary research clearances are kept up to date by the research team.

If you want to stop being in the research project at any time, you can. This will not affect your current or future medical care. This study is for research purposes only, and not funded by a drug company. Your personal details will be held confidentially, you name will not be attached to the information we collect from you. All the data, interview, questions, blood, scan, and EEG information collected will only be used for research purposes.

If you have any questions with respect to the present study do not hesitate to contact the principal investigator howellsfleur@gmail.com else 021 404 5480

If you would like to participate or would like to refer potential research participants please email participantstar@gmail.com to be in contact with the research team.

If you would like to contact the Research Ethics Committee: The UCT's Faculty of Health Sciences Human Research Ethics Committee can be contacted on 021 406 6338 in case you have any ethical concerns or questions about your rights or welfare as a participant on this research study.

Participant Name: __________________ Participant Number _________________

Modelling neuroinflammation in schizophrenia:

A magnetic resonance imaging, electroencephalography, and cytokine study

RESEARCH STUDY

UCT FHS HREC Ref no. 413/2016

CONSENT FORM

I voluntarily agree to participate in the present study: modelling neuroinflammation in schizophrenia: a magnetic resonance imaging, electroencephalography, and cytokine study

YES NO

I have been informed of the procedures and have a copy of the study's information sheet (attached).

YES NO

I consent (willing to complete) all of the procedures that are needed for this research project, checklist of procedures:

1. Psychiatrist interview with clinical scales	YES	NO
2. Blood draw	YES	NO
3. Saliva sample	YES	NO
4. Magnetic resonance imaging (MRI) brain scan	YES	NO
5. Electroencephalography (EEG) brain scan	YES	NO

6. More questionnaires with a researcher YES NO

If there are any procedures that the participant is not willing to undergo note here:

I understand that all information and data collected will be used for research purposes only, and will not affect my current or future medical treatment.

YES NO

I have been allowed the opportunity to ask questions that relate to the present study and they have been answered (else please ask these questions from the researcher before you sign this consent form). I am allowed to ask questions from any of the researchers that are involved in the research study that I interact with.

YES NO

What if Something Goes Wrong?

The University of Cape Town (UCT) has insurance cover for the event that research-related injury or harm results from your participation in the trial. The insurer will pay all reasonable medical expenses in accordance with the South African Good Clinical Practice Guidelines (DoH 2006), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI) in the event of an injury or side effect resulting directly from your participation in the trial. You will not be required to prove fault on the part of the University.

The University **will not be liable** for any loss, injuries and/or harm that you may sustain where the loss is caused by

The use of unauthorised medicine or substances during the study

Any injury that results from you not following the protocol requirements or the instructions that the study doctor may give you

Any injury that arises from inadequate action or lack of action to deal adequately with a side effect or reaction to the study medication.

An injury that results from negligence on your part.

[Researchers must bear in mind that it is unacceptable to impose a burden on participants who may not recognise symptoms or have the ready means to take action.]

"By agreeing to participate in this study, you do not give up your right to claim compensation for injury where you can prove negligence, in separate litigation. In particular, your right to pursue such a claim in a South African court in terms of South African law must be ensured. Note, however, that you will usually be requested to accept that payment made by the University under the SA GCP guideline 4.11 is in full settlement of the claim relating to the medical expenses. "

An injury is considered trial-related if, and to the extent that, it is caused by study activities. You must notify the study doctor immediately of any side effects and/or injuries during the trial, whether they are research-related or other related complications.

UCT reserves the right not to provide compensation if, and to the extent that, your injury came about because you chose not to follow the instructions that you were given while you were taking part in the study. Your right in law to claim compensation for injury where you prove negligence is not affected. Copies of these guidelines are available on request.

I (participant full name) am voluntarily participating in the

present study and am aware that at any point I may stop participating in the present study. If I stop participating, there will be no impact (affect) on my current or future medical treatment.

Participant signature ………….……………… date: DAY / MONTH / YEAR

Participant email and/or contact number:

…………………………………………………………………………………………………….

I (researcher full name) have gone through the consent form and

answered any questions that the participant has asked

Researcher signature ……………………………… date: DAY / MONTH / YEAR

Appendix B - Positive and negative syndrome scale (PANSS)

Participant Number________________________ Clinician ________ Date / /

Positive and negative syndrome scale (PANSS) - Rating Form

Kay SR, Opler LA, Lindenmayer J-P (1988). Reliability and validity of the positive and negative syndrome scale for schizophrenics. Psychiatry research, 23:99-110

Instructions: Circle the appropriate rating for each dimension following the specified clinical interview. Refer to the rating manual for item definitions, description of anchoring points, and scoring procedure

Positive scale		Absent	Minimal	Mild	Moderate	Moderate-severe	Severe	Extreme	**General psychopathology scale**		Absent	Minimal	Mild	Moderate	Moderate-severe	Severe	Extreme
P1	Delusions	1	2	3	4	5	6	7	G1	Somatic concern	1	2	3	4	5	6	7
P2	Conceptual disorganization	1	2	3	4	5	6	7	G2	Anxiety	1	2	3	4	5	6	7
P3	Hallucinatory behaviour	1	2	3	4	5	6	7	G3	Guilt feelings	1	2	3	4	5	6	7
P4	Excitement	1	2	3	4	5	6	7	G4	Tension	1	2	3	4	5	6	7

P5	Grandiosity	1	2	3	4	5	6	7	G5	Mannerisms & posturing	1	2	3	4	5	6	7
P6	Suspiciousness	1	2	3	4	5	6	7	G6	Depression	1	2	3	4	5	6	7
P7	Hostility	1	2	3	4	5	6	7	G7	Motor retardation	1	2	3	4	5	6	7
Negative scale		Absent	Minimal	Mild	Moderate	Moderate-severe	Severe	Extreme	G8	Uncooperativeness	1	2	3	4	5	6	7
N1	Blunted effect	1	2	3	4	5	6	7	G9	Unusual thought content	1	2	3	4	5	6	7
N2	Emotional withdrawal	1	2	3	4	5	6	7	G10	Disorientation	1	2	3	4	5	6	7
N3	Poor rapport	1	2	3	4	5	6	7	G11	Poor attention	1	2	3	4	5	6	7
N4	Passive/apathetic social withdrawal	1	2	3	4	5	6	7	G12	Lack of judgment & insight	1	2	3	4	5	6	7
N5	Difficulty in abstract thinking	1	2	3	4	5	6	7	G13	Disturbance of volition	1	2	3	4	5	6	7
N6	Lack of spontaneity &	1	2	3	4	5	6	7	G14	Poor impulse control	1	2	3	4	5	6	7

	flow of conversation																
N7	Stereotyped thinking	1	2	3	4	5	6	7	G15	Preoccupation	1	2	3	4	5	6	7
									G16	Active social avoidance	1	2	3	4	5	6	7
		Total															
	Positive scale																
	Negative scale																
	General psychopathology																
	Total score																

Appendix C - Clinical global impression severity scale

Participant Number__________________________ Research details _________ Date / /

Considering your total clinical experience with this particular population, how mentally ill is the patient at this time?

Clinical global impression severity scale (CGI-S)

0	Not assessed
1	Normal, not at all ill
2	Borderline mentally ill
3	Mildly ill
4	Moderately ill
5	Markedly ill
6	Severely ill
7	Among the most extremely ill patients

Appendix D - Global Assessment of Functioning

Participant Number__________________________ Research details _________ Date / /

Global Assessment of Functioning (GAF) scale (DSM - IV Axis V)

91 - 100	Person has no problems OR has superior functioning in several areas OR is admired and sought after by others due to positive qualities
81 - 90	Person has few or no symptoms. Good functioning in several areas. No more than "everyday" problems or concerns.
71 - 80	Person has symptoms/problems, but they are temporary, expectable reactions to stressors. There is no more than slight impairment in any area of psychological functioning.
61 - 70	Mild symptoms in one area OR difficulty in one of the following: social, occupational, or school functioning. BUT, the person is generally functioning pretty well and has some meaningful interpersonal relationships.
51 - 60	Moderate symptoms OR moderate difficulty in one of the following: social, occupational, or school functioning.
41 - 50	Serious symptoms OR serious impairment in one of the following: social, occupational, or school functioning.
31 - 40	Some impairment in reality testing OR impairment in speech and communication OR serious impairment in several of the following: occupational or school functioning, interpersonal relationships, judgment, thinking, or mood.
21 - 30	Presence of hallucinations or delusions which influence behaviour OR serious impairment in ability to communicate with others OR serious impairment in judgment OR inability to function in almost all areas.
11 - 20	There is some danger of harm to self or others OR occasional failure to maintain personal hygiene OR the person is virtually unable to communicate with others due to being incoherent or mute.
0 - 10	Persistent danger of harming self or others OR persistent inability to maintain personal hygiene OR person has made a serious attempt at suicide.

Appendix E - Kreek-McHugh-Schluger-Kellogg (KMSK) Scale

Participant Number______________________________ Clinician __________ Date / /

KMSK Scale

Have you ever used any of the following substances?

	YES	NO
Alcohol		
Tobacco		
Cocaine		
Heroin		
Opiates		
Cannabis		
Methamphetamine / Amphetamine		

ALCOHOL (1 drink = 1 beer / 1 glass of wine)

At the time when you were drinking the most alcohol, were you drinking it:	Every day/nearly every day (5 points)	Three or more days per week (4 points)	Every weekend, most weekends and holidays (3 points)	Once a week or less (2 points)	A few times a year/ special occasions (1 point)	Never (0 points)
When was this?						
How long did this pattern of drinking last?	12+ months (3 points)	6-12 months (2 points)	Less than 6 months (1 point)			
During the last 30 days, how many days did you drink alcohol?	15-30 days (5 points)	6-14 days (4 points)	4-5 days (3 points)	2-3 days (2 points)	1 day (1 point)	None (0 points)
How long has this current pattern of drinking been going on?	12+ months (3 points)	6-12 months (2 points)	Less than 6 months	No use (0 points)		

			(1 point)			
During the 30 days, when you were drinking the most, how many drinks at a time or in a day would you typically drink?	10+ (5 points)	5-10 (4 points)	4-5 (3 points)	2-3 (2 points)	1-2 (1 point)	None (0 points)
Is alcohol your drug of choice?	YES	NO				

TOBACCO (cigarettes / cigars)

At the time of your life when you were smoking the most, were you smoking:	At regular intervals every day/ most days (5 points)	In clusters, at specific times of day (lunch, breaks) every day / most days (4 points)	Once a day - every day or most days (3 points)	20-100 times in lifetime (2 points)	Fewer than 20 times in lifetime (1 point)	Never smoked (0 points)
When was this?						
Are you smoking currently?	YES	NO				
How long did this pattern of smoking last?			12+ months (3 points)	6-12 months (2 points)	Less than 6 months (1 point)	
During the last 30 days, how many packs of cigarettes would you typically smoke at your heaviest use?	2+ packs (5 points)	1-2 packs (4 points)	1 pack (3 points)	½ pack (2 points)	Less than ½ pack (1 point)	None (0 points)
Is tobacco your drug of choice?	YES	NO				

COCAINE

At the time in your life when you were using the most cocaine, were you using it:	Several times a day/most days or use as long as drug is available (7 points)	3+ more times a day, three to five days a week (6 points)	3+ more times a day, one to three days a week (5 points)	Once a day, every day or most days (4 points)	100+ times in lifetime (3 points)	20-100 times in lifetime (2 points)	Fewer than 20 times in lifetime (1 point)
How did you use it?		smoking	snorting	freebasing	skin popping	IV injection	
When was this?							
Are you currently using?	YES	NO					
How long did this pattern of cocaine use last?		12+ months (3 points)	6-12 months (2 points)	Less than 6 months (1 point)			
During the last 30 days, how many days did you use cocaine?		19-30 days (4 points)	8-18 days (3 points)	3-7 days (2 points)	1-2 days (1 point)	None (0 points)	
During the time when you were using the most cocaine, how much would you use / spend at a time?		________ grams		R___________			
Is cocaine your drug of choice?	YES	NO					

HEROIN

At the time in your life when you were using the most heroin, were you using it:		Several times a day, every day / most days (4 points)	Once a day, every day / most days (3 points)	20-100 times in lifetime (2 points)	Less than 20 times in lifetime (1 point)	Never used (0 points)
How did you use it?		smoking	snorting	freebasing	skin popping	IV injection
When was this?						
Are you currently using?	YES	NO				

How long did this pattern of heroin use last?		12+ months (3 points)	6-12 months (2 points)	Less than 6 months (1 point)			
During the last 30 days, how much heroin would you use at a time? (1 bag = 1 dose)	10+ doses (6 points)	8-9 doses (5 points)	6-7 doses (4 points)	4-5 doses (3 points)	2-3 doses (2 points)	<1 - 1 dose (1 point)	0 doses (0 points)
During the time you were using the most heroin, how much would you spend at a time?		R__________					
Is heroin your drug of choice?	YES	NO					

CANNABIS

At the time in your life when you were using the most cannabis, were you using it:	Several times a day, every day (6 points)	Every day / nearly every day (5 points)	3+ days per week (4 points)	Every weekend / most weekends and holidays (3 points)	1x per week or less (2 points)	Few times a year, on special occasions (1 point)	Never used (0 points)
What form did you use?		plant	oil	hash	__________	__________	
When was this?							
Are you currently using?	YES	NO					
How long did this pattern of cannabis use last?		12+ months (3 points)	6-12 months (2 points)	Less than 6 months (1 point)			
During the last 30 days, how much cannabis did you use at a time?		5+ joints (5 points)	4-5 joints (4 points)	2-3 joints (3 points)	1-2 joints (2 points)	< 1 joint (1 point)	None (0 points)
Is cannabis your drug of choice?	YES	NO					

METHAMPHETAMINE /
AMPHETAMINE

At the time in your life when you were using the most methamphetamine / amphetamine, which drug did you use primarily?	Methamphetamine ______________			Amphetamine ______________		
Were you using it:	Every day/nearly every day (5 points)	Three or more days per week (4 points)	Every weekend, most weekends and holidays (3 points)	Once a week or less (2 points)	A few times a year/ special occasions (1 point)	Never (0 points)
When was this?						
Are you currently using?	YES	NO				
How long did this pattern of methamphetamine / amphetamine use last?	12+ months (3 points)	6-12 months (2 points)	Less than 6 months (1 point)			
During the last 30 days, how many days did you use methamphetamine / amphetamine?	21-30 days (4 points)	11-20 days (3 points)	3-10 days (2 points)	1-2 days (1 point)	None (0 points)	
When you were using methamphetamine / amphetamine, how did you use it?	Intravenous (4 points)	Smoking (3 points)	Intranasal "snorting" (2 points)	Oral - pills, licking (1 point)		
Is methamphetamine / amphetamine your drug of choice?	YES	NO				

Appendix F - Standard Operating Protocol – MRI and ^{1}H-MRS scanning

Standard operating protocol – MRI - researcher - MODNISZ

TO HAVE ON HAND WHEN PARTICIPANT ARRIVES

1. Participant file with questionnaires
2. Saliva collection aid and cryovial (icepack with cooler bag) with their unique participant number written on

WHEN PARTICIPANT ARRIVES

1. Explain to the participant what the scanner looks like – tunnel, open at both ends, nothing will touch or hurt them. This will be covered during the consent, but recap on scan day.
2. Explain to the participant that all they have to do is lie still in the scanner. They will be fitted with a 'helmet' which will show us the pictures. On the helmet will be a mirror to see the TV screen. For the first 15 minutes, a cross will be on the screen – all they have to do is look at the cross. When the cross disappears, the word 'relax' will appear – then they can close their eyes and sleep. Reiterate that it is important to lie still. When scanning, the machine makes a lot of noise. Reiterate that nothing will touch or hurt them.
3. Tell the participant that a strap will be placed over their thighs – explain that this is standard for all participants, and that it is just to make it more comfortable for them, as they can then relax their legs against it.
4. Explain to the participant that we will not talk to them during the scan, unless something is wrong. A thumbs up/thumbs down system will be used to communicate – to minimise head movement.
5. **Do the safety checklist (get from radiographers) with the participant, within earshot of the radiographer(s).** Most of the questions involve big words that most of the participants do not understand. Ask the participant if they have had any operations. If no, then just confirm that there is no metal anywhere in their body – name body parts (ears, heart, other organs). If yes, explore further to determine whether any metal parts were involved in the operation. Also ask specifically about bullets – whether they had ever been shot. If yes, and unsure whether it was removed, speak to the radiographer(s) and arrange for an x-ray to be done to verify. (The scan is then rescheduled.)

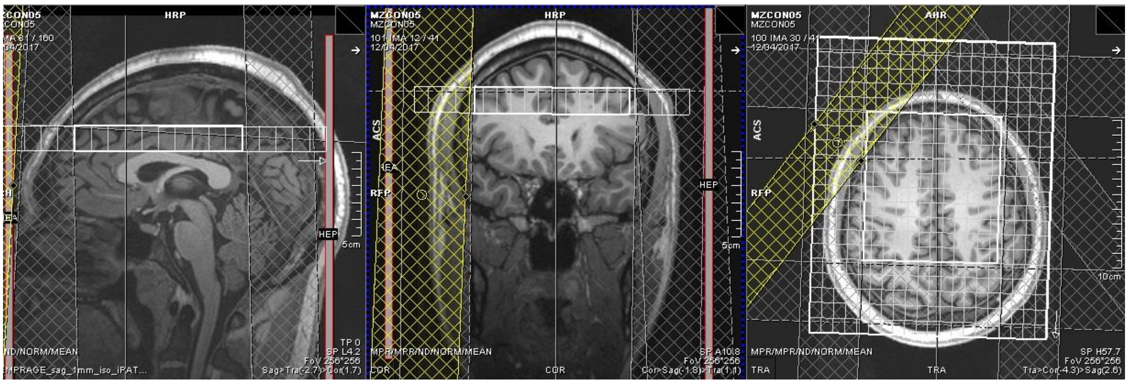
6. Give the participant a gown to change into – this is standard for all participants. There are XS, S, M, L and XL sizes. Give the size most suited to the participant – if too small, change to bigger size.
7. Weigh and measure height of the participant, and record on bench sheet as well as safety checklist form.
8. **Provide radiographer with participant code, date of birth, weight and height of the participant**.
9. Do the first saliva sample before the scan commences. **Make sure the tube is labelled with the participant code, date, and PRE**. Note down the time of the saliva sample next to saliva sample 1 on the bench sheet. Do the tablet/questionnaires with the participant while they do the saliva sample to focus their attention on something else.
10. Do more questionnaires if there is more time available.

SCANNER

1. Put the + sign up on the screen
2. The radiographer will prepare the scan bed with the 32-channel head coil.
3. Make sure the NoMoCo cushions are used – they are in the bottom drawer of the chest of drawers next to the radiographers.
4. Give the participant a pair of ear plugs and show/explain how to use it. Explain that it is used to minimise the noise from the scanner.
5. The radiographer will ask the participant to lie down and will make sure the positioning is optimal. They will place the cushions and check the alignment of the participant with the scanner.
6. Give the participant the panic ball and explain that if something is wrong / they are not OK, that they can press it, and we will talk to them / go to them.
7. Make sure the participant is covered with a blanket
8.
9. Make sure the leg strap is placed and is not too tight over mid-thigh region, this is so they can relax into the strap, and over the blanket.
10. Make sure the participant can see the screen with the cross on it and repeat the instruction of looking at the cross, and then relaxing/close their eyes when the word 'relax' appears.
11. Check with the participant that they are OK before you leave the room.
12. DO NOT TALK TO THE PARTICIPANT UNLESS SOMETHING IS WRONG IF THEY ARE MOVING TOO MUCH. IF MOVING PROVIDE REASSURANCE THAT THEY ARE DOING WELL AND GIVE THE AMOUNT OF TIME LEFT. They should not talk, as their head position can move, and compromise the data. Use a thumbs up/thumbs down system when having to communicate with the participant. Explain this to them before the scan starts and reiterate.

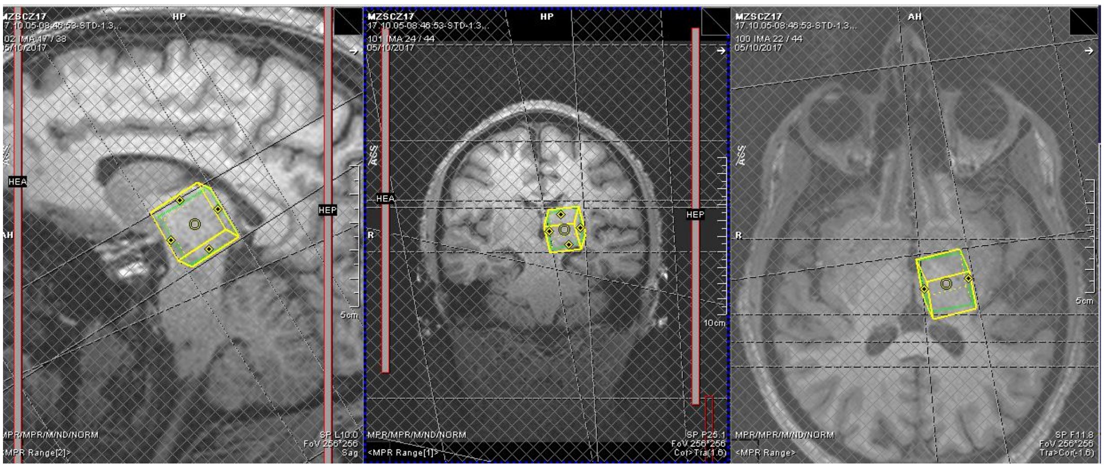
SCAN

1. The radiographers are all very capable and have been fully briefed on what to do.
2. The sequence of the protocol:
    - Circle localiser
    - MPRAGE – structural/anatomical scan (full brain)
    - Gre-field mapping (prep for resting state BOLD)
    - Resting state BOLD (full brain resting state functional MRI)
    - MRS CSI – brain areas to include bilaterally ACC, DLPFC, FWM bilateral
    - MRS SVS left thalamus standard metabolites (TE30)
    - MRS SVS left thalamus standard metabolites (TE30) – water reference file
    - MRS SVS ACC standard metabolites (TE30)
    - MRS SVS ACC standard metabolites (TE30) – water reference file
    - MRS SVS ACC glutamate (TE80)
    - MRS SVS ACC glutamate (TE80) – water reference file
3. Things to check:
    a. Make sure the + is on display
    - After the resting state, change the cross on the TV screen to 'relax'
    - Planning of the CSI – placement of the saturation bands. Saturation bands should be extended over the skull. Ensure that a screen shot is taken of final set-up Saturation bands are positioned extensively to reduce artefact from bone, fatty tissue, and CSF. The suppression of CSF is very important for axial front angled saturation bands, rather apply greater restriction than loose data due to the impact of CSF.



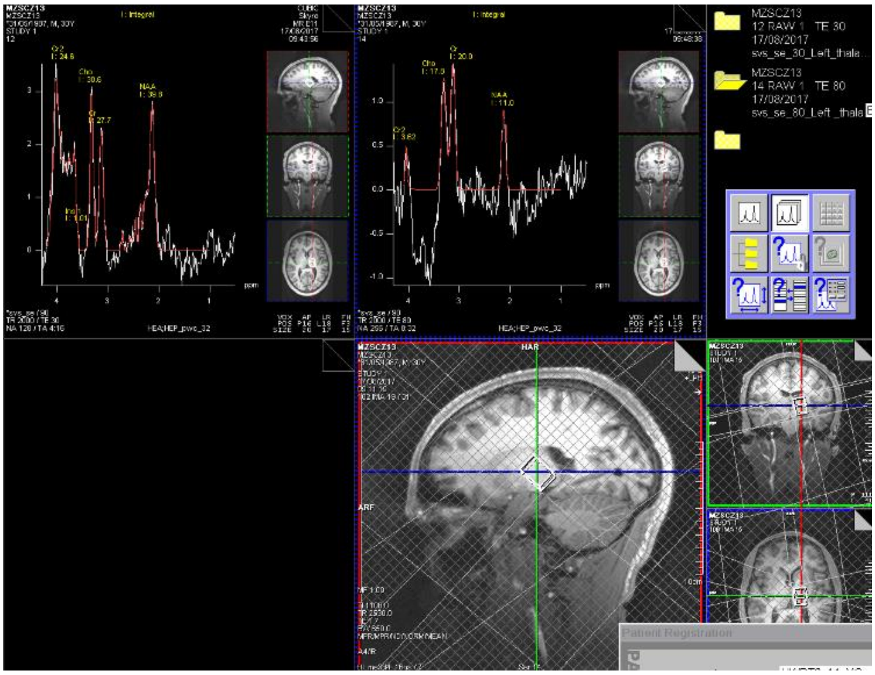
    - Once CSI is completed – go to selected brain regions to check how well the scan went, if poor, see if there may be time to repeat
    - Screen shot of final CSI should be taken
    - Thalamus SVS planning – placement of saturation bands. Saturation bands should be **extended over the skull.** Ensure that ventricles are covered as far as possible. A screen shot should be taken of set-up.
    - Screen shot of final thalamus with 3D orientation, TE30 should be taken

Example of screen shot in 3D orientation:

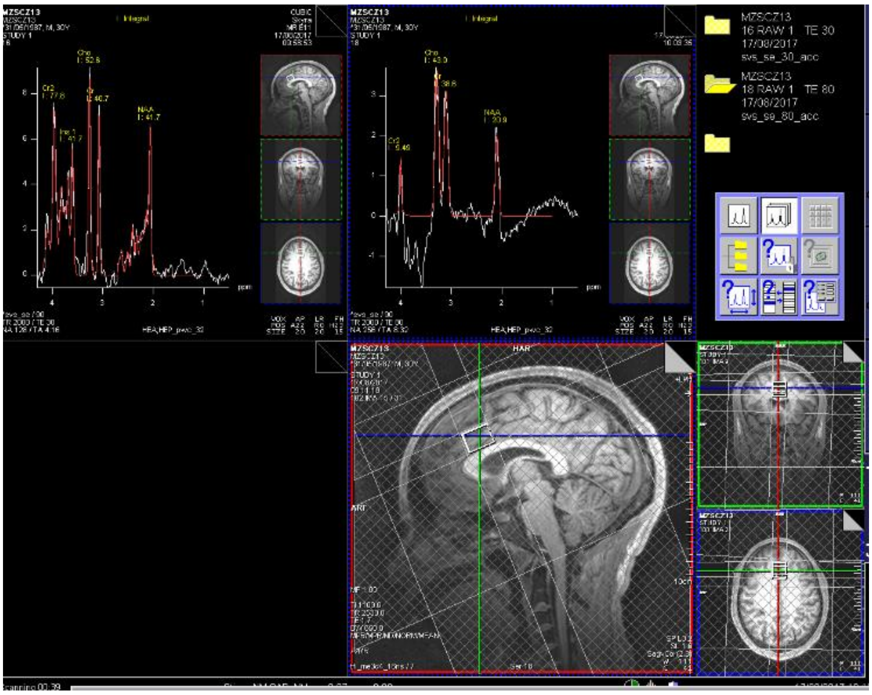


- ACC SVS planning – placement of saturation bands. Saturation bands should be extended over the skull. Ensure that ventricles are covered as far as possible. A screen shot should be taken.
- Screen shot of final ACC with 3D orientation, TE30 and TE80 should be taken
- When sequences have completed, screen shots should be taken of:
  - CSI
  - Thalamus (TE30)
  - ACC (TE30 and 80 together)

Thalamus:



ACC:



4. As soon as the scan is complete remove participant from scanner and have them change back into their normal clothes
5. Handover for EEG if that is their next scan.

Appendix G - Standard Operating Protocol – Blood draw and handling

Standard operating protocol – Blood draw - researcher - MODNISZ

DO BEFORE PARTICIPANT ARRIVES

1. Make sure you have a cooler bag (with ice brick and tissue) for EDTA filled vials and the ability to stand SERUM tubes after inverting.
2. Make sure you have the biohazard sharps container and biohazard bin nearby (if biohazard bin not nearby use red bag in the blood draw kit).
3. Vacutainers (Blood collection devices), need to collect 2 SERUM (red) tubes and 3 EDTA (purple) tubes.
   ENSURE THESE ARE CLEARLY LABELLED WITH PARTICIPANT NUMBER (with a permanent marker)
4. Have at least one extra of each vacutainer tubes on hand if needed, e.g. vacuum lost or a tube not filled.
5. Unpack blood draw kit: Unfold napkin and place alcohol swabs, needle (still sealed and capped), vacutainer tubes, and tourniquet on napkin.
6. Have two pairs of gloves ready – in both size medium and large – one pair for clinician and one pair for researcher working with clinician.

WHEN PARTICIPANT ARRIVES

7. Explain to the participant that blood is going to be drawn from them – it will already have been covered in the consent but recap the blood draw step.
8. Clinician and researcher to both wear gloves.
9. Clinician to clean site of potential venepuncture with alcohol swab(s).
10. Open needle packet, attach vacutainer holder (clear plastic tube), and hand sheathed needle to the clinician – do not put it back on the towel. Discard in Biohazard sharps bin.
11. When needle inserted clinician to indicate ready for blood draw from site punctured.
12. Insert/plug vacutainer into collection device to collect blood (the tube creates a vacuum, if the clinician is in a vein blood will enter the vacutainer, reasons for lack of blood draw, incorrect needle placement else damage to vacutainer vacuum).
13. Ensure clinician has sight to the needle puncture as they are holding the needle in place, and work carefully with them.
14. Fill one EDTA (purple) and one SERUM (red) tube first, then follow with the rest of the tubes.
15. When 1st EDTA tube is filled, swop out with 1st SERUM tube, while SERUM tube is filling invert the filled EDTA tube, and continue this process until all 5 vacutainer tubes are filled.

16. If a tube is not properly filled (view marker on tube to see fill line – vacuum will also stop), hand another tube of the same kind to the clinician to fill.
17. SERUM tubes must be inverted eight times, then left standing upright in room temperature for 30 minutes before transportation.
18. EDTA tubes must be inverted eight times and put into cooler box – do not put directly onto ice bricks. Use paper towel as buffer if needed.
19. When drawing of blood is completed, hand cotton wool to clinician so they can replace the needle site with cotton wool swab and apply pressure. The Dr/Sr is to place the needle directly into the sharps container so make sure very close by *(they are not to pass the needle to you, and you are not to take the needle as this can create a window of needle stick)*.
20. Cover puncture site with a plaster / cotton wool with medical tape.
21. Full clean-up: Ensure all sharps have been put into sharps container, and all other material in a biohazard container.
22. Upon completion of the blood draw, issue participant with a snack pack and water.

Appendix H - Standard Operating Protocol – Cytokine processing and extraction

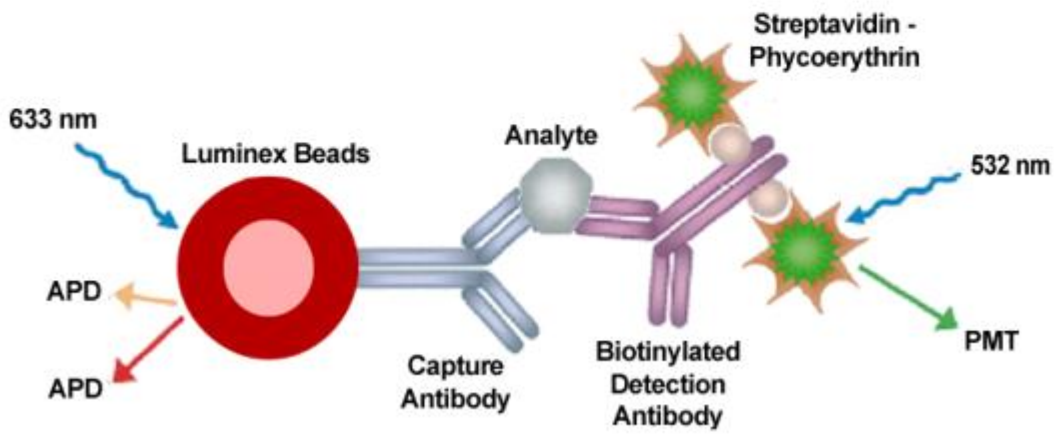
Standard Operating Protocol – Cytokine extraction - Researcher

Cytokine preparation:

Information for the Multiplex system:

The Multiplex system is based on a Luminex xMap technology which comprises of beads with a unique red blend of red dye and UV dye. This blend gives each bead a signature which can be identified by the instrument when the bead is excited by the red laser (632 nm).

Each analyte is bound to a detection antibody that is conjugated to Phycoerythrin (PE). Pe is excited by the 532 nm green laser and the detection is around 677nm. The instrument first identifies the bead and then detects the PE emission from that bead region. The diagram below is what happens for each bead detected



Preparation of samples for multiplex:

1. Prepare lab space

- ensure 1ml and 200ul pipette tip boxes are loaded

- ensure paper towel down where you will be aliquoting to absorb condensation.

- prepare eppies (labelling and order in line with samples) for aliquoting your samples

2. Fill the Styrofoam container with ice chips.
3. Remove 10 cryovials from your unique box at a time - as have been entered, each having 38 samples, starting with CON, second SCZ, third group MPD.

Box A - Antoinette

Box B - Lauren

Box C - Kim

4. Extract 500µl from the thawed serum cryovial.
5. Spin down the 500ul aliquot serum samples for 10 minutes at 2000rpm.
6. While spinning down - return your cryovials and take the next ten samples to be thawed on ice

7. From the spun down 500ul aliquot - aliquot 100ul of the supernatant into clearly marked Eppendorf tubes (these will be used for the cytokine assays) and store into your cryovial box (labelled A1) in the identical order as the cryovials.

9. Discard the remaining spun down sample from the 500ul aliquot.

Repeat 4-9 until all your 38 samples are processed. Replace ice if needed

The table below contains the layout of the cryovial boxes.

BOX A	1	2	3	4	5	6	7	8	9
1-9	CON02	CON05	CON08	CON11	CON14	CON17	CON21	CON26	CON29
10-18	CON32	CON35	CON39						
19-27	SCZ03	SCZ06	SCZ09	SCZ13	SCZ16	SCZ21	SCZ25	SCZ28	SCZ32
28-36	SCZ35	SCZ38							
37-45	MPD01	MPD04	MPD07	MPD12	MPD15	MPD18	MPD21	MPD24	MPD27

46-54	MPD30	MPD33	MPD36	MPD39	MPD42	MPD46			
55-63									
64-72									
73-81									

BOX A	1	2	3	4	5	6	7	8	9
1-9	CON03	CON06	CON09	CON12	CON15	CON18	CON22	CON27	CON30
10-18	CON33	CON36	CON40						
19-27	SCZ02	SCZ05	SCZ08	SCZ11	SCZ15	SCZ19	SCZ23	SCZ27	SCZ31
28-36	SCZ34	SCZ37	SCZ40						
37-45	MPD02	MPD05	MPD09	MPD13	MPD16	MPD19	MPD22	MPD25	MPD28
46-54	MPD31	MPD34	MPD37	MPD40	MPD44				
55-63									
64-72									
73-81									

BOX C	1	2	3	4	5	6	7	8	9
1-9	CON01	CON04	CON07	CON10	CON13	CON16	CON19	CON24	CON28
10-18	CON31	CON34	CON37	CON41					
19-27	SCZ04	SCZ07	SCZ10	SCZ14	SCZ17	SCZ22	SCZ26	SCZ30	SCZ33

28-36	SCZ36	SCZ39							
37-45	MPD03	MPD06	MPD10	MPD14	MPD17	MPD20	MPD23	MPD26	MPD29
46-54	MPD32	MPD35	MPD38	MPD41	MPD45				
55-63									
64-72									
73-81									

Appendix I – Statistical analyses Chapter 3

Variable	Descriptive Statistics (Spreadsheet Chapter 3) Valid N	Mean	Minimum	Maximum	Std.Dev.
Duration of current diagnosis (months)	24	4.3333	0.00000	11.000	3.6076
Number of psychotic episodes	78	2.9487	1.00000	9.000	1.8649
Onset of Meth use	51	19.5490	12.00000	36.000	6.0144
Duration of meth use (years)	50	81.9816	0.08000	228.000	60.9807
Duration of methamphetamine abstinence (months)	50	18.4130	0.03000	168.000	35.4617
cpzeq	74	277.6622	0.00000	1100.000	261.5452
Years of education - School (years)	115	10.3043	1.00000	13.000	2.1731
Years of education - Post school (years)	111	0.6186	0.00000	5.000	1.1939
Age on day	116	29.5690	20.00000	45.000	5.6649
PANSS positive score	113	10.1504	1.00000	27.000	4.6832
PANSS negative score	113	12.2920	7.00000	45.000	7.2638
PANSS general psychopathology score	113	19.9381	16.00000	45.000	5.8711
PANSS total score	114	42.1140	0.00000	97.000	15.9794
CGI score	114	2.3640	1.00000	6.000	1.3894
GAF score	114	72.3158	25.00000	99.000	17.6316
Height (metres)	106	1.6989	1.52000	1.880	0.0854
Weight (kg)	105	71.5210	42.40000	121.500	16.5247
Alcohol life time - Frequency score	100	2.0500	0.00000	5.000	1.3286
Alcohol life time - Duration score	103	1.9806	0.00000	3.000	1.1630
Alcohol life time - Amount score	82	2.6220	0.00000	5.000	1.7960
Alcohol life time - Total score	82	6.4512	0.00000	12.000	3.6923
Tobacco life time - Frequency score	104	3.3365	0.00000	5.000	2.1115
Tobacco life time - Duration score	104	2.1442	0.00000	3.000	1.2954
Tobacco life time Amount score	98	2.0918	0.00000	5.000	1.7591
Tobacco life time - Total score	98	7.5510	0.00000	13.000	4.8760
Cocaine life time - Frequency score	104	0.4423	0.00000	7.000	1.1810
Cocaine life time - Duration score	104	0.3462	0.00000	3.000	0.8098
Cocaine life time - Amount score	101	0.5149	0.00000	6.000	1.4739
Cocaine life time - Total score	101	1.2079	0.00000	16.000	3.1664
Heroin life time score - Frequency score	104	0.2115	0.00000	4.000	0.7717
Heroin life time score - Duration Score	104	0.2019	0.00000	3.000	0.6880
Heroin life time score - Amount score	103	0.0777	0.00000	3.000	0.3883
Heroin life time score - Total score	103	0.4660	0.00000	10.000	1.7367
Cannabis life time - Frequency score	104	2.6250	0.00000	6.000	2.4660
Cannabis life time - Duration score	104	1.5673	0.00000	3.000	1.3707
Cannabis life time - Amount score	88	1.6818	0.00000	5.000	1.9271
Cannabis life time - Total score	88	5.3977	0.00000	14.000	5.5678
Methamphetamine life time - Frequency score	102	1.7255	0.00000	5.000	2.0880
Methamphetamine life time - Duration score	102	1.1961	0.00000	3.000	1.3718
Methamphetamine - METHOD score	102	1.4412	0.00000	3.000	1.5062
Methamphetamine - Total score	102	4.3627	0.00000	11.000	4.7778
IFNg (25)pg/ml	114	10.9601	1.14000	64.090	12.2416
IL-10 (27)pg/ml	114	3.5325	0.03000	39.720	6.0302
IL-1b (46)pg/ml	114	2.1998	0.05000	15.120	2.5292
IL-8 (63)pg/ml	114	9.2864	1.56000	80.140	8.9604
TNFa (75)pg/ml	114	4.3661	1.05000	23.930	3.5128
ACC30 NAA abs	74	2.7918	0.85600	6.093	1.1212
ACC30 NAA+NAAG abs	74	3.0776	1.10600	6.093	1.1197
ACC30 mI abs	74	4.2566	2.53640	10.072	1.0776
ACC80 Glu abs	71	3.3352	1.08590	5.934	1.0302
ACC80 Gln abs	41	0.8899	0.40620	1.958	0.3962
ACC80 Glx abs	71	4.0138	1.35430	7.766	1.2157
Thal30 NAA abs	60	3.3042	0.90220	5.976	1.2592
Thal30 NAA+NAAG abs	73	3.6803	1.17460	6.115	1.4089
Thal30 mI abs	72	2.6646	1.40640	4.314	0.6616

Category	Frequency table: Duration of current diagnosis (months) (Spreadsheet Chapter 3) Shapiro-Wilk W=,94403, p=,00258 Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-5,00000<x<=0,000000	1	1	1.35135	1.3514	0.86207	0.8621
0,000000<x<=5,000000	28	29	37.83784	39.1892	24.13793	25.0000
5,000000<x<=10,00000	30	59	40.54054	79.7297	25.86207	50.8621
10,00000<x<=15,00000	11	70	14.86486	94.5946	9.48276	60.3448
15,00000<x<=20,00000	4	74	5.40541	100.0000	3.44828	63.7931
Missing	42	116	56.75676		36.20690	100.0000

Category	Frequency table: Duration of current diagnosis (months) (Spreadsheet Chapter 3) Shapiro-Wilk W=,91055, p=,03625 Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	4	4	16.6667	16.6667	3.44828	3.4483
0,000000<x<=2,000000	5	9	20.8333	37.5000	4.31034	7.7586
2,000000<x<=4,000000	5	14	20.8333	58.3333	4.31034	12.0690
4,000000<x<=6,000000	4	18	16.6667	75.0000	3.44828	15.5172
6,000000<x<=8,000000	2	20	8.3333	83.3333	1.72414	17.2414
8,000000<x<=10,00000	2	22	8.3333	91.6667	1.72414	18.9655
10,00000<x<=12,00000	2	24	8.3333	100.0000	1.72414	20.6897
Missing	92	116	383.3333		79.31034	100.0000

Category	Frequency table: Number of psychotic episodes (Spreadsheet Chapter 3) Shapiro-Wilk W=,87883, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	21	21	26.92308	26.9231	18.10345	18.1034
1,000000<x<=2,000000	17	38	21.79487	48.7179	14.65517	32.7586
2,000000<x<=3,000000	16	54	20.51282	69.2308	13.79310	46.5517
3,000000<x<=4,000000	7	61	8.97436	78.2051	6.03448	52.5862
4,000000<x<=5,000000	10	71	12.82051	91.0256	8.62069	61.2069
5,000000<x<=6,000000	3	74	3.84615	94.8718	2.58621	63.7931
6,000000<x<=7,000000	2	76	2.56410	97.4359	1.72414	65.5172
7,000000<x<=8,000000	1	77	1.28205	98.7179	0.86207	66.3793
8,000000<x<=9,000000	1	78	1.28205	100.0000	0.86207	67.2414
Missing	38	116	48.71795		32.75862	100.0000

Category	Frequency table: Onset of Meth use (Spreadsheet Chapter 3) Shapiro-Wilk W=,88904, p=,00018					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
5,000000<x<=10,00000	0	0	0.0000	0.0000	0.00000	0.0000
10,00000<x<=15,00000	14	14	27.4510	27.4510	12.06897	12.0690
15,00000<x<=20,00000	18	32	35.2941	62.7451	15.51724	27.5862
20,00000<x<=25,00000	13	45	25.4902	88.2353	11.20690	38.7931
25,00000<x<=30,00000	2	47	3.9216	92.1569	1.72414	40.5172
30,00000<x<=35,00000	3	50	5.8824	98.0392	2.58621	43.1034
35,00000<x<=40,00000	1	51	1.9608	100.0000	0.86207	43.9655
Missing	65	116	127.4510		56.03448	100.0000

Category	Frequency table: Duration of meth use (years) (Spreadsheet Chapter 3) Shapiro-Wilk W=,94856, p=,02977					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-50,0000<x<=0,000000	0	0	0.0000	0.0000	0.00000	0.0000
0,000000<x<=50,00000	18	18	36.0000	36.0000	15.51724	15.5172
50,00000<x<=100,0000	14	32	28.0000	64.0000	12.06897	27.5862
100,0000<x<=150,0000	10	42	20.0000	84.0000	8.62069	36.2069
150,0000<x<=200,0000	6	48	12.0000	96.0000	5.17241	41.3793
200,0000<x<=250,0000	2	50	4.0000	100.0000	1.72414	43.1034
Missing	66	116	132.0000		56.89655	100.0000

Category	Frequency table: Duration of methamphetamine abstinence (months) (Spreadsheet Chapter 3) Shapiro-Wilk W=,59165, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-50,0000<x<=0,000000	0	0	0.0000	0.0000	0.00000	0.0000
0,000000<x<=50,00000	43	43	86.0000	86.0000	37.06897	37.0690
50,00000<x<=100,0000	5	48	10.0000	96.0000	4.31034	41.3793
100,0000<x<=150,0000	1	49	2.0000	98.0000	0.86207	42.2414
150,0000<x<=200,0000	1	50	2.0000	100.0000	0.86207	43.1034
Missing	66	116	132.0000		56.89655	100.0000

Category	Frequency table: cpzeq (Spreadsheet Chapter 3) Shapiro-Wilk W=,89359, p=,00001					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-200,000<x<=0,000000	23	23	31.08108	31.0811	19.82759	19.8276
0,000000<x<=200,0000	11	34	14.86486	45.9459	9.48276	29.3103
200,0000<x<=400,0000	20	54	27.02703	72.9730	17.24138	46.5517
400,0000<x<=600,0000	14	68	18.91892	91.8919	12.06897	58.6207
600,0000<x<=800,0000	4	72	5.40541	97.2973	3.44828	62.0690
800,0000<x<=1000,000	1	73	1.35135	98.6486	0.86207	62.9310
1000,000<x<=1200,000	1	74	1.35135	100.0000	0.86207	63.7931
Missing	42	116	56.75676		36.20690	100.0000

Category	Frequency table: Years of education - School (years) (Spreadsheet Chapter 3) Shapiro-Wilk W=,80014, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=2,000000	1	1	0.86957	0.8696	0.86207	0.8621
2,000000<x<=4,000000	2	3	1.73913	2.6087	1.72414	2.5862
4,000000<x<=6,000000	3	6	2.60870	5.2174	2.58621	5.1724
6,000000<x<=8,000000	15	21	13.04348	18.2609	12.93103	18.1034
8,000000<x<=10,00000	28	49	24.34783	42.6087	24.13793	42.2414
10,00000<x<=12,00000	65	114	56.52174	99.1304	56.03448	98.2759
12,00000<x<=14,00000	1	115	0.86957	100.0000	0.86207	99.1379
Missing	1	116	0.86957		0.86207	100.0000

Category	Frequency table: Years of education - Post school (years) (Spreadsheet Chapter 3) Shapiro-Wilk W=,58887, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	77	77	69.36937	69.3694	66.37931	66.3793
0,000000<x<=1,000000	13	90	11.71171	81.0811	11.20690	77.5862
1,000000<x<=2,000000	9	99	8.10811	89.1892	7.75862	85.3448
2,000000<x<=3,000000	4	103	3.60360	92.7928	3.44828	88.7931
3,000000<x<=4,000000	7	110	6.30631	99.0991	6.03448	94.8276
4,000000<x<=5,000000	1	111	0.90090	100.0000	0.86207	95.6897
Missing	5	116	4.50450		4.31034	100.0000

Category	Frequency table: Age on day (Spreadsheet Chapter 3) Shapiro-Wilk W=,96344, p=,00299					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
15,00000<x<=20,00000	2	2	1.72414	1.7241	1.72414	1.7241
20,00000<x<=25,00000	33	35	28.44828	30.1724	28.44828	30.1724
25,00000<x<=30,00000	36	71	31.03448	61.2069	31.03448	61.2069
30,00000<x<=35,00000	27	98	23.27586	84.4828	23.27586	84.4828
35,00000<x<=40,00000	15	113	12.93103	97.4138	12.93103	97.4138
40,00000<x<=45,00000	3	116	2.58621	100.0000	2.58621	100.0000
Missing	0	116	0.00000		0.00000	100.0000

Category	Frequency table: PANSS positive score (Spreadsheet Chapter 3) Shapiro-Wilk W=,76661, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-5,00000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=5,000000	1	1	0.88496	0.8850	0.86207	0.8621
5,000000<x<=10,00000	74	75	65.48673	66.3717	63.79310	64.6552
10,00000<x<=15,00000	27	102	23.89381	90.2655	23.27586	87.9310
15,00000<x<=20,00000	4	106	3.53982	93.8053	3.44828	91.3793
20,00000<x<=25,00000	6	112	5.30973	99.1150	5.17241	96.5517
25,00000<x<=30,00000	1	113	0.88496	100.0000	0.86207	97.4138
Missing	3	116	2.65487		2.58621	100.0000

Category	Frequency table: PANSS negative score (Spreadsheet Chapter 3) Shapiro-Wilk W=,75493, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=5,000000	0	0	0.00000	0.0000	0.00000	0.0000
5,000000<x<=10,00000	63	63	55.75221	55.7522	54.31034	54.3103
10,00000<x<=15,00000	23	86	20.35398	76.1062	19.82759	74.1379
15,00000<x<=20,00000	9	95	7.96460	84.0708	7.75862	81.8966
20,00000<x<=25,00000	9	104	7.96460	92.0354	7.75862	89.6552
25,00000<x<=30,00000	7	111	6.19469	98.2301	6.03448	95.6897
30,00000<x<=35,00000	0	111	0.00000	98.2301	0.00000	95.6897
35,00000<x<=40,00000	1	112	0.88496	99.1150	0.86207	96.5517
40,00000<x<=45,00000	1	113	0.88496	100.0000	0.86207	97.4138
Missing	3	116	2.65487		2.58621	100.0000

Category	Frequency table: PANSS general psychopathology score (Spreadsheet Chapter 3) Shapiro-Wilk W=,69797, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
10,00000<x<=15,00000	0	0	0.00000	0.0000	0.00000	0.0000
15,00000<x<=20,00000	83	83	73.45133	73.4513	71.55172	71.5517
20,00000<x<=25,00000	15	98	13.27434	86.7257	12.93103	84.4828
25,00000<x<=30,00000	5	103	4.42478	91.1504	4.31034	88.7931
30,00000<x<=35,00000	6	109	5.30973	96.4602	5.17241	93.9655
35,00000<x<=40,00000	2	111	1.76991	98.2301	1.72414	95.6897
40,00000<x<=45,00000	2	113	1.76991	100.0000	1.72414	97.4138
Missing	3	116	2.65487		2.58621	100.0000

Category	Frequency table: PANS total score (Spreadsheet Chapter 3) Shapiro-Wilk W=,82724, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-20,0000<x<=0,000000	1	1	0.87719	0.8772	0.86207	0.8621
0,000000<x<=20,00000	0	1	0.00000	0.8772	0.00000	0.8621
20,00000<x<=40,00000	68	69	59.64912	60.5263	58.62069	59.4828
40,00000<x<=60,00000	32	101	28.07018	88.5965	27.58621	87.0690
60,00000<x<=80,00000	9	110	7.89474	96.4912	7.75862	94.8276
80,00000<x<=100,0000	4	114	3.50877	100.0000	3.44828	98.2759
Missing	2	116	1.75439		1.72414	100.0000

Category	Frequency table: CGI score (Spreadsheet Chapter 3) Shapiro-Wilk W=,84885, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	43	43	37.71930	37.7193	37.06897	37.0690
1,000000<x<=2,000000	25	68	21.92982	59.6491	21.55172	58.6207
2,000000<x<=3,000000	20	88	17.54386	77.1930	17.24138	75.8621
3,000000<x<=4,000000	14	102	12.28070	89.4737	12.06897	87.9310
4,000000<x<=5,000000	11	113	9.64912	99.1228	9.48276	97.4138
5,000000<x<=6,000000	1	114	0.87719	100.0000	0.86207	98.2759
Missing	2	116	1.75439		1.72414	100.0000

Category	Frequency table: GAF score (Spreadsheet Chapter 3) Shapiro-Wilk W=,93972, p=,00006					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
10,00000<x<=20,00000	0	0	0.00000	0.0000	0.00000	0.0000
20,00000<x<=30,00000	2	2	1.75439	1.7544	1.72414	1.7241
30,00000<x<=40,00000	1	3	0.87719	2.6316	0.86207	2.5862
40,00000<x<=50,00000	9	12	7.89474	10.5263	7.75862	10.3448
50,00000<x<=60,00000	18	30	15.78947	26.3158	15.51724	25.8621
60,00000<x<=70,00000	27	57	23.68421	50.0000	23.27586	49.1379
70,00000<x<=80,00000	9	66	7.89474	57.8947	7.75862	56.8966
80,00000<x<=90,00000	24	90	21.05263	78.9474	20.68966	77.5862
90,00000<x<=100,0000	24	114	21.05263	100.0000	20.68966	98.2759
Missing	2	116	1.75439		1.72414	100.0000

Category	Frequency table: Height (metres) (Spreadsheet Chapter 3) Shapiro-Wilk W=,98444, p=,25250					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
1,400000<x<=1,500000	0	0	0.00000	0.0000	0.00000	0.0000
1,500000<x<=1,600000	15	15	14.15094	14.1509	12.93103	12.9310
1,600000<x<=1,700000	38	53	35.84906	50.0000	32.75862	45.6897
1,700000<x<=1,800000	42	95	39.62264	89.6226	36.20690	81.8966
1,800000<x<=1,900000	11	106	10.37736	100.0000	9.48276	91.3793
Missing	10	116	9.43396		8.62069	100.0000

Category	Frequency table: Weight (kg) (Spreadsheet Chapter 3) Shapiro-Wilk W=,95002, p=,00059					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
30,00000<x<=40,00000	0	0	0.00000	0.0000	0.00000	0.0000
40,00000<x<=50,00000	6	6	5.71429	5.7143	5.17241	5.1724
50,00000<x<=60,00000	23	29	21.90476	27.6190	19.82759	25.0000
60,00000<x<=70,00000	23	52	21.90476	49.5238	19.82759	44.8276
70,00000<x<=80,00000	26	78	24.76190	74.2857	22.41379	67.2414
80,00000<x<=90,00000	15	93	14.28571	88.5714	12.93103	80.1724
90,00000<x<=100,0000	6	99	5.71429	94.2857	5.17241	85.3448
100,0000<x<=110,0000	2	101	1.90476	96.1905	1.72414	87.0690
110,0000<x<=120,0000	3	104	2.85714	99.0476	2.58621	89.6552
120,0000<x<=130,0000	1	105	0.95238	100.0000	0.86207	90.5172
Missing	11	116	10.47619		9.48276	100.0000

Category	Frequency table: Alcohol life time - Frequency score (Spreadsheet Chapter 3) Shapiro-Wilk W=,89655, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	12	12	12.00000	12.00000	10.34483	10.34488
0,000000<x<=1,000000	31	43	31.00000	43.00000	26.72414	37.06900
1,000000<x<=2,000000	11	54	11.00000	54.00000	9.48276	46.5517
2,000000<x<=3,000000	36	90	36.00000	90.00000	31.03448	77.58622
3,000000<x<=4,000000	6	96	6.00000	96.00000	5.17241	82.75866
4,000000<x<=5,000000	4	100	4.00000	100.00000	3.44828	86.20699
Missing	16	116	16.00000		13.79310	100.00000

Category	Frequency table: Alcohol life time - Duration score (Spreadsheet Chapter 3) Shapiro-Wilk W=,76207, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	15	15	14.56311	14.5631	12.93103	12.93100
0,000000<x<=,5000000	0	15	0.00000	14.5631	0.00000	12.93100
,5000000<x<=1,000000	25	40	24.27184	38.83500	21.55172	34.48288
1,000000<x<=1,500000	0	40	0.00000	38.83500	0.00000	34.48288
1,500000<x<=2,000000	10	50	9.70874	48.5437	8.62069	43.10344
2,000000<x<=2,500000	0	50	0.00000	48.5437	0.00000	43.10344
2,500000<x<=3,000000	53	103	51.45631	100.00000	45.68966	88.7931
Missing	13	116	12.62136		11.20690	100.00000

Category	Frequency table: Alcohol life time - Amount score (Spreadsheet Chapter 3) Shapiro-Wilk W=,88075, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	16	16	19.51220	19.51222	13.79310	13.7931
0,000000<x<=1,000000	11	27	13.41463	32.92688	9.48276	23.27599
1,000000<x<=2,000000	9	36	10.97561	43.90244	7.75862	31.03455
2,000000<x<=3,000000	12	48	14.63415	58.53666	10.34483	41.37933
3,000000<x<=4,000000	20	68	24.39024	82.92688	17.24138	58.6207
4,000000<x<=5,000000	14	82	17.07317	100.00000	12.06897	70.6897
Missing	34	116	41.46341		29.31034	100.00000

Category	Frequency table: Alcohol life time - Total score (Spreadsheet Chapter 3) Shapiro-Wilk W=,87510, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	14	14	17.07317	17.07322	12.06897	12.06900
0,000000<x<=2,000000	2	16	2.43902	19.51222	1.72414	13.7931
2,000000<x<=4,000000	5	21	6.09756	25.60988	4.31034	18.10344
4,000000<x<=6,000000	10	31	12.19512	37.80499	8.62069	26.7241
6,000000<x<=8,000000	19	50	23.17073	60.97566	16.37931	43.10344
8,000000<x<=10,00000	25	75	30.48780	91.46344	21.55172	64.65522
10,00000<x<=12,00000	7	82	8.53659	100.00000	6.03448	70.6897
Missing	34	116	41.46341		29.31034	100.00000

Category	Frequency table: Tobacco life time - Frequency score (Spreadsheet Chapter 3) Shapiro-Wilk W=,70926, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	25	25	24.03846	24.0385	21.55172	21.5517
0,000000<x<=1,000000	3	28	2.88462	26.9231	2.58621	24.1379
1,000000<x<=2,000000	4	32	3.84615	30.7692	3.44828	27.5862
2,000000<x<=3,000000	7	39	6.73077	37.5000	6.03448	33.6207
3,000000<x<=4,000000	10	49	9.61538	47.1154	8.62069	42.2414
4,000000<x<=5,000000	55	104	52.88462	100.0000	47.41379	89.6552
Missing	12	116	11.53846		10.34483	100.0000

Category	Frequency table: Tobacco life time - Duration score (Spreadsheet Chapter 3) Shapiro-Wilk W=,61766, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	25	25	24.03846	24.0385	21.55172	21.5517
0,000000<x<=,5000000	0	25	0.00000	24.0385	0.00000	21.5517
,5000000<x<=1,000000	5	30	4.80769	28.8462	4.31034	25.8621
1,000000<x<=1,500000	0	30	0.00000	28.8462	0.00000	25.8621
1,500000<x<=2,000000	4	34	3.84615	32.6923	3.44828	29.3103
2,000000<x<=2,500000	0	34	0.00000	32.6923	0.00000	29.3103
2,500000<x<=3,000000	70	104	67.30769	100.0000	60.34483	89.6552
Missing	12	116	11.53846		10.34483	100.0000

Category	Frequency table: Tobacco life time Amount score (Spreadsheet Chapter 3) Shapiro-Wilk W=,87979, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	26	26	26.53061	26.5306	22.41379	22.4138
0,000000<x<=1,000000	19	45	19.38776	45.9184	16.37931	38.7931
1,000000<x<=2,000000	9	54	9.18367	55.1020	7.75862	46.5517
2,000000<x<=3,000000	21	75	21.42857	76.5306	18.10345	64.6552
3,000000<x<=4,000000	10	85	10.20408	86.7347	8.62069	73.2759
4,000000<x<=5,000000	13	98	13.26531	100.0000	11.20690	84.4828
Missing	18	116	18.36735		15.51724	100.0000

Category	Frequency table: Tobacco life time - Total score (Spreadsheet Chapter 3) Shapiro-Wilk W=,81092, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	25	25	25.51020	25.5102	21.55172	21.5517
0,000000<x<=2,000000	0	25	0.00000	25.5102	0.00000	21.5517
2,000000<x<=4,000000	1	26	1.02041	26.5306	0.86207	22.4138
4,000000<x<=6,000000	6	32	6.12245	32.6531	5.17241	27.5862
6,000000<x<=8,000000	7	39	7.14286	39.7959	6.03448	33.6207
8,000000<x<=10,00000	19	58	19.38776	59.1837	16.37931	50.0000
10,00000<x<=12,00000	28	86	28.57143	87.7551	24.13793	74.1379
12,00000<x<=14,00000	12	98	12.24490	100.0000	10.34483	84.4828
Missing	18	116	18.36735		15.51724	100.0000

Category	Frequency table: Cocaine life time - Frequency score (Spreadsheet Chapter 3) Shapiro-Wilk W=,43451, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	83	83	79.80769	79.8077	71.55172	71.5517
0,000000<x<=1,000000	12	95	11.53846	91.3462	10.34483	81.8966
1,000000<x<=2,000000	2	97	1.92308	93.2692	1.72414	83.6207
2,000000<x<=3,000000	3	100	2.88462	96.1538	2.58621	86.2069
3,000000<x<=4,000000	2	102	1.92308	98.0769	1.72414	87.9310
4,000000<x<=5,000000	0	102	0.00000	98.0769	0.00000	87.9310
5,000000<x<=6,000000	1	103	0.96154	99.0385	0.86207	88.7931
6,000000<x<=7,000000	1	104	0.96154	100.0000	0.86207	89.6552
Missing	12	116	11.53846		10.34483	100.0000

Category	Frequency table: Cocaine life time - Duration score (Spreadsheet Chapter 3) Shapiro-Wilk W=,47660, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	83	83	79.80769	79.8077	71.55172	71.5517
0,000000<x<=,5000000	0	83	0.00000	79.8077	0.00000	71.5517
,5000000<x<=1,000000	13	96	12.50000	92.3077	11.20690	82.7586
1,000000<x<=1,500000	0	96	0.00000	92.3077	0.00000	82.7586
1,500000<x<=2,000000	1	97	0.96154	93.2692	0.86207	83.6207
2,000000<x<=2,500000	0	97	0.00000	93.2692	0.00000	83.6207
2,500000<x<=3,000000	7	104	6.73077	100.0000	6.03448	89.6552
Missing	12	116	11.53846		10.34483	100.0000

Category	Frequency table: Cocaine life time - Amount score (Spreadsheet Chapter 3) Shapiro-Wilk W=,38816, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	89	89	88.11881	88.1188	76.72414	76.7241
0,000000<x<=1,000000	0	89	0.00000	88.1188	0.00000	76.7241
1,000000<x<=2,000000	1	90	0.99010	89.1089	0.86207	77.5862
2,000000<x<=3,000000	3	93	2.97030	92.0792	2.58621	80.1724
3,000000<x<=4,000000	1	94	0.99010	93.0693	0.86207	81.0345
4,000000<x<=5,000000	5	99	4.95050	98.0198	4.31034	85.3448
5,000000<x<=6,000000	2	101	1.98020	100.0000	1.72414	87.0690
Missing	15	116	14.85149		12.93103	100.0000

Category	Frequency table: Cocaine life time - Total score (Spreadsheet Chapter 3) Shapiro-Wilk W=,44413, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	83	83	82.17822	82.1782	71.55172	71.5517
0,000000<x<=2,000000	6	89	5.94059	88.1188	5.17241	76.7241
2,000000<x<=4,000000	0	89	0.00000	88.1188	0.00000	76.7241
4,000000<x<=6,000000	3	92	2.97030	91.0891	2.58621	79.3103
6,000000<x<=8,000000	3	95	2.97030	94.0594	2.58621	81.8966
8,000000<x<=10,00000	2	97	1.98020	96.0396	1.72414	83.6207
10,00000<x<=12,00000	2	99	1.98020	98.0198	1.72414	85.3448
12,00000<x<=14,00000	1	100	0.99010	99.0099	0.86207	86.2069
14,00000<x<=16,00000	1	101	0.99010	100.0000	0.86207	87.0690
Missing	15	116	14.85149		12.93103	100.0000

Category	Frequency table: Heroin life time score - Frequency score (Spreadsheet Chapter 3) Shapiro-Wilk W=,30028, p=0,0000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	94	94	90.38462	90.3846	81.03448	81.0345
0,000000<x<=,5000000	0	94	0.00000	90.3846	0.00000	81.0345
,5000000<x<=1,000000	5	99	4.80769	95.1923	4.31034	85.3448
1,000000<x<=1,500000	0	99	0.00000	95.1923	0.00000	85.3448
1,500000<x<=2,000000	1	100	0.96154	96.1538	0.86207	86.2069
2,000000<x<=2,500000	0	100	0.00000	96.1538	0.00000	86.2069
2,500000<x<=3,000000	1	101	0.96154	97.1154	0.86207	87.0690
3,000000<x<=3,500000	0	101	0.00000	97.1154	0.00000	87.0690
3,500000<x<=4,000000	3	104	2.88462	100.0000	2.58621	89.6552
Missing	12	116	11.53846		10.34483	100.0000

Category	Frequency table: Heroin life time score - Duration Score (Spreadsheet Chapter 3) Shapiro-Wilk W=,31858, p=0,0000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	94	94	90.38462	90.3846	81.03448	81.0345
0,000000<x<=,5000000	0	94	0.00000	90.3846	0.00000	81.0345
,5000000<x<=1,000000	4	98	3.84615	94.2308	3.44828	84.4828
1,000000<x<=1,500000	0	98	0.00000	94.2308	0.00000	84.4828
1,500000<x<=2,000000	1	99	0.96154	95.1923	0.86207	85.3448
2,000000<x<=2,500000	0	99	0.00000	95.1923	0.00000	85.3448
2,500000<x<=3,000000	5	104	4.80769	100.0000	4.31034	89.6552
Missing	12	116	11.53846		10.34483	100.0000

Category	Frequency table: Heroin life time score - Amount score (Spreadsheet Chapter 3) Shapiro-Wilk W=,20602, p=0,0000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	98	98	95.14563	95.1456	84.48276	84.4828
0,000000<x<=,5000000	0	98	0.00000	95.1456	0.00000	84.4828
,5000000<x<=1,000000	3	101	2.91262	98.0583	2.58621	87.0690
1,000000<x<=1,500000	0	101	0.00000	98.0583	0.00000	87.0690
1,500000<x<=2,000000	1	102	0.97087	99.0291	0.86207	87.9310
2,000000<x<=2,500000	0	102	0.00000	99.0291	0.00000	87.9310
2,500000<x<=3,000000	1	103	0.97087	100.0000	0.86207	88.7931
Missing	13	116	12.62136		11.20690	100.0000

Category	Frequency table: Heroin life time score - Total score (Spreadsheet Chapter 3) Shapiro-Wilk W=,29761, p=0,0000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	94	94	91.26214	91.2621	81.03448	81.0345
0,000000<x<=2,000000	2	96	1.94175	93.2039	1.72414	82.7586
2,000000<x<=4,000000	3	99	2.91262	96.1165	2.58621	85.3448
4,000000<x<=6,000000	1	100	0.97087	97.0874	0.86207	86.2069
6,000000<x<=8,000000	1	101	0.97087	98.0583	0.86207	87.0690
8,000000<x<=10,00000	2	103	1.94175	100.0000	1.72414	88.7931
Missing	13	116	12.62136		11.20690	100.0000

Category	Frequency table: Cannabis life time - Frequency score (Spreadsheet Chapter 3) Shapiro-Wilk W=,81322, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	37	37	35.57692	35.5769	31.89655	31.8966
0,000000<x<=1,000000	11	48	10.57692	46.1538	9.48276	41.3793
1,000000<x<=2,000000	5	53	4.80769	50.9615	4.31034	45.6897
2,000000<x<=3,000000	9	62	8.65385	59.6154	7.75862	53.4483
3,000000<x<=4,000000	8	70	7.69231	67.3077	6.89655	60.3448
4,000000<x<=5,000000	11	81	10.57692	77.8846	9.48276	69.8276
5,000000<x<=6,000000	23	104	22.11538	100.0000	19.82759	89.6552
Missing	12	116	11.53846		10.34483	100.0000

Category	Frequency table: Cannabis life time - Duration score (Spreadsheet Chapter 3) Shapiro-Wilk W=,73486, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	38	38	36.53846	36.5385	32.75862	32.7586
0,000000<x<=,5000000	0	38	0.00000	36.5385	0.00000	32.7586
,5000000<x<=1,000000	15	53	14.42308	50.9615	12.93103	45.6897
1,000000<x<=1,500000	0	53	0.00000	50.9615	0.00000	45.6897
1,500000<x<=2,000000	5	58	4.80769	55.7692	4.31034	50.0000
2,000000<x<=2,500000	0	58	0.00000	55.7692	0.00000	50.0000
2,500000<x<=3,000000	46	104	44.23077	100.0000	39.65517	89.6552
Missing	12	116	11.53846		10.34483	100.0000

Category	Frequency table: Cannabis life time - Amount score (Spreadsheet Chapter 3) Shapiro-Wilk W=,78100, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	40	40	45.45455	45.4545	34.48276	34.4828
0,000000<x<=1,000000	9	49	10.22727	55.6818	7.75862	42.2414
1,000000<x<=2,000000	14	63	15.90909	71.5909	12.06897	54.3103
2,000000<x<=3,000000	4	67	4.54545	76.1364	3.44828	57.7586
3,000000<x<=4,000000	6	73	6.81818	82.9545	5.17241	62.9310
4,000000<x<=5,000000	15	88	17.04545	100.0000	12.93103	75.8621
Missing	28	116	31.81818		24.13793	100.0000

Category	Frequency table: Cannabis life time - Total score (Spreadsheet Chapter 3) Shapiro-Wilk W=,80317, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	38	38	43.18182	43.1818	32.75862	32.7586
0,000000<x<=2,000000	2	40	2.27273	45.4545	1.72414	34.4828
2,000000<x<=4,000000	6	46	6.81818	52.2727	5.17241	39.6552
4,000000<x<=6,000000	5	51	5.68182	57.9545	4.31034	43.9655
6,000000<x<=8,000000	7	58	7.95455	65.9091	6.03448	50.0000
8,000000<x<=10,00000	4	62	4.54545	70.4545	3.44828	53.4483
10,00000<x<=12,00000	11	73	12.50000	82.9545	9.48276	62.9310
12,00000<x<=14,00000	15	88	17.04545	100.0000	12.93103	75.8621
Missing	28	116	31.81818		24.13793	100.0000

Category	Frequency table: Methamphetamine life time - Frequency score (Spreadsheet Chapter 3) Shapiro-Wilk W=,73201, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	53	53	51.96078	51.9608	45.68966	45.6897
0,000000<x<=1,000000	9	62	8.82353	60.7843	7.75862	53.4483
1,000000<x<=2,000000	1	63	0.98039	61.7647	0.86207	54.3103
2,000000<x<=3,000000	13	76	12.74510	74.5098	11.20690	65.5172
3,000000<x<=4,000000	4	80	3.92157	78.4314	3.44828	68.9655
4,000000<x<=5,000000	22	102	21.56863	100.0000	18.96552	87.9310
Missing	14	116	13.72549		12.06897	100.0000

Category	Frequency table: Methamphetamine life time - Duration score (Spreadsheet Chapter 3) Shapiro-Wilk W=,70145, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	53	53	51.96078	51.9608	45.68966	45.6897
0,000000<x<=,5000000	0	53	0.00000	51.9608	0.00000	45.6897
,5000000<x<=1,000000	10	63	9.80392	61.7647	8.62069	54.3103
1,000000<x<=1,500000	0	63	0.00000	61.7647	0.00000	54.3103
1,500000<x<=2,000000	5	68	4.90196	66.6667	4.31034	58.6207
2,000000<x<=2,500000	0	68	0.00000	66.6667	0.00000	58.6207
2,500000<x<=3,000000	34	102	33.33333	100.0000	29.31034	87.9310
Missing	14	116	13.72549		12.06897	100.0000

Category	Frequency table: Methamphetamine - METHOD score (Spreadsheet Chapter 3) Shapiro-Wilk W=,63584, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	53	53	51.96078	51.9608	45.68966	45.6897
0,000000<x<=,5000000	0	53	0.00000	51.9608	0.00000	45.6897
,5000000<x<=1,000000	0	53	0.00000	51.9608	0.00000	45.6897
1,000000<x<=1,500000	0	53	0.00000	51.9608	0.00000	45.6897
1,500000<x<=2,000000	0	53	0.00000	51.9608	0.00000	45.6897
2,000000<x<=2,500000	0	53	0.00000	51.9608	0.00000	45.6897
2,500000<x<=3,000000	49	102	48.03922	100.0000	42.24138	87.9310
Missing	14	116	13.72549		12.06897	100.0000

Category	Frequency table: Methamphetamine - Total score (Spreadsheet Chapter 3) Shapiro-Wilk W=,73744, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	53	53	51.96078	51.9608	45.68966	45.6897
0,000000<x<=2,000000	0	53	0.00000	51.9608	0.00000	45.6897
2,000000<x<=4,000000	0	53	0.00000	51.9608	0.00000	45.6897
4,000000<x<=6,000000	7	60	6.86275	58.8235	6.03448	51.7241
6,000000<x<=8,000000	5	65	4.90196	63.7255	4.31034	56.0345
8,000000<x<=10,00000	19	84	18.62745	82.3529	16.37931	72.4138
10,00000<x<=12,00000	18	102	17.64706	100.0000	15.51724	87.9310
Missing	14	116	13.72549		12.06897	100.0000

Category	Frequency table: IFNg (25)pg/ml (Spreadsheet Chapter 3) Shapiro-Wilk W=,72266, p=,00000 Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-10,0000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=10,00000	76	76	66.66667	66.6667	65.51724	65.5172
10,00000<x<=20,00000	19	95	16.66667	83.3333	16.37931	81.8966
20,00000<x<=30,00000	10	105	8.77193	92.1053	8.62069	90.5172
30,00000<x<=40,00000	3	108	2.63158	94.7368	2.58621	93.1034
40,00000<x<=50,00000	4	112	3.50877	98.2456	3.44828	96.5517
50,00000<x<=60,00000	1	113	0.87719	99.1228	0.86207	97.4138
60,00000<x<=70,00000	1	114	0.87719	100.0000	0.86207	98.2759
Missing	2	116	1.75439		1.72414	100.0000

Category	Frequency table: IL-10 (27)pg/ml (Spreadsheet Chapter 3) Shapiro-Wilk W=,44050, p=,00000 Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-5,00000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=5,000000	103	103	90.35088	90.3509	88.79310	88.7931
5,000000<x<=10,00000	4	107	3.50877	93.8596	3.44828	92.2414
10,00000<x<=15,00000	3	110	2.63158	96.4912	2.58621	94.8276
15,00000<x<=20,00000	1	111	0.87719	97.3684	0.86207	95.6897
20,00000<x<=25,00000	0	111	0.00000	97.3684	0.00000	95.6897
25,00000<x<=30,00000	0	111	0.00000	97.3684	0.00000	95.6897
30,00000<x<=35,00000	1	112	0.87719	98.2456	0.86207	96.5517
35,00000<x<=40,00000	2	114	1.75439	100.0000	1.72414	98.2759
Missing	2	116	1.75439		1.72414	100.0000

Category	Frequency table: IL-1b (46)pg/ml (Spreadsheet Chapter 3) Shapiro-Wilk W=,55273, p=,00000 Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=2,000000	83	83	72.80702	72.8070	71.55172	71.5517
2,000000<x<=4,000000	20	103	17.54386	90.3509	17.24138	88.7931
4,000000<x<=6,000000	4	107	3.50877	93.8596	3.44828	92.2414
6,000000<x<=8,000000	2	109	1.75439	95.6140	1.72414	93.9655
8,000000<x<=10,00000	0	109	0.00000	95.6140	0.00000	93.9655
10,00000<x<=12,00000	2	111	1.75439	97.3684	1.72414	95.6897
12,00000<x<=14,00000	2	113	1.75439	99.1228	1.72414	97.4138
14,00000<x<=16,00000	1	114	0.87719	100.0000	0.86207	98.2759
Missing	2	116	1.75439		1.72414	100.0000

Category	Frequency table: TNFa (75)pg/ml (Spreadsheet Chapter 3) Shapiro-Wilk W=,60928, p=,00000 Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-5,00000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=5,000000	90	90	78.94737	78.9474	77.58621	77.5862
5,000000<x<=10,00000	19	109	16.66667	95.6140	16.37931	93.9655
10,00000<x<=15,00000	2	111	1.75439	97.3684	1.72414	95.6897
15,00000<x<=20,00000	0	111	0.00000	97.3684	0.00000	95.6897
20,00000<x<=25,00000	3	114	2.63158	100.0000	2.58621	98.2759
Missing	2	116	1.75439		1.72414	100.0000

Category	Frequency table: ACC30 NAA abs (Spreadsheet Chapter 3) Shapiro-Wilk W=,96755, p=,05390					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	2	2	2.70270	2.7027	1.72414	1.7241
1,000000<x<=2,000000	21	23	28.37838	31.0811	18.10345	19.8276
2,000000<x<=3,000000	17	40	22.97297	54.0541	14.65517	34.4828
3,000000<x<=4,000000	22	62	29.72973	83.7838	18.96552	53.4483
4,000000<x<=5,000000	11	73	14.86486	98.6486	9.48276	62.9310
5,000000<x<=6,000000	0	73	0.00000	98.6486	0.00000	62.9310
6,000000<x<=7,000000	1	74	1.35135	100.0000	0.86207	63.7931
Missing	42	116	56.75676		36.20690	100.0000

Category	Frequency table: ACC30 NAA+NAAG abs (Spreadsheet Chapter 3) Shapiro-Wilk W=,97494, p=,14826					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	0	0	0.00000	0.0000	0.00000	0.0000
1,000000<x<=2,000000	14	14	18.91892	18.9189	12.06897	12.0690
2,000000<x<=3,000000	21	35	28.37838	47.2973	18.10345	30.1724
3,000000<x<=4,000000	23	58	31.08108	78.3784	19.82759	50.0000
4,000000<x<=5,000000	13	71	17.56757	95.9459	11.20690	61.2069
5,000000<x<=6,000000	2	73	2.70270	98.6486	1.72414	62.9310
6,000000<x<=7,000000	1	74	1.35135	100.0000	0.86207	63.7931
Missing	42	116	56.75676		36.20690	100.0000

Category	Frequency table: ACC30 mI abs (Spreadsheet Chapter 3) Shapiro-Wilk W=,82841, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
1,000000<x<=2,000000	0	0	0.00000	0.0000	0.00000	0.0000
2,000000<x<=3,000000	3	3	4.05405	4.0541	2.58621	2.5862
3,000000<x<=4,000000	33	36	44.59459	48.6486	28.44828	31.0345
4,000000<x<=5,000000	24	60	32.43243	81.0811	20.68966	51.7241
5,000000<x<=6,000000	12	72	16.21622	97.2973	10.34483	62.0690
6,000000<x<=7,000000	0	72	0.00000	97.2973	0.00000	62.0690
7,000000<x<=8,000000	1	73	1.35135	98.6486	0.86207	62.9310
8,000000<x<=9,000000	0	73	0.00000	98.6486	0.00000	62.9310
9,000000<x<=10,00000	0	73	0.00000	98.6486	0.00000	62.9310
10,00000<x<=11,00000	1	74	1.35135	100.0000	0.86207	63.7931
Missing	42	116	56.75676		36.20690	100.0000

Category	Frequency table: ACC80 Glu abs (Spreadsheet Chapter 3) Shapiro-Wilk W=,98469, p=,54153					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	0	0	0.00000	0.0000	0.00000	0.0000
1,000000<x<=2,000000	7	7	9.85915	9.8592	6.03448	6.0345
2,000000<x<=3,000000	24	31	33.80282	43.6620	20.68966	26.7241
3,000000<x<=4,000000	18	49	25.35211	69.0141	15.51724	42.2414
4,000000<x<=5,000000	18	67	25.35211	94.3662	15.51724	57.7586
5,000000<x<=6,000000	4	71	5.63380	100.0000	3.44828	61.2069
Missing	45	116	63.38028		38.79310	100.0000

Category	Frequency table: ACC80 Glx abs (Spreadsheet Chapter 3) Shapiro-Wilk W=,97486, p=,16475					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	0	0	0.00000	0.0000	0.00000	0.0000
1,000000<x<=2,000000	2	2	2.81690	2.8169	1.72414	1.7241
2,000000<x<=3,000000	11	13	15.49296	18.3099	9.48276	11.2069
3,000000<x<=4,000000	28	41	39.43662	57.7465	24.13793	35.3448
4,000000<x<=5,000000	15	56	21.12676	78.8732	12.93103	48.2759
5,000000<x<=6,000000	10	66	14.08451	92.9577	8.62069	56.8966
6,000000<x<=7,000000	4	70	5.63380	98.5915	3.44828	60.3448
7,000000<x<=8,000000	1	71	1.40845	100.0000	0.86207	61.2069
Missing	45	116	63.38028		38.79310	100.0000

Category	Frequency table: Thal30 NAA abs (Spreadsheet Chapter 3) Shapiro-Wilk W=,97216, p=,18589					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	1	1	1.66667	1.6667	0.86207	0.8621
1,000000<x<=2,000000	10	11	16.66667	18.3333	8.62069	9.4828
2,000000<x<=3,000000	11	22	18.33333	36.6667	9.48276	18.9655
3,000000<x<=4,000000	17	39	28.33333	65.0000	14.65517	33.6207
4,000000<x<=5,000000	16	55	26.66667	91.6667	13.79310	47.4138
5,000000<x<=6,000000	5	60	8.33333	100.0000	4.31034	51.7241
Missing	56	116	93.33333		48.27586	100.0000

Category	Frequency table: Thal30 NAA+NAAG abs (Spreadsheet Chapter 3) Shapiro-Wilk W=,95173, p=,00718					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	0	0	0.00000	0.0000	0.00000	0.0000
1,000000<x<=2,000000	13	13	17.80822	17.8082	11.20690	11.2069
2,000000<x<=3,000000	13	26	17.80822	35.6164	11.20690	22.4138
3,000000<x<=4,000000	12	38	16.43836	52.0548	10.34483	32.7586
4,000000<x<=5,000000	20	58	27.39726	79.4521	17.24138	50.0000
5,000000<x<=6,000000	13	71	17.80822	97.2603	11.20690	61.2069
6,000000<x<=7,000000	2	73	2.73973	100.0000	1.72414	62.9310
Missing	43	116	58.90411		37.06897	100.0000

Category	Frequency table: Thal30 mI abs (Spreadsheet Chapter 3) Shapiro-Wilk W=,97246, p=,11518					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
1,000000<x<=1,500000	2	2	2.77778	2.7778	1.72414	1.7241
1,500000<x<=2,000000	13	15	18.05556	20.8333	11.20690	12.9310
2,000000<x<=2,500000	19	34	26.38889	47.2222	16.37931	29.3103
2,500000<x<=3,000000	16	50	22.22222	69.4444	13.79310	43.1034
3,000000<x<=3,500000	15	65	20.83333	90.2778	12.93103	56.0345
3,500000<x<=4,000000	5	70	6.94444	97.2222	4.31034	60.3448
4,000000<x<=4,500000	2	72	2.77778	100.0000	1.72414	62.0690
Missing	44	116	61.11111		37.93103	100.0000

Depend.: Duration of current diagnosis (months)	Kruskal-Wallis ANOVA by Ranks; Duration of current diagnosis (months) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 74) =0,000000 p =1,000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	0		0.00000
SCZ	2	44	1980.500	45.01136
MPD	3	30	794.500	26.48333

Dependent: Duration of current diagnosis (months)	Median Test, Overall Median = 7,00000; Duration of current diagnosis (months) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 5,322708 df = 2 p = ,0699			
	CON	SCZ	MPD	Total
<= Median: observed	0.00	22.0000	23.0000	45.0000
expected	0.00	26.7567	18.2432	
obs.-exp	0.00	-4.7567	4.7567	
> Median: observed	0.00	22.0000	7.0000	29.0000
expected	0.00	17.2432	11.7567	
obs.-exp	0.00	4.7567	-4.7567	
Total: observed	0.00	44.0000	30.0000	74.0000

Depend.: Duration of current diagnosis (months)	Kruskal-Wallis ANOVA by Ranks; Duration of current diagnosis (months) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 24) =0,000000 p =1,000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	0		0.00000
SCZ	2	10	150.5000	15.05000
MPD	3	14	149.5000	10.67857

Dependent: Duration of current diagnosis (months)	Median Test, Overall Median = 3,00000; Duration of current diagnosis (months) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 1,385814 df = 2 p = ,5001			
	CON	SCZ	MPD	Total
<= Median: observed	0.00	4.0000	9.0000	13.0000
expected	0.00	5.4166	7.5833	
obs.-exp	0.00	-1.4166	1.4166	
> Median: observed	0.00	6.0000	5.0000	11.0000
expected	0.00	4.5833	6.4166	
obs.-exp	0.00	1.4166	-1.4166	
Total: observed	0.00	10.0000	14.0000	24.0000

Depend.: Number of psychotic episodes	Kruskal-Wallis ANOVA by Ranks; Number of psychotic episodes (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 78) =0,000000 p =1,000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	0		0.00000
SCZ	2	44	2004.500	45.55682
MPD	3	34	1076.500	31.66176

Dependent: Number of psychotic episodes	Median Test, Overall Median = 3,00000; Number of psychotic episodes (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 4,872103 df = 2 p = ,0875			
	CON	SCZ	MPD	Total
<= Median: observed	0.00	26.00000	28.00000	54.00000
expectec	0.00	30.46154	23.53846	
obs.-exp.	0.00	-4.46154	4.46154	
> Median: observed	0.00	18.00000	6.00000	24.00000
expectec	0.00	13.53846	10.46154	
obs.-exp.	0.00	4.46154	-4.46154	
Total: observed	0.00	44.00000	34.00000	78.00000

Depend.: Onset of Meth use	Kruskal-Wallis ANOVA by Ranks; Onset of Meth use (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 51) =6,964012 p =,0307			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	2	41.5000	20.75000
SCZ	2	15	517.0000	34.46667
MPD	3	34	767.5000	22.57353

Dependent: Onset of Meth use	Median Test, Overall Median = 17,0000; Onset of Meth use (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 5,131385 df = 2 p = ,0769			
	CON	SCZ	MPD	Total
<= Median: observed	1.000000	4.00000	21.00000	26.00000
expected	1.019608	7.64706	17.33333	
obs.-exp.	-0.019608	-3.64706	3.66667	
> Median: observed	1.000000	11.00000	13.00000	25.00000
expected	0.980392	7.35294	16.66667	
obs.-exp.	0.019608	3.64706	-3.66667	
Total: observed	2.000000	15.00000	34.00000	51.00000

Depend.: Duration of meth use (years)	Kruskal-Wallis ANOVA by Ranks; Duration of meth use (years) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 50) =20,19899 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	2	5.500	2.7500
SCZ	2	14	192.000	13.7142
MPD	3	34	1077.500	31.6911

Dependent: Duration of meth use (years)	Median Test, Overall Median = 83,0000; Duration of meth use (years) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 13,37815 df = 2 p = ,0012			
	CON	SCZ	MPD	Total
<= Median: observed	2.00000	12.00000	11.00000	25.00000
expected	1.00000	7.00000	17.00000	
obs.-exp.	1.00000	5.00000	-6.00000	
> Median: observed	0.00000	2.00000	23.00000	25.00000
expected	1.00000	7.00000	17.00000	
obs.-exp.	-1.00000	-5.00000	6.00000	
Total: observed	2.00000	14.00000	34.00000	50.00000

Depend.: Duration of methamphetamine abstinence (months)	Kruskal-Wallis ANOVA by Ranks; Duration of methamphetamine abstinence (months) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 50) =6,957404 p =,0308			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	2	94.5000	47.25000
SCZ	2	15	439.5000	29.30000
MPD	3	33	741.0000	22.4545

Dependent: Duration of methamphetamine abstinence (months)	Median Test, Overall Median = 1,00000; Duration of methamphetamine abstinence (months) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 2,748640 df = 2 p = ,2530			
	CON	SCZ	MPD	Total
<= Median: observed	0.00000	7.00000	19.00000	26.00000
expected	1.04000	7.80000	17.16000	
obs.-exp.	-1.04000	-0.80000	1.84000	
> Median: observed	2.00000	8.00000	14.00000	24.00000
expected	0.96000	7.20000	15.84000	
obs.-exp.	1.04000	0.80000	-1.84000	
Total: observe	2.00000	15.00000	33.00000	50.00000

Depend.: cpzeq	Kruskal-Wallis ANOVA by Ranks; cpzeq (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 74) =0,000000 p =1,000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	0		47.2500
SCZ	2	40	1746.000	43.6500
MPD	3	34	1029.000	30.26471

Dependent: cpzeq	Median Test, Overall Median = 300,000; cpzeq (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 6,860427 df = 2 p = ,0324			
	CON	SCZ	MPD	Total
<= Median: observed	0.00	20.00000	27.00000	47.00000
expected	0.00	25.40541	21.59459	
obs.-exp.	0.00	-5.40541	5.40541	
> Median: observed	0.00	20.00000	7.00000	27.00000
expected	0.00	14.59459	12.40541	
obs.-exp.	0.00	5.40541	-5.40541	
Total: observed	0.00	40.00000	34.00000	74.00000

Depend.: Years of education - School (years)	Kruskal-Wallis ANOVA by Ranks; Years of education - School (years) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 115) =26,20426 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	37	2947.000	79.6486
SCZ	2	44	2203.000	50.0681
MPD	3	34	1520.000	44.7058

Dependent: Years of education - School (years)	Median Test, Overall Median = 11,0000; Years of education - School (years) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 21,79283 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	8.0000	29.0000	24.0000	61.0000
expected	19.6261	23.3391	18.0347	
obs.-exp.	-11.6261	5.66087	5.96522	
> Median: observed	29.0000	15.0000	10.0000	54.0000
expected	17.3739	20.66087	15.96522	
obs.-exp.	11.6261	-5.66087	-5.96522	
Total: observed	37.0000	44.0000	34.0000	115.0000

Depend.: Years of education - Post school (years)	Kruskal-Wallis ANOVA by Ranks; Years of education - Post school (years) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 111) =12,64372 p =,0018			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	36	2429.000	67.47222
SCZ	2	44	2045.500	46.48864
MPD	3	31	1741.500	56.17742

Dependent: Years of education - Post school (years)	Median Test, Overall Median = 0,00000; Years of education - Post school (years) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 12,37547 df = 2 p = ,0021			
	CON	SCZ	MPD	Total
<= Median: observed	18.00000	38.00000	21.00000	77.0000
expected	24.97297	30.52252	21.50450	
obs.-exp.	-6.97297	7.47748	-0.50450	
> Median: observed	18.00000	6.00000	10.00000	34.0000
expected	11.02703	13.47748	9.49550	
obs.-exp.	6.97297	-7.47748	0.50450	
Total: observed	36.00000	44.00000	31.00000	111.0000

Depend.: Age on day	Kruskal-Wallis ANOVA by Ranks; Age on day (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 115) =3,130895 p =,2090			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	37	2285.500	61.77027
SCZ	2	44	2700.500	61.37500
MPD	3	34	1684.000	49.52941

Dependent: Age on day	Median Test, Overall Median = 29,0000; Age on day (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 1,212458 df = 2 p = ,5454			
	CON	SCZ	MPD	Total
<= Median: observed	19.00000	22.00000	21.00000	62.0000
expected	19.94783	23.72174	18.33043	
obs.-exp.	-0.94783	-1.72174	2.66957	
> Median: observed	18.00000	22.00000	13.00000	53.0000
expected	17.05217	20.27826	15.66957	
obs.-exp.	0.94783	1.72174	-2.66957	
Total: observed	37.00000	44.00000	34.00000	115.0000

Kruskal-Wallis ANOVA by Ranks; PANSS positive score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 113) =43,10524 p =,0000

Depend.: PANSS positive score	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1021.50(	29.18571
SCZ	2	44	3327.00(	75.6136(
MPD	3	34	2092.50(	61.5441(

Median Test, Overall Median = 8,00000; PANSS positive score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Chi-Square = 43,76601 df = 2 p = ,0000

Dependent: PANSS positive score	CON	SCZ	MPD	Total
<= Median: observed	34.0000	10.0000	17.00000	61.0000
expected	18.8938	23.7522	18.35398	
obs.-exp.	15.1062	-13.7522	-1.35398	
> Median: observed	1.0000	34.0000	17.00000	52.0000
expected	16.1062	20.2478	15.64602	
obs.-exp.	-15.1062	13.7522	1.35398	
Total: observed	35.0000	44.0000	34.00000	113.0000

Kruskal-Wallis ANOVA by Ranks; PANSS negative score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 113) =54,63894 p =,0000

Depend.: PANSS negative score	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	899.50(	25.7000(
SCZ	2	44	3448.00(	78.3636(
MPD	3	34	2093.50(	61.5735(

Median Test, Overall Median = 9,00000; PANSS negative score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Chi-Square = 47,46994 df = 2 p = ,0000

Dependent: PANSS negative score	CON	SCZ	MPD	Total
<= Median: observed	35.0000	10.0000	17.00000	62.0000
expected	19.2035	24.1416	18.65487	
obs.-exp.	15.7965	-14.1416	-1.65487	
> Median: observed	0.0000	34.0000	17.00000	51.0000
expected	15.7965	19.8584	15.34513	
obs.-exp.	-15.7965	14.1416	1.65487	
Total: observed	35.0000	44.0000	34.00000	113.0000

Kruskal-Wallis ANOVA by Ranks; PANSS general psychopathology score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 113) =42,10384 p =,0000

Depend.: PANSS general psychopathology score	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1020.00(	29.1428(
SCZ	2	44	3317.50(	75.3977(
MPD	3	34	2103.50(	61.8676(

Median Test, Overall Median = 18,0000; PANSS general psychopathology score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Chi-Square = 33,53825 df = 2 p = ,0000

Dependent: PANSS general psychopathology score	CON	SCZ	MPD	Total
<= Median: observed	33.000	13.000	18.0000	64.000
expected	19.823	24.920	19.2566	
obs.-exp	13.177	-11.920	-1.2566	
> Median: observed	2.000	31.000	16.0000	49.000
expected	15.177	19.079	14.7433	
obs.-exp	-13.177	11.920	1.2566	
Total: observe	35.000	44.000	34.0000	113.000

Kruskal-Wallis ANOVA by Ranks; PANS total score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 113) =57,33298 p =,0000

Depend.: PANS total score	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	831.500	23.75714
SCZ	2	44	3444.000	78.27273
MPD	3	34	2165.500	63.69118

Median Test, Overall Median = 37,0000; PANS total score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Chi-Square = 51,02723 df = 2 p = ,0000

Dependent: PANS total score	CON	SCZ	MPD	Total
<= Median: observed	35.0000	10.0000	12.00000	57.0000
expected	17.6549	22.1947	17.15044	
obs.-exp.	17.3451	-12.1947	-5.15044	
> Median: observed	0.0000	34.0000	22.00000	56.0000
expected	17.3451	21.8053	16.84956	
obs.-exp.	-17.3451	12.1947	5.15044	
Total: observed	35.0000	44.0000	34.00000	113.0000

Kruskal-Wallis ANOVA by Ranks; CGI score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 114) =69,13279 p =,0000

Depend.: CGI score	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	36	792.00	22.0000
SCZ	2	44	3521.50	80.0340
MPD	3	34	2241.50	65.9264

Median Test, Overall Median = 2,00000; CGI score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Chi-Square = 41,12001 df = 2 p = ,0000

Dependent: CGI score	CON	SCZ	MPD	Total
<= Median: observed	36.0000	13.0000	19.00000	68.0000
expected	21.4737	26.2456	20.28070	
obs.-exp.	14.5263	-13.2456	-1.28070	
> Median: observed	0.0000	31.0000	15.00000	46.0000
expected	14.5263	17.7544	13.71930	
obs.-exp.	-14.5263	13.2456	1.28070	
Total: observed	36.0000	44.0000	34.00000	114.0000

Depend.: GAF score	Kruskal-Wallis ANOVA by Ranks; GAF score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 114) =60,59984 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	36	3313.00(	92.0277ε
SCZ	2	44	1591.50(	36.1704ξ
MPD	3	34	1650.50(	48.5441ℤ

Dependent: GAF score	Median Test, Overall Median = 70,5000; GAF score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 48,14320 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	1.0000	34.0000	22.00000	57.0000
expected	18.0000	22.0000	17.00000	
obs.-exp.	-17.0000	12.0000	5.00000	
> Median: observed	35.0000	10.0000	12.00000	57.0000
expected	18.0000	22.0000	17.00000	
obs.-exp.	17.0000	-12.0000	-5.00000	
Total: observed	36.0000	44.0000	34.00000	114.0000

Depend.: Weight (kg)	Kruskal-Wallis ANOVA by Ranks; Weight (kg) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 104) =7,762030 p =,0206			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	2125.50(	62.51471
SCZ	2	39	2043.50(	52.39744
MPD	3	31	1291.00(	41.6451б

Dependent: Weight (kg)	Median Test, Overall Median = 69,6000; Weight (kg) (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 4,520897 df = 2 p = ,1043			
	CON	SCZ	MPD	Total
<= Median: observed	13.0000(	19.0000(	20.0000(	52.0000
expected	17.0000(	19.5000(	15.5000(	
obs.-exp.	-4.00000	-0.50000	4.50000	
> Median: observed	21.0000(	20.0000(	11.0000(	52.0000
expected	17.0000(	19.5000(	15.5000(	
obs.-exp.	4.00000	0.50000	-4.50000	
Total: observed	34.0000(	39.0000(	31.0000(	104.000(

Depend.: Alcohol life time - Frequency score	Kruskal-Wallis ANOVA by Ranks; Alcohol life time - Frequency score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 99) =,0573045 p =,9718			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1778.50(	50.8142ς
SCZ	2	35	1723.50(	49.2428б
MPD	3	29	1448.00(	49.9310ȝ

Dependent: Alcohol life time - Frequency score	Median Test, Overall Median = 2,00000; Alcohol life time - Frequency score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = ,1016177 df = 2 p = ,9505			
	CON	SCZ	MPD	Total
<= Median: observed	19.0000(	18.0000(	16.0000(	53.0000(
expected	18.73737	18.73737	15.5252!	
obs.-exp.	0.2626:	-0.73737	0.47475	
> Median: observed	16.0000(	17.0000(	13.0000(	46.0000(
expected	16.2626:	16.2626:	13.47475	
obs.-exp.	-0.2626:	0.73737	-0.47475	
Total: observed	35.0000(	35.0000(	29.0000(	99.0000(

Depend.: Alcohol life time - Duration score	Kruskal-Wallis ANOVA by Ranks; Alcohol life time - Duration score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 102) =,7245776 p =,6961			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1889.500	53.98571
SCZ	2	38	1849.000	48.65789
MPD	3	29	1514.500	52.22414

Dependent: Alcohol life time - Duration score	Median Test, Overall Median = 3,00000; Alcohol life time - Duration score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 0,000000 df = 2 p = 1,000			
	CON	SCZ	MPD	Total
<= Median: observed	35.0000(	38.0000(	29.0000(	102.000(
expected	35.0000(	38.0000(	29.0000(	
obs.-exp	0.0000(	0.0000(	0.0000(	
> Median: observed	0.0000(	0.0000(	0.0000(	0.000(
expected	0.0000(	0.0000(	0.0000(	
obs.-exp	0.0000(	0.0000(	0.0000(	
Total: observed	35.0000(	38.0000(	29.0000(	102.000(

Depend.: Alcohol life time - Amount score	Kruskal-Wallis ANOVA by Ranks; Alcohol life time - Amount score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 81) =6,003202 p =,0497			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	26	1164.500	44.78846
SCZ	2	32	1066.000	33.31250
MPD	3	23	1090.500	47.41304

Dependent: Alcohol life time - Amount score	Median Test, Overall Median = 3,00000; Alcohol life time - Amount score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 3,670418 df = 2 p = ,1596			
	CON	SCZ	MPD	Total
<= Median: observed	14.0000(	23.0000(	11.0000(	48.0000(
expected	15.40741	18.9629(	13.6296:	
obs.-exp	-1.40741	4.03704	-2.6296:	
> Median: observed	12.0000(	9.0000(	12.0000(	33.0000(
expected	10.5925!	13.03704	9.37037	
obs.-exp	1.40741	-4.03704	2.6296:	
Total: observed	26.0000(	32.0000(	23.0000(	81.0000(

Kruskal-Wallis ANOVA by Ranks; Alcohol life time - Total score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 81) =5,022034 p =,0812

Depend.: Alcohol life time - Total score	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	26	1184.500	45.5576
SCZ	2	32	1082.000	33.8125
MPD	3	23	1054.500	45.8478

Median Test, Overall Median = 7,00000; Alcohol life time - Total score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Chi-Square = 2,551251 df = 2 p = ,2793

Dependent: Alcohol life time - Total score	CON	SCZ	MPD	Total
<= Median: observed	11.00000	20.00000	11.00000	42.00000
expected	13.48148	16.59259	11.92593	
obs.-exp.	-2.48148	3.40741	-0.92593	
> Median: observed	15.00000	12.00000	12.00000	39.00000
expected	12.51852	15.40741	11.07407	
obs.-exp.	2.48148	-3.40741	0.92593	
Total: observed	26.00000	32.00000	23.00000	81.00000

Kruskal-Wallis ANOVA by Ranks; Tobacco life time - Frequency score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 103) =12,37164 p =,0021

Depend.: Tobacco life time - Frequency score	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1369.000	39.1142
SCZ	2	38	2145.500	56.4605
MPD	3	30	1841.500	61.3833

Median Test, Overall Median = 5,00000; Tobacco life time - Frequency score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Chi-Square = 0,000000 df = 2 p = 1,000

Dependent: Tobacco life time - Frequency score	CON	SCZ	MPD	Total
<= Median: observed	35.0000	38.0000	30.0000	103.000
expected	35.0000	38.0000	30.0000	
obs.-exp	0.0000	0.0000	0.0000	
> Median: observed	0.0000	0.0000	0.0000	0.000
expected	0.0000	0.0000	0.0000	
obs.-exp	0.0000	0.0000	0.0000	
Total: observed	35.0000	38.0000	30.0000	103.000

Kruskal-Wallis ANOVA by Ranks; Tobacco life time - Duration score (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 103) =10,98169 p =,0041

Depend.: Tobacco life time - Duration score	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1456.500	41.61429
SCZ	2	38	2057.500	54.14474
MPD	3	30	1842.000	61.40000

Dependent: Tobacco life time - Duration score	Median Test, Overall Median = 3,00000; Tobacco life time - Duration score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 0,000000 df = 2 p = 1,000			
	CON	SCZ	MPD	Total
<= Median: observed	35.0000C	38.0000C	30.0000C	103.0000
expected	35.0000C	38.0000C	30.0000C	
obs.-exp.	0.0000C	0.0000C	0.0000C	
> Median: observed	0.0000C	0.0000C	0.0000C	0.0000
expected	0.0000C	0.0000C	0.0000C	
obs.-exp.	0.0000C	0.0000C	0.0000C	
Total: observed	35.0000C	38.0000C	30.0000C	103.0000

Depend.: Tobacco life time Amount score	Kruskal-Wallis ANOVA by Ranks; Tobacco life time Amount score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =8,159547 p =,0169			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	33	1262.00(	38.2424:
SCZ	2	36	1882.00(	52.2777i
MPD	3	28	1609.00(	57.4642!

Dependent: Tobacco life time Amount score	Median Test, Overall Median = 2,00000; Tobacco life time Amount score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 7,043769 df = 2 p = ,0295			
	CON	SCZ	MPD	Total
<= Median: observed	24.0000C	15.0000C	14.0000C	53.0000C
expectec	18.03093	19.6701C	15.29897	
obs.-exp.	5.96907	-4.67010	-1.29897	
> Median: observed	9.00000	21.0000C	14.0000C	44.0000C
expectec	14.96907	16.3299C	12.70103	
obs.-exp.	-5.96907	4.67010	1.29897	
Total: observed	33.0000C	36.0000C	28.0000C	97.0000C

Depend.: Tobacco life time - Total score	Kruskal-Wallis ANOVA by Ranks; Tobacco life time - Total score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =10,15428 p =,0062			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	33	1216.50(	36.8636
SCZ	2	36	1904.50(	52.9027
MPD	3	28	1632.00(	58.2857

Dependent: Tobacco life time - Total score	Median Test, Overall Median = 9,00000; Tobacco life time - Total score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 7,841895 df = 2 p = ,0198			
	CON	SCZ	MPD	Total
<= Median: observed	23.00000	16.00000	10.00000	49.00000
expectec	16.67010	18.18557	14.14433	
obs.-exp.	6.32990	-2.18557	-4.14433	
> Median: observed	10.00000	20.00000	18.00000	48.00000
expectec	16.32990	17.81443	13.85567	
obs.-exp.	-6.32990	2.18557	4.14433	
Total: observed	33.00000	36.00000	28.00000	97.00000

Depend.: Cocaine life time - Frequency score	Kruskal-Wallis ANOVA by Ranks; Cocaine life time - Frequency score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 103) =8,609350 p =,0135			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1610.000	46.00000
SCZ	2	38	1915.500	50.40789
MPD	3	30	1830.500	61.01667

Dependent: Cocaine life time - Frequency score	Median Test, Overall Median = 0,00000; Cocaine life time - Frequency score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 7,999238 df = 2 p = ,0183			
	CON	SCZ	MPD	Total
<= Median: observed	32.00000	31.00000	19.00000	82.0000
expected	27.86408	30.25243	23.88350	
obs.-exp.	4.13592	0.74757	-4.88350	
> Median: observed	3.00000	7.00000	11.00000	21.0000
expected	7.13592	7.74757	6.11650	
obs.-exp.	-4.13592	-0.74757	4.88350	
Total: observed	35.00000	38.00000	30.00000	103.0000

Depend.: Cocaine life time - Duration score	Kruskal-Wallis ANOVA by Ranks; Cocaine life time - Duration score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 103) =8,330631 p =,0155			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1606.000	45.88571
SCZ	2	38	1927.500	50.72368
MPD	3	30	1822.500	60.75000

Dependent: Cocaine life time - Duration score	Median Test, Overall Median = 0,00000; Cocaine life time - Duration score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 7,999238 df = 2 p = ,0183			
	CON	SCZ	MPD	Total
<= Median: observed	32.00000	31.00000	19.00000	82.0000
expected	27.86408	30.25243	23.88350	
obs.-exp.	4.13592	0.74757	-4.88350	
> Median: observed	3.00000	7.00000	11.00000	21.0000
expected	7.13592	7.74757	6.11650	
obs.-exp.	-4.13592	-0.74757	4.88350	
Total: observed	35.00000	38.00000	30.00000	103.0000

Depend.: Cocaine life time - Amount score	Kruskal-Wallis ANOVA by Ranks; Cocaine life time - Amount score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 100) =3,634303 p =,1625			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1705.000	48.71429
SCZ	2	37	1791.000	48.40541
MPD	3	28	1554.000	55.50000

Dependent: Cocaine life time - Amount score	Median Test, Overall Median = 0,00000; Cocaine life time - Amount score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 3,277466 df = 2 p = ,1942			
	CON	SCZ	MPD	Total
<= Median: observed	32.0000	34.0000	22.0000	88.000
expecte	30.8000	32.5600	24.6400	
obs.-exp	1.2000	1.4400	-2.6400	
> Median: observed	3.0000	3.0000	6.0000	12.000
expecte	4.2000	4.4400	3.3600	
obs.-exp	-1.2000	-1.4400	2.6400	
Total: observe	35.0000	37.0000	28.0000	100.000

Depend.: Cocaine life time - Total score	Kruskal-Wallis ANOVA by Ranks; Cocaine life time - Total score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 100) =6,283866 p =,0432			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1606.50	45.9000
SCZ	2	37	1820.00	49.1891
MPD	3	28	1623.50	57.9821

Dependent: Cocaine life time - Total score	Median Test, Overall Median = 0,00000; Cocaine life time - Total score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 5,982202 df = 2 p = ,0502			
	CON	SCZ	MPD	Total
<= Median: observed	32.00000	31.00000	19.00000	82.0000
expected	28.70000	30.34000	22.96000	
obs.-exp.	3.30000	0.66000	-3.96000	
> Median: observed	3.00000	6.00000	9.00000	18.0000
expected	6.30000	6.66000	5.04000	
obs.-exp.	-3.30000	-0.66000	3.96000	
Total: observed	35.00000	37.00000	28.00000	100.0000

Depend.: Heroin life time score - Frequency score	Kruskal-Wallis ANOVA by Ranks; Heroin life time score - Frequency score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 103) =14,75359 p =,0006			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1645.00	47.0000
SCZ	2	38	1884.00	49.5789
MPD	3	30	1827.00	60.9000

Dependent: Heroin life time score - Frequency score	Median Test, Overall Median = 0,00000; Heroin life time score - Frequency score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 14,46158 df = 2 p = ,0007			
	CON	SCZ	MPD	Total
<= Median: observed	35.00000	36.00000	22.00000	93.0000
expected	31.60194	34.31068	27.08738	
obs.-exp.	3.39806	1.68932	-5.08738	
> Median: observed	0.00000	2.00000	8.00000	10.0000
expected	3.39806	3.68932	2.91262	
obs.-exp.	-3.39806	-1.68932	5.08738	
Total: observed	35.00000	38.00000	30.00000	103.0000

Depend.: Heroin life time score - Duration Score	Kruskal-Wallis ANOVA by Ranks; Heroin life time score - Duration Score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 103) =14,61175 p =,0007			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1645.00(	47.0000(
SCZ	2	38	1885.50(	49.6184:
MPD	3	30	1825.50(	60.8500(

Dependent: Heroin life time score - Duration Score	Median Test, Overall Median = 0,00000; Heroin life time score - Duration Score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 14,46158 df = 2 p = ,0007			
	CON	SCZ	MPD	Total
<= Median: observed	35.0000(	36.0000(	22.0000(	93.000(
expectec	31.6019	34.3106	27.0873	
obs.-exp	3.3980	1.6893	-5.0873	
> Median: observed	0.0000(	2.0000(	8.0000(	10.000(
expectec	3.3980	3.6893	2.9126	
obs.-exp	-3.3980	-1.6893	5.0873	
Total: observe	35.0000(	38.0000(	30.0000(	103.000(

Depend.: Heroin life time score - Amount score	Kruskal-Wallis ANOVA by Ranks; Heroin life time score - Amount score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 102) =12,48677 p =,0019			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1715.00(	49.0000(
SCZ	2	37	1813.00(	49.0000(
MPD	3	30	1725.00(	57.5000(

Dependent: Heroin life time score - Amount score	Median Test, Overall Median = 0,00000; Heroin life time score - Amount score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 12,61856 df = 2 p = ,0018			
	CON	SCZ	MPD	Total
<= Median: observed	35.0000(	37.0000(	25.0000(	97.000(
expectec	33.2843	35.1862	28.5294	
obs.-exp	1.7156	1.8137	-3.5294	
> Median: observed	0.0000(	0.0000(	5.0000(	5.000(
expectec	1.7156	1.8137	1.4705	
obs.-exp	-1.7156	-1.8137	3.5294	
Total: observe	35.0000(	37.0000(	30.0000(	102.000(

Depend.: Heroin life time score - Total score	Kruskal-Wallis ANOVA by Ranks; Heroin life time score - Total score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 102) =17,17690 p =,0002			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1645.00(	47.0000(
SCZ	2	37	1786.50(	48.2837(
MPD	3	30	1821.50(	60.7166

Dependent: Heroin life time score - Total score	Median Test, Overall Median = 0,00000; Heroin life time score - Total score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 16,98254 df = 2 p = ,0002			
	CON	SCZ	MPD	Total
<= Median: observed	35.00000	36.00000	22.00000	93.0000
expected	31.91176	33.73529	27.35294	
obs.-exp.	3.08824	2.26471	-5.35294	
> Median: observed	0.00000	1.00000	8.00000	9.0000
expected	3.08824	3.26471	2.64706	
obs.-exp.	-3.08824	-2.26471	5.35294	
Total: observed	35.00000	37.00000	30.00000	102.0000

Depend.: Cannabis life time - Frequency score	Kruskal-Wallis ANOVA by Ranks; Cannabis life time - Frequency score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 103) =14,62146 p =,0007			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1327.000	37.91429
SCZ	2	38	2080.000	54.73684
MPD	3	30	1949.000	64.96667

Dependent: Cannabis life time - Frequency score	Median Test, Overall Median = 2,00000; Cannabis life time - Frequency score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 14,51993 df = 2 p = ,0007			
	CON	SCZ	MPD	Total
<= Median: observed	27.00000	16.00000	10.00000	53.0000
expected	18.00971	19.55340	15.43689	
obs.-exp.	8.99029	-3.55340	-5.43689	
> Median: observed	8.00000	22.00000	20.00000	50.0000
expected	16.99029	18.44660	14.56311	
obs.-exp.	-8.99029	3.55340	5.43689	
Total: observed	35.00000	38.00000	30.00000	103.0000

Depend.: Cannabis life time - Duration score	Kruskal-Wallis ANOVA by Ranks; Cannabis life time - Duration score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 103) =11,37410 p =,0034			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1408.000	40.22857
SCZ	2	38	2052.000	54.00000
MPD	3	30	1896.000	63.20000

Dependent: Cannabis life time - Duration score	Median Test, Overall Median = 1,00000; Cannabis life time - Duration score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 9,788093 df = 2 p = ,0075			
	CON	SCZ	MPD	Total
<= Median: observed	25.00000	18.00000	10.00000	53.0000
expected	18.00971	19.55340	15.43689	
obs.-exp.	6.99029	-1.55340	-5.43689	
> Median: observed	10.00000	20.00000	20.00000	50.0000
expected	16.99029	18.44660	14.56311	
obs.-exp.	-6.99029	1.55340	5.43689	
Total: observed	35.00000	38.00000	30.00000	103.0000

Depend.: Cannabis life time - Amount score	Kruskal-Wallis ANOVA by Ranks; Cannabis life time - Amount score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 87) =8,716585 p =,0128			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	32	1136.000	35.50000
SCZ	2	30	1335.000	44.50000
MPD	3	25	1357.000	54.28000

Dependent: Cannabis life time - Amount score	Median Test, Overall Median = 1,00000; Cannabis life time - Amount score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 5,962852 df = 2 p = ,0507			
	CON	SCZ	MPD	Total
<= Median: observed	23.00000	16.00000	10.00000	49.00000
expected	18.02299	16.89655	14.08046	
obs.-exp.	4.97701	-0.89655	-4.08046	
> Median: observed	9.00000	14.00000	15.00000	38.00000
expected	13.97701	13.10345	10.91954	
obs.-exp.	-4.97701	0.89655	4.08046	
Total: observed	32.00000	30.00000	25.00000	87.00000

Depend.: Cannabis life time - Total score	Kruskal-Wallis ANOVA by Ranks; Cannabis life time - Total score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 87) =10,77358 p =,0046			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	32	1100.50(	34.3906;
SCZ	2	30	1339.50(	44.6500(
MPD	3	25	1388.00(	55.5200(

Dependent: Cannabis life time - Total score	Median Test, Overall Median = 3,00000; Cannabis life time - Total score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 7,645643 df = 2 p = ,0219			
	CON	SCZ	MPD	Total
<= Median: observed	22.00000	15.00000	8.00000	45.00000
expectec	16.55172	15.51724	12.93103	
obs.-exp.	5.44828	-0.51724	-4.93103	
> Median: observed	10.00000	15.00000	17.00000	42.00000
expectec	15.44828	14.48276	12.06897	
obs.-exp.	-5.44828	0.51724	4.93103	
Total: observed	32.00000	30.00000	25.00000	87.00000

Depend.: Methamphetamine life time - Frequency score	Kruskal-Wallis ANOVA by Ranks; Methamphetamine life time - Frequency score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 101) =56,15566 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1061.500	30.32857
SCZ	2	37	1750.000	47.29730
MPD	3	29	2339.500	80.67241

Dependent: Methamphetamine life time - Frequency score	Median Test, Overall Median = 0,00000; Methamphetamine life time - Frequency score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 50,45966 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	31.0000	21.00000	0.0000	52.0000
expected	18.0198	19.04950	14.9307	
obs.-exp	12.9802	1.95050	-14.9307	
> Median: observed	4.0000	16.00000	29.0000	49.0000
expected	16.9802	17.95050	14.0693	
obs.-exp	-12.9802	-1.95050	14.9307	
Total: observed	35.0000	37.00000	29.0000	101.0000

Depend.: Methamphetamine life time - Duration score	Kruskal-Wallis ANOVA by Ranks; Methamphetamine life time - Duration score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 101) =56,99136 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1078.500	30.81429
SCZ	2	37	1734.500	46.87838
MPD	3	29	2338.000	80.62069

Dependent: Methamphetamine life time - Duration score	Median Test, Overall Median = 0,00000; Methamphetamine life time - Duration score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 50,45966 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	31.0000	21.00000	0.0000	52.0000
expected	18.0198	19.04950	14.9307	
obs.-exp	12.9802	1.95050	-14.9307	
> Median: observed	4.0000	16.00000	29.0000	49.0000
expected	16.9802	17.95050	14.0693	
obs.-exp	-12.9802	-1.95050	14.9307	
Total: observed	35.0000	37.00000	29.0000	101.0000

Depend.: Methamphetamine - METHOD score	Kruskal-Wallis ANOVA by Ranks; Methamphetamine - METHOD score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 101) =49,96006 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1129.500	32.27143
SCZ	2	37	1788.500	48.33784
MPD	3	29	2233.000	77.00000

Dependent: Methamphetamine - METHOD score	Median Test, Overall Median = 0,00000; Methamphetamine - METHOD score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 50,45966 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	31.0000	21.00000	0.0000	52.0000
expected	18.0198	19.04950	14.9307	
obs.-exp.	12.9802	1.95050	-14.9307	
> Median: observed	4.0000	16.00000	29.0000	49.0000
expected	16.9802	17.95050	14.0693	
obs.-exp.	-12.9802	-1.95050	14.9307	
Total: observed	35.0000	37.00000	29.0000	101.0000

Depend.: Methamphetamine - Total score	Kruskal-Wallis ANOVA by Ranks; Methamphetamine - Total score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 101) =58,02556 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	35	1061.00(	30.3142!
SCZ	2	37	1727.50(	46.6891!
MPD	3	29	2362.50(	81.4655:

Dependent: Methamphetamine - Total score	Median Test, Overall Median = 0,00000; Methamphetamine - Total score (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 50,45966 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	31.0000	21.00000	0.0000	52.0000
expectec	18.0198	19.04950	14.9307	
obs.-exp.	12.9802	1.95050	-14.9307	
> Median: observed	4.0000	16.00000	29.0000	49.0000
expectec	16.9802	17.95050	14.0693	
obs.-exp.	-12.9802	-1.95050	14.9307	
Total: observed	35.0000	37.00000	29.0000	101.0000

Depend.: IFNg (25)pg/ml	Kruskal-Wallis ANOVA by Ranks; IFNg (25)pg/ml (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 114) =4,598094 p =,1004			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	37	2457.00(	66.40541
SCZ	2	43	2402.00(	55.86047
MPD	3	34	1696.00(	49.8823!

Dependent: IFNg (25)pg/ml	Median Test, Overall Median = 5,77000; IFNg (25)pg/ml (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 6,765926 df = 2 p = ,0339			
	CON	SCZ	MPD	Total
<= Median: observed	12.0000(	25.0000(	20.0000(	57.000(
expected	18.5000(	21.5000(	17.0000(	
obs.-exp.	-6.5000(	3.5000(	3.0000(	
> Median: observed	25.0000(	18.0000(	14.0000(	57.000(
expected	18.5000(	21.5000(	17.0000(	
obs.-exp.	6.5000(	-3.5000(	-3.0000(	
Total: observed	37.0000(	43.0000(	34.0000(	114.000(

Depend.: IL-10 (27)pg/ml	Kruskal-Wallis ANOVA by Ranks; IL-10 (27)pg/ml (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 114) =2,605867 p =,2717			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	37	2250.50(	60.8243:
SCZ	2	43	2198.50(	51.12791
MPD	3	34	2106.00(	61.9411ε

Dependent: IL-10 (27)pg/ml	Median Test, Overall Median = 2,42000; IL-10 (27)pg/ml (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 4,160170 df = 2 p = ,1249			
	CON	SCZ	MPD	Total
<= Median: observed	18.0000(	29.0000(	16.0000(	63.000(
expected	20.44737	23.7631(	18.78947	
obs.-exp.	-2.44737	5.2368(	-2.78947	
> Median: observed	19.0000(	14.0000(	18.0000(	51.000(
expected	16.5526(	19.2368(	15.2105(	
obs.-exp.	2.44737	-5.23684	2.78947	
Total: observed	37.0000(	43.0000(	34.0000(	114.000(

Depend.: IL-1b (46)pg/ml	Kruskal-Wallis ANOVA by Ranks; IL-1b (46)pg/ml (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 114) =,3151573 p =,8542			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	37	2189.50(	59.1756(
SCZ	2	43	2498.00(	58.0930(
MPD	3	34	1867.50(	54.9264(

Dependent: IL-1b (46)pg/ml	Median Test, Overall Median = 1,36000; IL-1b (46)pg/ml (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 1,198901 df = 2 p = ,5491			
	CON	SCZ	MPD	Total
<= Median: observed	17.0000(	23.0000(	20.0000(	60.000(
expected	19.4736(	22.6315(	17.8947(	
obs.-exp.	-2.4736(	0.3684(	2.1052(	
> Median: observed	20.0000(	20.0000(	14.0000(	54.000(
expected	17.5263(	20.3684(	16.1052(	
obs.-exp.	2.4736(	-0.3684(	-2.1052(	
Total: observed	37.0000(	43.0000(	34.0000(	114.000(

Depend.: TNFa (75)pg/ml	Kruskal-Wallis ANOVA by Ranks; TNFa (75)pg/ml (Spreadsheet Chapter 3) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 114) =,8609243 p =,6502			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	37	2280.50(	61.6351(
SCZ	2	43	2395.50(	55.7093(
MPD	3	34	1879.00(	55.26471

Dependent: TNFa (75)pg/ml	Median Test, Overall Median = 3,44500; TNFa (75)pg/ml (Spreadsheet Chapter 3) Independent (grouping) variable: Group Chi-Square = 3,446371 df = 2 p = ,1785			
	CON	SCZ	MPD	Total
<= Median: observed	14.0000(	25.0000(	18.0000(	57.000(
expectec	18.5000(	21.5000(	17.0000(	
obs.-exp.	-4.5000(	3.5000(	1.0000(	
> Median: observed	23.0000(	18.0000(	16.0000(	57.000(
expectec	18.5000(	21.5000(	17.0000(	
obs.-exp.	4.5000(	-3.5000(	-1.0000(	
Total: observec	37.0000(	43.0000(	34.0000(	114.000(

Kruskal-Wallis ANOVA by Ranks; ACC30 ml abs (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 73) =2,315773 p =,3142

Depend.: ACC30 ml abs	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	25	968.0000	38.72000
SCZ	2	27	870.0000	32.22222
MPD	3	21	863.0000	41.09524

Median Test, Overall Median = 4,06750; ACC30 ml abs (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Chi-Square = 2,849270 df = 2 p = ,2406

Dependent: ACC30 ml abs	CON	SCZ	MPD	Total
<= Median: observed	10.00000	17.00000	10.00000	37.00000
expected	12.67123	13.68493	10.64384	
obs.-exp.	-2.67123	3.31507	-0.64384	
> Median: observed	15.00000	10.00000	11.00000	36.00000
expected	12.32877	13.31507	10.35616	
obs.-exp.	2.67123	-3.31507	0.64384	
Total: observed	25.00000	27.00000	21.00000	73.00000

Kruskal-Wallis ANOVA by Ranks; Thal30 NAA+NAAG abs (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 72) =,9340971 p =,6269

Depend.: Thal30 NAA+NAAG abs	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	24	955.0000	39.79167
SCZ	2	28	961.0000	34.32143
MPD	3	20	712.0000	35.60000

Median Test, Overall Median = 3,84765; Thal30 NAA+NAAG abs (Spreadsheet Chapter 3)
Independent (grouping) variable: Group
Chi-Square = 1,009524 df = 2 p = ,6036

Dependent: Thal30 NAA+NAAG abs	CON	SCZ	MPD	Total
<= Median: observed	10.00000	15.00000	11.00000	36.00000
expected	12.00000	14.00000	10.00000	
obs.-exp.	-2.00000	1.00000	1.00000	
> Median: observed	14.00000	13.00000	9.00000	36.00000
expected	12.00000	14.00000	10.00000	
obs.-exp.	2.00000	-1.00000	-1.00000	
Total: observed	24.00000	28.00000	20.00000	72.00000

Univariate Results for Each DV (Spreadsheet Chapter 3)
Sigma-restricted parameterization
Effective hypothesis decomposition

Effect	Degr. of Freedom	Height (metres) SS	Height (metres) MS	Height (metres) F	Height (metres) p	ACC30 NAA abs SS	ACC30 NAA abs MS	ACC30 NAA abs F	AC
Intercept	1	143.9542	143.9542	14545.32	0.000000	446.3055	446.3055	455.3995	
Group	2	0.0157	0.0079	0.79	0.457922	0.4068	0.2034	0.2075	
Error	47	0.4652	0.0099			46.0614	0.9800		
Total	49	0.4809				46.4682			

Cell No.	LSD test; variable Height (metres) (Spreadsheet Chapter 3) Probabilities for Post Hoc Tests Error: Between MS = ,00990, df = 47,000 Group	{1} 1,6788	{2} 1,7219	{3} 1,6975
1	CON		0.214175	0.587579
2	SCZ	0.214175		0.491714
3	MPD	0.587579	0.491714	

All Groups
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Duration of current diagnosis (months) & ACC30 NAA+NAAG abs	46	0.079520	0.52915	0.599359
Duration of current diagnosis (months) & ACC30 mI abs	46	0.061512	0.40880	0.684670
Duration of current diagnosis (months) & ACC80 Glu abs	45	-0.088779	-0.58447	0.561957
Duration of current diagnosis (months) & ACC80 Glx abs	44	-0.051636	-0.33509	0.739227
Duration of current diagnosis (months) & Thal30 NAA abs	36	-0.030843	-0.17993	0.858277
Duration of current diagnosis (months) & Thal30 NAA+NAAG abs	46	-0.139485	-0.93438	0.355210
Duration of current diagnosis (months) & Thal30 mI abs	45	-0.022337	-0.14651	0.884204
Duration of current diagnosis (months) & ACC30 NAA abs	15	-0.166075	-0.60722	0.554161
Duration of current diagnosis (months) & ACC30 NAA+NAAG abs	15	-0.194957	-0.71668	0.486248
Duration of current diagnosis (months) & ACC30 mI abs	15	-0.342980	-1.31649	0.210749
Duration of current diagnosis (months) & ACC80 Glu abs	15	-0.382694	-1.49352	0.159172
Duration of current diagnosis (months) & ACC80 Glx abs	15	-0.480173	-1.97371	0.070056
Duration of current diagnosis (months) & Thal30 NAA abs	14	0.322969	1.18215	0.260042
Duration of current diagnosis (months) & Thal30 NAA+NAAG abs	15	-0.092063	-0.33335	0.744182
Duration of current diagnosis (months) & Thal30 mI abs	15	0.014441	0.05207	0.959261
Number of psychotic episodes & ACC30 NAA abs	48	0.193115	1.33490	0.188480
Number of psychotic episodes & ACC30 NAA+NAAG abs	48	0.196220	1.35721	0.181337
Number of psychotic episodes & ACC30 mI abs	48	0.059271	0.40270	0.689034
Number of psychotic episodes & ACC80 Glu abs	47	-0.103657	-0.69912	0.488075
Number of psychotic episodes & ACC80 Glx abs	46	-0.232860	-1.58828	0.119384
Number of psychotic episodes & Thal30 NAA abs	38	0.026357	0.15819	0.875188
Number of psychotic episodes & Thal30 NAA+NAAG abs	48	-0.066023	-0.44877	0.655708
Number of psychotic episodes & Thal30 mI abs	47	0.060442	0.40620	0.686522
Onset of Meth use & ACC30 NAA abs	33	0.031360	0.17469	0.862457
Onset of Meth use & ACC30 NAA+NAAG abs	33	-0.002348	-0.01307	0.989654
Onset of Meth use & ACC30 mI abs	33	0.068255	0.38091	0.705865
Onset of Meth use & ACC80 Glu abs	32	-0.167158	-0.92863	0.360494
Onset of Meth use & ACC80 Glx abs	32	-0.128908	-0.71200	0.481965
Onset of Meth use & Thal30 NAA abs	28	0.165248	0.85435	0.400716
Onset of Meth use & Thal30 NAA+NAAG abs	33	0.184137	1.04307	0.304984
Onset of Meth use & Thal30 mI abs	32	0.231584	1.30389	0.202189
Duration of meth use (years) & ACC30 NAA abs	32	0.106992	0.58940	0.560003
Duration of meth use (years) & ACC30 NAA+NAAG abs	32	0.118554	0.65396	0.518120
Duration of meth use (years) & ACC30 mI abs	32	0.031015	0.16996	0.866185
Duration of meth use (years) & ACC80 Glu abs	31	0.000808	0.00435	0.996560
Duration of meth use (years) & ACC80 Glx abs	31	0.104169	0.56404	0.577067
Duration of meth use (years) & Thal30 NAA abs	27	-0.099633	-0.50066	0.620991
Duration of meth use (years) & Thal30 NAA+NAAG abs	32	-0.272319	-1.55014	0.131595
Duration of meth use (years) & Thal30 mI abs	31	-0.277986	-1.55842	0.129981
Duration of methamphetamine abstinence (months) & ACC30 NAA abs	32	-0.251313	-1.42214	0.165301
Duration of methamphetamine abstinence (months) & ACC30 NAA+NAAG abs	32	-0.285348	-1.63072	0.113406
Duration of methamphetamine abstinence (months) & ACC30 mI abs	32	-0.158772	-0.88080	0.385426
Duration of methamphetamine abstinence (months) & ACC80 Glu abs	31	-0.265239	-1.48142	0.149281
Duration of methamphetamine abstinence (months) & ACC80 Glx abs	31	-0.242395	-1.34546	0.188904
Duration of methamphetamine abstinence (months) & Thal30 NAA abs	27	0.107264	0.53943	0.594361
Duration of methamphetamine abstinence (months) & Thal30 NAA+NAAG abs	32	0.140939	0.77974	0.441652
Duration of methamphetamine abstinence (months) & Thal30 mI abs	31	0.171881	0.93959	0.355188
cpzeq & ACC30 NAA abs	46	-0.098848	-0.65891	0.513387
cpzeq & ACC30 NAA+NAAG abs	46	-0.075250	-0.50057	0.619168
cpzeq & ACC30 mI abs	46	-0.095584	-0.63695	0.527457
cpzeq & ACC80 Glu abs	44	-0.250260	-1.67518	0.101331
cpzeq & ACC80 Glx abs	43	-0.258287	-1.71194	0.094464
cpzeq & Thal30 NAA abs	35	-0.052526	-0.30216	0.764429

All Groups
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
PANSS positive score & ACC30 NAA+NAAG abs	71	0.043630	0.36276	0.717894
PANSS positive score & ACC30 mI abs	71	-0.020006	-0.16621	0.868476
PANSS positive score & ACC80 Glu abs	68	-0.007694	-0.06251	0.950346
PANSS positive score & ACC80 Glx abs	68	-0.017473	-0.14197	0.887536
PANSS positive score & Thal30 NAA abs	58	-0.201871	-1.54242	0.128605
PANSS positive score & Thal30 NAA+NAAG abs	70	-0.131647	-1.09512	0.277326
PANSS positive score & Thal30 mI abs	69	-0.219981	-1.84584	0.069334
PANSS negative score & ACC30 NAA abs	71	-0.007678	-0.06378	0.949330
PANSS negative score & ACC30 NAA+NAAG abs	71	-0.002635	-0.02189	0.982601
PANSS negative score & ACC30 mI abs	71	-0.064128	-0.53379	0.595203
PANSS negative score & ACC80 Glu abs	68	-0.163603	-1.34727	0.182501
PANSS negative score & ACC80 Glx abs	68	-0.096913	-0.79105	0.431748
PANSS negative score & Thal30 NAA abs	58	-0.079590	-0.59749	0.552589
PANSS negative score & Thal30 NAA+NAAG abs	70	-0.098949	-0.81998	0.415094
PANSS negative score & Thal30 mI abs	69	-0.164463	-1.36477	0.176891
PANSS general psychopathology score & ACC30 NAA abs	71	0.053040	0.44120	0.660447
PANSS general psychopathology score & ACC30 NAA+NAAG abs	71	0.043749	0.36375	0.717153
PANSS general psychopathology score & ACC30 mI abs	71	0.011267	0.09359	0.925704
PANSS general psychopathology score & ACC80 Glu abs	68	-0.019361	-0.15732	0.875477
PANSS general psychopathology score & ACC80 Glx abs	68	-0.089977	-0.73395	0.465578
PANSS general psychopathology score & Thal30 NAA abs	58	-0.234649	-1.80639	0.076232
PANSS general psychopathology score & Thal30 NAA+NAAG abs	70	-0.122283	-1.01599	0.313234
PANSS general psychopathology score & Thal30 mI abs	69	-0.197904	-1.65260	0.103091
PANSS total score & ACC30 NAA abs	72	0.001848	0.01546	0.987710
PANSS total score & ACC30 NAA+NAAG abs	72	-0.004546	-0.03803	0.969770
PANSS total score & ACC30 mI abs	72	-0.059308	-0.49708	0.620692
PANSS total score & ACC80 Glu abs	69	-0.112245	-0.92460	0.358490
PANSS total score & ACC80 Glx abs	69	-0.107399	-0.88421	0.379744
PANSS total score & Thal30 NAA abs	59	-0.193594	-1.48979	0.141793
PANSS total score & Thal30 NAA+NAAG abs	71	-0.163772	-1.37901	0.172345
PANSS total score & Thal30 mI abs	70	-0.254593	-2.17096	0.033428
CGI score & ACC30 NAA abs	72	-0.048072	-0.40266	0.688422
CGI score & ACC30 NAA+NAAG abs	72	-0.048711	-0.40803	0.684496
CGI score & ACC30 mI abs	72	-0.064236	-0.53855	0.591906
CGI score & ACC80 Glu abs	69	-0.159595	-1.32330	0.190234
CGI score & ACC80 Glx abs	69	-0.116813	-0.96275	0.339137
CGI score & Thal30 NAA abs	58	-0.210295	-1.60970	0.113086
CGI score & Thal30 NAA+NAAG abs	71	-0.212206	-1.80379	0.075629
CGI score & Thal30 mI abs	70	-0.311168	-2.70000	0.008742
GAF score & ACC30 NAA abs	72	0.006770	0.05665	0.954989
GAF score & ACC30 NAA+NAAG abs	72	0.010697	0.08950	0.928940
GAF score & ACC30 mI abs	72	0.049622	0.41568	0.678918
GAF score & ACC80 Glu abs	69	0.139802	1.15568	0.251916
GAF score & ACC80 Glx abs	69	0.099833	0.82127	0.414404
GAF score & Thal30 NAA abs	58	0.164302	1.24647	0.217782
GAF score & Thal30 NAA+NAAG abs	71	0.189892	1.60659	0.112711
GAF score & Thal30 mI abs	70	0.249106	2.12105	0.037567
Height (metres) & ACC30 NAA abs	74	-0.244513	-2.13971	0.035768
Height (metres) & ACC30 NAA+NAAG abs	74	-0.233913	-2.04145	0.044871
Height (metres) & ACC30 mI abs	74	-0.156999	-1.34891	0.181592
Height (metres) & ACC80 Glu abs	71	-0.137500	-1.15311	0.252843
Height (metres) & ACC80 Glx abs	71	-0.031187	-0.25918	0.796266
Height (metres) & Thal30 NAA abs	60	-0.176094	-1.36238	0.178344
Height (metres) & Thal30 NAA+NAAG abs	73	-0.033708	-0.28419	0.777093

All Groups
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Alcohol life time - Frequency score & ACC30 NAA abs	70	0.011366	0.09373	0.925600
Alcohol life time - Frequency score & ACC30 NAA+NAAG abs	70	0.044311	0.36576	0.715680
Alcohol life time - Frequency score & ACC30 mI abs	70	-0.016573	-0.13669	0.891683
Alcohol life time - Frequency score & ACC80 Glu abs	67	-0.014277	-0.11511	0.908710
Alcohol life time - Frequency score & ACC80 Glx abs	67	-0.068079	-0.55015	0.584106
Alcohol life time - Frequency score & Thal30 NAA abs	58	0.060905	0.45662	0.649709
Alcohol life time - Frequency score & Thal30 NAA+NAAG abs	69	-0.047997	-0.39332	0.695330
Alcohol life time - Frequency score & Thal30 mI abs	68	-0.033932	-0.27582	0.783548
Alcohol life time - Duration score & ACC30 NAA abs	72	0.059006	0.49454	0.622473
Alcohol life time - Duration score & ACC30 NAA+NAAG abs	72	0.086322	0.72493	0.470910
Alcohol life time - Duration score & ACC30 mI abs	72	0.128882	1.08737	0.280603
Alcohol life time - Duration score & ACC80 Glu abs	69	-0.024289	-0.19887	0.842964
Alcohol life time - Duration score & ACC80 Glx abs	69	-0.089491	-0.73547	0.464622
Alcohol life time - Duration score & Thal30 NAA abs	60	0.024486	0.18653	0.852677
Alcohol life time - Duration score & Thal30 NAA+NAAG abs	71	0.047395	0.39414	0.694694
Alcohol life time - Duration score & Thal30 mI abs	70	0.106735	0.88521	0.379160
Alcohol life time - Amount score & ACC30 NAA abs	59	0.173858	1.33290	0.187869
Alcohol life time - Amount score & ACC30 NAA+NAAG abs	59	0.145715	1.11199	0.270810
Alcohol life time - Amount score & ACC30 mI abs	59	0.206761	1.59549	0.116133
Alcohol life time - Amount score & ACC80 Glu abs	56	0.143014	1.06185	0.293032
Alcohol life time - Amount score & ACC80 Glx abs	56	0.104741	0.77395	0.442338
Alcohol life time - Amount score & Thal30 NAA abs	48	-0.000111	-0.00075	0.999404
Alcohol life time - Amount score & Thal30 NAA+NAAG abs	58	0.244990	1.89096	0.063807
Alcohol life time - Amount score & Thal30 mI abs	58	0.010593	0.07928	0.937095
Alcohol life time - Total score & ACC30 NAA abs	59	0.165263	1.26510	0.210981
Alcohol life time - Total score & ACC30 NAA+NAAG abs	59	0.143842	1.09739	0.277084
Alcohol life time - Total score & ACC30 mI abs	59	0.191376	1.47206	0.146504
Alcohol life time - Total score & ACC80 Glu abs	56	0.110359	0.81595	0.418111
Alcohol life time - Total score & ACC80 Glx abs	56	0.078156	0.57609	0.566946
Alcohol life time - Total score & Thal30 NAA abs	48	0.011298	0.07663	0.939251
Alcohol life time - Total score & Thal30 NAA+NAAG abs	58	0.141218	1.06747	0.290338
Alcohol life time - Total score & Thal30 mI abs	58	-0.024846	-0.18599	0.853127
Tobacco life time - Frequency score & ACC30 NAA abs	73	-0.161147	-1.37583	0.173200
Tobacco life time - Frequency score & ACC30 NAA+NAAG abs	73	-0.183294	-1.57108	0.120611
Tobacco life time - Frequency score & ACC30 mI abs	73	-0.217233	-1.87522	0.064875
Tobacco life time - Frequency score & ACC80 Glu abs	70	-0.293662	-2.53330	0.013611
Tobacco life time - Frequency score & ACC80 Glx abs	70	-0.293845	-2.53502	0.013550
Tobacco life time - Frequency score & Thal30 NAA abs	60	-0.111810	-0.85689	0.395032
Tobacco life time - Frequency score & Thal30 NAA+NAAG abs	72	-0.081226	-0.68184	0.497593
Tobacco life time - Frequency score & Thal30 mI abs	71	-0.205301	-1.74248	0.085881
Tobacco life time - Duration score & ACC30 NAA abs	73	-0.112998	-0.95828	0.341174
Tobacco life time - Duration score & ACC30 NAA+NAAG abs	73	-0.143091	-1.21824	0.227165
Tobacco life time - Duration score & ACC30 mI abs	73	-0.207831	-1.79031	0.077667
Tobacco life time - Duration score & ACC80 Glu abs	70	-0.274138	-2.35065	0.021648
Tobacco life time - Duration score & ACC80 Glx abs	70	-0.272360	-2.33418	0.022548
Tobacco life time - Duration score & Thal30 NAA abs	60	-0.116805	-0.89569	0.374119
Tobacco life time - Duration score & Thal30 NAA+NAAG abs	72	-0.063023	-0.52834	0.598937
Tobacco life time - Duration score & Thal30 mI abs	71	-0.177303	-1.49650	0.139083
Tobacco life time Amount score & ACC30 NAA abs	68	-0.102864	-0.84013	0.403868
Tobacco life time Amount score & ACC30 NAA+NAAG abs	68	-0.121122	-0.99130	0.325159
Tobacco life time Amount score & ACC30 mI abs	68	-0.227455	-1.89759	0.062125
Tobacco life time Amount score & ACC80 Glu abs	65	-0.309661	-2.58491	0.012068
Tobacco life time Amount score & ACC80 Glx abs	65	-0.258400	-2.12309	0.037681

Pair of Variables	All Groups Spearman Rank Order Correlations (Spreadsheet Chapter 3) MD pairwise deleted Marked correlations are significant at p <,01000 Valid N	Spearman R	t(N-2)	p-value
IFNg (25)pg/ml & ACC30 NAA abs	72	-0.113741	-0.95784	0.341440
IFNg (25)pg/ml & ACC30 NAA+NAAG abs	72	-0.088690	-0.74497	0.458783
IFNg (25)pg/ml & ACC30 ml abs	72	-0.087211	-0.73245	0.466339
IFNg (25)pg/ml & ACC80 Glu abs	69	-0.122549	-1.01072	0.315786
IFNg (25)pg/ml & ACC80 Glx abs	69	-0.114072	-0.93985	0.350670
IFNg (25)pg/ml & Thal30 NAA abs	58	0.137047	1.03534	0.304961
IFNg (25)pg/ml & Thal30 NAA+NAAG abs	71	0.025035	0.20802	0.835828
IFNg (25)pg/ml & Thal30 ml abs	70	0.005109	0.04213	0.966517
IL-10 (27)pg/ml & ACC30 NAA abs	72	-0.050132	-0.41996	0.675800
IL-10 (27)pg/ml & ACC30 NAA+NAAG abs	72	-0.044781	-0.37504	0.708761
IL-10 (27)pg/ml & ACC30 ml abs	72	0.040923	0.34267	0.732873
IL-10 (27)pg/ml & ACC80 Glu abs	69	-0.018575	-0.15207	0.879590
IL-10 (27)pg/ml & ACC80 Glx abs	69	0.013100	0.10723	0.914923
IL-10 (27)pg/ml & Thal30 NAA abs	58	0.099945	0.75168	0.455389
IL-10 (27)pg/ml & Thal30 NAA+NAAG abs	71	0.065863	0.54829	0.585263
IL-10 (27)pg/ml & Thal30 ml abs	70	-0.074201	-0.61357	0.541545
IL-1b (46)pg/ml & ACC30 NAA abs	72	-0.171018	-1.45224	0.150904
IL-1b (46)pg/ml & ACC30 NAA+NAAG abs	72	-0.156528	-1.32595	0.189166
IL-1b (46)pg/ml & ACC30 ml abs	72	-0.086538	-0.72676	0.469797
IL-1b (46)pg/ml & ACC80 Glu abs	69	-0.125684	-1.03699	0.303468
IL-1b (46)pg/ml & ACC80 Glx abs	69	-0.095314	-0.78375	0.435952
IL-1b (46)pg/ml & Thal30 NAA abs	58	0.039046	0.29241	0.771051
IL-1b (46)pg/ml & Thal30 NAA+NAAG abs	71	0.088958	0.74188	0.460676
IL-1b (46)pg/ml & Thal30 ml abs	70	0.141917	1.18224	0.241226
TNFa (75)pg/ml & ACC30 NAA abs	72	-0.133056	-1.12321	0.265186
TNFa (75)pg/ml & ACC30 NAA+NAAG abs	72	-0.138265	-1.16803	0.246758
TNFa (75)pg/ml & ACC30 ml abs	72	-0.022447	-0.18785	0.851538
TNFa (75)pg/ml & ACC80 Glu abs	69	-0.128980	-1.06464	0.290859
TNFa (75)pg/ml & ACC80 Glx abs	69	-0.086413	-0.70998	0.480181
TNFa (75)pg/ml & Thal30 NAA abs	58	0.056081	0.42033	0.675850
TNFa (75)pg/ml & Thal30 NAA+NAAG abs	71	0.022335	0.18558	0.853321
TNFa (75)pg/ml & Thal30 ml abs	70	0.019772	0.16308	0.870942

Pair of Variables	All Groups Spearman Rank Order Correlations (Spreadsheet Chapter 3) MD pairwise deleted Marked correlations are significant at p <,01000 Valid N	Spearman R	t(N-2)	p-value
ACC30 NAA abs & ACC80 Glu abs	70	0.698329	8.04520	0.000000
ACC30 NAA abs & ACC80 Glx abs	70	0.605039	6.26640	0.000000
ACC30 NAA+NAAG abs & ACC80 Glu abs	70	0.678838	7.62350	0.000000
ACC30 NAA+NAAG abs & ACC80 Glx abs	70	0.582434	5.90848	0.000000
ACC30 ml abs & ACC80 Glu abs	70	0.722754	8.62384	0.000000
ACC30 ml abs & ACC80 Glx abs	70	0.656023	7.16763	0.000000
ACC80 Glu abs & ACC80 Glx abs	70	0.914093	18.58873	0.000000
Thal30 NAA abs & ACC80 Glu abs	58	0.301609	2.36727	0.021400
Thal30 NAA abs & ACC80 Glx abs	57	0.296928	2.30608	0.024901
Thal30 NAA+NAAG abs & ACC80 Glu abs	70	0.489843	4.63329	0.000017
Thal30 NAA+NAAG abs & ACC80 Glx abs	70	0.491488	4.65379	0.000016
Thal30 ml abs & ACC80 Glu abs	69	0.263829	2.23886	0.028491
Thal30 ml abs & ACC80 Glx abs	69	0.263062	2.23186	0.028973

Group=CON
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Years of education - School (years) & ACC30 NAA abs	25	-0.394736	-2.06040	0.050847
Years of education - School (years) & ACC30 NAA+NAAG abs	25	-0.400160	-2.09407	0.047471
Years of education - School (years) & ACC30 mI abs	25	-0.362193	-1.86354	0.075203
Years of education - School (years) & ACC80 Glu abs	23	-0.313421	-1.51248	0.145315
Years of education - School (years) & ACC80 Glx abs	24	-0.333583	-1.65971	0.111162
Years of education - School (years) & Thal30 NAA abs	21	-0.483504	-2.40768	0.026380
Years of education - School (years) & Thal30 NAA+NAAG abs	24	-0.510422	-2.78407	0.010820
Years of education - School (years) & Thal30 mI abs	24	-0.170810	-0.81312	0.424861
Years of education - Post school (years) & ACC30 NAA abs	24	-0.251246	-1.21750	0.236311
Years of education - Post school (years) & ACC30 NAA+NAAG abs	24	-0.224518	-1.08067	0.291548
Years of education - Post school (years) & ACC30 mI abs	24	-0.158912	-0.75496	0.458281
Years of education - Post school (years) & ACC80 Glu abs	22	-0.032133	-0.14378	0.887114
Years of education - Post school (years) & ACC80 Glx abs	23	-0.115709	-0.53383	0.599065
Years of education - Post school (years) & Thal30 NAA abs	20	-0.273777	-1.20768	0.242800
Years of education - Post school (years) & Thal30 NAA+NAAG abs	23	-0.484741	-2.53969	0.019066
Years of education - Post school (years) & Thal30 mI abs	23	-0.258940	-1.22851	0.232844
Age on day & ACC30 NAA abs	25	0.157794	0.76635	0.451260
Age on day & ACC30 NAA+NAAG abs	25	0.137732	0.66690	0.511474
Age on day & ACC30 mI abs	25	0.277007	1.38258	0.180071
Age on day & ACC80 Glu abs	23	0.035184	0.16133	0.873375
Age on day & ACC80 Glx abs	24	0.057990	0.27246	0.787812
Age on day & Thal30 NAA abs	21	0.101530	0.44486	0.661450
Age on day & Thal30 NAA+NAAG abs	24	0.107696	0.50809	0.616444
Age on day & Thal30 mI abs	24	0.245477	1.18773	0.247604

Group=CON
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
PANSS positive score & ACC30 NAA abs	23	-0.064282	-0.29519	0.770748
PANSS positive score & ACC30 NAA+NAAG abs	23	-0.128565	-0.59409	0.558799
PANSS positive score & ACC30 mI abs	23	-0.257130	-1.21931	0.236244
PANSS positive score & ACC80 Glu abs	21	-0.147710	-0.65099	0.522847
PANSS positive score & ACC80 Glx abs	22	-0.292366	-1.36724	0.186722
PANSS positive score & Thal30 NAA abs	20	0.218822	0.95144	0.353983
PANSS positive score & Thal30 NAA+NAAG abs	22	0.292366	1.36724	0.186722
PANSS positive score & Thal30 mI abs	22	0.154782	0.70065	0.491594
PANSS negative score & ACC30 NAA abs	23	-0.064282	-0.29519	0.770748
PANSS negative score & ACC30 NAA+NAAG abs	23	-0.128565	-0.59409	0.558799
PANSS negative score & ACC30 mI abs	23	-0.257130	-1.21931	0.236244
PANSS negative score & ACC80 Glu abs	21	-0.147710	-0.65099	0.522847
PANSS negative score & ACC80 Glx abs	22	-0.292366	-1.36724	0.186722
PANSS negative score & Thal30 NAA abs	20	0.218822	0.95144	0.353983
PANSS negative score & Thal30 NAA+NAAG abs	22	0.292366	1.36724	0.186722
PANSS negative score & Thal30 mI abs	22	0.154782	0.70065	0.491594
PANSS general psychopathology score & ACC30 NAA abs	23	-0.183369	-0.85480	0.402310
PANSS general psychopathology score & ACC30 NAA+NAAG abs	23	-0.239503	-1.13044	0.271037
PANSS general psychopathology score & ACC30 mI abs	23	-0.298630	-1.43393	0.166317
PANSS general psychopathology score & ACC80 Glu abs	21	-0.320544	-1.47505	0.156577
PANSS general psychopathology score & ACC80 Gln abs	15	-0.408529	-1.61378	0.130575
PANSS general psychopathology score & ACC80 Glx abs	22	-0.416704	-2.05002	0.053703
PANSS general psychopathology score & Thal30 NAA abs	20	-0.342542	-1.54686	0.139297
PANSS general psychopathology score & Thal30 NAA+NAAG abs	22	-0.151223	-0.68416	0.501726
PANSS general psychopathology score & Thal30 mI abs	22	-0.194910	-0.88871	0.384725
PANS total score & ACC30 NAA abs	23	-0.191494	-0.89408	0.381412
PANS total score & ACC30 NAA+NAAG abs	23	-0.248343	-1.17486	0.253202
PANS total score & ACC30 mI abs	23	-0.310429	-1.49650	0.149403
PANS total score & ACC80 Glu abs	21	-0.328852	-1.51785	0.145516
PANS total score & ACC80 Glx abs	22	-0.427358	-2.11397	0.047276
PANS total score & Thal30 NAA abs	20	-0.327209	-1.46910	0.159066
PANS total score & Thal30 NAA+NAAG abs	22	-0.141053	-0.63718	0.531234
PANS total score & Thal30 mI abs	22	-0.193109	-0.88018	0.389218
GAF score & ACC30 NAA abs	24	-0.047484	-0.22297	0.825617
GAF score & ACC30 NAA+NAAG abs	24	-0.053815	-0.25278	0.802785
GAF score & ACC30 mI abs	24	-0.147425	-0.69913	0.491800
GAF score & ACC80 Glu abs	22	-0.087376	-0.39226	0.699018
GAF score & ACC80 Glx abs	23	0.065358	0.30015	0.767013
GAF score & Thal30 NAA abs	20	0.072470	0.30827	0.761413
GAF score & Thal30 NAA+NAAG abs	23	-0.094029	-0.43281	0.669563
GAF score & Thal30 mI abs	23	-0.296037	-1.42027	0.170205
Height (metres) & ACC30 NAA abs	25	-0.269469	-1.34197	0.192705
Height (metres) & ACC30 NAA+NAAG abs	25	-0.219353	-1.07824	0.292106
Height (metres) & ACC30 mI abs	25	-0.268312	-1.33576	0.194696
Height (metres) & ACC80 Glu abs	23	-0.122399	-0.56515	0.577959
Height (metres) & ACC80 Glx abs	24	-0.007847	-0.03680	0.970973
Height (metres) & Thal30 NAA abs	21	0.215777	0.96324	0.347526
Height (metres) & Thal30 NAA+NAAG abs	24	0.133217	0.63046	0.534886
Height (metres) & Thal30 mI abs	24	0.054419	0.25563	0.800615
Weight (kg) & ACC30 NAA abs	25	0.103077	0.49699	0.623916
Weight (kg) & ACC30 NAA+NAAG abs	25	0.170769	0.83119	0.414412
Weight (kg) & ACC30 mI abs	25	0.280000	1.39878	0.175218
Weight (kg) & ACC80 Glu abs	23	-0.007905	-0.03623	0.971443
Weight (kg) & ACC80 Glx abs	24	-0.006087	-0.02855	0.977480

Group=CON
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Alcohol life time - Frequency score & ACC30 NAA abs	25	-0.358862	-1.84386	0.078125
Alcohol life time - Frequency score & ACC30 NAA+NAAG abs	25	-0.257164	-1.27624	0.214609
Alcohol life time - Frequency score & ACC30 mI abs	25	-0.256747	-1.27402	0.215379
Alcohol life time - Frequency score & ACC80 Glu abs	23	-0.105035	-0.48401	0.633388
Alcohol life time - Frequency score & ACC80 Glx abs	24	-0.069546	-0.32699	0.746764
Alcohol life time - Frequency score & Thal30 NAA abs	21	0.051913	0.22659	0.823162
Alcohol life time - Frequency score & Thal30 NAA+NAAG abs	24	-0.309200	-1.52500	0.141506
Alcohol life time - Frequency score & Thal30 mI abs	24	-0.157419	-0.74768	0.462568
Alcohol life time - Duration score & ACC30 NAA abs	25	0.112731	0.54411	0.591604
Alcohol life time - Duration score & ACC30 NAA+NAAG abs	25	0.110636	0.53387	0.598556
Alcohol life time - Duration score & ACC30 mI abs	25	0.139552	0.67588	0.505856
Alcohol life time - Duration score & ACC80 Glu abs	23	0.142167	0.65818	0.517575
Alcohol life time - Duration score & ACC80 Glx abs	24	0.267020	1.29962	0.207184
Alcohol life time - Duration score & Thal30 NAA abs	21	0.262814	1.18732	0.249735
Alcohol life time - Duration score & Thal30 NAA+NAAG abs	24	0.279849	1.36724	0.185360
Alcohol life time - Duration score & Thal30 mI abs	24	0.284600	1.39248	0.177694
Alcohol life time - Amount score & ACC30 NAA abs	19	-0.147870	-0.61646	0.545757
Alcohol life time - Amount score & ACC30 NAA+NAAG abs	19	-0.137952	-0.57428	0.573298
Alcohol life time - Amount score & ACC30 mI abs	19	-0.133444	-0.55517	0.586011
Alcohol life time - Amount score & ACC80 Glu abs	18	-0.071038	-0.28487	0.779396
Alcohol life time - Amount score & ACC80 Glx abs	19	-0.033361	-0.13763	0.892152
Alcohol life time - Amount score & Thal30 NAA abs	15	0.232766	0.86295	0.403804
Alcohol life time - Amount score & Thal30 NAA+NAAG abs	19	0.118116	0.49044	0.630095
Alcohol life time - Amount score & Thal30 mI abs	19	0.010820	0.04461	0.964935
Alcohol life time - Total score & ACC30 NAA abs	19	-0.084095	-0.34797	0.732138
Alcohol life time - Total score & ACC30 NAA+NAAG abs	19	-0.082306	-0.34051	0.737644
Alcohol life time - Total score & ACC30 mI abs	19	-0.108250	-0.44896	0.659128
Alcohol life time - Total score & ACC80 Glu abs	18	0.015818	0.06328	0.950327
Alcohol life time - Total score & ACC80 Glx abs	19	0.052783	0.21793	0.830075
Alcohol life time - Total score & Thal30 NAA abs	15	0.342113	1.31272	0.211981
Alcohol life time - Total score & Thal30 NAA+NAAG abs	19	0.077833	0.32189	0.751461
Alcohol life time - Total score & Thal30 mI abs	19	0.018787	0.07748	0.939150
Tobacco life time - Frequency score & ACC30 NAA abs	25	-0.319536	-1.61723	0.119464
Tobacco life time - Frequency score & ACC30 NAA+NAAG abs	25	-0.367228	-1.89346	0.070945
Tobacco life time - Frequency score & ACC30 mI abs	25	-0.385113	-2.00130	0.057295
Tobacco life time - Frequency score & ACC80 Glu abs	23	-0.382644	-1.89794	0.071537
Tobacco life time - Frequency score & ACC80 Glx abs	24	-0.286489	-1.40254	0.174707
Tobacco life time - Frequency score & Thal30 NAA abs	21	-0.008072	-0.03519	0.972297
Tobacco life time - Frequency score & Thal30 NAA+NAAG abs	24	-0.196295	-0.93897	0.357941
Tobacco life time - Frequency score & Thal30 mI abs	24	-0.303897	-1.49616	0.148820
Tobacco life time - Duration score & ACC30 NAA abs	25	-0.252776	-1.25296	0.222809
Tobacco life time - Duration score & ACC30 NAA+NAAG abs	25	-0.296850	-1.49084	0.149591
Tobacco life time - Duration score & ACC30 mI abs	25	-0.301171	-1.51469	0.143474
Tobacco life time - Duration score & ACC80 Glu abs	23	-0.258294	-1.22523	0.234055
Tobacco life time - Duration score & ACC80 Glx abs	24	-0.198234	-0.94863	0.353116
Tobacco life time - Duration score & Thal30 NAA abs	21	-0.017669	-0.07703	0.939404
Tobacco life time - Duration score & Thal30 NAA+NAAG abs	24	-0.196285	-0.93892	0.357964
Tobacco life time - Duration score & Thal30 mI abs	24	-0.331019	-1.64538	0.114105
Tobacco life time Amount score & ACC30 NAA abs	23	-0.347399	-1.69772	0.104332
Tobacco life time Amount score & ACC30 NAA+NAAG abs	23	-0.374986	-1.85366	0.077889
Tobacco life time Amount score & ACC30 mI abs	23	-0.388269	-1.93075	0.067127
Tobacco life time Amount score & ACC80 Glu abs	21	-0.305613	-1.39908	0.177903
Tobacco life time Amount score & ACC80 Glx abs	22	-0.228657	-1.05042	0.306055
Tobacco life time Amount score & Thal30 NAA abs	19	0.099486	0.41223	0.685319

Group=CON
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
IFNg (25)pg/ml & ACC30 NAA abs	25	0.11000	0.5307	0.60067
IFNg (25)pg/ml & ACC30 NAA+NAAG abs	25	0.02615	0.1254	0.90124
IFNg (25)pg/ml & ACC30 ml abs	25	0.12384	0.5985	0.55532
IFNg (25)pg/ml & ACC80 Glu abs	23	-0.03952	-0.1812	0.85789
IFNg (25)pg/ml & ACC80 Glx abs	24	0.10695	0.5045	0.61888
IFNg (25)pg/ml & Thal30 NAA abs	21	0.07013	0.3064	0.76260
IFNg (25)pg/ml & Thal30 NAA+NAAG abs	24	0.15304	0.7263	0.47525
IFNg (25)pg/ml & Thal30 ml abs	24	0.02521	0.1183	0.90689
IL-10 (27)pg/ml & ACC30 NAA abs	25	0.25251	1.2515	0.22331
IL-10 (27)pg/ml & ACC30 NAA+NAAG abs	25	0.12239	0.5914	0.56000
IL-10 (27)pg/ml & ACC30 ml abs	25	0.22509	1.1079	0.27932
IL-10 (27)pg/ml & ACC80 Glu abs	23	-0.04855	-0.2227	0.82588
IL-10 (27)pg/ml & ACC80 Glx abs	24	0.02093	0.0982	0.92265
IL-10 (27)pg/ml & Thal30 NAA abs	21	0.32161	1.4805	0.15511
IL-10 (27)pg/ml & Thal30 NAA+NAAG abs	24	0.31965	1.5823	0.12784
IL-10 (27)pg/ml & Thal30 ml abs	24	0.09257	0.4361	0.66701
IL-1b (46)pg/ml & ACC30 NAA abs	25	0.00000	0.0000	1.00000
IL-1b (46)pg/ml & ACC30 NAA+NAAG abs	25	-0.07307	-0.3514	0.72848
IL-1b (46)pg/ml & ACC30 ml abs	25	0.05000	0.2400	0.81238
IL-1b (46)pg/ml & ACC80 Glu abs	23	-0.14822	-0.6868	0.49971
IL-1b (46)pg/ml & ACC80 Glx abs	24	0.00260	0.0122	0.99034
IL-1b (46)pg/ml & Thal30 NAA abs	21	-0.06623	-0.2893	0.77545
IL-1b (46)pg/ml & Thal30 NAA+NAAG abs	24	0.15739	0.7475	0.46264
IL-1b (46)pg/ml & Thal30 ml abs	24	0.06869	0.3229	0.74976
TNFa (75)pg/ml & ACC30 NAA abs	25	0.00769	0.0369	0.97087
TNFa (75)pg/ml & ACC30 NAA+NAAG abs	25	-0.08157	-0.3925	0.69830
TNFa (75)pg/ml & ACC30 ml abs	25	0.02116	0.1015	0.92002
TNFa (75)pg/ml & ACC80 Glu abs	23	-0.05437	-0.2495	0.80536
TNFa (75)pg/ml & ACC80 Glx abs	24	0.07742	0.3642	0.71915
TNFa (75)pg/ml & Thal30 NAA abs	21	-0.05651	-0.2467	0.80776
TNFa (75)pg/ml & Thal30 NAA+NAAG abs	24	0.03827	0.1796	0.85905
TNFa (75)pg/ml & Thal30 ml abs	24	-0.16615	-0.7903	0.43776

Group=CON
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
ACC30 NAA abs & ACC80 Glu abs	23	0.85079	7.4191	0.00000
ACC30 NAA abs & ACC80 Glx abs	24	0.74260	5.2008	0.00003
ACC30 NAA+NAAG abs & ACC80 Glu abs	23	0.89031	8.9601	0.00000
ACC30 NAA+NAAG abs & ACC80 Glx abs	24	0.77826	5.8132	0.00000
ACC30 ml abs & ACC80 Glu abs	23	0.74011	5.0435	0.00005
ACC30 ml abs & ACC80 Glx abs	24	0.68434	4.4021	0.00022
ACC80 Glu abs & ACC80 Glx abs	23	0.92885	11.4903	0.00000
Thal30 NAA abs & ACC80 Glu abs	20	0.45263	2.1535	0.04507
Thal30 NAA abs & ACC80 Glx abs	20	0.43308	2.0385	0.05646
Thal30 NAA+NAAG abs & ACC80 Glu abs	22	0.35403	1.6929	0.10598
Thal30 NAA+NAAG abs & ACC80 Glx abs	23	0.35869	1.7609	0.09280
Thal30 ml abs & ACC80 Glu abs	22	0.16657	0.7554	0.45876
Thal30 ml abs & ACC80 Glx abs	23	0.13339	0.6168	0.54398

Group=SCZ
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Duration of current diagnosis (months) & ACC30 NAA abs	27	-0.09700	-0.48731	0.630288
Duration of current diagnosis (months) & ACC30 NAA+NAAG abs	27	-0.02864	-0.14325	0.887240
Duration of current diagnosis (months) & ACC30 mI abs	27	-0.10193	-0.51231	0.612930
Duration of current diagnosis (months) & ACC80 Glu abs	28	-0.14729	-0.75934	0.454479
Duration of current diagnosis (months) & ACC80 Glx abs	27	-0.11579	-0.58285	0.565216
Duration of current diagnosis (months) & Thal30 NAA abs	20	-0.06808	-0.28951	0.775499
Duration of current diagnosis (months) & Thal30 NAA+NAAG abs	28	0.00993	0.05064	0.960003
Duration of current diagnosis (months) & Thal30 mI abs	27	0.08510	0.42706	0.672993
Duration of current diagnosis (months) & ACC30 NAA abs	5	-0.60000	-1.29904	0.284757
Duration of current diagnosis (months) & ACC30 NAA+NAAG abs	5	-0.60000	-1.29904	0.284757
Duration of current diagnosis (months) & ACC30 mI abs	5	-0.70000	-1.69775	0.188120
Duration of current diagnosis (months) & ACC80 Glu abs	5	-0.70000	-1.69775	0.188120
Duration of current diagnosis (months) & ACC80 Glx abs	5	-0.60000	-1.29904	0.284757
Duration of current diagnosis (months) & Thal30 NAA abs	4	0.60000	1.06066	0.400000
Duration of current diagnosis (months) & Thal30 NAA+NAAG abs	5	0.10000	0.17408	0.872889
Duration of current diagnosis (months) & Thal30 mI abs	5	0.10000	0.17408	0.872889
Number of psychotic episodes & ACC30 NAA abs	27	0.19481	0.99310	0.330177
Number of psychotic episodes & ACC30 NAA+NAAG abs	27	0.17620	0.89501	0.379318
Number of psychotic episodes & ACC30 mI abs	27	0.03133	0.15674	0.876713
Number of psychotic episodes & ACC80 Glu abs	28	-0.20241	-1.05390	0.301625
Number of psychotic episodes & ACC80 Glx abs	27	-0.38221	-2.06808	0.049127
Number of psychotic episodes & Thal30 NAA abs	20	0.06469	0.27504	0.786414
Number of psychotic episodes & Thal30 NAA+NAAG abs	28	0.00916	0.04672	0.963092
Number of psychotic episodes & Thal30 mI abs	27	-0.15372	-0.77785	0.443957
Onset of Meth use & ACC30 NAA abs	11	-0.54670	-1.95872	0.081812
Onset of Meth use & ACC30 NAA+NAAG abs	11	-0.37813	-1.22538	0.251531
Onset of Meth use & ACC30 mI abs	11	-0.42369	-1.40325	0.194089
Onset of Meth use & ACC80 Glu abs	12	-0.47286	-1.69701	0.120547
Onset of Meth use & ACC80 Glx abs	12	-0.23468	-0.76343	0.462837
Onset of Meth use & Thal30 NAA abs	9	0.21667	0.58719	0.575515
Onset of Meth use & Thal30 NAA+NAAG abs	12	0.02452	0.07756	0.939710
Onset of Meth use & Thal30 mI abs	11	-0.16857	-0.51304	0.620280
Duration of meth use (years) & ACC30 NAA abs	10	-0.10334	-0.29387	0.776334
Duration of meth use (years) & ACC30 NAA+NAAG abs	10	-0.06079	-0.17226	0.867511
Duration of meth use (years) & ACC30 mI abs	10	-0.49848	-1.62640	0.142518
Duration of meth use (years) & ACC80 Glu abs	11	-0.32346	-1.02552	0.331890
Duration of meth use (years) & ACC80 Glx abs	11	-0.19590	-0.59931	0.563744
Duration of meth use (years) & Thal30 NAA abs	8	-0.23810	-0.60048	0.570156
Duration of meth use (years) & Thal30 NAA+NAAG abs	11	-0.20957	-0.64298	0.536272
Duration of meth use (years) & Thal30 mI abs	10	-0.19453	-0.56093	0.590207
Duration of methamphetamine abstinence (months) & ACC30 NAA abs	11	-0.38269	-1.24266	0.245393
Duration of methamphetamine abstinence (months) & ACC30 NAA+NAAG abs	11	-0.33713	-1.07428	0.310652
Duration of methamphetamine abstinence (months) & ACC30 mI abs	11	-0.21868	-0.67231	0.518272
Duration of methamphetamine abstinence (months) & ACC80 Glu abs	12	-0.16140	-0.51719	0.616271
Duration of methamphetamine abstinence (months) & ACC80 Glx abs	12	-0.14386	-0.45971	0.655557
Duration of methamphetamine abstinence (months) & Thal30 NAA abs	9	0.20084	0.54242	0.604359
Duration of methamphetamine abstinence (months) & Thal30 NAA+NAAG abs	12	0.00702	0.02219	0.982731
Duration of methamphetamine abstinence (months) & Thal30 mI abs	11	0.49203	1.69552	0.124214
cpzeq & ACC30 NAA abs	25	-0.14231	-0.68950	0.497405
cpzeq & ACC30 NAA+NAAG abs	25	-0.08957	-0.43131	0.670260
cpzeq & ACC30 mI abs	25	-0.02792	-0.13395	0.894611
cpzeq & ACC80 Glu abs	25	-0.11400	-0.55032	0.587406
cpzeq & ACC80 Glx abs	24	-0.10926	-0.51558	0.611293
cpzeq & Thal30 NAA abs	17	-0.25262	-1.01120	0.327955

Group=SCZ
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
PANSS positive score & ACC30 NAA abs	27	0.352532	1.88359	0.071304
PANSS positive score & ACC30 NAA+NAAG abs	27	0.352225	1.88171	0.071568
PANSS positive score & ACC30 mI abs	27	0.247509	1.27729	0.213236
PANSS positive score & ACC80 Glu abs	28	0.295628	1.57794	0.126669
PANSS positive score & ACC80 Glx abs	27	0.153164	0.77496	0.445630
PANSS positive score & Thal30 NAA abs	20	-0.410017	-1.90724	0.072577
PANSS positive score & Thal30 NAA+NAAG abs	28	-0.094964	-0.48642	0.630742
PANSS positive score & Thal30 mI abs	27	-0.145318	-0.73439	0.469547
PANSS negative score & ACC30 NAA abs	27	0.350637	1.87204	0.072945
PANSS negative score & ACC30 NAA+NAAG abs	27	0.343594	1.82934	0.079301
PANSS negative score & ACC30 mI abs	27	0.258461	1.33776	0.193018
PANSS negative score & ACC80 Glu abs	28	0.208592	1.08753	0.286780
PANSS negative score & ACC80 Glx abs	27	0.345072	1.83827	0.077933
PANSS negative score & Thal30 NAA abs	20	-0.029401	-0.12479	0.902072
PANSS negative score & Thal30 NAA+NAAG abs	28	0.165501	0.85569	0.399985
PANSS negative score & Thal30 mI abs	27	0.164141	0.83199	0.413292
PANSS general psychopathology score & ACC30 NAA abs	27	0.536592	3.17946	0.003908
PANSS general psychopathology score & ACC30 NAA+NAAG abs	27	0.478607	2.72546	0.011555
PANSS general psychopathology score & ACC30 mI abs	27	0.349751	1.86665	0.073722
PANSS general psychopathology score & ACC80 Glu abs	28	0.343020	1.86204	0.073937
PANSS general psychopathology score & ACC80 Glx abs	27	0.156944	0.79457	0.434344
PANSS general psychopathology score & Thal30 NAA abs	20	-0.293724	-1.30367	0.208775
PANSS general psychopathology score & Thal30 NAA+NAAG abs	28	0.025603	0.13059	0.897104
PANSS general psychopathology score & Thal30 mI abs	27	-0.127211	-0.64127	0.527186
PANSS total score & ACC30 NAA abs	27	0.463795	2.61752	0.014820
PANSS total score & ACC30 NAA+NAAG abs	27	0.432936	2.40140	0.024092
PANSS total score & ACC30 mI abs	27	0.317140	1.67201	0.106993
PANSS total score & ACC80 Glu abs	28	0.324021	1.74641	0.092546
PANSS total score & ACC80 Glx abs	27	0.249924	1.29057	0.208660
PANSS total score & Thal30 NAA abs	20	-0.247461	-1.08359	0.292848
PANSS total score & Thal30 NAA+NAAG abs	28	0.055327	0.28255	0.779761
PANSS total score & Thal30 mI abs	27	0.012221	0.06111	0.951757
CGI score & ACC30 NAA abs	27	0.236830	1.21882	0.234288
CGI score & ACC30 NAA+NAAG abs	27	0.239679	1.23438	0.228541
CGI score & ACC30 mI abs	27	0.138045	0.69690	0.492297
CGI score & ACC80 Glu abs	28	0.128900	0.66279	0.513298
CGI score & ACC80 Glx abs	27	0.158965	0.80506	0.428375
CGI score & Thal30 NAA abs	20	-0.179098	-0.77234	0.449937
CGI score & Thal30 NAA+NAAG abs	28	0.014480	0.07384	0.941702
CGI score & Thal30 mI abs	27	-0.064590	-0.32363	0.748914
GAF score & ACC30 NAA abs	27	-0.274803	-1.42903	0.165373
GAF score & ACC30 NAA+NAAG abs	27	-0.266784	-1.38408	0.178566
GAF score & ACC30 mI abs	27	-0.086666	-0.43497	0.667318
GAF score & ACC80 Glu abs	28	-0.102214	-0.52394	0.604760
GAF score & ACC80 Glx abs	27	-0.202657	-1.03475	0.310690
GAF score & Thal30 NAA abs	20	0.127374	0.54484	0.592552
GAF score & Thal30 NAA+NAAG abs	28	-0.024587	-0.12541	0.901167
GAF score & Thal30 mI abs	27	-0.027082	-0.13546	0.893333
Height (metres) & ACC30 NAA abs	27	-0.211251	-1.08064	0.290172
Height (metres) & ACC30 NAA+NAAG abs	27	-0.200245	-1.02192	0.316605
Height (metres) & ACC30 mI abs	27	-0.201468	-1.02843	0.313597
Height (metres) & ACC80 Glu abs	28	-0.044950	-0.22943	0.820328
Height (metres) & ACC80 Glx abs	27	0.015892	0.07947	0.937290
Height (metres) & Thal30 NAA abs	20	-0.244822	-1.07129	0.298193

Group=SCZ
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Alcohol life time - Frequency score & ACC30 NAA abs	24	-0.102269	-0.48221	0.634418
Alcohol life time - Frequency score & ACC30 NAA+NAAG abs	24	0.015184	0.07123	0.943860
Alcohol life time - Frequency score & ACC30 mI abs	24	-0.163005	-0.77493	0.446633
Alcohol life time - Frequency score & ACC80 Glu abs	25	-0.169391	-0.82428	0.418245
Alcohol life time - Frequency score & ACC80 Glx abs	24	-0.286638	-1.40334	0.174474
Alcohol life time - Frequency score & Thal30 NAA abs	18	-0.152041	-0.61532	0.546997
Alcohol life time - Frequency score & Thal30 NAA+NAAG abs	25	-0.048794	-0.23429	0.816835
Alcohol life time - Frequency score & Thal30 mI abs	24	-0.046801	-0.21976	0.828087
Alcohol life time - Duration score & ACC30 NAA abs	26	-0.131328	-0.64899	0.522506
Alcohol life time - Duration score & ACC30 NAA+NAAG abs	26	-0.095126	-0.46814	0.643906
Alcohol life time - Duration score & ACC30 mI abs	26	-0.165219	-0.82068	0.419905
Alcohol life time - Duration score & ACC80 Glu abs	27	-0.159245	-0.80652	0.427551
Alcohol life time - Duration score & ACC80 Glx abs	26	-0.398790	-2.13039	0.043588
Alcohol life time - Duration score & Thal30 NAA abs	20	-0.114826	-0.49041	0.629770
Alcohol life time - Duration score & Thal30 NAA+NAAG abs	27	-0.188735	-0.96094	0.345783
Alcohol life time - Duration score & Thal30 mI abs	26	-0.113612	-0.56021	0.580529
Alcohol life time - Amount score & ACC30 NAA abs	22	0.024862	0.11122	0.912548
Alcohol life time - Amount score & ACC30 NAA+NAAG abs	22	-0.026019	-0.11640	0.908497
Alcohol life time - Amount score & ACC30 mI abs	22	-0.009829	-0.04396	0.965372
Alcohol life time - Amount score & ACC80 Glu abs	22	0.052616	0.23563	0.816114
Alcohol life time - Amount score & ACC80 Glx abs	21	-0.107342	-0.47061	0.643275
Alcohol life time - Amount score & Thal30 NAA abs	17	-0.291494	-1.18021	0.256297
Alcohol life time - Amount score & Thal30 NAA+NAAG abs	22	-0.039896	-0.17856	0.860079
Alcohol life time - Amount score & Thal30 mI abs	22	-0.265971	-1.23390	0.231544
Alcohol life time - Total score & ACC30 NAA abs	22	-0.064228	-0.28783	0.776438
Alcohol life time - Total score & ACC30 NAA+NAAG abs	22	-0.094621	-0.42507	0.675326
Alcohol life time - Total score & ACC30 mI abs	22	-0.075124	-0.33692	0.739691
Alcohol life time - Total score & ACC80 Glu abs	22	-0.026379	-0.11801	0.907235
Alcohol life time - Total score & ACC80 Glx abs	21	-0.118327	-0.51942	0.609464
Alcohol life time - Total score & Thal30 NAA abs	17	-0.205117	-0.81167	0.429671
Alcohol life time - Total score & Thal30 NAA+NAAG abs	22	-0.001720	-0.00769	0.993938
Alcohol life time - Total score & Thal30 mI abs	22	-0.231679	-1.06508	0.299530
Tobacco life time - Frequency score & ACC30 NAA abs	26	-0.098412	-0.48447	0.632444
Tobacco life time - Frequency score & ACC30 NAA+NAAG abs	26	-0.159071	-0.78934	0.437644
Tobacco life time - Frequency score & ACC30 mI abs	26	-0.319415	-1.65131	0.111701
Tobacco life time - Frequency score & ACC80 Glu abs	27	-0.391166	-2.12516	0.043634
Tobacco life time - Frequency score & ACC80 Glx abs	26	-0.443688	-2.42542	0.023180
Tobacco life time - Frequency score & Thal30 NAA abs	20	-0.190304	-0.82242	0.421599
Tobacco life time - Frequency score & Thal30 NAA+NAAG abs	27	-0.117866	-0.59346	0.558202
Tobacco life time - Frequency score & Thal30 mI abs	26	-0.201639	-1.00854	0.323255
Tobacco life time - Duration score & ACC30 NAA abs	26	-0.005781	-0.02832	0.977641
Tobacco life time - Duration score & ACC30 NAA+NAAG abs	26	-0.075150	-0.36920	0.715216
Tobacco life time - Duration score & ACC30 mI abs	26	-0.237010	-1.19516	0.243701
Tobacco life time - Duration score & ACC80 Glu abs	27	-0.412330	-2.26297	0.032576
Tobacco life time - Duration score & ACC80 Glx abs	26	-0.456678	-2.51481	0.019016
Tobacco life time - Duration score & Thal30 NAA abs	20	-0.216777	-0.94211	0.358609
Tobacco life time - Duration score & Thal30 NAA+NAAG abs	27	0.000000	0.00000	1.000000
Tobacco life time - Duration score & Thal30 mI abs	26	-0.109834	-0.54135	0.593257
Tobacco life time Amount score & ACC30 NAA abs	24	0.096189	0.45327	0.654795
Tobacco life time Amount score & ACC30 NAA+NAAG abs	24	0.071234	0.33497	0.740821
Tobacco life time Amount score & ACC30 mI abs	24	-0.277224	-1.35334	0.189691
Tobacco life time Amount score & ACC80 Glu abs	25	-0.316663	-1.60106	0.123011
Tobacco life time Amount score & ACC80 Glx abs	24	-0.265893	-1.29372	0.209181
Tobacco life time Amount score & Thal30 NAA abs	19	-0.323393	-1.40910	0.176834

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Group=SCZ Spearman Rank Order Correlations (Spreadsheet Chapter 3) MD pairwise deleted Marked correlations are significant at p <,01000				
IFNg (25)pg/ml & ACC30 NAA abs	26	-0.413133	-2.22246	0.035930
IFNg (25)pg/ml & ACC30 NAA+NAAG abs	26	-0.333789	-1.73472	0.095618
IFNg (25)pg/ml & ACC30 ml abs	26	-0.491792	-2.76702	0.010718
IFNg (25)pg/ml & ACC80 Glu abs	27	-0.461374	-2.60015	0.015420
IFNg (25)pg/ml & ACC80 Glx abs	26	-0.516074	-2.95167	0.006959
IFNg (25)pg/ml & Thal30 NAA abs	19	0.019307	0.07962	0.937470
IFNg (25)pg/ml & Thal30 NAA+NAAG abs	27	-0.182595	-0.92859	0.361982
IFNg (25)pg/ml & Thal30 ml abs	26	-0.196306	-0.98078	0.336483
IL-10 (27)pg/ml & ACC30 NAA abs	26	-0.469304	-2.60364	0.015576
IL-10 (27)pg/ml & ACC30 NAA+NAAG abs	26	-0.308350	-1.58798	0.125380
IL-10 (27)pg/ml & ACC30 ml abs	26	-0.221094	-1.11062	0.277735
IL-10 (27)pg/ml & ACC80 Glu abs	27	-0.082723	-0.41504	0.681655
IL-10 (27)pg/ml & ACC80 Glx abs	26	-0.128903	-0.63681	0.530278
IL-10 (27)pg/ml & Thal30 NAA abs	19	-0.168190	-0.70349	0.491276
IL-10 (27)pg/ml & Thal30 NAA+NAAG abs	27	-0.241043	-1.24183	0.225824
IL-10 (27)pg/ml & Thal30 ml abs	26	-0.187919	-0.93731	0.357935
IL-1b (46)pg/ml & ACC30 NAA abs	26	-0.327516	-1.69815	0.102409
IL-1b (46)pg/ml & ACC30 NAA+NAAG abs	26	-0.297399	-1.52600	0.140082
IL-1b (46)pg/ml & ACC30 ml abs	26	-0.280288	-1.43046	0.165476
IL-1b (46)pg/ml & ACC80 Glu abs	27	-0.216315	-1.10781	0.278491
IL-1b (46)pg/ml & ACC80 Glx abs	26	-0.166325	-0.82633	0.416756
IL-1b (46)pg/ml & Thal30 NAA abs	19	-0.043956	-0.18141	0.858190
IL-1b (46)pg/ml & Thal30 NAA+NAAG abs	27	-0.123434	-0.62193	0.539621
IL-1b (46)pg/ml & Thal30 ml abs	26	0.129684	0.64073	0.527771
TNFa (75)pg/ml & ACC30 NAA abs	26	-0.513592	-2.93237	0.007283
TNFa (75)pg/ml & ACC30 NAA+NAAG abs	26	-0.537186	-3.12007	0.004658
TNFa (75)pg/ml & ACC30 ml abs	26	-0.332365	-1.72639	0.097130
TNFa (75)pg/ml & ACC80 Glu abs	27	-0.426805	-2.35975	0.026403
TNFa (75)pg/ml & ACC80 Glx abs	26	-0.399043	-2.13200	0.043443
TNFa (75)pg/ml & Thal30 NAA abs	19	0.047368	0.19552	0.847300
TNFa (75)pg/ml & Thal30 NAA+NAAG abs	27	-0.058922	-0.29512	0.770336
TNFa (75)pg/ml & Thal30 ml abs	26	-0.056078	-0.27516	0.785550

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Group=SCZ Spearman Rank Order Correlations (Spreadsheet Chapter 3) MD pairwise deleted Marked correlations are significant at p <,01000				
ACC30 NAA abs & ACC80 Glu abs	27	0.691697	4.78890	0.000064
ACC30 NAA abs & ACC80 Glx abs	26	0.470769	2.61408	0.015212
ACC30 NAA+NAAG abs & ACC80 Glu abs	27	0.620879	3.96016	0.000549
ACC30 NAA+NAAG abs & ACC80 Glx abs	26	0.384615	2.04124	0.052370
ACC30 ml abs & ACC80 Glu abs	27	0.780220	6.23671	0.000002
ACC30 ml abs & ACC80 Glx abs	26	0.598632	3.66117	0.001234
ACC80 Glu abs & ACC80 Glu abs				
ACC80 Glu abs & ACC80 Glx abs	27	0.822955	7.24296	0.000000
Thal30 NAA abs & ACC80 Glu abs	20	0.082707	0.35210	0.728851
Thal30 NAA abs & ACC80 Glx abs	19	0.101754	0.42173	0.678505
Thal30 NAA+NAAG abs & ACC80 Glu abs	28	0.470717	2.72043	0.011469
Thal30 NAA+NAAG abs & ACC80 Glx abs	27	0.576923	3.53161	0.001631
Thal30 ml abs & ACC80 Glu abs	27	0.156288	0.79116	0.436291
Thal30 ml abs & ACC80 Glx abs	26	0.346325	1.80856	0.083066

Group=MPD
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Duration of current diagnosis (months) & ACC30 NAA abs	19	0.309528	1.34213	0.197205
Duration of current diagnosis (months) & ACC30 NAA+NAAG abs	19	0.281309	1.20868	0.243331
Duration of current diagnosis (months) & ACC30 mI abs	19	0.366848	1.62591	0.122361
Duration of current diagnosis (months) & ACC80 Glu abs	17	0.151573	0.59390	0.561427
Duration of current diagnosis (months) & ACC80 Glx abs	17	0.191007	0.75364	0.462730
Duration of current diagnosis (months) & Thal30 NAA abs	16	-0.099188	-0.37297	0.714759
Duration of current diagnosis (months) & Thal30 NAA+NAAG abs	18	-0.356186	-1.52474	0.146845
Duration of current diagnosis (months) & Thal30 mI abs	18	-0.289725	-1.21083	0.243542
Duration of current diagnosis (months) & ACC30 NAA abs	10	0.332347	0.99667	0.348111
Duration of current diagnosis (months) & ACC30 NAA+NAAG abs	10	0.381584	1.16763	0.276575
Duration of current diagnosis (months) & ACC30 mI abs	10	-0.024618	-0.06965	0.946180
Duration of current diagnosis (months) & ACC80 Glu abs	10	-0.086164	-0.24462	0.812909
Duration of current diagnosis (months) & ACC80 Glx abs	10	-0.276956	-0.81524	0.438530
Duration of current diagnosis (months) & Thal30 NAA abs	10	0.043082	0.12197	0.905933
Duration of current diagnosis (months) & Thal30 NAA+NAAG abs	10	-0.203101	-0.58668	0.573594
Duration of current diagnosis (months) & Thal30 mI abs	10	-0.092319	-0.26224	0.799765
Number of psychotic episodes & ACC30 NAA abs	21	0.428810	2.06902	0.052426
Number of psychotic episodes & ACC30 NAA+NAAG abs	21	0.459972	2.25802	0.035903
Number of psychotic episodes & ACC30 mI abs	21	0.235744	1.05739	0.303595
Number of psychotic episodes & ACC80 Glu abs	19	0.158499	0.66187	0.516924
Number of psychotic episodes & ACC80 Glx abs	19	0.154813	0.64610	0.526842
Number of psychotic episodes & Thal30 NAA abs	18	-0.134076	-0.54119	0.595831
Number of psychotic episodes & Thal30 NAA+NAAG abs	20	-0.149943	-0.64343	0.528058
Number of psychotic episodes & Thal30 mI abs	20	0.135028	0.57817	0.570314
Onset of Meth use & ACC30 NAA abs	21	0.272555	1.23479	0.231963
Onset of Meth use & ACC30 NAA+NAAG abs	21	0.207194	0.92317	0.367494
Onset of Meth use & ACC30 mI abs	21	0.441840	2.14686	0.044926
Onset of Meth use & ACC80 Glu abs	19	0.382689	1.70787	0.105854
Onset of Meth use & ACC80 Glx abs	19	0.473721	2.21785	0.040476
Onset of Meth use & Thal30 NAA abs	18	0.409574	1.79583	0.091428
Onset of Meth use & Thal30 NAA+NAAG abs	20	0.590168	3.10162	0.006158
Onset of Meth use & Thal30 mI abs	20	0.269705	1.18829	0.250160
Duration of meth use (years) & ACC30 NAA abs	21	0.227214	1.01700	0.321928
Duration of meth use (years) & ACC30 NAA+NAAG abs	21	0.285808	1.30004	0.209139
Duration of meth use (years) & ACC30 mI abs	21	0.115886	0.50856	0.616914
Duration of meth use (years) & ACC80 Glu abs	19	-0.008799	-0.03628	0.971481
Duration of meth use (years) & ACC80 Glx abs	19	-0.010559	-0.04354	0.965780
Duration of meth use (years) & Thal30 NAA abs	18	0.093168	0.37430	0.713095
Duration of meth use (years) & Thal30 NAA+NAAG abs	20	-0.334717	-1.50701	0.149158
Duration of meth use (years) & Thal30 mI abs	20	-0.160573	-0.69021	0.498865
Duration of methamphetamine abstinence (months) & ACC30 NAA abs	20	-0.141725	-0.60742	0.551160
Duration of methamphetamine abstinence (months) & ACC30 NAA+NAAG abs	20	-0.199324	-0.86298	0.399502
Duration of methamphetamine abstinence (months) & ACC30 mI abs	20	-0.049263	-0.20926	0.836597
Duration of methamphetamine abstinence (months) & ACC80 Glu abs	18	-0.361189	-1.54935	0.140850
Duration of methamphetamine abstinence (months) & ACC80 Glx abs	18	-0.226262	-0.92914	0.366621
Duration of methamphetamine abstinence (months) & Thal30 NAA abs	17	0.011105	0.04301	0.966261
Duration of methamphetamine abstinence (months) & Thal30 NAA+NAAG abs	19	0.203639	0.85759	0.403046
Duration of methamphetamine abstinence (months) & Thal30 mI abs	19	0.015052	0.06207	0.951234
cpzeq & ACC30 NAA abs	21	0.190353	0.84518	0.408526
cpzeq & ACC30 NAA+NAAG abs	21	0.213633	0.95321	0.352453
cpzeq & ACC30 mI abs	21	0.035606	0.15530	0.878223
cpzeq & ACC80 Glu abs	19	-0.507520	-2.42857	0.026544
cpzeq & ACC80 Glx abs	19	-0.444423	-2.04551	0.056601

Group=MPD
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
PANSS positive score & ACC30 NAA abs	21	0.205775	0.91657	0.370856
PANSS positive score & ACC30 NAA+NAAG abs	21	0.231333	1.03647	0.312993
PANSS positive score & ACC30 ml abs	21	0.075364	0.32944	0.745428
PANSS positive score & ACC80 Glu abs	19	-0.049515	-0.20441	0.840462
PANSS positive score & ACC80 Glx abs	19	-0.055705	-0.23003	0.820811
PANSS positive score & Thal30 NAA abs	18	-0.257303	-1.06507	0.302653
PANSS positive score & Thal30 NAA+NAAG abs	20	-0.209694	-0.90989	0.374905
PANSS positive score & Thal30 ml abs	20	-0.133235	-0.57036	0.575488
PANSS negative score & ACC30 NAA abs	21	0.193532	0.85984	0.400595
PANSS negative score & ACC30 NAA+NAAG abs	21	0.215631	0.96256	0.347861
PANSS negative score & ACC30 ml abs	21	0.012054	0.05255	0.958643
PANSS negative score & ACC80 Glu abs	19	-0.373654	-1.66092	0.115060
PANSS negative score & ACC80 Glx abs	19	-0.248494	-1.05774	0.304972
PANSS negative score & Thal30 NAA abs	18	-0.045483	-0.18212	0.857777
PANSS negative score & Thal30 NAA+NAAG abs	20	-0.177684	-0.76604	0.453582
PANSS negative score & Thal30 ml abs	20	-0.089621	-0.38177	0.707103
PANSS general psychopathology score & ACC30 NAA abs	21	0.032975	0.14381	0.887164
PANSS general psychopathology score & ACC30 NAA+NAAG abs	21	0.085075	0.37218	0.713877
PANSS general psychopathology score & ACC30 ml abs	21	0.095626	0.41874	0.680098
PANSS general psychopathology score & ACC80 Glu abs	19	-0.086075	-0.35622	0.726060
PANSS general psychopathology score & ACC80 Glx abs	19	-0.165938	-0.69380	0.497179
PANSS general psychopathology score & Thal30 NAA abs	18	-0.138456	-0.55921	0.583763
PANSS general psychopathology score & Thal30 NAA+NAAG abs	20	-0.056321	-0.23933	0.813555
PANSS general psychopathology score & Thal30 ml abs	20	0.009133	0.03875	0.969516
PANSS total score & ACC30 NAA abs	21	0.133814	0.58857	0.563079
PANSS total score & ACC30 NAA+NAAG abs	21	0.148827	0.65603	0.519672
PANSS total score & ACC30 ml abs	21	0.030027	0.13094	0.897198
PANSS total score & ACC80 Glu abs	19	-0.265024	-1.13325	0.272841
PANSS total score & ACC80 Glx abs	19	-0.236755	-1.00473	0.329114
PANSS total score & Thal30 NAA abs	18	-0.162082	-0.65701	0.520511
PANSS total score & Thal30 NAA+NAAG abs	20	-0.239793	-1.04793	0.308540
PANSS total score & Thal30 ml abs	20	-0.181546	-0.78325	0.443663
CGI score & ACC30 NAA abs	21	-0.002015	-0.00878	0.993085
CGI score & ACC30 NAA+NAAG abs	21	-0.010744	-0.04684	0.963133
CGI score & ACC30 ml abs	21	-0.169894	-0.75148	0.461573
CGI score & ACC80 Glu abs	19	-0.462815	-2.15266	0.046001
CGI score & ACC80 Glx abs	19	-0.431900	-1.97442	0.064808
CGI score & Thal30 NAA abs	18	-0.376929	-1.62778	0.123101
CGI score & Thal30 NAA+NAAG abs	20	-0.434430	-2.04632	0.055617
CGI score & Thal30 ml abs	20	-0.381394	-1.75043	0.097070
GAF score & ACC30 NAA abs	21	-0.036602	-0.15965	0.874840
GAF score & ACC30 NAA+NAAG abs	21	-0.058171	-0.25399	0.802230
GAF score & ACC30 ml abs	21	0.137258	0.60401	0.552981
GAF score & ACC80 Glu abs	19	0.513950	2.47030	0.024384
GAF score & ACC80 Glx abs	19	0.436106	1.99813	0.061958
GAF score & Thal30 NAA abs	18	0.277845	1.15693	0.264281
GAF score & Thal30 NAA+NAAG abs	20	0.496037	2.42371	0.026122
GAF score & Thal30 ml abs	20	0.438482	2.06992	0.053122
Height (metres) & ACC30 NAA abs	21	-0.072135	-0.31525	0.756009
Height (metres) & ACC30 NAA+NAAG abs	21	-0.108202	-0.47443	0.640603
Height (metres) & ACC30 ml abs	21	0.059019	0.25771	0.799403
Height (metres) & ACC80 Glu abs	19	-0.147569	-0.61518	0.546586
Height (metres) & ACC80 Glx abs	19	-0.123567	-0.51341	0.614271
Height (metres) & Thal30 NAA abs	18	-0.623929	-3.19357	0.005654

Group=MPD
Spearman Rank Order Correlations (Spreadsheet Chapter 3)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Alcohol life time - Frequency score & ACC30 NAA abs	20	0.360141	1.63785	0.118814
Alcohol life time - Frequency score & ACC30 NAA+NAAG abs	20	0.397099	1.83569	0.082981
Alcohol life time - Frequency score & ACC30 mI abs	20	0.345201	1.56049	0.136054
Alcohol life time - Frequency score & ACC80 Glu abs	18	0.433909	1.92643	0.072005
Alcohol life time - Frequency score & ACC80 Glx abs	18	0.361229	1.54955	0.140802
Alcohol life time - Frequency score & Thal30 NAA abs	18	0.404620	1.76983	0.095807
Alcohol life time - Frequency score & Thal30 NAA+NAAG abs	19	0.234323	0.99381	0.334254
Alcohol life time - Frequency score & Thal30 mI abs	19	0.188556	0.79164	0.439478
Alcohol life time - Duration score & ACC30 NAA abs	20	0.107238	0.45761	0.652707
Alcohol life time - Duration score & ACC30 NAA+NAAG abs	20	0.140490	0.60202	0.554669
Alcohol life time - Duration score & ACC30 mI abs	20	0.294282	1.30638	0.207871
Alcohol life time - Duration score & ACC80 Glu abs	18	-0.001148	-0.00459	0.996393
Alcohol life time - Duration score & ACC80 Glx abs	18	-0.132025	-0.53276	0.601520
Alcohol life time - Duration score & Thal30 NAA abs	18	-0.049366	-0.19770	0.845767
Alcohol life time - Duration score & Thal30 NAA+NAAG abs	19	0.187084	0.78523	0.443126
Alcohol life time - Duration score & Thal30 mI abs	19	0.274389	1.17649	0.255610
Alcohol life time - Amount score & ACC30 NAA abs	17	0.389830	1.63951	0.121905
Alcohol life time - Amount score & ACC30 NAA+NAAG abs	17	0.403752	1.70924	0.108008
Alcohol life time - Amount score & ACC30 mI abs	17	0.398689	1.68372	0.112925
Alcohol life time - Amount score & ACC80 Glu abs	15	0.295361	1.11467	0.285176
Alcohol life time - Amount score & ACC80 Glx abs	15	0.315924	1.20057	0.251339
Alcohol life time - Amount score & Thal30 NAA abs	15	0.256104	0.95525	0.356876
Alcohol life time - Amount score & Thal30 NAA+NAAG abs	16	0.679885	3.46902	0.003760
Alcohol life time - Amount score & Thal30 mI abs	16	0.330011	1.30807	0.211920
Alcohol life time - Total score & ACC30 NAA abs	17	0.485086	2.14843	0.048419
Alcohol life time - Total score & ACC30 NAA+NAAG abs	17	0.500127	2.23683	0.040909
Alcohol life time - Total score & ACC30 mI abs	17	0.589122	2.82368	0.012831
Alcohol life time - Total score & ACC80 Glu abs	15	0.193658	0.71172	0.489216
Alcohol life time - Total score & ACC80 Gln abs	11	-0.343744	-1.09815	0.300648
Alcohol life time - Total score & ACC80 Glx abs	15	0.168080	0.61477	0.549317
Alcohol life time - Total score & Thal30 NAA abs	15	0.149811	0.54632	0.594102
Alcohol life time - Total score & Thal30 NAA+NAAG abs	16	0.472354	2.00518	0.064674
Alcohol life time - Total score & Thal30 mI abs	16	0.221931	0.85163	0.408752
Tobacco life time - Frequency score & ACC30 NAA abs	21	-0.108031	-0.47367	0.641132
Tobacco life time - Frequency score & ACC30 NAA+NAAG abs	21	-0.045855	-0.20009	0.843538
Tobacco life time - Frequency score & ACC30 mI abs	21	0.069948	0.30565	0.763197
Tobacco life time - Frequency score & ACC80 Glu abs	19	0.059017	0.24376	0.810335
Tobacco life time - Frequency score & ACC80 Glx abs	19	-0.053342	-0.22025	0.828300
Tobacco life time - Frequency score & Thal30 NAA abs	18	-0.003931	-0.01572	0.987648
Tobacco life time - Frequency score & Thal30 NAA+NAAG abs	20	0.203474	0.88171	0.389555
Tobacco life time - Frequency score & Thal30 mI abs	20	0.180246	0.77745	0.446989
Tobacco life time - Duration score & ACC30 NAA abs	21	-0.168690	-0.74600	0.464801
Tobacco life time - Duration score & ACC30 NAA+NAAG abs	21	-0.132678	-0.58349	0.566428
Tobacco life time - Duration score & ACC30 mI abs	21	-0.135521	-0.59622	0.558064
Tobacco life time - Duration score & ACC80 Glu abs	19	-0.144796	-0.60337	0.554229
Tobacco life time - Duration score & ACC80 Glx abs	19	-0.263266	-1.12517	0.276154
Tobacco life time - Duration score & Thal30 NAA abs	18	0.163611	0.66338	0.516529
Tobacco life time - Duration score & Thal30 NAA+NAAG abs	20	0.142717	0.61176	0.548348
Tobacco life time - Duration score & Thal30 mI abs	20	0.283014	1.25191	0.226626
Tobacco life time Amount score & ACC30 NAA abs	20	-0.014642	-0.06213	0.951145
Tobacco life time Amount score & ACC30 NAA+NAAG abs	20	0.028514	0.12102	0.905013
Tobacco life time Amount score & ACC30 mI abs	20	0.190351	0.82263	0.421483
Tobacco life time Amount score & ACC80 Glu abs	18	-0.236934	-0.97551	0.343826

Pair of Variables	Group=MPD Spearman Rank Order Correlations (Spreadsheet Chapter 3) MD pairwise deleted Marked correlations are significant at p <,01000 Valid N	Spearman R	t(N-2)	p-value
IFNg (25)pg/ml & ACC30 NAA abs	21	-0.105879	-0.46412	0.647834
IFNg (25)pg/ml & ACC30 NAA+NAAG abs	21	-0.079247	-0.34652	0.732762
IFNg (25)pg/ml & ACC30 ml abs	21	0.027282	0.11896	0.906554
IFNg (25)pg/ml & ACC80 Glu abs	19	0.207108	0.87286	0.394904
IFNg (25)pg/ml & ACC80 Glx abs	19	0.133392	0.55495	0.586159
IFNg (25)pg/ml & Thal30 NAA abs	18	0.246773	1.01860	0.323551
IFNg (25)pg/ml & Thal30 NAA+NAAG abs	20	0.063934	0.27180	0.788866
IFNg (25)pg/ml & Thal30 ml abs	20	0.029334	0.12451	0.902292
IL-10 (27)pg/ml & ACC30 NAA abs	21	-0.037280	-0.16261	0.872540
IL-10 (27)pg/ml & ACC30 NAA+NAAG abs	21	-0.030740	-0.13406	0.894769
IL-10 (27)pg/ml & ACC30 ml abs	21	0.055593	0.24270	0.810838
IL-10 (27)pg/ml & ACC80 Glu abs	19	0.056665	0.23401	0.817772
IL-10 (27)pg/ml & ACC80 Glx abs	19	0.113329	0.47030	0.644119
IL-10 (27)pg/ml & Thal30 NAA abs	18	-0.047995	-0.19220	0.850004
IL-10 (27)pg/ml & Thal30 NAA+NAAG abs	20	0.077334	0.32909	0.745889
IL-10 (27)pg/ml & Thal30 ml abs	20	-0.240342	-1.05048	0.307399
IL-1b (46)pg/ml & ACC30 NAA abs	21	-0.249432	-1.12273	0.275538
IL-1b (46)pg/ml & ACC30 NAA+NAAG abs	21	-0.194868	-0.86601	0.397287
IL-1b (46)pg/ml & ACC30 ml abs	21	-0.144203	-0.63520	0.532871
IL-1b (46)pg/ml & ACC80 Glu abs	19	0.000878	0.00362	0.997155
IL-1b (46)pg/ml & ACC80 Glx abs	19	-0.102677	-0.42560	0.675741
IL-1b (46)pg/ml & Thal30 NAA abs	18	0.034073	0.13637	0.893228
IL-1b (46)pg/ml & Thal30 NAA+NAAG abs	20	0.134637	0.57647	0.571440
IL-1b (46)pg/ml & Thal30 ml abs	20	0.164724	0.70854	0.487684
TNFa (75)pg/ml & ACC30 NAA abs	21	-0.037025	-0.16150	0.873405
TNFa (75)pg/ml & ACC30 NAA+NAAG abs	21	-0.000650	-0.00283	0.997770
TNFa (75)pg/ml & ACC30 ml abs	21	0.129263	0.56821	0.576547
TNFa (75)pg/ml & ACC80 Glu abs	19	0.112330	0.46610	0.647062
TNFa (75)pg/ml & ACC80 Glx abs	19	0.047389	0.19561	0.847234
TNFa (75)pg/ml & Thal30 NAA abs	18	0.219928	0.90179	0.380543
TNFa (75)pg/ml & Thal30 NAA+NAAG abs	20	0.038360	0.16287	0.872436
TNFa (75)pg/ml & Thal30 ml abs	20	0.108311	0.46225	0.649444

Pair of Variables	Group=MPD Spearman Rank Order Correlations (Spreadsheet Chapter 3) MD pairwise deleted Marked correlations are significant at p <,01000 Valid N	Spearman R	t(N-2)	p-value
ACC30 NAA abs & ACC80 Glu abs	19	0.378947	1.68836	0.109600
ACC30 NAA abs & ACC80 Glx abs	19	0.454386	2.10313	0.050652
ACC30 NAA+NAAG abs & ACC80 Glu abs	19	0.343860	1.50984	0.149447
ACC30 NAA+NAAG abs & ACC80 Glx abs	19	0.421053	1.91397	0.072612
ACC30 ml abs & ACC80 Glu abs	19	0.524561	2.54039	0.021123
ACC30 ml abs & ACC80 Glx abs	19	0.577193	2.91428	0.009665
ACC80 Glu abs & ACC80 Glx abs	19	0.940351	11.39652	0.000000
Thal30 NAA abs & ACC80 Glu abs	17	0.421569	1.80055	0.091913
Thal30 NAA abs & ACC80 Glx abs	17	0.333333	1.36931	0.191058
Thal30 NAA+NAAG abs & ACC80 Glu abs	19	0.605263	3.13503	0.006034
Thal30 NAA+NAAG abs & ACC80 Glx abs	19	0.563158	2.80990	0.012052
Thal30 ml abs & ACC80 Glu abs	19	0.496491	2.35828	0.030596
Thal30 ml abs & ACC80 Glx abs	19	0.368421	1.63397	0.120645

Appendix J – Statistical analyses Chapter 4

Variable	All Groups Descriptive Statistics (Spreadsheet paper 2 use this one) Valid N	Mean	Minimum	Maximum	Std.Dev.
Duration of current diagnosis (years)	62	7.0645	0.00000	19.000	4.5299
Duration of current diagnosis (months)	22	4.3182	0.00000	11.000	3.7466
Number of psychotic episodes	64	2.8750	1.00000	9.000	1.8559
Onset of Meth use (age in years)	43	19.3256	12.00000	36.000	5.8583
Duration of meth use (months)	42	86.9543	0.08000	228.000	53.2055
Duration of methamphetamine abstinence (clinical day) (months)	42	22.1324	0.03000	168.000	38.1202
cpzeq(HT)	61	292.5902	0.00000	1100.000	259.2889
Years of education - School (years)	98	10.4898	1.00000	13.000	2.0319
Years of education - Post school (years)	98	0.5843	0.00000	5.000	1.1494
Age on day	98	29.4184	20.00000	45.000	5.4450
PANSS positive score	96	10.0729	1.00000	25.000	4.6072
PANSS negative score	96	12.1042	7.00000	45.000	7.4445
PANSS general psychopathology score	96	19.6771	16.00000	45.000	5.9072
PANS total score	96	41.9792	30.00000	97.000	15.8533
CDS score	97	0.9072	0.00000	13.000	2.3188
HAMD score	98	2.0816	0.00000	21.000	4.0017
GAD-7 score	98	1.5102	0.00000	17.000	3.4678
CGI score	97	2.3557	1.00000	6.000	1.4433
GAF score	97	72.8351	25.00000	99.000	17.9685
Height (metres)	98	3.3590	1.52000	164.500	16.4457
Weight (kg)	97	71.5289	42.40000	121.500	15.9949
Alcohol life time - Frequency score	94	2.0957	0.00000	5.000	1.3285
Alcohol life time - Duration score	96	2.0000	0.00000	3.000	1.1517
Alcohol life time - Amount score	77	2.6364	0.00000	5.000	1.7764
Alcohol life time - Total score	77	6.5844	0.00000	12.000	3.6068
Tobacco life time - Frequency score	97	3.3505	0.00000	5.000	2.1018
Tobacco life time - Duration score	97	2.1443	0.00000	3.000	1.2909
Tobacco life time Amount score	91	2.1099	0.00000	5.000	1.7413
Tobacco life time - Total score	91	7.5824	0.00000	13.000	4.8558
Cocaine life time - Frequency score	97	0.4639	0.00000	7.000	1.2167
Cocaine life time - Duration score	97	0.3608	0.00000	3.000	0.8315
Cocaine life time - Amount score	94	0.5532	0.00000	6.000	1.5213
Cocaine life time - Total score	94	1.2766	0.00000	16.000	3.2673
Heroin life time score - Frequency score	97	0.2165	0.00000	4.000	0.7936
Heroin life time score - Duration Score	97	0.1959	0.00000	3.000	0.6868
Heroin life time score - Amount score	97	0.0825	0.00000	3.000	0.3997
Heroin life time score - Total score	97	0.4948	0.00000	10.000	1.7861
Cannabis life time - Frequency score	97	2.6495	0.00000	6.000	2.4582
Cannabis life time - Duration score	97	1.5979	0.00000	3.000	1.3743
Cannabis life time - Amount score	82	1.7317	0.00000	5.000	1.9629
Cannabis life time - Total score	82	5.5366	0.00000	14.000	5.6201
Methamphetamine life time - Frequency score	97	1.7113	0.00000	5.000	2.1211
Methamphetamine life time - Duration score	97	1.1340	0.00000	3.000	1.3511
Methamphetamine - METHOD score	97	1.3918	0.00000	3.000	1.5039
Methamphetamine - Total score	97	4.2371	0.00000	11.000	4.8019
IFNg (25)pg/ml	98	11.3603	1.89000	64.090	12.5352
IL-10 (27)pg/ml	98	3.6365	0.03000	39.720	6.3761
IL-12p70 (33)pg/ml	98	9.7051	0.67000	40.670	8.6479
IL-1b (46)pg/ml	98	2.3482	0.63000	15.120	2.6773
IL-6 (57)pg/ml	98	1.9024	0.21000	36.860	4.1300
IL-8 (63)pg/ml	98	9.6930	1.56000	80.140	9.4730
TNFa (75)pg/ml	98	4.5619	1.05000	23.930	3.7396
IL-6 (57)pg/ml	97	7.4482	0.30000	43.660	6.7772
Right DLPFC NAA	97	1.4577	0.82400	1.953	0.2314
Right DLPFC NAA+NAAG	97	1.5658	1.04300	2.196	0.2272
Right DLPFC Glu	97	0.8472	0.41500	2.484	0.3375
Right DLPFC Glx	97	0.9160	0.41500	3.751	0.4613
Right DLPFC ml	97	1.0207	0.66500	1.657	0.1915
Right DLPFC GPC+PCh	97	0.3449	0.21500	0.539	0.0583
Left DLPFC NAA	97	1.4074	0.64300	1.930	0.2078
Left DLPFC NAA+NAAG	97	1.5453	0.97200	1.990	0.1849
Left DLPFC Glu	97	0.8344	0.36300	2.032	0.3123
Left DLPFC Glx	97	0.8487	0.36300	2.444	0.3462
Left DLPFC ml	97	0.9791	0.10200	1.684	0.2185
Left DLPFC GPC+PCh	97	0.3390	0.21200	0.545	0.0541
Right ACC NAA	98	1.2258	0.76000	1.780	0.1790
Right ACC NAA+NAAG	98	1.3083	1.01200	1.982	0.1613
Right ACC Glu	98	1.1594	0.11800	2.526	0.3313
Right ACC Glx	98	1.1975	0.56600	2.844	0.3619
Right ACC ml	98	1.1108	0.74100	1.846	0.1693
Right ACC GPC+PCh	98	0.2826	0.17500	0.450	0.0477
Left ACC NAA	98	1.2336	0.70000	1.711	0.1882
Left ACC NAA+NAAG	98	1.3197	0.96700	1.938	0.1792
Left ACC Glu	98	1.1903	0.67100	3.244	0.3509
Left ACC Glx	98	1.2242	0.67100	3.244	0.3844
Left ACC ml	98	1.0893	0.13000	1.517	0.1954
Left ACC GPC+PCh	98	0.2857	0.18400	0.417	0.0473
Right FWM NAA	97	1.3166	0.80500	1.768	0.1680
Right FWM NAA+NAAG	97	1.4209	1.03700	1.774	0.1693
Right FWM Glu	97	0.9410	0.28400	2.993	0.3860
Right FWM Glx	97	0.9929	0.28400	4.024	0.5249
Right FWM ml	97	1.0781	0.68900	1.727	0.1971
Right FWM GPC+PCh	97	0.3365	0.21300	0.474	0.0494
Left FWM NAA	97	1.3248	0.46000	1.834	0.1937
Left FWM NAA+NAAG	97	1.4686	1.12200	1.894	0.1797
Left FWM Glu	97	0.9150	0.45100	2.090	0.3300
Left FWM Glx	97	0.9499	0.45100	2.090	0.3640
Left FWM ml	97	1.0561	0.58800	1.745	0.1969
Left FWM GPC+PCh	97	0.3434	0.24800	0.459	0.0466
ACC 30 Glu abs	70	3.5592	1.80660	6.681	1.0790
ACC30 Glx abs	71	3.8734	1.80660	8.280	1.2623
ACC30 NAA abs	73	2.7478	0.85600	6.093	1.1452
ACC30 NAA+NAAG abs	73	3.0361	1.10600	6.093	1.1458
ACC30 GPC+PCh abs	73	0.9935	0.23550	2.495	0.2969
ACC30 ml abs	73	4.2160	2.53640	10.072	1.0937
ACC30 Cr+PCr abs	73	3.8807	2.18070	9.160	1.0729
ACC 30 Glu rel	70	0.9814	0.61700	1.520	0.1620
ACC30 Glx rel	71	1.0748	0.61700	2.156	0.2332
ACC30 NAA rel	73	0.7383	0.32600	1.219	0.1826
ACC30 NAA+NAAG rel	73	0.8243	0.44300	1.234	0.1715
ACC30 GPC+PCh rel	73	0.2927	0.21700	0.458	0.0426
ACC30 ml rel	73	1.2456	0.86800	1.566	0.1353

All Groups
Frequency table: Duration of current diagnosis (years) (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,94420, p=,00708

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-5,00000<x<=0,000000	1	1	1.61290	1.6129	1.02041	1.0204
0,000000<x<=5,000000	24	25	38.70968	40.3226	24.48980	25.5102
5,000000<x<=10,00000	24	49	38.70968	79.0323	24.48980	50.0000
10,00000<x<=15,00000	10	59	16.12903	95.1613	10.20408	60.2041
15,00000<x<=20,00000	3	62	4.83871	100.0000	3.06122	63.2653
Missing	36	98	58.06452		36.73469	100.0000

All Groups
Frequency table: Duration of current diagnosis (months) (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,89893, p=,02830

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	4	4	18.1818	18.1818	4.08163	4.0816
0,000000<x<=2,000000	5	9	22.7273	40.9091	5.10204	9.1837
2,000000<x<=4,000000	4	13	18.1818	59.0909	4.08163	13.2653
4,000000<x<=6,000000	3	16	13.6364	72.7273	3.06122	16.3265
6,000000<x<=8,000000	2	18	9.0909	81.8182	2.04082	18.3673
8,000000<x<=10,00000	2	20	9.0909	90.9091	2.04082	20.4082
10,00000<x<=12,00000	2	22	9.0909	100.0000	2.04082	22.4490
Missing	76	98	345.4545		77.55102	100.0000

All Groups
Frequency table: Number of psychotic episodes (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,86498, p=,00000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	18	18	28.12500	28.1250	18.36735	18.3673
1,000000<x<=2,000000	14	32	21.87500	50.0000	14.28571	32.6531
2,000000<x<=3,000000	14	46	21.87500	71.8750	14.28571	46.9388
3,000000<x<=4,000000	5	51	7.81250	79.6875	5.10204	52.0408
4,000000<x<=5,000000	8	59	12.50000	92.1875	8.16327	60.2041
5,000000<x<=6,000000	2	61	3.12500	95.3125	2.04082	62.2449
6,000000<x<=7,000000	1	62	1.56250	96.8750	1.02041	63.2653
7,000000<x<=8,000000	1	63	1.56250	98.4375	1.02041	64.2857
8,000000<x<=9,000000	1	64	1.56250	100.0000	1.02041	65.3061
Missing	34	98	53.12500		34.69388	100.0000

All Groups
Frequency table: Onset of Meth use (age in years) (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,89419, p=,00084

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
5,000000<x<=10,00000	0	0	0.0000	0.0000	0.00000	0.0000
10,00000<x<=15,00000	12	12	27.9070	27.9070	12.24490	12.2449
15,00000<x<=20,00000	15	27	34.8837	62.7907	15.30612	27.5510
20,00000<x<=25,00000	12	39	27.9070	90.6977	12.24490	39.7959
25,00000<x<=30,00000	1	40	2.3256	93.0233	1.02041	40.8163
30,00000<x<=35,00000	2	42	4.6512	97.6744	2.04082	42.8571
35,00000<x<=40,00000	1	43	2.3256	100.0000	1.02041	43.8776
Missing	55	98	127.9070		56.12245	100.0000

Category	All Groups Frequency table: Duration of meth use (months) (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,96702, p=,26139 Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-50,0000<x<=0,000000	0	0	0.0000	0.0000	0.00000	0.0000
0,000000<x<=50,00000	13	13	30.9524	30.9524	13.26531	13.2653
50,00000<x<=100,0000	12	25	28.5714	59.5238	12.24490	25.5102
100,0000<x<=150,0000	11	36	26.1905	85.7143	11.22449	36.7347
150,0000<x<=200,0000	5	41	11.9048	97.6190	5.10204	41.8367
200,0000<x<=250,0000	1	42	2.3810	100.0000	1.02041	42.8571
Missing	56	98	133.3333		57.14286	100.0000

Category	All Groups Frequency table: Duration of methamphetamine abstinence (clinical day) (months) (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,64915, p=,00000 Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-50,0000<x<=0,000000	0	0	0.0000	0.0000	0.00000	0.0000
0,000000<x<=50,00000	35	35	83.3333	83.3333	35.71429	35.7143
50,00000<x<=100,0000	5	40	11.9048	95.2381	5.10204	40.8163
100,0000<x<=150,0000	1	41	2.3810	97.6190	1.02041	41.8367
150,0000<x<=200,0000	1	42	2.3810	100.0000	1.02041	42.8571
Missing	56	98	133.3333		57.14286	100.0000

Category	All Groups Frequency table: cpzeq(HT) (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,90772, p=,00023 Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-200,000<x<=0,000000	16	16	26.22951	26.2295	16.32653	16.3265
0,000000<x<=200,0000	10	26	16.39344	42.6230	10.20408	26.5306
200,0000<x<=400,0000	18	44	29.50820	72.1311	18.36735	44.8980
400,0000<x<=600,0000	13	57	21.31148	93.4426	13.26531	58.1633
600,0000<x<=800,0000	2	59	3.27869	96.7213	2.04082	60.2041
800,0000<x<=1000,000	1	60	1.63934	98.3607	1.02041	61.2245
1000,000<x<=1200,000	1	61	1.63934	100.0000	1.02041	62.2449
Missing	37	98	60.65574		37.75510	100.0000

Category	All Groups Frequency table: Years of education - School (years) (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,77552, p=,00000 Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=2,000000	1	1	1.02041	1.0204	1.02041	1.0204
2,000000<x<=4,000000	1	2	1.02041	2.0408	1.02041	2.0408
4,000000<x<=6,000000	1	3	1.02041	3.0612	1.02041	3.0612
6,000000<x<=8,000000	12	15	12.24490	15.3061	12.24490	15.3061
8,000000<x<=10,00000	25	40	25.51020	40.8163	25.51020	40.8163
10,00000<x<=12,00000	57	97	58.16327	98.9796	58.16327	98.9796
12,00000<x<=14,00000	1	98	1.02041	100.0000	1.02041	100.0000
Missing	0	98	0.00000		0.00000	100.0000

Category	All Groups Frequency table: Years of education - Post school (years) (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,58121, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	69	69	70.40816	70.4082	70.40816	70.4082
0,000000<x<=1,000000	11	80	11.22449	81.6327	11.22449	81.6327
1,000000<x<=2,000000	9	89	9.18367	90.8163	9.18367	90.8163
2,000000<x<=3,000000	3	92	3.06122	93.8776	3.06122	93.8776
3,000000<x<=4,000000	5	97	5.10204	98.9796	5.10204	98.9796
4,000000<x<=5,000000	1	98	1.02041	100.0000	1.02041	100.0000
Missing	0	98	0.00000		0.00000	100.0000

Category	All Groups Frequency table: Age on day (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,96006, p=,00457					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
15,00000<x<=20,00000	1	1	1.02041	1.0204	1.02041	1.0204
20,00000<x<=25,00000	28	29	28.57143	29.5918	28.57143	29.5918
25,00000<x<=30,00000	34	63	34.69388	64.2857	34.69388	64.2857
30,00000<x<=35,00000	21	84	21.42857	85.7143	21.42857	85.7143
35,00000<x<=40,00000	12	96	12.24490	97.9592	12.24490	97.9592
40,00000<x<=45,00000	2	98	2.04082	100.0000	2.04082	100.0000
Missing	0	98	0.00000		0.00000	100.0000

Category	All Groups Frequency table: PANSS positive score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,76153, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-5,00000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=5,000000	1	1	1.04167	1.0417	1.02041	1.0204
5,000000<x<=10,00000	64	65	66.66667	67.7083	65.30612	66.3265
10,00000<x<=15,00000	21	86	21.87500	89.5833	21.42857	87.7551
15,00000<x<=20,00000	4	90	4.16667	93.7500	4.08163	91.8367
20,00000<x<=25,00000	6	96	6.25000	100.0000	6.12245	97.9592
Missing	2	98	2.08333		2.04082	100.0000

Category	All Groups Frequency table: PANSS negative score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,72891, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=5,000000	0	0	0.00000	0.0000	0.00000	0.0000
5,000000<x<=10,00000	56	56	58.33333	58.3333	57.14286	57.1429
10,00000<x<=15,00000	19	75	19.79167	78.1250	19.38776	76.5306
15,00000<x<=20,00000	6	81	6.25000	84.3750	6.12245	82.6531
20,00000<x<=25,00000	7	88	7.29167	91.6667	7.14286	89.7959
25,00000<x<=30,00000	6	94	6.25000	97.9167	6.12245	95.9184
30,00000<x<=35,00000	0	94	0.00000	97.9167	0.00000	95.9184
35,00000<x<=40,00000	1	95	1.04167	98.9583	1.02041	96.9388
40,00000<x<=45,00000	1	96	1.04167	100.0000	1.02041	97.9592
Missing	2	98	2.08333		2.04082	100.0000

Category	All Groups Frequency table: PANSS general psychopathology score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,65534, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
10,00000<x<=15,00000	0	0	0.00000	0.0000	0.00000	0.0000
15,00000<x<=20,00000	74	74	77.08333	77.0833	75.51020	75.5102
20,00000<x<=25,00000	11	85	11.45833	88.5417	11.22449	86.7347
25,00000<x<=30,00000	3	88	3.12500	91.6667	3.06122	89.7959
30,00000<x<=35,00000	4	92	4.16667	95.8333	4.08163	93.8776
35,00000<x<=40,00000	2	94	2.08333	97.9167	2.04082	95.9184
40,00000<x<=45,00000	2	96	2.08333	100.0000	2.04082	97.9592
Missing	2	98	2.08333		2.04082	100.0000

Category	All Groups Frequency table: PANS total score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,76494, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
20,00000<x<=30,00000	29	29	30.20833	30.2083	29.59184	29.5918
30,00000<x<=40,00000	32	61	33.33333	63.5417	32.65306	62.2449
40,00000<x<=50,00000	12	73	12.50000	76.0417	12.24490	74.4898
50,00000<x<=60,00000	13	86	13.54167	89.5833	13.26531	87.7551
60,00000<x<=70,00000	3	89	3.12500	92.7083	3.06122	90.8163
70,00000<x<=80,00000	3	92	3.12500	95.8333	3.06122	93.8776
80,00000<x<=90,00000	2	94	2.08333	97.9167	2.04082	95.9184
90,00000<x<=100,0000	2	96	2.08333	100.0000	2.04082	97.9592
Missing	2	98	2.08333		2.04082	100.0000

Category	All Groups Frequency table: CGI score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,83310, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	39	39	40.20619	40.2062	39.79592	39.7959
1,000000<x<=2,000000	20	59	20.61856	60.8247	20.40816	60.2041
2,000000<x<=3,000000	15	74	15.46392	76.2887	15.30612	75.5102
3,000000<x<=4,000000	11	85	11.34021	87.6289	11.22449	86.7347
4,000000<x<=5,000000	11	96	11.34021	98.9691	11.22449	97.9592
5,000000<x<=6,000000	1	97	1.03093	100.0000	1.02041	98.9796
Missing	1	98	1.03093		1.02041	100.0000

All Groups
Frequency table: GAF score (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,93285, p=,00009

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
10,00000<x<=20,00000	0	0	0.00000	0.0000	0.00000	0.0000
20,00000<x<=30,00000	2	2	2.06186	2.0619	2.04082	2.0408
30,00000<x<=40,00000	1	3	1.03093	3.0928	1.02041	3.0612
40,00000<x<=50,00000	8	11	8.24742	11.3402	8.16327	11.2245
50,00000<x<=60,00000	15	26	15.46392	26.8041	15.30612	26.5306
60,00000<x<=70,00000	20	46	20.61856	47.4227	20.40816	46.9388
70,00000<x<=80,00000	8	54	8.24742	55.6701	8.16327	55.1020
80,00000<x<=90,00000	22	76	22.68041	78.3505	22.44898	77.5510
90,00000<x<=100,0000	21	97	21.64948	100.0000	21.42857	98.9796
Missing	1	98	1.03093		1.02041	100.0000

All Groups
Frequency table: Height (metres) (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,07915, p=0,0000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-20,0000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=20,00000	97	97	98.97959	98.9796	98.97959	98.9796
20,00000<x<=40,00000	0	97	0.00000	98.9796	0.00000	98.9796
40,00000<x<=60,00000	0	97	0.00000	98.9796	0.00000	98.9796
60,00000<x<=80,00000	0	97	0.00000	98.9796	0.00000	98.9796
80,00000<x<=100,0000	0	97	0.00000	98.9796	0.00000	98.9796
100,0000<x<=120,0000	0	97	0.00000	98.9796	0.00000	98.9796
120,0000<x<=140,0000	0	97	0.00000	98.9796	0.00000	98.9796
140,0000<x<=160,0000	0	97	0.00000	98.9796	0.00000	98.9796
160,0000<x<=180,0000	1	98	1.02041	100.0000	1.02041	100.0000
Missing	0	98	0.00000		0.00000	100.0000

All Groups
Frequency table: Weight (kg) (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,95445, p=,00200

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
30,00000<x<=40,00000	0	0	0.00000	0.0000	0.00000	0.0000
40,00000<x<=50,00000	6	6	6.18557	6.1856	6.12245	6.1224
50,00000<x<=60,00000	19	25	19.58763	25.7732	19.38776	25.5102
60,00000<x<=70,00000	23	48	23.71134	49.4845	23.46939	48.9796
70,00000<x<=80,00000	24	72	24.74227	74.2268	24.48980	73.4694
80,00000<x<=90,00000	15	87	15.46392	89.6907	15.30612	88.7755
90,00000<x<=100,0000	5	92	5.15464	94.8454	5.10204	93.8776
100,0000<x<=110,0000	2	94	2.06186	96.9072	2.04082	95.9184
110,0000<x<=120,0000	2	96	2.06186	98.9691	2.04082	97.9592
120,0000<x<=130,0000	1	97	1.03093	100.0000	1.02041	98.9796
Missing	1	98	1.03093		1.02041	100.0000

All Groups
Frequency table: Alcohol life time - Frequency score (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,89254, p=,00000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	10	10	10.63830	10.6383	10.20408	10.2041
0,000000<x<=1,000000	30	40	31.91489	42.5532	30.61224	40.8163
1,000000<x<=2,000000	9	49	9.57447	52.1277	9.18367	50.0000
2,000000<x<=3,000000	35	84	37.23404	89.3617	35.71429	85.7143
3,000000<x<=4,000000	6	90	6.38298	95.7447	6.12245	91.8367
4,000000<x<=5,000000	4	94	4.25532	100.0000	4.08163	95.9184
Missing	4	98	4.25532		4.08163	100.0000

All Groups
Frequency table: Alcohol life time - Duration score (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,75918, p=,00000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	13	13	13.54167	13.5417	13.26531	13.2653
0,000000<x<=,5000000	0	13	0.00000	13.5417	0.00000	13.2653
,5000000<x<=1,000000	24	37	25.00000	38.5417	24.48980	37.7551
1,000000<x<=1,500000	0	37	0.00000	38.5417	0.00000	37.7551
1,500000<x<=2,000000	9	46	9.37500	47.9167	9.18367	46.9388
2,000000<x<=2,500000	0	46	0.00000	47.9167	0.00000	46.9388
2,500000<x<=3,000000	50	96	52.08333	100.0000	51.02041	97.9592
Missing	2	98	2.08333		2.04082	100.0000

All Groups
Frequency table: Alcohol life time - Amount score (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,88502, p=,00000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	14	14	18.18182	18.1818	14.28571	14.2857
0,000000<x<=1,000000	11	25	14.28571	32.4675	11.22449	25.5102
1,000000<x<=2,000000	9	34	11.68831	44.1558	9.18367	34.6939
2,000000<x<=3,000000	11	45	14.28571	58.4416	11.22449	45.9184
3,000000<x<=4,000000	19	64	24.67532	83.1169	19.38776	65.3061
4,000000<x<=5,000000	13	77	16.88312	100.0000	13.26531	78.5714
Missing	21	98	27.27273		21.42857	100.0000

All Groups
Frequency table: Alcohol life time - Total score (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,87795, p=,00000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	12	12	15.58442	15.5844	12.24490	12.2449
0,000000<x<=2,000000	2	14	2.59740	18.1818	2.04082	14.2857
2,000000<x<=4,000000	4	18	5.19481	23.3766	4.08163	18.3673
4,000000<x<=6,000000	10	28	12.98701	36.3636	10.20408	28.5714
6,000000<x<=8,000000	19	47	24.67532	61.0390	19.38776	47.9592
8,000000<x<=10,00000	23	70	29.87013	90.9091	23.46939	71.4286
10,00000<x<=12,00000	7	77	9.09091	100.0000	7.14286	78.5714
Missing	21	98	27.27273		21.42857	100.0000

Category	All Groups Frequency table: Tobacco life time - Frequency score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,70941, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	23	23	23.71134	23.7113	23.46939	23.4694
0,000000<x<=1,000000	3	26	3.09278	26.8041	3.06122	26.5306
1,000000<x<=2,000000	3	29	3.09278	29.8969	3.06122	29.5918
2,000000<x<=3,000000	7	36	7.21649	37.1134	7.14286	36.7347
3,000000<x<=4,000000	10	46	10.30928	47.4227	10.20408	46.9388
4,000000<x<=5,000000	51	97	52.57732	100.0000	52.04082	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Tobacco life time - Duration score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,62130, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	23	23	23.71134	23.7113	23.46939	23.4694
0,000000<x<=,5000000	0	23	0.00000	23.7113	0.00000	23.4694
,5000000<x<=1,000000	5	28	5.15464	28.8660	5.10204	28.5714
1,000000<x<=1,500000	0	28	0.00000	28.8660	0.00000	28.5714
1,500000<x<=2,000000	4	32	4.12371	32.9897	4.08163	32.6531
2,000000<x<=2,500000	0	32	0.00000	32.9897	0.00000	32.6531
2,500000<x<=3,000000	65	97	67.01031	100.0000	66.32653	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Tobacco life time Amount score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,88485, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	23	23	25.27473	25.2747	23.46939	23.4694
0,000000<x<=1,000000	18	41	19.78022	45.0549	18.36735	41.8367
1,000000<x<=2,000000	9	50	9.89011	54.9451	9.18367	51.0204
2,000000<x<=3,000000	20	70	21.97802	76.9231	20.40816	71.4286
3,000000<x<=4,000000	9	79	9.89011	86.8132	9.18367	80.6122
4,000000<x<=5,000000	12	91	13.18681	100.0000	12.24490	92.8571
Missing	7	98	7.69231		7.14286	100.0000

Category	All Groups Frequency table: Tobacco life time - Total score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,80916, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	23	23	25.27473	25.2747	23.46939	23.4694
0,000000<x<=2,000000	0	23	0.00000	25.2747	0.00000	23.4694
2,000000<x<=4,000000	1	24	1.09890	26.3736	1.02041	24.4898
4,000000<x<=6,000000	5	29	5.49451	31.8681	5.10204	29.5918
6,000000<x<=8,000000	7	36	7.69231	39.5604	7.14286	36.7347
8,000000<x<=10,00000	18	54	19.78022	59.3407	18.36735	55.1020
10,00000<x<=12,00000	26	80	28.57143	87.9121	26.53061	81.6327
12,00000<x<=14,00000	11	91	12.08791	100.0000	11.22449	92.8571
Missing	7	98	7.69231		7.14286	100.0000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
	All Groups Frequency table: Cocaine life time - Frequency score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,44352, p=,00000					
-1,00000<x<=0,000000	77	77	79.38144	79.3814	78.57143	78.5714
0,000000<x<=1,000000	11	88	11.34021	90.7216	11.22449	89.7959
1,000000<x<=2,000000	2	90	2.06186	92.7835	2.04082	91.8367
2,000000<x<=3,000000	3	93	3.09278	95.8763	3.06122	94.8980
3,000000<x<=4,000000	2	95	2.06186	97.9381	2.04082	96.9388
4,000000<x<=5,000000	0	95	0.00000	97.9381	0.00000	96.9388
5,000000<x<=6,000000	1	96	1.03093	98.9691	1.02041	97.9592
6,000000<x<=7,000000	1	97	1.03093	100.0000	1.02041	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
	All Groups Frequency table: Cocaine life time - Duration score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,48298, p=,00000					
-,500000<x<=0,000000	77	77	79.38144	79.3814	78.57143	78.5714
0,000000<x<=,5000000	0	77	0.00000	79.3814	0.00000	78.5714
,5000000<x<=1,000000	12	89	12.37113	91.7526	12.24490	90.8163
1,000000<x<=1,500000	0	89	0.00000	91.7526	0.00000	90.8163
1,500000<x<=2,000000	1	90	1.03093	92.7835	1.02041	91.8367
2,000000<x<=2,500000	0	90	0.00000	92.7835	0.00000	91.8367
2,500000<x<=3,000000	7	97	7.21649	100.0000	7.14286	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
	All Groups Frequency table: Cocaine life time - Amount score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,40488, p=,00000					
-1,00000<x<=0,000000	82	82	87.23404	87.2340	83.67347	83.6735
0,000000<x<=1,000000	0	82	0.00000	87.2340	0.00000	83.6735
1,000000<x<=2,000000	1	83	1.06383	88.2979	1.02041	84.6939
2,000000<x<=3,000000	3	86	3.19149	91.4894	3.06122	87.7551
3,000000<x<=4,000000	1	87	1.06383	92.5532	1.02041	88.7755
4,000000<x<=5,000000	5	92	5.31915	97.8723	5.10204	93.8776
5,000000<x<=6,000000	2	94	2.12766	100.0000	2.04082	95.9184
Missing	4	98	4.25532		4.08163	100.0000

Category	All Groups Frequency table: Cocaine life time - Total score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,45479, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	77	77	81.91489	81.9149	78.57143	78.5714
0,000000<x<=2,000000	5	82	5.31915	87.2340	5.10204	83.6735
2,000000<x<=4,000000	0	82	0.00000	87.2340	0.00000	83.6735
4,000000<x<=6,000000	3	85	3.19149	90.4255	3.06122	86.7347
6,000000<x<=8,000000	3	88	3.19149	93.6170	3.06122	89.7959
8,000000<x<=10,00000	2	90	2.12766	95.7447	2.04082	91.8367
10,00000<x<=12,00000	2	92	2.12766	97.8723	2.04082	93.8776
12,00000<x<=14,00000	1	93	1.06383	98.9362	1.02041	94.8980
14,00000<x<=16,00000	1	94	1.06383	100.0000	1.02041	95.9184
Missing	4	98	4.25532		4.08163	100.0000

Category	All Groups Frequency table: Heroin life time score - Frequency score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,29807, p=0,0000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	88	88	90.72165	90.7216	89.79592	89.7959
0,000000<x<=,5000000	0	88	0.00000	90.7216	0.00000	89.7959
,5000000<x<=1,000000	4	92	4.12371	94.8454	4.08163	93.8776
1,000000<x<=1,500000	0	92	0.00000	94.8454	0.00000	93.8776
1,500000<x<=2,000000	1	93	1.03093	95.8763	1.02041	94.8980
2,000000<x<=2,500000	0	93	0.00000	95.8763	0.00000	94.8980
2,500000<x<=3,000000	1	94	1.03093	96.9072	1.02041	95.9184
3,000000<x<=3,500000	0	94	0.00000	96.9072	0.00000	95.9184
3,500000<x<=4,000000	3	97	3.09278	100.0000	3.06122	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Heroin life time score - Duration Score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,30615, p=0,0000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	88	88	90.72165	90.7216	89.79592	89.7959
0,000000<x<=,5000000	0	88	0.00000	90.7216	0.00000	89.7959
,5000000<x<=1,000000	4	92	4.12371	94.8454	4.08163	93.8776
1,000000<x<=1,500000	0	92	0.00000	94.8454	0.00000	93.8776
1,500000<x<=2,000000	0	92	0.00000	94.8454	0.00000	93.8776
2,000000<x<=2,500000	0	92	0.00000	94.8454	0.00000	93.8776
2,500000<x<=3,000000	5	97	5.15464	100.0000	5.10204	98.9796
Missing	1	98	1.03093		1.02041	100.0000

All Groups
Frequency table: Heroin life time score - Amount score (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,21468, p=0,0000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	92	92	94.84536	94.8454	93.87755	93.8776
0,000000<x<=,5000000	0	92	0.00000	94.8454	0.00000	93.8776
,5000000<x<=1,000000	3	95	3.09278	97.9381	3.06122	96.9388
1,000000<x<=1,500000	0	95	0.00000	97.9381	0.00000	96.9388
1,500000<x<=2,000000	1	96	1.03093	98.9691	1.02041	97.9592
2,000000<x<=2,500000	0	96	0.00000	98.9691	0.00000	97.9592
2,500000<x<=3,000000	1	97	1.03093	100.0000	1.02041	98.9796
Missing	1	98	1.03093		1.02041	100.0000

All Groups
Frequency table: Heroin life time score - Total score (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,30936, p=0,0000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	88	88	90.72165	90.7216	89.79592	89.7959
0,000000<x<=2,000000	2	90	2.06186	92.7835	2.04082	91.8367
2,000000<x<=4,000000	3	93	3.09278	95.8763	3.06122	94.8980
4,000000<x<=6,000000	1	94	1.03093	96.9072	1.02041	95.9184
6,000000<x<=8,000000	1	95	1.03093	97.9381	1.02041	96.9388
8,000000<x<=10,00000	2	97	2.06186	100.0000	2.04082	98.9796
Missing	1	98	1.03093		1.02041	100.0000

All Groups
Frequency table: Cannabis life time - Frequency score (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,81677, p=,00000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	34	34	35.05155	35.0515	34.69388	34.6939
0,000000<x<=1,000000	10	44	10.30928	45.3608	10.20408	44.8980
1,000000<x<=2,000000	5	49	5.15464	50.5155	5.10204	50.0000
2,000000<x<=3,000000	8	57	8.24742	58.7629	8.16327	58.1633
3,000000<x<=4,000000	8	65	8.24742	67.0103	8.16327	66.3265
4,000000<x<=5,000000	11	76	11.34021	78.3505	11.22449	77.5510
5,000000<x<=6,000000	21	97	21.64948	100.0000	21.42857	98.9796
Missing	1	98	1.03093		1.02041	100.0000

All Groups
Frequency table: Cannabis life time - Duration score (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,73151, p=,00000

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	35	35	36.08247	36.0825	35.71429	35.7143
0,000000<x<=,5000000	0	35	0.00000	36.0825	0.00000	35.7143
,5000000<x<=1,000000	13	48	13.40206	49.4845	13.26531	48.9796
1,000000<x<=1,500000	0	48	0.00000	49.4845	0.00000	48.9796
1,500000<x<=2,000000	5	53	5.15464	54.6392	5.10204	54.0816
2,000000<x<=2,500000	0	53	0.00000	54.6392	0.00000	54.0816
2,500000<x<=3,000000	44	97	45.36082	100.0000	44.89796	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Cannabis life time - Amount score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,77940, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	37	37	45.12195	45.1220	37.75510	37.7551
0,000000<x<=1,000000	8	45	9.75610	54.8780	8.16327	45.9184
1,000000<x<=2,000000	13	58	15.85366	70.7317	13.26531	59.1837
2,000000<x<=3,000000	3	61	3.65854	74.3902	3.06122	62.2449
3,000000<x<=4,000000	6	67	7.31707	81.7073	6.12245	68.3673
4,000000<x<=5,000000	15	82	18.29268	100.0000	15.30612	83.6735
Missing	16	98	19.51220		16.32653	100.0000

Category	All Groups Frequency table: Cannabis life time - Total score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,80375, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	35	35	42.68293	42.6829	35.71429	35.7143
0,000000<x<=2,000000	2	37	2.43902	45.1220	2.04082	37.7551
2,000000<x<=4,000000	5	42	6.09756	51.2195	5.10204	42.8571
4,000000<x<=6,000000	4	46	4.87805	56.0976	4.08163	46.9388
6,000000<x<=8,000000	7	53	8.53659	64.6341	7.14286	54.0816
8,000000<x<=10,00000	4	57	4.87805	69.5122	4.08163	58.1633
10,00000<x<=12,00000	10	67	12.19512	81.7073	10.20408	68.3673
12,00000<x<=14,00000	15	82	18.29268	100.0000	15.30612	83.6735
Missing	16	98	19.51220		16.32653	100.0000

Category	All Groups Frequency table: Methamphetamine life time - Frequency score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,71702, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-1,00000<x<=0,000000	52	52	53.60825	53.6082	53.06122	53.0612
0,000000<x<=1,000000	8	60	8.24742	61.8557	8.16327	61.2245
1,000000<x<=2,000000	1	61	1.03093	62.8866	1.02041	62.2449
2,000000<x<=3,000000	10	71	10.30928	73.1959	10.20408	72.4490
3,000000<x<=4,000000	4	75	4.12371	77.3196	4.08163	76.5306
4,000000<x<=5,000000	22	97	22.68041	100.0000	22.44898	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Methamphetamine life time - Duration score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,69917, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	52	52	53.60825	53.6082	53.06122	53.0612
0,000000<x<=,5000000	0	52	0.00000	53.6082	0.00000	53.0612
,5000000<x<=1,000000	10	62	10.30928	63.9175	10.20408	63.2653
1,000000<x<=1,500000	0	62	0.00000	63.9175	0.00000	63.2653
1,500000<x<=2,000000	5	67	5.15464	69.0722	5.10204	68.3673
2,000000<x<=2,500000	0	67	0.00000	69.0722	0.00000	68.3673
2,500000<x<=3,000000	30	97	30.92784	100.0000	30.61224	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Methamphetamine - METHOD score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,63451, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,500000<x<=0,000000	52	52	53.60825	53.6082	53.06122	53.0612
0,000000<x<=,5000000	0	52	0.00000	53.6082	0.00000	53.0612
,5000000<x<=1,000000	0	52	0.00000	53.6082	0.00000	53.0612
1,000000<x<=1,500000	0	52	0.00000	53.6082	0.00000	53.0612
1,500000<x<=2,000000	0	52	0.00000	53.6082	0.00000	53.0612
2,000000<x<=2,500000	0	52	0.00000	53.6082	0.00000	53.0612
2,500000<x<=3,000000	45	97	46.39175	100.0000	45.91837	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Methamphetamine - Total score (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,72782, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	52	52	53.60825	53.6082	53.06122	53.0612
0,000000<x<=2,000000	0	52	0.00000	53.6082	0.00000	53.0612
2,000000<x<=4,000000	0	52	0.00000	53.6082	0.00000	53.0612
4,000000<x<=6,000000	7	59	7.21649	60.8247	7.14286	60.2041
6,000000<x<=8,000000	4	63	4.12371	64.9485	4.08163	64.2857
8,000000<x<=10,00000	16	79	16.49485	81.4433	16.32653	80.6122
10,00000<x<=12,00000	18	97	18.55670	100.0000	18.36735	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: IFNg (25)pg/ml (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,71668, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-10,0000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=10,00000	64	64	65.30612	65.3061	65.30612	65.3061
10,00000<x<=20,00000	18	82	18.36735	83.6735	18.36735	83.6735
20,00000<x<=30,00000	8	90	8.16327	91.8367	8.16327	91.8367
30,00000<x<=40,00000	2	92	2.04082	93.8776	2.04082	93.8776
40,00000<x<=50,00000	4	96	4.08163	97.9592	4.08163	97.9592
50,00000<x<=60,00000	1	97	1.02041	98.9796	1.02041	98.9796
60,00000<x<=70,00000	1	98	1.02041	100.0000	1.02041	100.0000
Missing	0	98	0.00000		0.00000	100.0000

Category	All Groups Frequency table: IL-10 (27)pg/ml (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,43136, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-5,00000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=5,000000	89	89	90.81633	90.81633	90.81633	90.81633
5,000000<x<=10,00000	3	92	3.06122	93.8776	3.06122	93.8776
10,00000<x<=15,00000	2	94	2.04082	95.9184	2.04082	95.9184
15,00000<x<=20,00000	1	95	1.02041	96.9388	1.02041	96.9388
20,00000<x<=25,00000	0	95	0.00000	96.9388	0.00000	96.9388
25,00000<x<=30,00000	0	95	0.00000	96.9388	0.00000	96.9388
30,00000<x<=35,00000	1	96	1.02041	97.9592	1.02041	97.9592
35,00000<x<=40,00000	2	98	2.04082	100.0000	2.04082	100.0000
Missing	0	98	0.00000		0.00000	100.0000

Category	All Groups Frequency table: IL-1b (46)pg/ml (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,56084, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-2,00000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=2,000000	68	68	69.38776	69.3878	69.38776	69.3878
2,000000<x<=4,000000	20	88	20.40816	89.7959	20.40816	89.7959
4,000000<x<=6,000000	3	91	3.06122	92.8571	3.06122	92.8571
6,000000<x<=8,000000	2	93	2.04082	94.8980	2.04082	94.8980
8,000000<x<=10,00000	0	93	0.00000	94.8980	0.00000	94.8980
10,00000<x<=12,00000	2	95	2.04082	96.9388	2.04082	96.9388
12,00000<x<=14,00000	2	97	2.04082	98.9796	2.04082	98.9796
14,00000<x<=16,00000	1	98	1.02041	100.0000	1.02041	100.0000
Missing	0	98	0.00000		0.00000	100.0000

Category	All Groups Frequency table: TNFa (75)pg/ml (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,63093, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-5,00000<x<=0,000000	0	0	0.00000	0.0000	0.00000	0.0000
0,000000<x<=5,000000	74	74	75.51020	75.5102	75.51020	75.5102
5,000000<x<=10,00000	19	93	19.38776	94.8980	19.38776	94.8980
10,00000<x<=15,00000	2	95	2.04082	96.9388	2.04082	96.9388
15,00000<x<=20,00000	0	95	0.00000	96.9388	0.00000	96.9388
20,00000<x<=25,00000	3	98	3.06122	100.0000	3.06122	100.0000
Missing	0	98	0.00000		0.00000	100.0000

Category	All Groups Frequency table: Right DLPFC NAA (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,98656, p=,43069					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,6000000<x<=,8000000	0	0	0.00000	0.0000	0.00000	0.0000
,8000000<x<=1,000000	3	3	3.09278	3.0928	3.06122	3.0612
1,000000<x<=1,200000	14	17	14.43299	17.5258	14.28571	17.3469
1,200000<x<=1,400000	17	34	17.52577	35.0515	17.34694	34.6939
1,400000<x<=1,600000	37	71	38.14433	73.1959	37.75510	72.4490
1,600000<x<=1,800000	21	92	21.64948	94.8454	21.42857	93.8776
1,800000<x<=2,000000	5	97	5.15464	100.0000	5.10204	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Right DLPFC NAA+NAAG (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,99215, p=,84552					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,8000000<x<=1,000000	0	0	0.00000	0.0000	0.00000	0.0000
1,000000<x<=1,200000	5	5	5.15464	5.1546	5.10204	5.1020
1,200000<x<=1,400000	17	22	17.52577	22.6804	17.34694	22.4490
1,400000<x<=1,600000	34	56	35.05155	57.7320	34.69388	57.1429
1,600000<x<=1,800000	28	84	28.86598	86.5979	28.57143	85.7143
1,800000<x<=2,000000	9	93	9.27835	95.8763	9.18367	94.8980
2,000000<x<=2,200000	4	97	4.12371	100.0000	4.08163	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Right DLPFC ml (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,98068, p=,16408					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,4000000<x<=,6000000	0	0	0.00000	0.0000	0.00000	0.0000
,6000000<x<=,8000000	10	10	10.30928	10.3093	10.20408	10.2041
,8000000<x<=1,000000	38	48	39.17526	49.4845	38.77551	48.9796
1,000000<x<=1,200000	33	81	34.02062	83.5052	33.67347	82.6531
1,200000<x<=1,400000	14	95	14.43299	97.9381	14.28571	96.9388
1,400000<x<=1,600000	1	96	1.03093	98.9691	1.02041	97.9592
1,600000<x<=1,800000	1	97	1.03093	100.0000	1.02041	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Left DLPFC NAA (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,96903, p=,02153					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,4000000<x<=,6000000	0	0	0.00000	0.0000	0.00000	0.0000
,6000000<x<=,8000000	1	1	1.03093	1.0309	1.02041	1.0204
,8000000<x<=1,000000	3	4	3.09278	4.1237	3.06122	4.0816
1,000000<x<=1,200000	12	16	12.37113	16.4948	12.24490	16.3265
1,200000<x<=1,400000	24	40	24.74227	41.2371	24.48980	40.8163
1,400000<x<=1,600000	44	84	45.36082	86.5979	44.89796	85.7143
1,600000<x<=1,800000	11	95	11.34021	97.9381	11.22449	96.9388
1,800000<x<=2,000000	2	97	2.06186	100.0000	2.04082	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Left DLPFC NAA+NAAG (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,96697, p=,01518					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,8000000<x<=1,000000	2	2	2.06186	2.0619	2.04082	2.0408
1,000000<x<=1,200000	1	3	1.03093	3.0928	1.02041	3.0612
1,200000<x<=1,400000	14	17	14.43299	17.5258	14.28571	17.3469
1,400000<x<=1,600000	44	61	45.36082	62.8866	44.89796	62.2449
1,600000<x<=1,800000	28	89	28.86598	91.7526	28.57143	90.8163
1,800000<x<=2,000000	8	97	8.24742	100.0000	8.16327	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Left DLPFC ml (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,93355, p=,00010					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,200000<x<=,722E-15	0	0	0.00000	0.0000	0.00000	0.0000
,722E-15<x<=,2000000	1	1	1.03093	1.0309	1.02041	1.0204
,2000000<x<=,4000000	0	1	0.00000	1.0309	0.00000	1.0204
,4000000<x<=,6000000	0	1	0.00000	1.0309	0.00000	1.0204
,6000000<x<=,8000000	17	18	17.52577	18.5567	17.34694	18.3673
,8000000<x<=1,000000	44	62	45.36082	63.9175	44.89796	63.2653
1,000000<x<=1,200000	24	86	24.74227	88.6598	24.48980	87.7551
1,200000<x<=1,400000	7	93	7.21649	95.8763	7.14286	94.8980
1,400000<x<=1,600000	2	95	2.06186	97.9381	2.04082	96.9388
1,600000<x<=1,800000	2	97	2.06186	100.0000	2.04082	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Right ACC NAA (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,97182, p=,03333					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,6000000<x<=,8000000	2	2	2.04082	2.0408	2.04082	2.0408
,8000000<x<=1,000000	6	8	6.12245	8.1633	6.12245	8.1633
1,000000<x<=1,200000	39	47	39.79592	47.9592	39.79592	47.9592
1,200000<x<=1,400000	37	84	37.75510	85.7143	37.75510	85.7143
1,400000<x<=1,600000	11	95	11.22449	96.9388	11.22449	96.9388
1,600000<x<=1,800000	3	98	3.06122	100.0000	3.06122	100.0000
Missing	0	98	0.00000		0.00000	100.0000

Category	All Groups Frequency table: Right ACC NAA+NAAG (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,94227, p=,00031					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,8000000<x<=1,000000	0	0	0.00000	0.0000	0.00000	0.0000
1,000000<x<=1,200000	27	27	27.55102	27.5510	27.55102	27.5510
1,200000<x<=1,400000	45	72	45.91837	73.4694	45.91837	73.4694
1,400000<x<=1,600000	21	93	21.42857	94.8980	21.42857	94.8980
1,600000<x<=1,800000	4	97	4.08163	98.9796	4.08163	98.9796
1,800000<x<=2,000000	1	98	1.02041	100.0000	1.02041	100.0000
Missing	0	98	0.00000		0.00000	100.0000

All Groups
Frequency table: Right ACC ml (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,94723, p=,00063

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,6000000<x<=,8000000	3	3	3.06122	3.0612	3.06122	3.0612
,8000000<x<=1,000000	18	21	18.36735	21.4286	18.36735	21.4286
1,000000<x<=1,200000	51	72	52.04082	73.4694	52.04082	73.4694
1,200000<x<=1,400000	20	92	20.40816	93.8776	20.40816	93.8776
1,400000<x<=1,600000	5	97	5.10204	98.9796	5.10204	98.9796
1,600000<x<=1,800000	0	97	0.00000	98.9796	0.00000	98.9796
1,800000<x<=2,000000	1	98	1.02041	100.0000	1.02041	100.0000
Missing	0	98	0.00000		0.00000	100.0000

All Groups
Frequency table: Left ACC NAA (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,97822, p=,10326

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,4000000<x<=,6000000	0	0	0.00000	0.0000	0.00000	0.0000
,6000000<x<=,8000000	3	3	3.06122	3.0612	3.06122	3.0612
,8000000<x<=1,000000	7	10	7.14286	10.2041	7.14286	10.2041
1,000000<x<=1,200000	33	43	33.67347	43.8776	33.67347	43.8776
1,200000<x<=1,400000	39	82	39.79592	83.6735	39.79592	83.6735
1,400000<x<=1,600000	14	96	14.28571	97.9592	14.28571	97.9592
1,600000<x<=1,800000	2	98	2.04082	100.0000	2.04082	100.0000
Missing	0	98	0.00000		0.00000	100.0000

All Groups
Frequency table: Left ACC NAA+NAAG (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,95859, p=,00361

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,8000000<x<=1,000000	3	3	3.06122	3.0612	3.06122	3.0612
1,000000<x<=1,200000	25	28	25.51020	28.5714	25.51020	28.5714
1,200000<x<=1,400000	42	70	42.85714	71.4286	42.85714	71.4286
1,400000<x<=1,600000	23	93	23.46939	94.8980	23.46939	94.8980
1,600000<x<=1,800000	3	96	3.06122	97.9592	3.06122	97.9592
1,800000<x<=2,000000	2	98	2.04082	100.0000	2.04082	100.0000
Missing	0	98	0.00000		0.00000	100.0000

Category	All Groups Frequency table: Left ACC ml (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,92253, p=,00002					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
-,200000<x<=,722E-15	0	0	0.00000	0.0000	0.00000	0.0000
,722E-15<x<=,2000000	1	1	1.02041	1.0204	1.02041	1.0204
,2000000<x<=,4000000	0	1	0.00000	1.0204	0.00000	1.0204
,4000000<x<=,6000000	0	1	0.00000	1.0204	0.00000	1.0204
,6000000<x<=,8000000	2	3	2.04082	3.0612	2.04082	3.0612
,8000000<x<=1,000000	26	29	26.53061	29.5918	26.53061	29.5918
1,000000<x<=1,200000	44	73	44.89796	74.4898	44.89796	74.4898
1,200000<x<=1,400000	18	91	18.36735	92.8571	18.36735	92.8571
1,400000<x<=1,600000	7	98	7.14286	100.0000	7.14286	100.0000
Missing	0	98	0.00000		0.00000	100.0000

Category	All Groups Frequency table: Right FWM NAA (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,97429, p=,05361					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,6000000<x<=,8000000	0	0	0.00000	0.0000	0.00000	0.0000
,8000000<x<=1,000000	5	5	5.15464	5.1546	5.10204	5.1020
1,000000<x<=1,200000	15	20	15.46392	20.6186	15.30612	20.4082
1,200000<x<=1,400000	51	71	52.57732	73.1959	52.04082	72.4490
1,400000<x<=1,600000	21	92	21.64948	94.8454	21.42857	93.8776
1,600000<x<=1,800000	5	97	5.15464	100.0000	5.10204	98.9796
Missing	1	98	1.03093		1.02041	100.0000

Category	All Groups Frequency table: Right FWM NAA+NAAG (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,96924, p=,02232					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,9000000<x<=1,000000	0	0	0.00000	0.0000	0.00000	0.0000
1,000000<x<=1,100000	3	3	3.09278	3.0928	3.06122	3.0612
1,100000<x<=1,200000	3	6	3.09278	6.1856	3.06122	6.1224
1,200000<x<=1,300000	21	27	21.64948	27.8351	21.42857	27.5510
1,300000<x<=1,400000	22	49	22.68041	50.5155	22.44898	50.0000
1,400000<x<=1,500000	17	66	17.52577	68.0412	17.34694	67.3469
1,500000<x<=1,600000	14	80	14.43299	82.4742	14.28571	81.6327
1,600000<x<=1,700000	10	90	10.30928	92.7835	10.20408	91.8367
1,700000<x<=1,800000	7	97	7.21649	100.0000	7.14286	98.9796
Missing	1	98	1.03093		1.02041	100.0000

All Groups
Frequency table: Right FWM ml (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,97616, p=,07449

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,4000000<x<=,6000000	0	0	0.00000	0.0000	0.00000	0.0000
,6000000<x<=,8000000	8	8	8.24742	8.2474	8.16327	8.1633
,8000000<x<=1,000000	30	38	30.92784	39.1753	30.61224	38.7755
1,000000<x<=1,200000	34	72	35.05155	74.2268	34.69388	73.4694
1,200000<x<=1,400000	20	92	20.61856	94.8454	20.40816	93.8776
1,400000<x<=1,600000	4	96	4.12371	98.9691	4.08163	97.9592
1,600000<x<=1,800000	1	97	1.03093	100.0000	1.02041	98.9796
Missing	1	98	1.03093		1.02041	100.0000

All Groups
Frequency table: Left FWM NAA (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,95632, p=,00268

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,2000000<x<=,4000000	0	0	0.00000	0.0000	0.00000	0.0000
,4000000<x<=,6000000	1	1	1.03093	1.0309	1.02041	1.0204
,6000000<x<=,8000000	0	1	0.00000	1.0309	0.00000	1.0204
,8000000<x<=1,000000	1	2	1.03093	2.0619	1.02041	2.0408
1,000000<x<=1,200000	23	25	23.71134	25.7732	23.46939	25.5102
1,200000<x<=1,400000	40	65	41.23711	67.0103	40.81633	66.3265
1,400000<x<=1,600000	24	89	24.74227	91.7526	24.48980	90.8163
1,600000<x<=1,800000	7	96	7.21649	98.9691	7.14286	97.9592
1,800000<x<=2,000000	1	97	1.03093	100.0000	1.02041	98.9796
Missing	1	98	1.03093		1.02041	100.0000

All Groups
Frequency table: Left FWM NAA+NAAG (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,98698, p=,45836

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
1,000000<x<=1,100000	0	0	0.00000	0.0000	0.00000	0.0000
1,100000<x<=1,200000	8	8	8.24742	8.2474	8.16327	8.1633
1,200000<x<=1,300000	10	18	10.30928	18.5567	10.20408	18.3673
1,300000<x<=1,400000	21	39	21.64948	40.2062	21.42857	39.7959
1,400000<x<=1,500000	16	55	16.49485	56.7010	16.32653	56.1224
1,500000<x<=1,600000	16	71	16.49485	73.1959	16.32653	72.4490
1,600000<x<=1,700000	17	88	17.52577	90.7216	17.34694	89.7959
1,700000<x<=1,800000	5	93	5.15464	95.8763	5.10204	94.8980
1,800000<x<=1,900000	4	97	4.12371	100.0000	4.08163	98.9796
Missing	1	98	1.03093		1.02041	100.0000

All Groups
Frequency table: Left FWM ml (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,96729, p=,01602

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
,4000000<x<=,6000000	1	1	1.03093	1.0309	1.02041	1.0204
,6000000<x<=,8000000	5	6	5.15464	6.1856	5.10204	6.1224
,8000000<x<=1,000000	32	38	32.98969	39.1753	32.65306	38.7755
1,000000<x<=1,200000	39	77	40.20619	79.3814	39.79592	78.5714
1,200000<x<=1,400000	14	91	14.43299	93.8144	14.28571	92.8571
1,400000<x<=1,600000	5	96	5.15464	98.9691	5.10204	97.9592
1,600000<x<=1,800000	1	97	1.03093	100.0000	1.02041	98.9796
Missing	1	98	1.03093		1.02041	100.0000

All Groups
Frequency table: ACC30 NAA abs (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,96611, p=,04677

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	3	3	4.10959	4.1096	3.06122	3.0612
1,000000<x<=2,000000	21	24	28.76712	32.8767	21.42857	24.4898
2,000000<x<=3,000000	17	41	23.28767	56.1644	17.34694	41.8367
3,000000<x<=4,000000	20	61	27.39726	83.5616	20.40816	62.2449
4,000000<x<=5,000000	11	72	15.06849	98.6301	11.22449	73.4694
5,000000<x<=6,000000	0	72	0.00000	98.6301	0.00000	73.4694
6,000000<x<=7,000000	1	73	1.36986	100.0000	1.02041	74.4898
Missing	25	98	34.24658		25.51020	100.0000

All Groups
Frequency table: ACC30 NAA+NAAG abs (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,97325, p=,12281

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	0	0	0.00000	0.0000	0.00000	0.0000
1,000000<x<=2,000000	15	15	20.54795	20.5479	15.30612	15.3061
2,000000<x<=3,000000	21	36	28.76712	49.3151	21.42857	36.7347
3,000000<x<=4,000000	21	57	28.76712	78.0822	21.42857	58.1633
4,000000<x<=5,000000	13	70	17.80822	95.8904	13.26531	71.4286
5,000000<x<=6,000000	2	72	2.73973	98.6301	2.04082	73.4694
6,000000<x<=7,000000	1	73	1.36986	100.0000	1.02041	74.4898
Missing	25	98	34.24658		25.51020	100.0000

Category	All Groups Frequency table: ACC30 ml abs (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,82960, p=,00000					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
1,000000<x<=2,000000	0	0	0.00000	0.0000	0.00000	0.0000
2,000000<x<=3,000000	4	4	5.47945	5.4795	4.08163	4.0816
3,000000<x<=4,000000	33	37	45.20548	50.6849	33.67347	37.7551
4,000000<x<=5,000000	23	60	31.50685	82.1918	23.46939	61.2245
5,000000<x<=6,000000	11	71	15.06849	97.2603	11.22449	72.4490
6,000000<x<=7,000000	0	71	0.00000	97.2603	0.00000	72.4490
7,000000<x<=8,000000	1	72	1.36986	98.6301	1.02041	73.4694
8,000000<x<=9,000000	0	72	0.00000	98.6301	0.00000	73.4694
9,000000<x<=10,00000	0	72	0.00000	98.6301	0.00000	73.4694
10,00000<x<=11,00000	1	73	1.36986	100.0000	1.02041	74.4898
Missing	25	98	34.24658		25.51020	100.0000

Category	All Groups Frequency table: Thal30 NAA abs (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,96802, p=,12901					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	1	1	1.72414	1.7241	1.02041	1.0204
1,000000<x<=2,000000	10	11	17.24138	18.9655	10.20408	11.2245
2,000000<x<=3,000000	11	22	18.96552	37.9310	11.22449	22.4490
3,000000<x<=4,000000	15	37	25.86207	63.7931	15.30612	37.7551
4,000000<x<=5,000000	16	53	27.58621	91.3793	16.32653	54.0816
5,000000<x<=6,000000	5	58	8.62069	100.0000	5.10204	59.1837
Missing	40	98	68.96552		40.81633	100.0000

Category	All Groups Frequency table: Thal30 NAA+NAAG abs (Spreadsheet paper 2 use this one) Shapiro-Wilk W=,94601, p=,00416					
	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
0,000000<x<=1,000000	0	0	0.00000	0.0000	0.00000	0.0000
1,000000<x<=2,000000	13	13	18.30986	18.3099	13.26531	13.2653
2,000000<x<=3,000000	13	26	18.30986	36.6197	13.26531	26.5306
3,000000<x<=4,000000	10	36	14.08451	50.7042	10.20408	36.7347
4,000000<x<=5,000000	20	56	28.16901	78.8732	20.40816	57.1429
5,000000<x<=6,000000	13	69	18.30986	97.1831	13.26531	70.4082
6,000000<x<=7,000000	2	71	2.81690	100.0000	2.04082	72.4490
Missing	27	98	38.02817		27.55102	100.0000

All Groups
Frequency table: Thal30 ml abs (Spreadsheet paper 2 use this one)
Shapiro-Wilk W=,97394, p=,15210

Category	Count	Cumulative Count	Percent of Valid	Cumul % of Valid	% of all Cases	Cumulative % of All
1,000000<x<=1,500000	2	2	2.85714	2.8571	2.04082	2.0408
1,500000<x<=2,000000	13	15	18.5714	21.4286	13.26531	15.3061
2,000000<x<=2,500000	17	32	24.28571	45.7143	17.34694	32.6531
2,500000<x<=3,000000	16	48	22.85714	68.5714	16.32653	48.9796
3,000000<x<=3,500000	15	63	21.42857	90.0000	15.30612	64.2857
3,500000<x<=4,000000	5	68	7.14286	97.1429	5.10204	69.3878
4,000000<x<=4,500000	2	70	2.85714	100.0000	2.04082	71.4286
Missing	28	98	40.0000		28.57143	100.0000

Univariate Results for Each DV (Spreadsheet paper 2 use this one)
Sigma-restricted parameterization
Effective hypothesis decomposition

Effect	Degr. of Freedom	Duration of meth use (months) SS	Duration of meth use (months) MS	Duration of meth use (months) F	Duration of meth use (months) p	Right DLPFC NAA SS	Right DLPFC NAA MS	Right DLPFC NAA F	Right DLPFC NAA p	Right DLPFC SS
Intercept	1	17749.23	17749.23	9.259886	0.006422	17.59812	17.59812	263.5483	0.000000	
Group	2	14997.27	7498.63	3.912084	0.036820	0.12839	0.06419	0.9614	0.399352	
Error	20	38335.75	1916.79			1.33548	0.06677			
Total	22	53333.02				1.46386				

LSD test; variable Duration of meth use (months) (Spreadsheet paper 2 use this one)
Probabilities for Post Hoc Tests
Error: Between MS = 1916,8, df = 20,000

Cell No.	Group	{1} ,08000	{2} 52,000	{3} 95,625
1	CON		0.285278	0.046973
2	SCZ	0.285278		0.050449
3	MPD	0.046973	0.050449	

Kruskal-Wallis ANOVA by Ranks; Duration of current diagnosis (years) (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 62) =0,000000 p =1,000

Depend.: Duration of current diagnosis (years)	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	0		0.00000
SCZ	2	36	1341.500	37.26389
MPD	3	26	611.500	23.51923

Median Test, Overall Median = 6,00000; Duration of current diagnosis (years) (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Chi-Square = 8,260319 df = 2 p = ,0161

Dependent: Duration of current diagnosis (years)	CON	SCZ	MPD	Total
<= Median: observed	0.00	13.00000	19.00000	32.00000
expected	0.00	18.58065	13.41935	
obs.-exp.	0.00	-5.58065	5.58065	
> Median: observed	0.00	23.00000	7.00000	30.00000
expected	0.00	17.41935	12.58065	
obs.-exp.	0.00	5.58065	-5.58065	
Total: observed	0.00	36.00000	26.00000	62.00000

Depend.: Duration of current diagnosis (months)	Kruskal-Wallis ANOVA by Ranks; Duration of current diagnosis (months) (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 22) =0,000000 p =1,000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	0		0.00000
SCZ	2	8	113.0000	14.12500
MPD	3	14	140.0000	10.00000

Dependent: Duration of current diagnosis (months)	Median Test, Overall Median = 3,00000; Duration of current diagnosis (months) (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 1,473214 df = 2 p = ,4787			
	CON	SCZ	MPD	Total
<= Median: observed	0.00	3.00000	9.00000	12.00000
expected	0.00	4.36364	7.63636	
obs.-exp.	0.00	-1.36364	1.36364	
> Median: observed	0.00	5.00000	5.00000	10.00000
expected	0.00	3.63636	6.36364	
obs.-exp.	0.00	1.36364	-1.36364	
Total: observed	0.00	8.00000	14.00000	22.00000

Depend.: Number of psychotic episodes	Kruskal-Wallis ANOVA by Ranks; Number of psychotic episodes (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 64) =0,000000 p =1,000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	0		0.00000
SCZ	2	36	1319.000	36.63889
MPD	3	28	761.000	27.17857

Dependent: Number of psychotic episodes	Median Test, Overall Median = 2,50000; Number of psychotic episodes (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 4,063492 df = 2 p = ,1311			
	CON	SCZ	MPD	Total
<= Median: observed	0.00	14.00000	18.00000	32.00000
expected	0.00	18.00000	14.00000	
obs.-exp.	0.00	-4.00000	4.00000	
> Median: observed	0.00	22.00000	10.00000	32.00000
expected	0.00	18.00000	14.00000	
obs.-exp.	0.00	4.00000	-4.00000	
Total: observed	0.00	36.00000	28.00000	64.00000

Depend.: Onset of Meth use (age in years)	Kruskal-Wallis ANOVA by Ranks; Onset of Meth use (age in years) (Spreadsheet Chapter Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 43) =6,489222 p =,0390			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	2	36.0000	18.00000
SCZ	2	13	382.0000	29.38462
MPD	3	28	528.0000	18.85714

Dependent: Onset of Meth use (age in years)	Median Test, Overall Median = 18,0000; Onset of Meth use (age in years) (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 6,087729 df = 2 p = ,0477			
	CON	SCZ	MPD	Total
<= Median: observed	1.000000	4.00000	20.00000	25.00000
expected	1.162791	7.55814	16.27907	
obs.-exp.	-0.162791	-3.55814	3.72093	
> Median: observed	1.000000	9.00000	8.00000	18.00000
expected	0.837209	5.44186	11.72093	
obs.-exp.	0.162791	3.55814	-3.72093	
Total: observed	2.000000	13.00000	28.00000	43.00000

Depend.: Duration of meth use (months)	Kruskal-Wallis ANOVA by Ranks; Duration of meth use (months) (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 42) =10,77135 p =,0046			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	2	13.0000	6.5000
SCZ	2	12	169.0000	14.0833
MPD	3	28	721.0000	25.7500

Dependent: Duration of meth use (months)	Median Test, Overall Median = 84,0000; Duration of meth use (months) (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 5,237986 df = 2 p = ,0729			
	CON	SCZ	MPD	Total
<= Median: observed	2.000000	9.00000	12.00000	23.00000
expected	1.095238	6.57143	15.33333	
obs.-exp.	0.904762	2.42857	-3.33333	
> Median: observed	0.000000	3.00000	16.00000	19.00000
expected	0.904762	5.42857	12.66667	
obs.-exp.	-0.904762	-2.42857	3.33333	
Total: observed	2.000000	12.00000	28.00000	42.00000

Depend.: Duration of methamphetamine abstinence (clinical day) (months)	Kruskal-Wallis ANOVA by Ranks; Duration of methamphetamine abstinence (clinical day) (months) (Spreadsheet Ch Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 42) =7,228639 p =,0269			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	2	78.5000	39.2500
SCZ	2	13	328.5000	25.2692
MPD	3	27	496.0000	18.3703

Dependent: Duration of methamphetamine abstinence (clinical day) (months)	Median Test, Overall Median = 2,00000; Duration of methamphetamine abstinence (clinical day) (months) (Spreadshe Independent (grouping) variable: Group Chi-Square = 2,914219 df = 2 p = ,2329			
	CON	SCZ	MPD	Total
<= Median: observed	0.0000	6.0000	16.0000	22.0000
expecte	1.0476	6.8095	14.1428	
obs.-exp	-1.0476	-0.8095	1.8571	
> Median: observed	2.0000	7.0000	11.0000	20.0000
expecte	0.9523	6.1904	12.8571	
obs.-exp	1.0476	0.8095	-1.8571	
Total: observe	2.0000	13.0000	27.0000	42.0000

Depend.: cpzeq(HT)	Kruskal-Wallis ANOVA by Ranks; cpzeq(HT) (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 61) =0,000000 p =1,000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	0		39.2500(
SCZ	2	33	1187.50(	35.98485
MPD	3	28	703.50(	25.1250(

Dependent: cpzeq(HT)	Median Test, Overall Median = 300,000; cpzeq(HT) (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 5,837623 df = 2 p = ,0540			
	CON	SCZ	MPD	Total
<= Median: observed	0.00	16.0000(	22.0000(	38.0000(
expected	0.00	20.5573ε	17.44262	
obs.-exp.	0.00	-4.5573ε	4.5573ε	
> Median: observed	0.00	17.0000(	6.0000(	23.0000(
expected	0.00	12.44262	10.5573ε	
obs.-exp.	0.00	4.5573ε	-4.5573ε	
Total: observe(	0.00	33.0000(	28.0000(	61.0000(

Depend.: Years of education - School (years)	Kruskal-Wallis ANOVA by Ranks; Years of education - School (years) (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 98) =21,42185 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	2257.000	66.38235
SCZ	2	36	1533.500	42.59722
MPD	3	28	1060.500	37.87500

Dependent: Years of education - School (years)	Median Test, Overall Median = 11,5000; Years of education - School (years) (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 18,11391 df = 2 p = ,0001			
	CON	SCZ	MPD	Total
<= Median: observed	7.0000	23.0000(	19.0000(	49.0000(
expected	17.0000	18.0000(	14.0000(	
obs.-exp.	-10.0000	5.0000(	5.0000(	
> Median: observed	27.0000	13.0000(	9.0000(	49.0000(
expected	17.0000	18.0000(	14.0000(	
obs.-exp.	10.0000	-5.00000	-5.00000	
Total: observed	34.0000	36.0000(	28.0000(	98.0000(

Depend.: Years of education - Post school (years)	Kruskal-Wallis ANOVA by Ranks; Years of education - Post school (years) (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 98) =8,340731 p =,0154			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1946.50(	57.2500(
SCZ	2	36	1493.00(	41.47222
MPD	3	28	1411.50(	50.41071

Dependent: Years of education - Post school (years)	Median Test, Overall Median = 0,00000; Years of education - Post school (years) (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 7,791268 df = 2 p = ,0203			
	CON	SCZ	MPD	Total
<= Median: observed	19.00000	31.00000	19.00000	69.00000
expected	23.93878	25.34694	19.71429	
obs.-exp.	-4.93878	5.65306	-0.71429	
> Median: observed	15.00000	5.00000	9.00000	29.00000
expected	10.06122	10.65306	8.28571	
obs.-exp.	4.93878	-5.65306	0.71429	
Total: observed	34.00000	36.00000	28.00000	98.00000

Depend.: Age on day	Kruskal-Wallis ANOVA by Ranks; Age on day (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 98) =4,197922 p =,1226			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1883.000	55.38235
SCZ	2	36	1827.000	50.75000
MPD	3	28	1141.000	40.75000

Dependent: Age on day	Median Test, Overall Median = 29,0000; Age on day (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 2,577862 df = 2 p = ,2756			
	CON	SCZ	MPD	Total
<= Median: observed	17.00000	18.00000	19.00000	54.00000
expected	18.73469	19.83673	15.42857	
obs.-exp.	-1.73469	-1.83673	3.57143	
> Median: observed	17.00000	18.00000	9.00000	44.00000
expected	15.26531	16.16327	12.57143	
obs.-exp.	1.73469	1.83673	-3.57143	
Total: observed	34.00000	36.00000	28.00000	98.00000

Depend.: PANSS positive score	Kruskal-Wallis ANOVA by Ranks; PANSS positive score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 96) =42,18744 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	32	774.500	24.20313
SCZ	2	36	2358.000	65.50000
MPD	3	28	1523.500	54.41071

Dependent: PANSS positive score	Median Test, Overall Median = 8,00000; PANSS positive score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 38,98302 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	31.0000	8.0000	13.00000	52.00000
expected	17.3333	19.5000	15.16667	
obs.-exp.	13.6667	-11.5000	-2.16667	
> Median: observed	1.0000	28.0000	15.00000	44.00000
expected	14.6667	16.5000	12.83333	
obs.-exp.	-13.6667	11.5000	2.16667	
Total: observed	32.0000	36.0000	28.00000	96.00000

Depend.: PANSS negative score	Kruskal-Wallis ANOVA by Ranks; PANSS negative score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 96) =46,10747 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	32	748.500	23.39063
SCZ	2	36	2403.000	66.75000
MPD	3	28	1504.500	53.73214

Dependent: PANSS negative score	Median Test, Overall Median = 8,00000; PANSS negative score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 47,95518 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	32.0000	6.0000	13.00000	51.00000
expected	17.0000	19.1250	14.87500	
obs.-exp.	15.0000	-13.1250	-1.87500	
> Median: observed	0.0000	30.0000	15.00000	45.00000
expected	15.0000	16.8750	13.12500	
obs.-exp.	-15.0000	13.1250	1.87500	
Total: observed	32.0000	36.0000	28.00000	96.00000

Depend.: PANSS general psychopathology score	Kruskal-Wallis ANOVA by Ranks; PANSS general psychopathology score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 96) =32,63363 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	32	861.000	26.90625
SCZ	2	36	2282.500	63.40278
MPD	3	28	1512.500	54.01786

Dependent: PANSS general psychopathology score	Median Test, Overall Median = 17,0000; PANSS general psychopathology score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 26,36660 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	28.0000	10.00000	11.00000	49.00000
expected	16.3333	18.37500	14.29167	
obs.-exp.	11.6667	-8.37500	-3.29167	
> Median: observed	4.0000	26.00000	17.00000	47.00000
expected	15.6667	17.62500	13.70833	
obs.-exp.	-11.6667	8.37500	3.29167	
Total: observed	32.0000	36.00000	28.00000	96.00000

Depend.: PANS total score	Kruskal-Wallis ANOVA by Ranks; PANS total score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 96) =48,27155 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	32	691.000	21.59375
SCZ	2	36	2391.500	66.43056
MPD	3	28	1573.500	56.19643

Dependent: PANS total score	Median Test, Overall Median = 35,0000; PANS total score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 49,26543 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	32.0000	6.0000	11.00000	49.00000
expected	16.3333	18.3750	14.29167	
obs.-exp.	15.6667	-12.3750	-3.29167	
> Median: observed	0.0000	30.0000	17.00000	47.00000
expected	15.6667	17.6250	13.70833	
obs.-exp.	-15.6667	12.3750	3.29167	
Total: observed	32.0000	36.0000	28.00000	96.00000

Depend.: CGI score	Kruskal-Wallis ANOVA by Ranks; CGI score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =61,19751 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	33	660.000	20.00000
SCZ	2	36	2503.000	69.52778
MPD	3	28	1590.000	56.78571

Dependent: CGI score	Median Test, Overall Median = 2,00000; CGI score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 35,71487 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	33.0000	11.0000	15.00000	59.00000
expected	20.0722	21.8969	17.03093	
obs.-exp.	12.9278	-10.8969	-2.03093	
> Median: observed	0.0000	25.0000	13.00000	38.00000
expected	12.9278	14.1031	10.96907	
obs.-exp.	-12.9278	10.8969	2.03093	
Total: observed	33.0000	36.0000	28.00000	97.00000

Depend.: GAF score	Kruskal-Wallis ANOVA by Ranks; GAF score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =51,19786 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	33	2532.000	76.72727
SCZ	2	36	1082.500	30.06944
MPD	3	28	1138.500	40.66071

Dependent: GAF score	Median Test, Overall Median = 75,0000; GAF score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 44,91789 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	2.0000	30.0000	19.00000	51.00000
expected	17.3505	18.9278	14.72165	
obs.-exp.	-15.3505	11.0722	4.27835	
> Median: observed	31.0000	6.0000	9.00000	46.00000
expected	15.6495	17.0722	13.27835	
obs.-exp.	15.3505	-11.0722	-4.27835	
Total: observed	33.0000	36.0000	28.00000	97.00000

Kruskal-Wallis ANOVA by Ranks; Height (metres) (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 98) =2,301565 p =,3164

Depend.: Height (metres)	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1494.000	43.94118
SCZ	2	36	1951.000	54.19444
MPD	3	28	1406.000	50.21429

Median Test, Overall Median = 1,70000; Height (metres) (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Chi-Square = ,2605042 df = 2 p = ,8779

Dependent: Height (metres)	CON	SCZ	MPD	Total
<= Median: observed	18.00000	18.00000	13.00000	49.00000
expected	17.00000	18.00000	14.00000	
obs.-exp.	1.00000	0.00000	-1.00000	
> Median: observed	16.00000	18.00000	15.00000	49.00000
expected	17.00000	18.00000	14.00000	
obs.-exp.	-1.00000	0.00000	1.00000	
Total: observed	34.00000	36.00000	28.00000	98.00000

Kruskal-Wallis ANOVA by Ranks; Weight (kg) (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 97) =4,528848 p =,1039

Depend.: Weight (kg)	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	33	1862.500	56.43939
SCZ	2	36	1739.500	48.31944
MPD	3	28	1151.000	41.10714

Median Test, Overall Median = 70,1000; Weight (kg) (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Chi-Square = 2,871670 df = 2 p = ,2379

Dependent: Weight (kg)	CON	SCZ	MPD	Total
<= Median: observed	13.00000	19.00000	17.00000	49.00000
expected	16.67010	18.18557	14.14433	
obs.-exp.	-3.67010	0.81443	2.85567	
> Median: observed	20.00000	17.00000	11.00000	48.00000
expected	16.32990	17.81443	13.85567	
obs.-exp.	3.67010	-0.81443	-2.85567	
Total: observed	33.00000	36.00000	28.00000	97.00000

Kruskal-Wallis ANOVA by Ranks; Alcohol life time - Frequency score (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 94) =,1074186 p =,9477

Depend.: Alcohol life time - Frequency score	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1588.500	46.72059
SCZ	2	33	1557.500	47.19697
MPD	3	27	1319.000	48.85185

Dependent: Alcohol life time - Frequency score	Median Test, Overall Median = 2,00000; Alcohol life time - Frequency score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = ,3683826 df = 2 p = ,8318			
	CON	SCZ	MPD	Total
<= Median: observed	19.00000	16.00000	14.00000	49.00000
expected	17.72340	17.20213	14.07447	
obs.-exp.	1.27660	-1.20213	-0.07447	
> Median: observed	15.00000	17.00000	13.00000	45.00000
expected	16.27660	15.79787	12.92553	
obs.-exp.	-1.27660	1.20213	0.07447	
Total: observed	34.00000	33.00000	27.00000	94.00000

Depend.: Alcohol life time - Duration score	Kruskal-Wallis ANOVA by Ranks; Alcohol life time - Duration score (Spreadsheet Chapter 4 Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 96) =1,154458 p =,5615			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1713.000	50.38235
SCZ	2	35	1568.500	44.81429
MPD	3	27	1374.500	50.90741

Dependent: Alcohol life time - Duration score	Median Test, Overall Median = 3,00000; Alcohol life time - Duration score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 0,000000 df = 2 p = 1,000			
	CON	SCZ	MPD	Total
<= Median: observed	34.00000	35.00000	27.00000	96.00000
expected	34.00000	35.00000	27.00000	
obs.-exp.	0.00000	0.00000	0.00000	
> Median: observed	0.00000	0.00000	0.00000	0.00000
expected	0.00000	0.00000	0.00000	
obs.-exp.	0.00000	0.00000	0.00000	
Total: observed	34.00000	35.00000	27.00000	96.00000

Depend.: Alcohol life time - Amount score	Kruskal-Wallis ANOVA by Ranks; Alcohol life time - Amount score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 77) =6,097392 p =,0474			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	25	1038.000	41.52000
SCZ	2	30	948.000	31.60000
MPD	3	22	1017.000	46.22727

Dependent: Alcohol life time - Amount score	Median Test, Overall Median = 3,00000; Alcohol life time - Amount score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 3,239347 df = 2 p = ,1980			
	CON	SCZ	MPD	Total
<= Median: observed	14.00000	21.00000	10.00000	45.00000
expected	14.61039	17.53247	12.85714	
obs.-exp.	-0.61039	3.46753	-2.85714	
> Median: observed	11.00000	9.00000	12.00000	32.00000
expected	10.38961	12.46753	9.14286	
obs.-exp.	0.61039	-3.46753	2.85714	
Total: observed	25.00000	30.00000	22.00000	77.00000

Depend.: Alcohol life time - Total score	Kruskal-Wallis ANOVA by Ranks; Alcohol life time - Total score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 77) =4,214906 p =,1215			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	25	1047.50(	41.9000(
SCZ	2	30	978.50(	32.61667
MPD	3	22	977.00(	44.4090(

Dependent: Alcohol life time - Total score	Median Test, Overall Median = 7,00000; Alcohol life time - Total score (Spreadsheet Chapter 4 Independent (grouping) variable: Group Chi-Square = 1,729123 df = 2 p = ,4212			
	CON	SCZ	MPD	Total
<= Median: observed	11.0000(	18.0000(	10.0000(	39.0000(
expected	12.66234	15.19481	11.1428(	
obs.-exp.	-1.66234	2.8051(	-1.1428(	
> Median: observed	14.0000(	12.0000(	12.0000(	38.0000(
expected	12.3376(	14.8051(	10.85714	
obs.-exp.	1.66234	-2.8051(	1.1428(	
Total: observe(	25.0000(	30.0000(	22.0000(	77.0000(

Depend.: Tobacco life time - Frequency score	Kruskal-Wallis ANOVA by Ranks; Tobacco life time - Frequency score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =13,56377 p =,0011			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1229.500	36.16176
SCZ	2	35	1879.000	53.68571
MPD	3	28	1644.500	58.73214

Dependent: Tobacco life time - Frequency score	Median Test, Overall Median = 5,00000; Tobacco life time - Frequency score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 0,000000 df = 2 p = 1,000			
	CON	SCZ	MPD	Total
<= Median: observed	34.0000(	35.0000(	28.0000(	97.0000(
expected	34.0000(	35.0000(	28.0000(	
obs.-exp.	0.0000(	0.0000(	0.0000(	
> Median: observed	0.0000(	0.0000(	0.0000(	0.0000(
expected	0.0000(	0.0000(	0.0000(	
obs.-exp.	0.0000(	0.0000(	0.0000(	
Total: observed	34.0000(	35.0000(	28.0000(	97.0000(

Depend.: Tobacco life time - Duration score	Kruskal-Wallis ANOVA by Ranks; Tobacco life time - Duration score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =10,98462 p =,0041			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1321.000	38.85294
SCZ	2	35	1812.000	51.77143
MPD	3	28	1620.000	57.85714

Dependent: Tobacco life time - Duration score	Median Test, Overall Median = 3,00000; Tobacco life time - Duration score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 0,000000 df = 2 p = 1,000			
	CON	SCZ	MPD	Total
<= Median: observed	34.00000	35.00000	28.00000	97.00000
expected	34.00000	35.00000	28.00000	
obs.-exp.	0.00000	0.00000	0.00000	
> Median: observed	0.00000	0.00000	0.00000	0.00000
expected	0.00000	0.00000	0.00000	
obs.-exp.	0.00000	0.00000	0.00000	
Total: observed	34.00000	35.00000	28.00000	97.00000

Depend.: Tobacco life time Amount score	Kruskal-Wallis ANOVA by Ranks; Tobacco life time Amount score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 91) =10,53966 p =,0051			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	32	1096.50(	34.26563
SCZ	2	33	1665.00(	50.45455
MPD	3	26	1424.50(	54.78846

Dependent: Tobacco life time Amount score	Median Test, Overall Median = 2,00000; Tobacco life time Amount score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 8,679638 df = 2 p = ,0130			
	CON	SCZ	MPD	Total
<= Median: observed	24.00000	13.00000	13.00000	50.00000
expected	17.58242	18.13187	14.28571	
obs.-exp.	6.41758	-5.13187	-1.28571	
> Median: observed	8.00000	20.00000	13.00000	41.00000
expected	14.41758	14.86813	11.71429	
obs.-exp.	-6.41758	5.13187	1.28571	
Total: observed	32.00000	33.00000	26.00000	91.00000

Depend.: Tobacco life time - Total score	Kruskal-Wallis ANOVA by Ranks; Tobacco life time - Total score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 91) =12,14406 p =,0023			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	32	1065.50(	33.29688
SCZ	2	33	1683.00(	51.00000
MPD	3	26	1437.50(	55.28846

Dependent: Tobacco life time - Total score	Median Test, Overall Median = 9,00000; Tobacco life time - Total score (Spreadsheet Chapte Independent (grouping) variable: Group Chi-Square = 9,334252 df = 2 p = ,0094			
	CON	SCZ	MPD	Total
<= Median: observed	23.0000(	14.0000(	9.0000(	46.0000(
expected	16.17582	16.68132	13.14286	
obs.-exp.	6.82418	-2.68132	-4.14286	
> Median: observed	9.0000(	19.0000(	17.0000(	45.0000(
expected	15.82418	16.31868	12.85714	
obs.-exp.	-6.82418	2.68132	4.14286	
Total: observed	32.0000(	33.0000(	26.0000(	91.0000(

Kruskal-Wallis ANOVA by Ranks; Cocaine life time - Frequency score (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 97) =9,760926 p =,0076

Depend.: Cocaine life time - Frequency score	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1473.500	43.33824
SCZ	2	35	1638.000	46.80000
MPD	3	28	1641.500	58.62500

Median Test, Overall Median = 0,00000; Cocaine life time - Frequency score (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Chi-Square = 9,109589 df = 2 p = ,0105

Dependent: Cocaine life time - Frequency score	CON	SCZ	MPD	Total
<= Median: observed	31.00000	29.00000	17.00000	77.00000
expected	26.98969	27.78351	22.22680	
obs.-exp.	4.01031	1.21649	-5.22680	
> Median: observed	3.00000	6.00000	11.00000	20.00000
expected	7.01031	7.21649	5.77320	
obs.-exp.	-4.01031	-1.21649	5.22680	
Total: observed	34.00000	35.00000	28.00000	97.00000

Kruskal-Wallis ANOVA by Ranks; Cocaine life time - Duration score (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 97) =9,402137 p =,0091

Depend.: Cocaine life time - Duration score	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1470.000	43.23529
SCZ	2	35	1649.000	47.11429
MPD	3	28	1634.000	58.35714

Median Test, Overall Median = 0,00000; Cocaine life time - Duration score (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Chi-Square = 9,109589 df = 2 p = ,0105

Dependent: Cocaine life time - Duration score	CON	SCZ	MPD	Total
<= Median: observed	31.00000	29.00000	17.00000	77.00000
expected	26.98969	27.78351	22.22680	
obs.-exp.	4.01031	1.21649	-5.22680	
> Median: observed	3.00000	6.00000	11.00000	20.00000
expected	7.01031	7.21649	5.77320	
obs.-exp.	-4.01031	-1.21649	5.22680	
Total: observed	34.00000	35.00000	28.00000	97.00000

Kruskal-Wallis ANOVA by Ranks; Cocaine life time - Amount score (Spreadsheet Chapter 4
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 94) =3,818487 p =,1482

Depend.: Cocaine life time - Amount score	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1549.500	45.57353
SCZ	2	34	1546.500	45.48529
MPD	3	26	1369.000	52.65385

Dependent: Cocaine life time - Amount score	Median Test, Overall Median = 0,00000; Cocaine life time - Amount score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 3,431244 df = 2 p = ,1799			
	CON	SCZ	MPD	Total
<= Median: observed	31.00000	31.00000	20.00000	82.00000
expected	29.65957	29.65957	22.68085	
obs.-exp.	1.34043	1.34043	-2.68085	
> Median: observed	3.00000	3.00000	6.00000	12.00000
expected	4.34043	4.34043	3.31915	
obs.-exp.	-1.34043	-1.34043	2.68085	
Total: observed	34.00000	34.00000	26.00000	94.00000

Depend.: Cocaine life time - Total score	Kruskal-Wallis ANOVA by Ranks; Cocaine life time - Total score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 94) =7,316307 p =,0258			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1469.500	43.22059
SCZ	2	34	1550.000	45.58824
MPD	3	26	1445.500	55.59615

Dependent: Cocaine life time - Total score	Median Test, Overall Median = 0,00000; Cocaine life time - Total score (Spreadsheet Chapte Independent (grouping) variable: Group Chi-Square = 7,026385 df = 2 p = ,0298			
	CON	SCZ	MPD	Total
<= Median: observed	31.00000	29.00000	17.00000	77.00000
expected	27.85106	27.85106	21.29787	
obs.-exp.	3.14894	1.14894	-4.29787	
> Median: observed	3.00000	5.00000	9.00000	17.00000
expected	6.14894	6.14894	4.70213	
obs.-exp.	-3.14894	-1.14894	4.29787	
Total: observed	34.00000	34.00000	26.00000	94.00000

Depend.: Heroin life time score - Frequency score	Kruskal-Wallis ANOVA by Ranks; Heroin life time score - Frequency score (Spreadsheet Chapter 4 Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =17,65718 p =,0001			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1513.000	44.50000
SCZ	2	35	1603.500	45.81429
MPD	3	28	1636.500	58.44643

Dependent: Heroin life time score - Frequency score	Median Test, Overall Median = 0,00000; Heroin life time score - Frequency score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 17,57338 df = 2 p = ,0002			
	CON	SCZ	MPD	Total
<= Median: observed	34.00000	34.00000	20.00000	88.00000
expected	30.84536	31.75258	25.40206	
obs.-exp.	3.15464	2.24742	-5.40206	
> Median: observed	0.00000	1.00000	8.00000	9.00000
expected	3.15464	3.24742	2.59794	
obs.-exp.	-3.15464	-2.24742	5.40206	
Total: observed	34.00000	35.00000	28.00000	97.00000

Depend.: Heroin life time score - Duration Score	Kruskal-Wallis ANOVA by Ranks; Heroin life time score - Duration Score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =17,66452 p =,0001			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1513.000	44.50000
SCZ	2	35	1603.500	45.81429
MPD	3	28	1636.500	58.44643

Dependent: Heroin life time score - Duration Score	Median Test, Overall Median = 0,00000; Heroin life time score - Duration Score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 17,57338 df = 2 p = ,0002			
	CON	SCZ	MPD	Total
<= Median: observed	34.00000	34.00000	20.00000	88.00000
expected	30.84536	31.75258	25.40206	
obs.-exp.	3.15464	2.24742	-5.40206	
> Median: observed	0.00000	1.00000	8.00000	9.00000
expected	3.15464	3.24742	2.59794	
obs.-exp.	-3.15464	-2.24742	5.40206	
Total: observed	34.00000	35.00000	28.00000	97.00000

Depend.: Heroin life time score - Amount score	Kruskal-Wallis ANOVA by Ranks; Heroin life time score - Amount score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =12,84793 p =,0016			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1581.000	46.50000
SCZ	2	35	1627.500	46.50000
MPD	3	28	1544.500	55.16071

Dependent: Heroin life time score - Amount score	Median Test, Overall Median = 0,00000; Heroin life time score - Amount score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 12,99107 df = 2 p = ,0015			
	CON	SCZ	MPD	Total
<= Median: observed	34.00000	35.00000	23.00000	92.00000
expected	32.24742	33.19588	26.55670	
obs.-exp.	1.75258	1.80412	-3.55670	
> Median: observed	0.00000	0.00000	5.00000	5.00000
expected	1.75258	1.80412	1.44330	
obs.-exp.	-1.75258	-1.80412	3.55670	
Total: observed	34.00000	35.00000	28.00000	97.00000

Depend.: Heroin life time score - Total score	Kruskal-Wallis ANOVA by Ranks; Heroin life time score - Total score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =17,77789 p =,0001			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1513.000	44.50000
SCZ	2	35	1602.500	45.78571
MPD	3	28	1637.500	58.48214

Dependent: Heroin life time score - Total score	Median Test, Overall Median = 0,00000; Heroin life time score - Total score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 17,57338 df = 2 p = ,0002			
	CON	SCZ	MPD	Total
<= Median: observed	34.00000	34.00000	20.00000	88.00000
expected	30.84536	31.75258	25.40206	
obs.-exp.	3.15464	2.24742	-5.40206	
> Median: observed	0.00000	1.00000	8.00000	9.00000
expected	3.15464	3.24742	2.59794	
obs.-exp.	-3.15464	-2.24742	5.40206	
Total: observed	34.00000	35.00000	28.00000	97.00000

Depend.: Cannabis life time - Frequency score	Kruskal-Wallis ANOVA by Ranks; Cannabis life time - Frequency score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =15,73412 p =,0004			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1208.500	35.54412
SCZ	2	35	1781.000	50.88571
MPD	3	28	1763.500	62.98214

Dependent: Cannabis life time - Frequency score	Median Test, Overall Median = 2,00000; Cannabis life time - Frequency score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 15,37788 df = 2 p = ,0005			
	CON	SCZ	MPD	Total
<= Median: observed	26.00000	15.00000	8.00000	49.00000
expected	17.17526	17.68041	14.14433	
obs.-exp.	8.82474	-2.68041	-6.14433	
> Median: observed	8.00000	20.00000	20.00000	48.00000
expected	16.82474	17.31959	13.85567	
obs.-exp.	-8.82474	2.68041	6.14433	
Total: observed	34.00000	35.00000	28.00000	97.00000

Depend.: Cannabis life time - Duration score	Kruskal-Wallis ANOVA by Ranks; Cannabis life time - Duration score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =12,24048 p =,0022			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1281.500	37.69118
SCZ	2	35	1770.000	50.57143
MPD	3	28	1701.500	60.76786

Dependent: Cannabis life time - Duration score	Median Test, Overall Median = 2,00000; Cannabis life time - Duration score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 14,65582 df = 2 p = ,0007			
	CON	SCZ	MPD	Total
<= Median: observed	27.00000	17.00000	9.00000	53.00000
expected	18.57732	19.12371	15.29897	
obs.-exp.	8.42268	-2.12371	-6.29897	
> Median: observed	7.00000	18.00000	19.00000	44.00000
expected	15.42268	15.87629	12.70103	
obs.-exp.	-8.42268	2.12371	6.29897	
Total: observed	34.00000	35.00000	28.00000	97.00000

Depend.: Cannabis life time - Amount score	Kruskal-Wallis ANOVA by Ranks; Cannabis life time - Amount score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 82) =9,347525 p =,0093			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	31	1032.000	33.29032
SCZ	2	28	1169.000	41.75000
MPD	3	23	1202.000	52.26087

Dependent: Cannabis life time - Amount score	Median Test, Overall Median = 1,00000; Cannabis life time - Amount score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 7,011150 df = 2 p = ,0300			
	CON	SCZ	MPD	Total
<= Median: observed	22.00000	15.00000	8.00000	45.00000
expected	17.01220	15.36585	12.62195	
obs.-exp.	4.98780	-0.36585	-4.62195	
> Median: observed	9.00000	13.00000	15.00000	37.00000
expected	13.98780	12.63415	10.37805	
obs.-exp.	-4.98780	0.36585	4.62195	
Total: observed	31.00000	28.00000	23.00000	82.00000

Depend.: Cannabis life time - Total score	Kruskal-Wallis ANOVA by Ranks; Cannabis life time - Total score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 82) =11,63633 p =,0030			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	31	994.000	32.06452
SCZ	2	28	1179.000	42.10714
MPD	3	23	1230.000	53.47826

Dependent: Cannabis life time - Total score	Median Test, Overall Median = 3,50000; Cannabis life time - Total score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 9,164095 df = 2 p = ,0102			
	CON	SCZ	MPD	Total
<= Median: observed	21.00000	14.00000	6.00000	41.00000
expected	15.50000	14.00000	11.50000	
obs.-exp.	5.50000	0.00000	-5.50000	
> Median: observed	10.00000	14.00000	17.00000	41.00000
expected	15.50000	14.00000	11.50000	
obs.-exp.	-5.50000	0.00000	5.50000	
Total: observed	31.00000	28.00000	23.00000	82.00000

Depend.: Methamphetamine life time - Frequency score	Kruskal-Wallis ANOVA by Ranks; Methamphetamine life time - Frequency score (Spreadsheet Chapter Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =51,39934 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1031.000	30.32353
SCZ	2	35	1574.500	44.98571
MPD	3	28	2147.500	76.69643

Dependent: Methamphetamine life time - Frequency score	Median Test, Overall Median = 0,00000; Methamphetamine life time - Frequency score (Spreadsheet Chapter Independent (grouping) variable: Group Chi-Square = 45,15521 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	30.0000	21.00000	1.0000	52.00000
expected	18.2268	18.76289	15.0103	
obs.-exp.	11.7732	2.23711	-14.0103	
> Median: observed	4.0000	14.00000	27.0000	45.00000
expected	15.7732	16.23711	12.9897	
obs.-exp.	-11.7732	-2.23711	14.0103	
Total: observed	34.0000	35.00000	28.0000	97.00000

Depend.: Methamphetamine life time - Duration score	Kruskal-Wallis ANOVA by Ranks; Methamphetamine life time - Duration score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =52,06867 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1050.000	30.88235
SCZ	2	35	1551.500	44.32857
MPD	3	28	2151.500	76.83929

Dependent: Methamphetamine life time - Duration score	Median Test, Overall Median = 0,00000; Methamphetamine life time - Duration score (Spreadsheet Chapter Independent (grouping) variable: Group Chi-Square = 45,15521 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	30.0000	21.00000	1.0000	52.00000
expected	18.2268	18.76289	15.0103	
obs.-exp.	11.7732	2.23711	-14.0103	
> Median: observed	4.0000	14.00000	27.0000	45.00000
expected	15.7732	16.23711	12.9897	
obs.-exp.	-11.7732	-2.23711	14.0103	
Total: observed	34.0000	35.00000	28.0000	97.00000

Depend.: Methamphetamine - METHOD score	Kruskal-Wallis ANOVA by Ranks; Methamphetamine - METHOD score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =44,68970 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1095.000	32.20588
SCZ	2	35	1606.500	45.90000
MPD	3	28	2051.500	73.26786

Dependent: Methamphetamine - METHOD score	Median Test, Overall Median = 0,00000; Methamphetamine - METHOD score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 45,15521 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	30.0000	21.00000	1.0000	52.00000
expected	18.2268	18.76289	15.0103	
obs.-exp.	11.7732	2.23711	-14.0103	
> Median: observed	4.0000	14.00000	27.0000	45.00000
expected	15.7732	16.23711	12.9897	
obs.-exp.	-11.7732	-2.23711	14.0103	
Total: observed	34.0000	35.00000	28.0000	97.00000

Depend.: Methamphetamine - Total score	Kruskal-Wallis ANOVA by Ranks; Methamphetamine - Total score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =53,00027 p =,0000			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1032.000	30.35294
SCZ	2	35	1553.500	44.38571
MPD	3	28	2167.500	77.41071

Dependent: Methamphetamine - Total score	Median Test, Overall Median = 0,00000; Methamphetamine - Total score (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 45,15521 df = 2 p = ,0000			
	CON	SCZ	MPD	Total
<= Median: observed	30.0000	21.00000	1.0000	52.00000
expected	18.2268	18.76289	15.0103	
obs.-exp.	11.7732	2.23711	-14.0103	
> Median: observed	4.0000	14.00000	27.0000	45.00000
expected	15.7732	16.23711	12.9897	
obs.-exp.	-11.7732	-2.23711	14.0103	
Total: observed	34.0000	35.00000	28.0000	97.00000

Depend.: IFNg (25)pg/ml	Kruskal-Wallis ANOVA by Ranks; IFNg (25)pg/ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 98) =2,202043 p =,3325			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1866.000	54.88235
SCZ	2	36	1744.500	48.45833
MPD	3	28	1240.500	44.30357

Dependent: IFNg (25)pg/ml	Median Test, Overall Median = 6,14500; IFNg (25)pg/ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 4,861811 df = 2 p = ,0880			
	CON	SCZ	MPD	Total
<= Median: observed	12.00000	22.00000	15.00000	49.00000
expected	17.00000	18.00000	14.00000	
obs.-exp.	-5.00000	4.00000	1.00000	
> Median: observed	22.00000	14.00000	13.00000	49.00000
expected	17.00000	18.00000	14.00000	
obs.-exp.	5.00000	-4.00000	-1.00000	
Total: observed	34.00000	36.00000	28.00000	98.00000

Depend.: IL-10 (27)pg/ml	Kruskal-Wallis ANOVA by Ranks; IL-10 (27)pg/ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 98) =1,277386 p =,5280			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1696.500	49.89706
SCZ	2	36	1648.000	45.77778
MPD	3	28	1506.500	53.80357

Dependent: IL-10 (27)pg/ml	Median Test, Overall Median = 2,42000; IL-10 (27)pg/ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 2,161765 df = 2 p = ,3393			
	CON	SCZ	MPD	Total
<= Median: observed	18.0000(	24.0000(	14.0000(	56.0000(
expected	19.42857	20.57143	16.0000(	
obs.-exp.	-1.42857	3.42857	-2.0000(	
> Median: observed	16.0000(	12.0000(	14.0000(	42.0000(
expected	14.5714:	15.42857	12.0000(	
obs.-exp.	1.42857	-3.42857	2.0000(	
Total: observe(	34.0000(	36.0000(	28.0000(	98.0000(

Depend.: IL-1b (46)pg/ml	Kruskal-Wallis ANOVA by Ranks; IL-1b (46)pg/ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 98) =1,157534 p =,5606			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1690.50(	49.7205(
SCZ	2	36	1899.00(	52.7500(
MPD	3	28	1261.50(	45.05357

Dependent: IL-1b (46)pg/ml	Median Test, Overall Median = 1,40500; IL-1b (46)pg/ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 1,042017 df = 2 p = ,5939			
	CON	SCZ	MPD	Total
<= Median: observed	15.0000(	18.0000(	16.0000(	49.0000(
expected	17.0000(	18.0000(	14.0000(	
obs.-exp.	-2.0000(	0.0000(	2.0000(	
> Median: observed	19.0000(	18.0000(	12.0000(	49.0000(
expected	17.0000(	18.0000(	14.0000(	
obs.-exp.	2.0000(	0.0000(	-2.0000(	
Total: observe(	34.0000(	36.0000(	28.0000(	98.0000(

Depend.: IL-8 (63)pg/ml	Kruskal-Wallis ANOVA by Ranks; IL-8 (63)pg/ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 98) =,1795488 p =,9141			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1703.00(	50.0882(
SCZ	2	36	1726.00(	47.9444(
MPD	3	28	1422.00(	50.78571

Dependent: IL-8 (63)pg/ml	Median Test, Overall Median = 7,04500; IL-8 (63)pg/ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = ,2539683 df = 2 p = ,8807			
	CON	SCZ	MPD	Total
<= Median: observed	17.0000(	19.0000(	13.0000(	49.0000(
expected	17.0000(	18.0000(	14.0000(	
obs.-exp.	0.0000(	1.0000(	-1.0000(	
> Median: observed	17.0000(	17.0000(	15.0000(	49.0000(
expected	17.0000(	18.0000(	14.0000(	
obs.-exp.	0.0000(	-1.0000(	1.0000(	
Total: observe(	34.0000(	36.0000(	28.0000(	98.0000(

Depend.: TNFa (75)pg/ml	Kruskal-Wallis ANOVA by Ranks; TNFa (75)pg/ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 98) =,6410628 p =,7258			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1789.00(	52.6176!
SCZ	2	36	1708.50(	47.4583:
MPD	3	28	1353.50(	48.3392(

Dependent: TNFa (75)pg/ml	Median Test, Overall Median = 3,55000; TNFa (75)pg/ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = ,9559744 df = 2 p = ,6200			
	CON	SCZ	MPD	Total
<= Median: observed	16.0000(	21.0000(	14.0000(	51.0000(
expectec	17.6938{	18.7346(	14.5714:	
obs.-exp.	-1.6938{	2.2653]	-0.5714:	
> Median: observed	18.0000(	15.0000(	14.0000(	47.0000(
expectec	16.3061:	17.2653]	13.4285i	
obs.-exp.	1.6938{	-2.2653]	0.5714:	
Total: observe(	34.0000(	36.0000(	28.0000(	98.0000(

Depend.: Left DLPFC NAA	Kruskal-Wallis ANOVA by Ranks; Left DLPFC NAA (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =,3446649 p =,8417			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1728.00(	50.8235:
SCZ	2	36	1689.50(	46.9305(
MPD	3	27	1335.50(	49.4629(

Dependent: Left DLPFC NAA	Median Test, Overall Median = 1,43800; Left DLPFC NAA (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = ,1378535 df = 2 p = ,9334			
	CON	SCZ	MPD	Total
<= Median: observed	17.0000(	19.0000(	13.0000(	49.0000(
expectec	17.1752(	18.1855i	13.6391{	
obs.-exp.	-0.1752(	0.8144:	-0.6391{	
> Median: observed	17.0000(	17.0000(	14.0000(	48.0000(
expectec	16.8247‹	17.8144:	13.3608:	
obs.-exp.	0.1752(	-0.8144:	0.6391{	
Total: observe(	34.0000(	36.0000(	27.0000(	97.0000(

Depend.: Left DLPFC NAA+NAAG	Kruskal-Wallis ANOVA by Ranks; Left DLPFC NAA+NAAG (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =4,416928 p =,1099			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1931.50(	56.8088:
SCZ	2	36	1543.50(	42.8750(
MPD	3	27	1278.00(	47.3333:

Dependent: Left DLPFC NAA+NAAG	Median Test, Overall Median = 1,52900; Left DLPFC NAA+NAAG (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 6,206037 df = 2 p = ,0449			
	CON	SCZ	MPD	Total
<= Median: observed	13.00000	24.00000	12.00000	49.00000
expected	17.17526	18.18557	13.63918	
obs.-exp.	-4.17526	5.81443	-1.63918	
> Median: observed	21.00000	12.00000	15.00000	48.00000
expected	16.82474	17.81443	13.36082	
obs.-exp.	4.17526	-5.81443	1.63918	
Total: observed	34.00000	36.00000	27.00000	97.00000

Depend.: Left DLPFC ml	Kruskal-Wallis ANOVA by Ranks; Left DLPFC ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =1,116239 p =,5723			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1783.000	52.44118
SCZ	2	36	1761.000	48.91667
MPD	3	27	1209.000	44.77778

Dependent: Left DLPFC ml	Median Test, Overall Median = ,944000; Left DLPFC ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 1,952657 df = 2 p = ,3767			
	CON	SCZ	MPD	Total
<= Median: observed	16.00000	17.00000	17.00000	50.00000
expected	17.52577	18.55670	13.91753	
obs.-exp.	-1.52577	-1.55670	3.08247	
> Median: observed	18.00000	19.00000	10.00000	47.00000
expected	16.47423	17.44330	13.08247	
obs.-exp.	1.52577	1.55670	-3.08247	
Total: observed	34.00000	36.00000	27.00000	97.00000

Depend.: Right ACC NAA	Kruskal-Wallis ANOVA by Ranks; Right ACC NAA (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 98) =1,179151 p =,5546			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1661.000	48.85294
SCZ	2	36	1915.500	53.20833
MPD	3	28	1274.500	45.51786

Dependent: Right ACC NAA	Median Test, Overall Median = 1,20400; Right ACC NAA (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = ,2539683 df = 2 p = ,8807			
	CON	SCZ	MPD	Total
<= Median: observed	17.00000	17.00000	15.00000	49.00000
expected	17.00000	18.00000	14.00000	
obs.-exp.	0.00000	-1.00000	1.00000	
> Median: observed	17.00000	19.00000	13.00000	49.00000
expected	17.00000	18.00000	14.00000	
obs.-exp.	0.00000	1.00000	-1.00000	
Total: observed	34.00000	36.00000	28.00000	98.00000

Depend.: Right ACC NAA+NAAG	Code	Valid N	Sum of Ranks	Mean Rank
	Kruskal-Wallis ANOVA by Ranks; Right ACC NAA+NAAG (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 98) =,0326900 p =,9838			
CON	1	34	1697.50(	49.92647
SCZ	2	36	1757.50(	48.81944
MPD	3	28	1396.00(	49.85714

Median Test, Overall Median = 1,28800; Right ACC NAA+NAAG (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Chi-Square = ,2539683 df = 2 p = ,8807

Dependent: Right ACC NAA+NAAG	CON	SCZ	MPD	Total
<= Median: observed	17.0000(	17.0000(	15.0000(	49.0000(
expected	17.0000(	18.0000(	14.0000(	
obs.-exp.	0.0000(	-1.0000(	1.0000(	
> Median: observed	17.0000(	19.0000(	13.0000(	49.0000(
expected	17.0000(	18.0000(	14.0000(	
obs.-exp.	0.0000(	1.0000(	-1.0000(	
Total: observe(	34.0000(	36.0000(	28.0000(	98.0000(

Kruskal-Wallis ANOVA by Ranks; Right ACC ml (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 98) =1,084066 p =,5816

Depend.: Right ACC ml	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1784.50(	52.48529
SCZ	2	36	1805.50(	50.15278
MPD	3	28	1261.00(	45.03571

Median Test, Overall Median = 1,09200; Right ACC ml (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Chi-Square = ,8001867 df = 2 p = ,6703

Dependent: Right ACC ml	CON	SCZ	MPD	Total
<= Median: observed	16.0000(	17.0000(	16.0000(	49.0000(
expected	17.0000(	18.0000(	14.0000(	
obs.-exp.	-1.0000(	-1.0000(	2.0000(	
> Median: observed	18.0000(	19.0000(	12.0000(	49.0000(
expected	17.0000(	18.0000(	14.0000(	
obs.-exp.	1.0000(	1.0000(	-2.0000(	
Total: observe(	34.0000(	36.0000(	28.0000(	98.0000(

Kruskal-Wallis ANOVA by Ranks; Left ACC NAA+NAAG (Spreadsheet Chapter 4)
Independent (grouping) variable: Group
Kruskal-Wallis test: H (2, N= 98) =2,572681 p =,2763

Depend.: Left ACC NAA+NAAG	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1480.50(	43.54412
SCZ	2	36	1956.50(	54.34722
MPD	3	28	1414.00(	50.5000(

Dependent: Left ACC NAA+NAAG	Median Test, Overall Median = 1,31600; Left ACC NAA+NAAG (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 1,646125 df = 2 p = ,4391			
	CON	SCZ	MPD	Total
<= Median: observed	20.0000(	16.0000(	13.0000(	49.0000(
expected	17.0000(	18.0000(	14.0000(	
obs.-exp.	3.0000(	-2.0000(	-1.0000(	
> Median: observed	14.0000(	20.0000(	15.0000(	49.0000(
expected	17.0000(	18.0000(	14.0000(	
obs.-exp.	-3.0000(	2.0000(	1.0000(	
Total: observe(	34.0000(	36.0000(	28.0000(	98.0000(

Depend.: Left ACC ml	Kruskal-Wallis ANOVA by Ranks; Left ACC ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 98) =2,396835 p =,3017			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1572.50(	46.2500(
SCZ	2	36	1992.00(	55.3333(
MPD	3	28	1286.50(	45.9464(

Dependent: Left ACC ml	Median Test, Overall Median = 1,06900; Left ACC ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 2,979458 df = 2 p = ,2254			
	CON	SCZ	MPD	Total
<= Median: observed	20.0000(	14.0000(	15.0000(	49.0000(
expected	17.0000(	18.0000(	14.0000(	
obs.-exp.	3.0000(	-4.0000(	1.0000(	
> Median: observed	14.0000(	22.0000(	13.0000(	49.0000(
expected	17.0000(	18.0000(	14.0000(	
obs.-exp.	-3.0000(	4.0000(	-1.0000(	
Total: observe(	34.0000(	36.0000(	28.0000(	98.0000(

Depend.: Right FWM NAA+NAAG	Kruskal-Wallis ANOVA by Ranks; Right FWM NAA+NAAG (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =,1596190 p =,9233			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1701.50(	50.04412
SCZ	2	36	1711.00(	47.5277ε
MPD	3	27	1340.50(	49.64815

Dependent: Right FWM NAA+NAAG	Median Test, Overall Median = 1,39900; Right FWM NAA+NAAG (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 1,497475 df = 2 p = ,4730			
	CON	SCZ	MPD	Total
<= Median: observed	15.0000(	21.0000(	13.0000(	49.0000(
expected	17.1752ϵ	18.18557	13.6391ε	
obs.-exp.	-2.1752ϵ	2.8144:	-0.6391ε	
> Median: observed	19.0000(	15.0000(	14.0000(	48.0000(
expected	16.8247⁄	17.8144:	13.3608≀	
obs.-exp.	2.1752ϵ	-2.8144:	0.6391ε	
Total: observe(	34.0000(	36.0000(	27.0000(	97.0000(

Depend.: Left FWM NAA	Kruskal-Wallis ANOVA by Ranks; Left FWM NAA (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =3,459297 p =,1773			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1828.500	53.77941
SCZ	2	36	1825.500	50.70833
MPD	3	27	1099.000	40.70370

Dependent: Left FWM NAA	Median Test, Overall Median = 1,31000; Left FWM NAA (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 2,863633 df = 2 p = ,2389			
	CON	SCZ	MPD	Total
<= Median: observed	14.00000	18.00000	17.00000	49.00000
expected	17.17526	18.18557	13.63918	
obs.-exp.	-3.17526	-0.18557	3.36082	
> Median: observed	20.00000	18.00000	10.00000	48.00000
expected	16.82474	17.81443	13.36082	
obs.-exp.	3.17526	0.18557	-3.36082	
Total: observed	34.00000	36.00000	27.00000	97.00000

Depend.: Left FWM ml	Kruskal-Wallis ANOVA by Ranks; Left FWM ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 97) =3,791187 p =,1502			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	34	1895.500	55.75000
SCZ	2	36	1730.500	48.06944
MPD	3	27	1127.000	41.74074

Dependent: Left FWM ml	Median Test, Overall Median = 1,04100; Left FWM ml (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 2,863633 df = 2 p = ,2389			
	CON	SCZ	MPD	Total
<= Median: observed	14.00000	18.00000	17.00000	49.00000
expected	17.17526	18.18557	13.63918	
obs.-exp.	-3.17526	-0.18557	3.36082	
> Median: observed	20.00000	18.00000	10.00000	48.00000
expected	16.82474	17.81443	13.36082	
obs.-exp.	3.17526	0.18557	-3.36082	
Total: observed	34.00000	36.00000	27.00000	97.00000

Depend.: ACC30 NAA abs	Kruskal-Wallis ANOVA by Ranks; ACC30 NAA abs (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 73) =4,323429 p =,1151			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	25	1008.000	40.32000
SCZ	2	27	818.000	30.29630
MPD	3	21	875.000	41.66667

Dependent: ACC30 NAA abs	Median Test, Overall Median = 2,81800; ACC30 NAA abs (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 2,590174 df = 2 p = ,2739			
	CON	SCZ	MPD	Total
<= Median: observed	11.0000(	17.0000(	9.0000(	37.0000(
expected	12.6712:	13.6849:	10.6438<	
obs.-exp.	-1.6712:	3.31507	-1.6438<	
> Median: observed	14.0000(	10.0000(	12.0000(	36.0000(
expected	12.32877	13.31507	10.3561€	
obs.-exp.	1.6712:	-3.31507	1.6438<	
Total: observe(	25.0000(	27.0000(	21.0000(	73.0000(

Depend.: ACC30 ml abs	Kruskal-Wallis ANOVA by Ranks; ACC30 ml abs (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 73) =3,644584 p =,1617			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	25	988.000(	39.5200(
SCZ	2	27	835.000(	30.9259:
MPD	3	21	878.000(	41.8095:

Dependent: ACC30 ml abs	Median Test, Overall Median = 3,96830; ACC30 ml abs (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 4,415701 df = 2 p = ,1099			
	CON	SCZ	MPD	Total
<= Median: observed	10.0000(	18.0000(	9.0000(	37.0000(
expected	12.6712:	13.6849:	10.6438<	
obs.-exp.	-2.6712:	4.31507	-1.6438<	
> Median: observed	15.0000(	9.0000(	12.0000(	36.0000(
expected	12.32877	13.31507	10.3561€	
obs.-exp.	2.6712:	-4.31507	1.6438<	
Total: observe(	25.0000(	27.0000(	21.0000(	73.0000(

Depend.: Thal30 NAA+NAAG abs	Kruskal-Wallis ANOVA by Ranks; Thal30 NAA+NAAG abs (Spreadsheet Chapter 4) Independent (grouping) variable: Group Kruskal-Wallis test: H (2, N= 71) =,8651952 p =,6488			
	Code	Valid N	Sum of Ranks	Mean Rank
CON	1	24	939.000(	39.1250(
SCZ	2	27	916.000(	33.9259:
MPD	3	20	701.000(	35.0500(

Dependent: Thal30 NAA+NAAG abs	Median Test, Overall Median = 3,91080; Thal30 NAA+NAAG abs (Spreadsheet Chapter 4) Independent (grouping) variable: Group Chi-Square = 1,186151 df = 2 p = ,5526			
	CON	SCZ	MPD	Total
<= Median: observed	10.0000(	15.0000(	11.0000(	36.0000(
expected	12.16901	13.6901<	10.1408{	
obs.-exp.	-2.16901	1.3098€	0.8591{	
> Median: observed	14.0000(	12.0000(	9.0000(	35.0000(
expected	11.8309(	13.3098€	9.8591{	
obs.-exp.	2.16901	-1.3098€	-0.8591{	
Total: observe(	24.0000(	27.0000(	20.0000(	71.0000(

	All Groups Spearman Rank Order Correlations (Spreadsheet Chapter 4) MD pairwise deleted Marked correlations are significant at p <,01000			
Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Duration of current diagnosis (years) & Right DLPFC NAA	61	0.077896	0.60016	0.550700
Duration of current diagnosis (years) & Right DLPFC NAA+NAAG	61	0.004167	0.03201	0.974575
Duration of current diagnosis (years) & Right DLPFC ml	61	0.247464	1.96182	0.054506
Duration of current diagnosis (years) & Left DLPFC NAA	61	-0.118756	-0.91868	0.362004
Duration of current diagnosis (years) & Left DLPFC NAA+NAAG	61	-0.050559	-0.38885	0.698788
Duration of current diagnosis (years) & Left DLPFC ml	61	0.080856	0.62310	0.535617
Duration of current diagnosis (years) & Right ACC NAA	62	0.053229	0.41290	0.681154
Duration of current diagnosis (years) & Right ACC NAA+NAAG	62	-0.110074	-0.85784	0.394393
Duration of current diagnosis (years) & Right ACC ml	62	0.031962	0.24770	0.805211
Duration of current diagnosis (years) & Left ACC NAA	62	0.152125	1.19223	0.237863
Duration of current diagnosis (years) & Left ACC NAA+NAAG	62	0.048921	0.37940	0.705734
Duration of current diagnosis (years) & Left ACC ml	62	-0.013586	-0.10524	0.916534
Duration of current diagnosis (years) & Right FWM NAA	61	-0.074239	-0.57182	0.569619
Duration of current diagnosis (years) & Right FWM NAA+NAAG	61	0.014345	0.11020	0.912626
Duration of current diagnosis (years) & Right FWM ml	61	0.088502	0.68247	0.497611
Duration of current diagnosis (years) & Left FWM NAA	61	0.281905	2.25689	0.027732
Duration of current diagnosis (years) & Left FWM NAA+NAAG	61	0.283811	2.27348	0.026652
Duration of current diagnosis (years) & Left FWM ml	61	0.136854	1.06118	0.292932
Duration of current diagnosis (months) & Right DLPFC NAA	22	-0.060797	-0.27239	0.788111
Duration of current diagnosis (months) & Right DLPFC NAA+NAAG	22	-0.155117	-0.70220	0.490645
Duration of current diagnosis (months) & Right DLPFC ml	22	0.252846	1.16874	0.256252
Duration of current diagnosis (months) & Left DLPFC NAA	22	-0.340348	-1.61872	0.121170
Duration of current diagnosis (months) & Left DLPFC NAA+NAAG	22	-0.412508	-2.02512	0.056410
Duration of current diagnosis (months) & Left DLPFC ml	22	-0.045455	-0.20349	0.840806
Duration of current diagnosis (months) & Right ACC NAA	22	0.322165	1.52191	0.143686
Duration of current diagnosis (months) & Right ACC NAA+NAAG	22	0.062501	0.28006	0.782307
Duration of current diagnosis (months) & Right ACC ml	22	-0.021591	-0.09658	0.924020
Duration of current diagnosis (months) & Left ACC NAA	22	0.293555	1.37332	0.184854
Duration of current diagnosis (months) & Left ACC NAA+NAAG	22	-0.040910	-0.18311	0.856557
Duration of current diagnosis (months) & Left ACC ml	22	0.034660	0.15510	0.878300
Duration of current diagnosis (months) & Right FWM NAA	22	0.105684	0.47529	0.639727
Duration of current diagnosis (months) & Right FWM NAA+NAAG	22	0.168753	0.76567	0.452815
Duration of current diagnosis (months) & Right FWM ml	22	0.130153	0.58706	0.563736
Duration of current diagnosis (months) & Left FWM NAA	22	0.315525	1.48703	0.152602
Duration of current diagnosis (months) & Left FWM NAA+NAAG	22	0.134094	0.60515	0.551885
Duration of current diagnosis (months) & Left FWM ml	22	0.465350	2.35120	0.029078
Number of psychotic episodes & Right DLPFC NAA	63	0.200958	1.60222	0.114274
Number of psychotic episodes & Right DLPFC NAA+NAAG	63	0.123610	0.97289	0.334451
Number of psychotic episodes & Right DLPFC ml	63	0.102236	0.80269	0.425270
Number of psychotic episodes & Left DLPFC NAA	63	-0.002223	-0.01736	0.986202
Number of psychotic episodes & Left DLPFC NAA+NAAG	63	0.074339	0.58222	0.562567
Number of psychotic episodes & Left DLPFC ml	63	0.020169	0.15756	0.875323
Number of psychotic episodes & Right ACC NAA	64	0.090544	0.71588	0.476751
Number of psychotic episodes & Right ACC NAA+NAAG	64	0.250990	2.04165	0.045447
Number of psychotic episodes & Right ACC ml	64	-0.066423	-0.52417	0.602028
Number of psychotic episodes & Left ACC NAA	64	0.306595	2.53628	0.013737
Number of psychotic episodes & Left ACC NAA+NAAG	64	0.248884	2.02338	0.047350
Number of psychotic episodes & Left ACC ml	64	0.071857	0.56727	0.572579
Number of psychotic episodes & Right FWM NAA	63	-0.072035	-0.56407	0.574772
Number of psychotic episodes & Right FWM NAA+NAAG	63	-0.051542	-0.40309	0.688293
Number of psychotic episodes & Right FWM ml	63	-0.013168	-0.10286	0.918415
Number of psychotic episodes & Left FWM NAA	63	0.192715	1.53391	0.130223
Number of psychotic episodes & Left FWM NAA+NAAG	63	0.095811	0.75177	0.455081
Number of psychotic episodes & Left FWM ml	63	0.086500	0.67813	0.500253
Onset of Meth use (age in years) & Right DLPFC NAA	42	-0.074836	-0.47463	0.637629
Onset of Meth use (age in years) & Right DLPFC NAA+NAAG	42	-0.111075	-0.70688	0.483741
Onset of Meth use (age in years) & Right DLPFC ml	42	0.081170	0.51507	0.609342
Onset of Meth use (age in years) & Left DLPFC NAA	42	-0.094089	-0.59772	0.553393
Onset of Meth use (age in years) & Left DLPFC NAA+NAAG	42	-0.126671	-0.80764	0.424072
Onset of Meth use (age in years) & Left DLPFC ml	42	0.005363	0.03392	0.973110
Onset of Meth use (age in years) & Right ACC NAA	43	-0.203870	-1.33341	0.189759
Onset of Meth use (age in years) & Right ACC NAA+NAAG	43	-0.215530	-1.41328	0.165120
Onset of Meth use (age in years) & Right ACC ml	43	-0.101617	-0.65405	0.516730
Onset of Meth use (age in years) & Left ACC NAA	43	-0.007572	-0.04849	0.961564
Onset of Meth use (age in years) & Left ACC NAA+NAAG	43	-0.181079	-1.17896	0.245211
Onset of Meth use (age in years) & Left ACC ml	43	0.142993	0.92511	0.360323
Onset of Meth use (age in years) & Right FWM NAA	42	-0.070245	-0.44537	0.658455
Onset of Meth use (age in years) & Right FWM NAA+NAAG	42	-0.046801	-0.29632	0.768519
Onset of Meth use (age in years) & Right FWM ml	42	-0.159875	-1.02432	0.311841
Onset of Meth use (age in years) & Left FWM NAA	42	0.013285	0.08403	0.933452
Onset of Meth use (age in years) & Left FWM NAA+NAAG	42	-0.079058	-0.50158	0.618716
Onset of Meth use (age in years) & Left FWM ml	42	-0.184360	-1.18633	0.242491
Duration of meth use (months) & Right DLPFC NAA	41	-0.015794	-0.09865	0.921924
Duration of meth use (months) & Right DLPFC NAA+NAAG	41	-0.000436	-0.00272	0.997840
Duration of meth use (months) & Right DLPFC ml	41	-0.025828	-0.16135	0.872652
Duration of meth use (months) & Left DLPFC NAA	41	0.061516	0.38489	0.702407
Duration of meth use (months) & Left DLPFC NAA+NAAG	41	0.098949	0.62098	0.538224
Duration of meth use (months) & Left DLPFC ml	41	0.076400	0.47851	0.634956
Duration of meth use (months) & Right ACC NAA	42	0.207338	1.34045	0.187664
Duration of meth use (months) & Right ACC NAA+NAAG	42	0.190293	1.22592	0.227398
Duration of meth use (months) & Right ACC ml	42	0.081291	0.51583	0.608810
Duration of meth use (months) & Left ACC NAA	42	-0.043141	-0.27310	0.786179
Duration of meth use (months) & Left ACC NAA+NAAG	42	0.175764	1.12921	0.265536
Duration of meth use (months) & Left ACC ml	42	-0.141025	-0.90093	0.373020
Duration of meth use (months) & Right FWM NAA	41	0.027531	0.17199	0.864332
Duration of meth use (months) & Right FWM NAA+NAAG	41	0.115266	0.72466	0.472984
Duration of meth use (months) & Right FWM ml	41	0.084690	0.53079	0.598572
Duration of meth use (months) & Left FWM NAA	41	-0.063700	-0.39862	0.692351
Duration of meth use (months) & Left FWM NAA+NAAG	41	-0.068671	-0.42986	0.669661
Duration of meth use (months) & Left FWM ml	41	-0.026613	-0.16626	0.868813
Duration of methamphetamine abstinence (clinical day) (months) & Right DLPFC NAA	41	0.230068	1.47638	0.147872
Duration of methamphetamine abstinence (clinical day) (months) & Right DLPFC NAA+NAAG	41	0.124427	0.78313	0.438279
Duration of methamphetamine abstinence (clinical day) (months) & Right DLPFC ml	41	0.167235	1.05930	0.295979
Duration of methamphetamine abstinence (clinical day) (months) & Left DLPFC NAA	41	-0.054609	-0.34154	0.734527
Duration of methamphetamine abstinence (clinical day) (months) & Left DLPFC NAA+NAAG	41	-0.119529	-0.75185	0.456657
Duration of methamphetamine abstinence (clinical day) (months) & Left DLPFC ml	41	0.026652	0.16650	0.868625
Duration of methamphetamine abstinence (clinical day) (months) & Right ACC NAA	42	-0.306108	-2.03362	0.048661
Duration of methamphetamine abstinence (clinical day) (months) & Right ACC NAA+NAAG	42	-0.222147	-1.44099	0.157371
Duration of methamphetamine abstinence (clinical day) (months) & Right ACC ml	42	-0.061916	-0.39234	0.696888
Duration of methamphetamine abstinence (clinical day) (months) & Left ACC NAA	42	-0.145514	-0.93021	0.357841
Duration of methamphetamine abstinence (clinical day) (months) & Left ACC NAA+NAAG	42	-0.246798	-1.61072	0.115106
Duration of methamphetamine abstinence (clinical day) (months) & Left ACC ml	42	-0.073913	-0.46875	0.641792
Duration of methamphetamine abstinence (clinical day) (months) & Right FWM NAA	41	0.030843	0.19271	0.848188
Duration of methamphetamine abstinence (clinical day) (months) & Right FWM NAA+NAAG	41	-0.060551	-0.37883	0.706866
Duration of methamphetamine abstinence (clinical day) (months) & Right FWM ml	41	-0.140636	-0.88709	0.380470
Duration of methamphetamine abstinence (clinical day) (months) & Left FWM NAA	41	0.105199	0.66063	0.512730
Duration of methamphetamine abstinence (clinical day) (months) & Left FWM NAA+NAAG	41	0.145916	0.92110	0.362660
Duration of methamphetamine abstinence (clinical day) (months) & Left FWM ml	41	0.007689	0.04802	0.961946
cpzeq(HT) & Right DLPFC NAA	60	0.144888	1.11520	0.269362
cpzeq(HT) & Right DLPFC NAA+NAAG	60	0.087120	0.66602	0.508040
cpzeq(HT) & Right DLPFC ml	60	0.095293	0.72905	0.468906
cpzeq(HT) & Left DLPFC NAA	60	-0.126429	-0.97064	0.335756
cpzeq(HT) & Left DLPFC NAA+NAAG	60	-0.078690	-0.60115	0.550083
cpzeq(HT) & Left DLPFC ml	60	-0.075511	-0.57672	0.566358
cpzeq(HT) & Right ACC NAA	61	0.314816	2.54769	0.013470
cpzeq(HT) & Right ACC NAA+NAAG	61	0.231444	1.82737	0.072702
cpzeq(HT) & Right ACC ml	61	0.024031	0.18464	0.854148
cpzeq(HT) & Left ACC NAA	61	0.425636	3.61298	0.000627
cpzeq(HT) & Left ACC NAA+NAAG	61	0.240105	1.89986	0.062342
cpzeq(HT) & Left ACC ml	61	0.185217	1.44773	0.152986
cpzeq(HT) & Right FWM NAA	60	-0.103485	-0.79237	0.431375
cpzeq(HT) & Right FWM NAA+NAAG	60	-0.131916	-1.01350	0.315030

All Groups
Spearman Rank Order Correlations (Spreadsheet Ch
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Duration of current diagnosis (years) & ACC30 NAA+NAAG abs	46	0.008231	0.05460	0.956705
Duration of current diagnosis (years) & ACC30 ml abs	46	-0.023455	-0.15562	0.877042
Duration of current diagnosis (years) & ACC30 NAA rel	46	0.020949	0.13899	0.890093
Duration of current diagnosis (years) & ACC30 NAA+NAAG rel	46	0.060125	0.39955	0.691421
Duration of current diagnosis (years) & ACC30 ml rel	46	0.104225	0.69513	0.490626
Duration of current diagnosis (years) & Thal30 NAA abs	35	-0.037646	-0.21641	0.829998
Duration of current diagnosis (years) & Thal30 NAA+NAAG abs	45	-0.138320	-0.91583	0.364866
Duration of current diagnosis (years) & Thal30 ml abs	44	-0.025527	-0.16549	0.869354
Duration of current diagnosis (months) & ACC30 NAA abs	15	-0.166075	-0.60722	0.554161
Duration of current diagnosis (months) & ACC30 NAA+NAAG abs	15	-0.194957	-0.71668	0.486248
Duration of current diagnosis (months) & ACC30 ml abs	15	-0.342980	-1.31649	0.210749
Duration of current diagnosis (months) & Thal30 NAA abs	14	0.322969	1.18215	0.260042
Duration of current diagnosis (months) & Thal30 NAA+NAAG abs	15	-0.092063	-0.33335	0.744182
Duration of current diagnosis (months) & Thal30 ml abs	15	0.117335	0.42600	0.677075
Number of psychotic episodes & ACC30 NAA abs	48	0.109937	0.75018	0.456967
Number of psychotic episodes & ACC30 NAA+NAAG abs	48	0.113428	0.77431	0.442712
Number of psychotic episodes & ACC30 ml abs	48	-0.038013	-0.25800	0.797557
Number of psychotic episodes & Thal30 NAA abs	37	0.022643	0.13399	0.894176
Number of psychotic episodes & Thal30 NAA+NAAG abs	47	-0.059403	-0.39919	0.691641
Number of psychotic episodes & Thal30 ml abs	46	0.094313	0.62840	0.532990
Onset of Meth use (age in years) & ACC30 NAA abs	33	-0.025645	-0.14283	0.887345
Onset of Meth use (age in years) & ACC30 NAA+NAAG abs	33	-0.060677	-0.33846	0.737297
Onset of Meth use (age in years) & ACC30 ml abs	33	0.000335	0.00187	0.998523
Onset of Meth use (age in years) & Thal30 NAA abs	27	0.164931	0.83611	0.411016
Onset of Meth use (age in years) & Thal30 NAA+NAAG abs	32	0.186834	1.04168	0.305884
Onset of Meth use (age in years) & Thal30 ml abs	31	0.227371	1.25736	0.218655
Duration of meth use (months) & ACC30 NAA abs	32	0.238796	1.34690	0.188099
Duration of meth use (months) & ACC30 NAA+NAAG abs	32	0.256246	1.45200	0.156881
Duration of meth use (months) & ACC30 ml abs	32	0.180934	1.00764	0.321684
Duration of meth use (months) & Thal30 NAA abs	26	-0.106544	-0.52494	0.604439
Duration of meth use (months) & Thal30 NAA+NAAG abs	31	-0.277054	-1.55277	0.131325
Duration of meth use (months) & Thal30 ml abs	30	-0.286511	-1.58242	0.124786
Duration of methamphetamine abstinence (clinical day) (months) & ACC30 NAA abs	32	-0.318184	-1.83831	0.075937
Duration of methamphetamine abstinence (clinical day) (months) & ACC30 NAA+NAAG abs	32	-0.352046	-2.06012	0.048154
Duration of methamphetamine abstinence (clinical day) (months) & ACC30 ml abs	32	-0.234268	-1.31987	0.196863
Duration of methamphetamine abstinence (clinical day) (months) & Thal30 NAA abs	26	0.047399	0.23247	0.818146
Duration of methamphetamine abstinence (clinical day) (months) & Thal30 NAA+NAAG abs	31	0.133051	0.72293	0.475514
Duration of methamphetamine abstinence (clinical day) (months) & Thal30 ml abs	30	0.172797	0.92832	0.361175
cpzeq(HT) & ACC30 NAA abs	45	-0.089875	-0.59175	0.557118
cpzeq(HT) & ACC30 NAA+NAAG abs	45	-0.068061	-0.44734	0.656872
cpzeq(HT) & ACC30 ml abs	45	-0.086922	-0.57215	0.570198
cpzeq(HT) & Thal30 NAA abs	34	-0.056143	-0.31810	0.752479
cpzeq(HT) & Thal30 NAA+NAAG abs	44	-0.173502	-1.14174	0.260030
cpzeq(HT) & Thal30 ml abs	43	0.104332	0.67171	0.505533
Years of education - School (years) & ACC30 NAA abs	73	0.024705	0.20823	0.835646
Years of education - School (years) & ACC30 NAA+NAAG abs	73	0.022747	0.19172	0.848509
Years of education - School (years) & ACC30 ml abs	73	0.098919	0.83761	0.405059
Years of education - School (years) & Thal30 NAA abs	58	0.075698	0.56810	0.572237
Years of education - School (years) & Thal30 NAA+NAAG abs	71	0.186309	1.57518	0.119790
Years of education - School (years) & Thal30 ml abs	70	0.351367	3.09478	0.002859
Years of education - Post school (years) & ACC30 NAA abs	73	0.024103	0.20316	0.839593
Years of education - Post school (years) & ACC30 NAA+NAAG abs	73	0.012642	0.10653	0.915462
Years of education - Post school (years) & ACC30 ml abs	73	0.079611	0.67295	0.503162
Years of education - Post school (years) & Thal30 NAA abs	58	0.094124	0.70750	0.482188
Years of education - Post school (years) & Thal30 NAA+NAAG abs	71	0.025551	0.21231	0.832488
Years of education - Post school (years) & Thal30 ml abs	70	0.063399	0.52386	0.602081
Age on day & ACC30 NAA abs	73	0.035766	0.30156	0.763870
Age on day & ACC30 NAA+NAAG abs	73	0.055436	0.46783	0.641339
Age on day & ACC30 ml abs	73	0.101385	0.85871	0.393391
Age on day & Thal30 NAA abs	58	0.213585	1.63608	0.107432
Age on day & Thal30 NAA+NAAG abs	71	0.049271	0.40977	0.683241
Age on day & Thal30 ml abs	70	0.201390	1.69544	0.094567

All Groups
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
PANSS positive score & Right DLPFC NAA	95	-0.001880	-0.01813	0.985572
PANSS positive score & Right DLPFC NAA+NAAG	95	-0.068654	-0.66364	0.508560
PANSS positive score & Right DLPFC mI	95	-0.155022	-1.51328	0.133600
PANSS positive score & Left DLPFC NAA	95	0.018110	0.17468	0.861714
PANSS positive score & Left DLPFC NAA+NAAG	95	-0.092157	-0.89253	0.374414
PANSS positive score & Left DLPFC mI	95	-0.047035	-0.45409	0.650819
PANSS positive score & Right ACC NAA	96	0.130753	1.27867	0.204160
PANSS positive score & Right ACC NAA+NAAG	96	0.142003	1.39086	0.167551
PANSS positive score & Right ACC mI	96	-0.077923	-0.75779	0.450469
PANSS positive score & Left ACC NAA	96	0.231695	2.30921	0.023122
PANSS positive score & Left ACC NAA+NAAG	96	0.262839	2.64119	0.009676
PANSS positive score & Left ACC mI	96	0.077784	0.75644	0.451278
PANSS positive score & Right FWM NAA	95	-0.130465	-1.26901	0.207605
PANSS positive score & Right FWM NAA+NAAG	95	-0.009307	-0.08975	0.928677
PANSS positive score & Right FWM mI	95	-0.100254	-0.97171	0.333716
PANSS positive score & Left FWM NAA	95	-0.025409	-0.24512	0.806905
PANSS positive score & Left FWM NAA+NAAG	95	-0.061607	-0.59525	0.553121
PANSS positive score & Left FWM mI	95	-0.192080	-1.88750	0.062212
PANSS negative score & Right DLPFC NAA	95	-0.121874	-1.18413	0.239378
PANSS negative score & Right DLPFC NAA+NAAG	95	-0.188626	-1.85230	0.067155
PANSS negative score & Right DLPFC mI	95	-0.029498	-0.28459	0.776590
PANSS negative score & Left DLPFC NAA	95	-0.151729	-1.48036	0.142158
PANSS negative score & Left DLPFC NAA+NAAG	95	-0.196906	-1.93681	0.055804
PANSS negative score & Left DLPFC mI	95	0.001983	0.01913	0.984781
PANSS negative score & Right ACC NAA	96	0.104197	1.01575	0.312355
PANSS negative score & Right ACC NAA+NAAG	96	0.056200	0.54575	0.586533
PANSS negative score & Right ACC mI	96	-0.036672	-0.35578	0.722800
PANSS negative score & Left ACC NAA	96	0.184264	1.81763	0.072307
PANSS negative score & Left ACC NAA+NAAG	96	0.149659	1.46752	0.145572
PANSS negative score & Left ACC mI	96	0.064657	0.62819	0.531405
PANSS negative score & Right FWM NAA	95	-0.070565	-0.68220	0.496807
PANSS negative score & Right FWM NAA+NAAG	95	-0.092124	-0.89221	0.374585
PANSS negative score & Right FWM mI	95	-0.029728	-0.28681	0.774895
PANSS negative score & Left FWM NAA	95	0.033578	0.32400	0.746665
PANSS negative score & Left FWM NAA+NAAG	95	-0.058722	-0.56727	0.571897
PANSS negative score & Left FWM mI	95	-0.076374	-0.73868	0.461961
PANSS general psychopathology score & Right DLPFC NAA	95	-0.023451	-0.22621	0.821534
PANSS general psychopathology score & Right DLPFC NAA+NAAG	95	-0.065337	-0.63143	0.529307
PANSS general psychopathology score & Right DLPFC mI	95	-0.124582	-1.21086	0.229018
PANSS general psychopathology score & Left DLPFC NAA	95	-0.053789	-0.51947	0.604667
PANSS general psychopathology score & Left DLPFC NAA+NAAG	95	-0.049681	-0.47970	0.632567
PANSS general psychopathology score & Left DLPFC mI	95	-0.018779	-0.18113	0.856658
PANSS general psychopathology score & Right ACC NAA	96	0.085981	0.83671	0.404875
PANSS general psychopathology score & Right ACC NAA+NAAG	96	0.110792	1.08082	0.282542
PANSS general psychopathology score & Right ACC mI	96	-0.031802	-0.30849	0.758392
PANSS general psychopathology score & Left ACC NAA	96	0.149509	1.46602	0.145980
PANSS general psychopathology score & Left ACC NAA+NAAG	96	0.192912	1.90616	0.059684
PANSS general psychopathology score & Left ACC mI	96	0.139624	1.36709	0.174857
PANSS general psychopathology score & Right FWM NAA	95	-0.088019	-0.85214	0.396328
PANSS general psychopathology score & Right FWM NAA+NAAG	95	-0.033209	-0.32043	0.749359
PANSS general psychopathology score & Right FWM mI	95	-0.027160	-0.26202	0.793887
PANSS general psychopathology score & Left FWM NAA	95	0.042502	0.41024	0.682571
PANSS general psychopathology score & Left FWM NAA+NAAG	95	0.002535	0.02444	0.980552
PANSS general psychopathology score & Left FWM mI	95	-0.107411	-1.04186	0.300178
PANSS total score & Right DLPFC NAA	95	-0.070605	-0.68260	0.496559
PANSS total score & Right DLPFC NAA+NAAG	95	-0.135971	-1.32355	0.188897
PANSS total score & Right DLPFC mI	95	-0.106407	-1.03201	0.304742
PANSS total score & Left DLPFC NAA	95	-0.111194	-1.07901	0.283374
PANSS total score & Left DLPFC NAA+NAAG	95	-0.154166	-1.50471	0.135786
PANSS total score & Left DLPFC mI	95	-0.033752	-0.32568	0.745397
PANSS total score & Right ACC NAA	96	0.123100	1.20265	0.232132
PANSS total score & Right ACC NAA+NAAG	96	0.090046	0.87659	0.382944
PANSS total score & Right ACC mI	96	-0.057461	-0.55803	0.578149
PANSS total score & Left ACC NAA	96	0.191734	1.89407	0.061290
PANSS total score & Left ACC NAA+NAAG	96	0.208672	2.06869	0.041321
PANSS total score & Left ACC mI	96	0.088493	0.86135	0.391239
PANSS total score & Right FWM NAA	95	-0.109681	-1.06414	0.290019
PANSS total score & Right FWM NAA+NAAG	95	-0.056004	-0.54093	0.589846
PANSS total score & Right FWM mI	95	-0.039343	-0.37970	0.705034
PANSS total score & Left FWM NAA	95	0.004692	0.04525	0.964007
PANSS total score & Left FWM NAA+NAAG	95	-0.042841	-0.41353	0.680173
PANSS total score & Left FWM mI	95	-0.127326	-1.23797	0.218845
CGI score & Right DLPFC NAA	96	-0.102409	-0.99814	0.320776
CGI score & Right DLPFC NAA+NAAG	96	-0.184824	-1.82335	0.071429
CGI score & Right DLPFC mI	96	-0.038040	-0.36907	0.712902
CGI score & Left DLPFC NAA	96	-0.072858	-0.70827	0.480531
CGI score & Left DLPFC NAA+NAAG	96	-0.194264	-1.92004	0.057885
CGI score & Left DLPFC mI	96	-0.034104	-0.33085	0.741498
CGI score & Right ACC NAA	97	0.131899	1.29692	0.197800
CGI score & Right ACC NAA+NAAG	97	0.058801	0.57412	0.567245
CGI score & Right ACC mI	97	-0.108045	-1.05930	0.292150
CGI score & Left ACC NAA	97	0.217446	2.17135	0.032395
CGI score & Left ACC NAA+NAAG	97	0.212841	2.12316	0.036339
CGI score & Left ACC mI	97	0.063134	0.61658	0.538986
CGI score & Right FWM NAA	96	-0.093940	-0.91482	0.362625
CGI score & Right FWM NAA+NAAG	96	-0.042526	-0.41268	0.680781
CGI score & Right FWM mI	96	0.013015	0.12619	0.899849
CGI score & Left FWM NAA	96	-0.032021	-0.31061	0.756783
CGI score & Left FWM NAA+NAAG	96	-0.099918	-0.97362	0.332746
CGI score & Left FWM mI	96	-0.162117	-1.59286	0.114550
GAF score & Right DLPFC NAA	96	0.090923	0.88519	0.378311
GAF score & Right DLPFC NAA+NAAG	96	0.168904	1.66145	0.099954
GAF score & Right DLPFC mI	96	0.092916	0.90477	0.367903
GAF score & Left DLPFC NAA	96	0.081990	0.79761	0.427110
GAF score & Left DLPFC NAA+NAAG	96	0.158404	1.55542	0.123206
GAF score & Left DLPFC mI	96	0.104735	1.02106	0.309848
GAF score & Right ACC NAA	97	-0.157034	-1.54981	0.124512
GAF score & Right ACC NAA+NAAG	97	-0.095667	-0.93675	0.351265
GAF score & Right ACC mI	97	0.102385	1.00320	0.318314
GAF score & Left ACC NAA	97	-0.214877	-2.14445	0.034548
GAF score & Left ACC NAA+NAAG	97	-0.271481	-2.74933	0.007149
GAF score & Left ACC mI	97	-0.035242	-0.34371	0.731827
GAF score & Right FWM NAA	96	0.084682	0.82399	0.412034
GAF score & Right FWM NAA+NAAG	96	0.007768	0.07531	0.940124
GAF score & Right FWM mI	96	0.002367	0.02295	0.981741
GAF score & Left FWM NAA	96	-0.042123	-0.40876	0.683645
GAF score & Left FWM NAA+NAAG	96	0.017978	0.17433	0.861983
GAF score & Left FWM mI	96	0.153395	1.50504	0.135668
Height (metres) & Right DLPFC NAA	97	0.103431	1.01355	0.313371
Height (metres) & Right DLPFC NAA+NAAG	97	0.086754	0.84878	0.398139
Height (metres) & Right DLPFC mI	97	-0.075373	-0.73674	0.463096
Height (metres) & Left DLPFC NAA	97	0.067134	0.65582	0.513523
Height (metres) & Left DLPFC NAA+NAAG	97	0.082007	0.80201	0.424551
Height (metres) & Left DLPFC mI	97	-0.017308	-0.16872	0.866377
Height (metres) & Right ACC NAA	98	-0.014381	-0.14092	0.888232
Height (metres) & Right ACC NAA+NAAG	98	0.034347	0.33673	0.737056
Height (metres) & Right ACC mI	98	-0.095656	-0.94155	0.348787
Height (metres) & Left ACC NAA	98	-0.015686	-0.15371	0.878163
Height (metres) & Left ACC NAA+NAAG	98	0.042948	0.42119	0.674560
Height (metres) & Left ACC mI	98	-0.103799	-1.02254	0.309095
Height (metres) & Right FWM NAA	97	-0.109019	-1.06896	0.287797
Height (metres) & Right FWM NAA+NAAG	97	-0.028016	-0.27317	0.785313

All Groups
Spearman Rank Order Correlations (Spreadsheet Chapte
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
PANSS positive score & ACC30 NAA abs	71	0.030045	0.24969	0.803572
PANSS positive score & ACC30 NAA+NAAG abs	71	0.020024	0.16637	0.868355
PANSS positive score & ACC30 ml abs	71	-0.047599	-0.39583	0.693449
PANSS positive score & Thal30 NAA abs	57	-0.204511	-1.54944	0.127011
PANSS positive score & Thal30 NAA+NAAG abs	69	-0.127380	-1.05121	0.296938
PANSS positive score & Thal30 ml abs	68	-0.219666	-1.82925	0.071879
PANSS negative score & ACC30 NAA abs	71	-0.024394	-0.20269	0.839973
PANSS negative score & ACC30 NAA+NAAG abs	71	-0.022265	-0.18499	0.853777
PANSS negative score & ACC30 ml abs	71	-0.084192	-0.70184	0.485138
PANSS negative score & Thal30 NAA abs	57	-0.079820	-0.59386	0.555042
PANSS negative score & Thal30 NAA+NAAG abs	69	-0.097372	-0.80083	0.426063
PANSS negative score & Thal30 ml abs	68	-0.170228	-1.40342	0.165179
PANSS general psychopathology score & ACC30 NAA abs	71	0.024203	0.20110	0.841209
PANSS general psychopathology score & ACC30 NAA+NAAG abs	71	0.013870	0.11522	0.908603
PANSS general psychopathology score & ACC30 ml abs	71	-0.025503	-0.21192	0.832798
PANSS general psychopathology score & Thal30 NAA abs	57	-0.241470	-1.84540	0.070366
PANSS general psychopathology score & Thal30 NAA+NAAG abs	69	-0.118640	-0.97802	0.331585
PANSS general psychopathology score & Thal30 ml abs	68	-0.202636	-1.68110	0.097471
PANSS total score & ACC30 NAA abs	71	-0.016434	-0.13653	0.891803
PANSS total score & ACC30 NAA+NAAG abs	71	-0.026246	-0.21809	0.828002
PANSS total score & ACC30 ml abs	71	-0.076690	-0.63892	0.524992
PANSS total score & Thal30 NAA abs	57	-0.215613	-1.63754	0.107226
PANSS total score & Thal30 NAA+NAAG abs	69	-0.170917	-1.41991	0.160271
PANSS total score & Thal30 ml abs	68	-0.253045	-2.12490	0.037344
CGI score & ACC30 NAA abs	72	-0.078204	-0.65631	0.513773
CGI score & ACC30 NAA+NAAG abs	72	-0.081298	-0.68245	0.497207
CGI score & ACC30 ml abs	72	-0.100265	-0.84313	0.402030
CGI score & Thal30 NAA abs	57	-0.212698	-1.61435	0.112174
CGI score & Thal30 NAA+NAAG abs	70	-0.211721	-1.78640	0.078493
CGI score & Thal30 ml abs	69	-0.314275	-2.70975	0.008542
GAF score & ACC30 NAA abs	72	0.027463	0.22986	0.818873
GAF score & ACC30 NAA+NAAG abs	72	0.033618	0.28143	0.779214
GAF score & ACC30 ml abs	72	0.075587	0.63422	0.528002
GAF score & Thal30 NAA abs	57	0.164038	1.23324	0.222731
GAF score & Thal30 NAA+NAAG abs	70	0.186977	1.56953	0.121167
GAF score & Thal30 ml abs	69	0.251844	2.13009	0.036840
Height (metres) & ACC30 NAA abs	73	-0.190212	-1.63256	0.106990
Height (metres) & ACC30 NAA+NAAG abs	73	-0.188220	-1.61483	0.110784
Height (metres) & ACC30 ml abs	73	-0.096882	-0.82020	0.414849
Height (metres) & Thal30 NAA abs	58	-0.171778	-1.30486	0.197276
Height (metres) & Thal30 NAA+NAAG abs	71	-0.027912	-0.23194	0.817268
Height (metres) & Thal30 ml abs	70	-0.070553	-0.58325	0.561655
Weight (kg) & ACC30 NAA abs	73	-0.118015	-1.00141	0.320027
Weight (kg) & ACC30 NAA+NAAG abs	73	-0.071180	-0.60129	0.549559
Weight (kg) & ACC30 ml abs	73	-0.006448	-0.05434	0.956820
Weight (kg) & Thal30 NAA abs	58	0.264608	2.05333	0.044722
Weight (kg) & Thal30 NAA+NAAG abs	71	0.392213	3.54175	0.000717
Weight (kg) & Thal30 ml abs	70	0.411471	3.72283	0.000402

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
	All Groups Spearman Rank Order Correlations (Spreadsheet Chapter 4) MD pairwise deleted Marked correlations are significant at p <,01000			
Alcohol life time - Frequency score & Right DLPFC NAA	93	-0.038033	-0.36307	0.717391
Alcohol life time - Frequency score & Right DLPFC NAA+NAAG	93	-0.049182	-0.46974	0.639666
Alcohol life time - Frequency score & Right DLPFC ml	93	0.035833	0.34205	0.733105
Alcohol life time - Frequency score & Left DLPFC NAA	93	-0.060902	-0.58205	0.561971
Alcohol life time - Frequency score & Left DLPFC NAA+NAAG	93	-0.011642	-0.11106	0.911810
Alcohol life time - Frequency score & Left DLPFC ml	93	-0.205055	-1.99857	0.048640
Alcohol life time - Frequency score & Right ACC NAA	94	-0.141132	-1.36738	0.174838
Alcohol life time - Frequency score & Right ACC NAA+NAAG	94	-0.133977	-1.29675	0.197960
Alcohol life time - Frequency score & Right ACC ml	94	-0.153487	-1.48985	0.139685
Alcohol life time - Frequency score & Left ACC NAA	94	-0.051061	-0.49040	0.625017
Alcohol life time - Frequency score & Left ACC NAA+NAAG	94	-0.084875	-0.81704	0.416014
Alcohol life time - Frequency score & Left ACC ml	94	-0.066795	-0.64211	0.522397
Alcohol life time - Frequency score & Right FWM NAA	93	-0.173789	-1.68346	0.095714
Alcohol life time - Frequency score & Right FWM NAA+NAAG	93	-0.166097	-1.60678	0.111567
Alcohol life time - Frequency score & Right FWM ml	93	-0.192360	-1.86992	0.064710
Alcohol life time - Frequency score & Left FWM NAA	93	-0.003181	-0.03035	0.975857
Alcohol life time - Frequency score & Left FWM NAA+NAAG	93	-0.071146	-0.68042	0.497968
Alcohol life time - Frequency score & Left FWM ml	93	-0.178073	-1.72630	0.087687
Alcohol life time - Duration score & Right DLPFC NAA	95	0.044784	0.43232	0.666512
Alcohol life time - Duration score & Right DLPFC NAA+NAAG	95	-0.017319	-0.16704	0.867702
Alcohol life time - Duration score & Right DLPFC ml	95	0.024272	0.23414	0.815388
Alcohol life time - Duration score & Left DLPFC NAA	95	0.062225	0.60124	0.549143
Alcohol life time - Duration score & Left DLPFC NAA+NAAG	95	0.096873	0.93862	0.350355
Alcohol life time - Duration score & Left DLPFC ml	95	-0.016051	-0.15481	0.877305
Alcohol life time - Duration score & Right ACC NAA	96	-0.132303	-1.29410	0.198802
Alcohol life time - Duration score & Right ACC NAA+NAAG	96	-0.129923	-1.27042	0.207071
Alcohol life time - Duration score & Right ACC ml	96	0.038323	0.37183	0.710858
Alcohol life time - Duration score & Left ACC NAA	96	-0.061033	-0.59284	0.554709
Alcohol life time - Duration score & Left ACC NAA+NAAG	96	-0.080064	-0.77875	0.438084
Alcohol life time - Duration score & Left ACC ml	96	0.136757	1.33848	0.183968
Alcohol life time - Duration score & Right FWM NAA	95	-0.110374	-1.07095	0.286962
Alcohol life time - Duration score & Right FWM NAA+NAAG	95	-0.041947	-0.40488	0.686495
Alcohol life time - Duration score & Right FWM ml	95	-0.069370	-0.67059	0.504142
Alcohol life time - Duration score & Left FWM NAA	95	-0.042124	-0.40659	0.685244
Alcohol life time - Duration score & Left FWM NAA+NAAG	95	-0.058374	-0.56390	0.574181
Alcohol life time - Duration score & Left FWM ml	95	-0.007007	-0.06758	0.946269
Alcohol life time - Amount score & Right DLPFC NAA	76	0.093253	0.80571	0.422993
Alcohol life time - Amount score & Right DLPFC NAA+NAAG	76	0.135866	1.17970	0.241897
Alcohol life time - Amount score & Right DLPFC ml	76	-0.131694	-1.14283	0.256794
Alcohol life time - Amount score & Left DLPFC NAA	76	0.098939	0.85531	0.395143
Alcohol life time - Amount score & Left DLPFC NAA+NAAG	76	0.179927	1.57347	0.119877
Alcohol life time - Amount score & Left DLPFC ml	76	-0.017241	-0.14833	0.882485
Alcohol life time - Amount score & Right ACC NAA	77	-0.207988	-1.84150	0.069503
Alcohol life time - Amount score & Right ACC NAA+NAAG	77	-0.035900	-0.31110	0.756585
Alcohol life time - Amount score & Right ACC ml	77	-0.182448	-1.60702	0.112252
Alcohol life time - Amount score & Left ACC NAA	77	-0.211028	-1.86966	0.065434
Alcohol life time - Amount score & Left ACC NAA+NAAG	77	-0.035399	-0.30676	0.759876
Alcohol life time - Amount score & Left ACC ml	77	-0.088887	-0.77285	0.442042
Alcohol life time - Amount score & Right FWM NAA	76	-0.054561	-0.47005	0.639700
Alcohol life time - Amount score & Right FWM NAA+NAAG	76	0.101514	0.87779	0.382900
Alcohol life time - Amount score & Right FWM ml	76	-0.159611	-1.39086	0.168437
Alcohol life time - Amount score & Left FWM NAA	76	0.000292	0.00251	0.998003
Alcohol life time - Amount score & Left FWM NAA+NAAG	76	-0.018826	-0.16197	0.871767
Alcohol life time - Amount score & Left FWM ml	76	-0.174169	-1.52152	0.132392
Alcohol life time - Total score & Right DLPFC NAA	76	0.179530	1.56988	0.120709
Alcohol life time - Total score & Right DLPFC NAA+NAAG	76	0.183632	1.60699	0.112315
Alcohol life time - Total score & Right DLPFC ml	76	-0.041788	-0.35979	0.720029
Alcohol life time - Total score & Left DLPFC NAA	76	0.061933	0.53379	0.595087
Alcohol life time - Total score & Left DLPFC NAA+NAAG	76	0.196081	1.72014	0.089586
Alcohol life time - Total score & Left DLPFC ml	76	-0.094200	-0.81396	0.418278
Alcohol life time - Total score & Right ACC NAA	77	-0.219143	-1.94511	0.055510
Alcohol life time - Total score & Right ACC NAA+NAAG	77	-0.105202	-0.91616	0.362518
Alcohol life time - Total score & Right ACC ml	77	-0.127805	-1.11597	0.267997
Alcohol life time - Total score & Left ACC NAA	77	-0.195312	-1.72466	0.088707
Alcohol life time - Total score & Left ACC NAA+NAAG	77	-0.080579	-0.70011	0.486022
Alcohol life time - Total score & Left ACC ml	77	-0.064912	-0.56334	0.574881
Alcohol life time - Total score & Right FWM NAA	76	-0.097368	-0.84159	0.402730
Alcohol life time - Total score & Right FWM NAA+NAAG	76	0.038518	0.33159	0.741139
Alcohol life time - Total score & Right FWM ml	76	-0.157921	-1.37575	0.173050
Alcohol life time - Total score & Left FWM NAA	76	0.010361	0.08913	0.929216
Alcohol life time - Total score & Left FWM NAA+NAAG	76	0.001281	0.01102	0.991235
Alcohol life time - Total score & Left FWM ml	76	-0.192022	-1.68316	0.096560
Tobacco life time - Frequency score & Right DLPFC NAA	96	0.109433	1.06741	0.288521
Tobacco life time - Frequency score & Right DLPFC NAA+NAAG	96	0.042799	0.41534	0.678842
Tobacco life time - Frequency score & Right DLPFC ml	96	-0.095556	-0.93071	0.354389
Tobacco life time - Frequency score & Left DLPFC NAA	96	0.071524	0.69523	0.488624
Tobacco life time - Frequency score & Left DLPFC NAA+NAAG	96	0.044724	0.43405	0.665249
Tobacco life time - Frequency score & Left DLPFC ml	96	-0.052981	-0.51440	0.608182
Tobacco life time - Frequency score & Right ACC NAA	97	-0.033497	-0.32667	0.744635
Tobacco life time - Frequency score & Right ACC NAA+NAAG	97	0.024741	0.24122	0.809908
Tobacco life time - Frequency score & Right ACC ml	97	-0.095159	-0.93173	0.353840
Tobacco life time - Frequency score & Left ACC NAA	97	-0.019859	-0.19360	0.846903
Tobacco life time - Frequency score & Left ACC NAA+NAAG	97	-0.007569	-0.07378	0.941344
Tobacco life time - Frequency score & Left ACC ml	97	-0.141211	-1.39029	0.167691
Tobacco life time - Frequency score & Right FWM NAA	96	0.162096	1.59264	0.114597
Tobacco life time - Frequency score & Right FWM NAA+NAAG	96	0.215557	2.14022	0.034926
Tobacco life time - Frequency score & Right FWM ml	96	-0.039221	-0.38056	0.704390
Tobacco life time - Frequency score & Left FWM NAA	96	0.082728	0.80483	0.422948
Tobacco life time - Frequency score & Left FWM NAA+NAAG	96	0.019752	0.19154	0.848517
Tobacco life time - Frequency score & Left FWM ml	96	-0.054134	-0.52562	0.600388
Tobacco life time - Duration score & Right DLPFC NAA	96	0.085823	0.83517	0.405740
Tobacco life time - Duration score & Right DLPFC NAA+NAAG	96	0.052967	0.51426	0.608279
Tobacco life time - Duration score & Right DLPFC ml	96	-0.085948	-0.83639	0.405057
Tobacco life time - Duration score & Left DLPFC NAA	96	0.091064	0.88658	0.377566
Tobacco life time - Duration score & Left DLPFC NAA+NAAG	96	0.075452	0.73362	0.465004
Tobacco life time - Duration score & Left DLPFC ml	96	-0.033709	-0.32700	0.744391
Tobacco life time - Duration score & Right ACC NAA	97	-0.068232	-0.66660	0.506644
Tobacco life time - Duration score & Right ACC NAA+NAAG	97	0.058068	0.56694	0.572093
Tobacco life time - Duration score & Right ACC ml	97	-0.126963	-1.24758	0.215252
Tobacco life time - Duration score & Left ACC NAA	97	-0.087784	-0.85893	0.392544
Tobacco life time - Duration score & Left ACC NAA+NAAG	97	-0.021622	-0.21079	0.833499
Tobacco life time - Duration score & Left ACC ml	97	-0.165339	-1.63401	0.105566
Tobacco life time - Duration score & Right FWM NAA	96	0.160773	1.57929	0.117628
Tobacco life time - Duration score & Right FWM NAA+NAAG	96	0.198521	1.96382	0.052505
Tobacco life time - Duration score & Right FWM ml	96	0.073919	0.71864	0.474147
Tobacco life time - Duration score & Left FWM NAA	96	0.070707	0.68725	0.493617
Tobacco life time - Duration score & Left FWM NAA+NAAG	96	0.048320	0.46903	0.640136
Tobacco life time - Duration score & Left FWM ml	96	-0.024339	-0.23605	0.813911
Tobacco life time Amount score & Right DLPFC NAA	90	0.123967	1.17195	0.244380
Tobacco life time Amount score & Right DLPFC NAA+NAAG	90	0.060418	0.56781	0.571612
Tobacco life time Amount score & Right DLPFC ml	90	-0.133634	-1.26495	0.209230
Tobacco life time Amount score & Left DLPFC NAA	90	-0.011073	-0.10388	0.917499
Tobacco life time Amount score & Left DLPFC NAA+NAAG	90	0.008019	0.07522	0.940208
Tobacco life time Amount score & Left DLPFC ml	90	-0.152791	-1.45034	0.150519
Tobacco life time Amount score & Right ACC NAA	91	0.007151	0.06746	0.946363
Tobacco life time Amount score & Right ACC NAA+NAAG	91	-0.002380	-0.02245	0.982140
Tobacco life time Amount score & Right ACC ml	91	-0.140775	-1.34142	0.183195
Tobacco life time Amount score & Left ACC NAA	91	-0.082326	-0.77931	0.437864
Tobacco life time Amount score & Left ACC NAA+NAAG	91	-0.111364	-1.05718	0.293291
Tobacco life time Amount score & Left ACC ml	91	-0.275991	-2.70891	0.008096
Tobacco life time Amount score & Right FWM NAA	90	0.133768	1.26624	0.208769
Tobacco life time Amount score & Right FWM NAA+NAAG	90	0.187478	1.79045	0.076821

All Groups
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Alcohol life time - Frequency score & ACC30 NAA abs	69	-0.007651	-0.06263	0.950251
Alcohol life time - Frequency score & ACC30 NAA+NAAG abs	69	0.027113	0.22201	0.824980
Alcohol life time - Frequency score & ACC30 ml abs	69	-0.028475	-0.23317	0.816341
Alcohol life time - Frequency score & Thal30 NAA abs	56	0.062358	0.45913	0.647983
Alcohol life time - Frequency score & Thal30 NAA+NAAG abs	67	-0.045833	-0.36991	0.712654
Alcohol life time - Frequency score & Thal30 ml abs	66	-0.023874	-0.19104	0.849097
Alcohol life time - Duration score & ACC30 NAA abs	71	0.018095	0.15033	0.880943
Alcohol life time - Duration score & ACC30 NAA+NAAG abs	71	0.047878	0.39816	0.691742
Alcohol life time - Duration score & ACC30 ml abs	71	0.087491	0.72955	0.468134
Alcohol life time - Duration score & Thal30 NAA abs	58	0.034669	0.25959	0.796130
Alcohol life time - Duration score & Thal30 NAA+NAAG abs	69	0.060584	0.49681	0.620948
Alcohol life time - Duration score & Thal30 ml abs	68	0.116932	0.95652	0.342300
Alcohol life time - Amount score & ACC30 NAA abs	58	0.162857	1.23520	0.221913
Alcohol life time - Amount score & ACC30 NAA+NAAG abs	58	0.137964	1.04239	0.301709
Alcohol life time - Amount score & ACC30 ml abs	58	0.189598	1.44503	0.154021
Alcohol life time - Amount score & Thal30 NAA abs	47	0.013032	0.08743	0.930720
Alcohol life time - Amount score & Thal30 NAA+NAAG abs	57	0.258355	1.98335	0.052330
Alcohol life time - Amount score & Thal30 ml abs	57	0.005580	0.04138	0.967142
Alcohol life time - Total score & ACC30 NAA abs	58	0.155551	1.17838	0.243628
Alcohol life time - Total score & ACC30 NAA+NAAG abs	58	0.138226	1.04441	0.300781
Alcohol life time - Total score & ACC30 ml abs	58	0.177688	1.35120	0.182066
Alcohol life time - Total score & Thal30 NAA abs	47	0.024936	0.16732	0.867864
Alcohol life time - Total score & Thal30 NAA+NAAG abs	57	0.152323	1.14299	0.257992
Alcohol life time - Total score & Thal30 ml abs	57	-0.015275	-0.11329	0.910210
Tobacco life time - Frequency score & ACC30 NAA abs	72	-0.159365	-1.35060	0.181173
Tobacco life time - Frequency score & ACC30 NAA+NAAG abs	72	-0.180427	-1.53475	0.129352
Tobacco life time - Frequency score & ACC30 ml abs	72	-0.208137	-1.78039	0.079352
Tobacco life time - Frequency score & Thal30 NAA abs	58	-0.120726	-0.91009	0.366676
Tobacco life time - Frequency score & Thal30 NAA+NAAG abs	70	-0.083576	-0.69160	0.491543
Tobacco life time - Frequency score & Thal30 ml abs	69	-0.180586	-1.50287	0.137571
Tobacco life time - Duration score & ACC30 NAA abs	72	-0.127728	-1.07747	0.284968
Tobacco life time - Duration score & ACC30 NAA+NAAG abs	72	-0.156752	-1.32790	0.188525
Tobacco life time - Duration score & ACC30 ml abs	72	-0.216094	-1.85172	0.068284
Tobacco life time - Duration score & Thal30 NAA abs	58	-0.127055	-0.95856	0.341899
Tobacco life time - Duration score & Thal30 NAA+NAAG abs	70	-0.066877	-0.55272	0.582270
Tobacco life time - Duration score & Thal30 ml abs	69	-0.154810	-1.28264	0.204039
Tobacco life time Amount score & ACC30 NAA abs	67	-0.092967	-0.75278	0.454299
Tobacco life time Amount score & ACC30 NAA+NAAG abs	67	-0.110608	-0.89725	0.372895
Tobacco life time Amount score & ACC30 ml abs	67	-0.204083	-1.68075	0.097612
Tobacco life time Amount score & Thal30 NAA abs	54	-0.049025	-0.35395	0.724807
Tobacco life time Amount score & Thal30 NAA+NAAG abs	65	-0.091108	-0.72617	0.470423
Tobacco life time Amount score & Thal30 ml abs	64	-0.267388	-2.18497	0.032679
Tobacco life time - Total score & ACC30 NAA abs	67	-0.120394	-0.97776	0.331820
Tobacco life time - Total score & ACC30 NAA+NAAG abs	67	-0.133431	-1.08546	0.281727
Tobacco life time - Total score & ACC30 ml abs	67	-0.235362	-1.95239	0.055201
Tobacco life time - Total score & Thal30 NAA abs	54	-0.057064	-0.41217	0.681911
Tobacco life time - Total score & Thal30 NAA+NAAG abs	65	-0.075724	-0.60277	0.548822
Tobacco life time - Total score & Thal30 ml abs	64	-0.261159	-2.13030	0.037122
Cocaine life time - Frequency score & ACC30 NAA abs	72	0.194572	1.65963	0.101464
Cocaine life time - Frequency score & ACC30 NAA+NAAG abs	72	0.153944	1.30352	0.196667
Cocaine life time - Frequency score & ACC30 ml abs	72	0.067744	0.56809	0.571788
Cocaine life time - Frequency score & Thal30 NAA abs	58	0.088203	0.66264	0.510281
Cocaine life time - Frequency score & Thal30 NAA+NAAG abs	70	0.005767	0.04755	0.962212
Cocaine life time - Frequency score & Thal30 ml abs	69	-0.049012	-0.40166	0.689210
Cocaine life time - Duration score & ACC30 NAA abs	72	0.211231	1.80808	0.074889
Cocaine life time - Duration score & ACC30 NAA+NAAG abs	72	0.172753	1.46742	0.146741
Cocaine life time - Duration score & ACC30 ml abs	72	0.079112	0.66398	0.508883
Cocaine life time - Duration score & Thal30 NAA abs	58	0.078530	0.58948	0.557908
Cocaine life time - Duration score & Thal30 NAA+NAAG abs	70	0.012047	0.09935	0.921153
Cocaine life time - Duration score & Thal30 ml abs	69	-0.046459	-0.38070	0.704633
Cocaine life time - Amount score & ACC30 NAA abs	69	0.041634	0.34108	0.734109
Cocaine life time - Amount score & ACC30 NAA+NAAG abs	69	0.010147	0.08306	0.934051
Cocaine life time - Amount score & ACC30 ml abs	69	-0.015447	-0.12645	0.899751
Cocaine life time - Amount score & Thal30 NAA abs	55	0.180451	1.33563	0.187379
Cocaine life time - Amount score & Thal30 NAA+NAAG abs	67	0.095649	0.77470	0.441326
Cocaine life time - Amount score & Thal30 ml abs	66	0.012978	0.10383	0.917629
Cocaine life time - Total score & ACC30 NAA abs	69	0.154639	1.28119	0.204545
Cocaine life time - Total score & ACC30 NAA+NAAG abs	69	0.113302	0.93343	0.353949
Cocaine life time - Total score & ACC30 ml abs	69	-0.002712	-0.02219	0.982359
Cocaine life time - Total score & Thal30 NAA abs	55	0.049170	0.35839	0.721472
Cocaine life time - Total score & Thal30 NAA+NAAG abs	67	0.000526	0.00424	0.996629
Cocaine life time - Total score & Thal30 ml abs	66	-0.163263	-1.32386	0.190258
Heroin life time score - Frequency score & ACC30 NAA abs	72	0.042623	0.35693	0.722216
Heroin life time score - Frequency score & ACC30 NAA+NAAG abs	72	0.045128	0.37796	0.706607
Heroin life time score - Frequency score & ACC30 ml abs	72	0.064936	0.54445	0.587864
Heroin life time score - Frequency score & Thal30 NAA abs	58	-0.130809	-0.98737	0.327708
Heroin life time score - Frequency score & Thal30 NAA+NAAG abs	70	-0.076349	-0.63143	0.529873
Heroin life time score - Frequency score & Thal30 ml abs	69	-0.289864	-2.47907	0.015695
Heroin life time score - Duration Score & ACC30 NAA abs	72	0.055193	0.46248	0.645168
Heroin life time score - Duration Score & ACC30 NAA+NAAG abs	72	0.057788	0.48430	0.629687
Heroin life time score - Duration Score & ACC30 ml abs	72	0.075596	0.63430	0.527956
Heroin life time score - Duration Score & Thal30 NAA abs	58	-0.141001	-1.06580	0.291088
Heroin life time score - Duration Score & Thal30 NAA+NAAG abs	70	-0.084527	-0.69953	0.486607
Heroin life time score - Duration Score & Thal30 ml abs	69	-0.295439	-2.53127	0.013718
Heroin life time score - Amount score & ACC30 NAA abs	72	-0.070891	-0.59461	0.554022
Heroin life time score - Amount score & ACC30 NAA+NAAG abs	72	-0.045329	-0.37964	0.705360
Heroin life time score - Amount score & ACC30 ml abs	72	-0.011748	-0.09829	0.921980
Heroin life time score - Amount score & Thal30 NAA abs	58	-0.011767	-0.08806	0.930140
Heroin life time score - Amount score & Thal30 NAA+NAAG abs	70	0.047459	0.39180	0.696431
Heroin life time score - Amount score & Thal30 ml abs	69	-0.122528	-1.01055	0.315867
Heroin life time score - Total score & ACC30 NAA abs	72	0.048742	0.40829	0.684306
Heroin life time score - Total score & ACC30 NAA+NAAG abs	72	0.051159	0.42858	0.669542
Heroin life time score - Total score & ACC30 ml abs	72	0.072406	0.60739	0.545561
Heroin life time score - Total score & Thal30 NAA abs	58	-0.134232	-1.01368	0.315098
Heroin life time score - Total score & Thal30 NAA+NAAG abs	70	-0.077436	-0.64048	0.524014
Heroin life time score - Total score & Thal30 ml abs	69	-0.289917	-2.47957	0.015676
Cannabis life time - Frequency score & ACC30 NAA abs	72	-0.050576	-0.42369	0.673091
Cannabis life time - Frequency score & ACC30 NAA+NAAG abs	72	-0.063654	-0.53365	0.595276
Cannabis life time - Frequency score & ACC30 ml abs	72	-0.136963	-1.15682	0.251279
Cannabis life time - Frequency score & Thal30 NAA abs	58	-0.384223	-3.11432	0.002904
Cannabis life time - Frequency score & Thal30 NAA+NAAG abs	70	-0.214416	-1.81022	0.074680
Cannabis life time - Frequency score & Thal30 ml abs	69	-0.198745	-1.65991	0.101607
Cannabis life time - Duration score & ACC30 NAA abs	72	-0.042453	-0.35550	0.723281
Cannabis life time - Duration score & ACC30 NAA+NAAG abs	72	-0.061198	-0.51298	0.609582
Cannabis life time - Duration score & ACC30 ml abs	72	-0.106754	-0.89830	0.372104
Cannabis life time - Duration score & Thal30 NAA abs	58	-0.392722	-3.19560	0.002294
Cannabis life time - Duration score & Thal30 NAA+NAAG abs	70	-0.184949	-1.55190	0.125329
Cannabis life time - Duration score & Thal30 ml abs	69	-0.142751	-1.18056	0.241951
Cannabis life time - Amount score & ACC30 NAA abs	60	-0.065074	-0.49664	0.621317
Cannabis life time - Amount score & ACC30 NAA+NAAG abs	60	-0.091818	-0.70223	0.485344
Cannabis life time - Amount score & ACC30 ml abs	60	-0.109228	-0.83686	0.406106
Cannabis life time - Amount score & Thal30 NAA abs	50	-0.404627	-3.06549	0.003562
Cannabis life time - Amount score & Thal30 NAA+NAAG abs	58	-0.143601	-1.08586	0.282191
Cannabis life time - Amount score & Thal30 ml abs	58	-0.122994	-0.92744	0.357677
Cannabis life time - Total score & ACC30 NAA abs	60	-0.031647	-0.24114	0.810301
Cannabis life time - Total score & ACC30 NAA+NAAG abs	60	-0.063033	-0.48100	0.632323
Cannabis life time - Total score & ACC30 ml abs	60	-0.116905	-0.89647	0.373707
Cannabis life time - Total score & Thal30 NAA abs	50	-0.391702	-2.94948	0.004907
Cannabis life time - Total score & Thal30 NAA+NAAG abs	58	-0.177668	-1.35104	0.182116
Cannabis life time - Total score & Thal30 ml abs	58	-0.171306	-1.30117	0.198529
Methamphetamine life time - Frequency score & ACC30 NAA abs	72	0.109642	0.92289	0.359232
Methamphetamine life time - Frequency score & ACC30 NAA+NAAG abs	72	0.077299	0.64867	0.518676

All Groups
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
IFNg (25)pg/ml & Right DLPFC NAA	97	-0.098664	-0.96637	0.336310
IFNg (25)pg/ml & Right DLPFC NAA+NAAG	97	-0.030875	-0.30107	0.764016
IFNg (25)pg/ml & Right DLPFC ml	97	0.093842	0.91871	0.360572
IFNg (25)pg/ml & Left DLPFC NAA	97	-0.191528	-1.90200	0.060201
IFNg (25)pg/ml & Left DLPFC NAA+NAAG	97	-0.104345	-1.02261	0.309090
IFNg (25)pg/ml & Left DLPFC ml	97	0.022393	0.21831	0.827655
IFNg (25)pg/ml & Right ACC NAA	98	0.050706	0.49746	0.620006
IFNg (25)pg/ml & Right ACC NAA+NAAG	98	0.003497	0.03427	0.972736
IFNg (25)pg/ml & Right ACC ml	98	0.106197	1.04643	0.297989
IFNg (25)pg/ml & Left ACC NAA	98	-0.111603	-1.10036	0.273927
IFNg (25)pg/ml & Left ACC NAA+NAAG	98	-0.072478	-0.71201	0.478188
IFNg (25)pg/ml & Left ACC ml	98	-0.039890	-0.39115	0.696555
IFNg (25)pg/ml & Right FWM NAA	97	0.053430	0.52151	0.603222
IFNg (25)pg/ml & Right FWM NAA+NAAG	97	-0.090547	-0.88619	0.377754
IFNg (25)pg/ml & Right FWM ml	97	0.134914	1.32711	0.187652
IFNg (25)pg/ml & Left FWM NAA	97	-0.217036	-2.16706	0.032731
IFNg (25)pg/ml & Left FWM NAA+NAAG	97	-0.025365	-0.24731	0.805205
IFNg (25)pg/ml & Left FWM ml	97	0.121638	1.19445	0.235274
IL-10 (27)pg/ml & Right DLPFC NAA	97	-0.198870	-1.97785	0.050843
IL-10 (27)pg/ml & Right DLPFC NAA+NAAG	97	-0.155434	-1.53362	0.128447
IL-10 (27)pg/ml & Right DLPFC ml	97	0.025666	0.25025	0.802936
IL-10 (27)pg/ml & Left DLPFC NAA	97	-0.179620	-1.77966	0.078329
IL-10 (27)pg/ml & Left DLPFC NAA+NAAG	97	-0.229339	-2.29653	0.023843
IL-10 (27)pg/ml & Left DLPFC ml	97	-0.015605	-0.15212	0.879415
IL-10 (27)pg/ml & Right ACC NAA	98	-0.048814	-0.47885	0.633133
IL-10 (27)pg/ml & Right ACC NAA+NAAG	98	-0.047267	-0.46364	0.643956
IL-10 (27)pg/ml & Right ACC ml	98	0.193014	1.92739	0.056888
IL-10 (27)pg/ml & Left ACC NAA	98	-0.129388	-1.27848	0.204162
IL-10 (27)pg/ml & Left ACC NAA+NAAG	98	-0.047681	-0.46770	0.641056
IL-10 (27)pg/ml & Left ACC ml	98	0.146221	1.44823	0.150810
IL-10 (27)pg/ml & Right FWM NAA	97	-0.145178	-1.43018	0.155947
IL-10 (27)pg/ml & Right FWM NAA+NAAG	97	-0.109888	-1.07758	0.283949
IL-10 (27)pg/ml & Right FWM ml	97	0.142981	1.40807	0.162374
IL-10 (27)pg/ml & Left FWM NAA	97	-0.313809	-3.22135	0.001748
IL-10 (27)pg/ml & Left FWM NAA+NAAG	97	-0.168308	-1.66421	0.099367
IL-10 (27)pg/ml & Left FWM ml	97	-0.039021	-0.38062	0.704334
IL-1b (46)pg/ml & Right DLPFC NAA	97	-0.089227	-0.87316	0.384777
IL-1b (46)pg/ml & Right DLPFC NAA+NAAG	97	-0.116850	-1.14677	0.254356
IL-1b (46)pg/ml & Right DLPFC ml	97	0.261538	2.64109	0.009663
IL-1b (46)pg/ml & Left DLPFC NAA	97	-0.164239	-1.62284	0.107938
IL-1b (46)pg/ml & Left DLPFC NAA+NAAG	97	-0.154851	-1.52773	0.129903
IL-1b (46)pg/ml & Left DLPFC ml	97	0.332270	3.43365	0.000884
IL-1b (46)pg/ml & Right ACC NAA	98	0.232058	2.33751	0.021490
IL-1b (46)pg/ml & Right ACC NAA+NAAG	98	0.122578	1.21014	0.229195
IL-1b (46)pg/ml & Right ACC ml	98	0.189622	1.89224	0.061473
IL-1b (46)pg/ml & Left ACC NAA	98	0.111220	1.09653	0.275588
IL-1b (46)pg/ml & Left ACC NAA+NAAG	98	0.084645	0.83234	0.407283
IL-1b (46)pg/ml & Left ACC ml	98	0.165766	1.64695	0.102837
IL-1b (46)pg/ml & Right FWM NAA	97	0.038498	0.37552	0.708115
IL-1b (46)pg/ml & Right FWM NAA+NAAG	97	-0.045383	-0.44280	0.658919
IL-1b (46)pg/ml & Right FWM ml	97	0.189656	1.88271	0.062800
IL-1b (46)pg/ml & Left FWM NAA	97	-0.139867	-1.37679	0.171813
IL-1b (46)pg/ml & Left FWM NAA+NAAG	97	-0.050496	-0.49281	0.623287
IL-1b (46)pg/ml & Left FWM ml	97	0.173817	1.72035	0.088625
IL-8 (63)pg/ml & Right DLPFC NAA	97	-0.178269	-1.76584	0.080635
IL-8 (63)pg/ml & Right DLPFC NAA+NAAG	97	-0.119094	-1.16910	0.245288
IL-8 (63)pg/ml & Right DLPFC ml	97	-0.004132	-0.04028	0.967956
IL-8 (63)pg/ml & Left DLPFC NAA	97	-0.167910	-1.66015	0.100181
IL-8 (63)pg/ml & Left DLPFC NAA+NAAG	97	-0.139532	-1.37342	0.172854
IL-8 (63)pg/ml & Left DLPFC ml	97	0.013998	0.13645	0.891753
IL-8 (63)pg/ml & Right ACC NAA	98	0.101049	0.99517	0.322154
IL-8 (63)pg/ml & Right ACC NAA+NAAG	98	0.036017	0.35312	0.724773
IL-8 (63)pg/ml & Right ACC ml	98	0.139968	1.38503	0.169252
IL-8 (63)pg/ml & Left ACC NAA	98	-0.048779	-0.47850	0.633380
IL-8 (63)pg/ml & Left ACC NAA+NAAG	98	0.007460	0.07309	0.941885
IL-8 (63)pg/ml & Left ACC ml	98	0.007973	0.07812	0.937894
IL-8 (63)pg/ml & Right FWM NAA	97	-0.031811	-0.31021	0.757080
IL-8 (63)pg/ml & Right FWM NAA+NAAG	97	0.005171	0.05040	0.959906
IL-8 (63)pg/ml & Right FWM ml	97	0.158800	1.56769	0.120280
IL-8 (63)pg/ml & Left FWM NAA	97	-0.114481	-1.12320	0.264182
IL-8 (63)pg/ml & Left FWM NAA+NAAG	97	-0.046256	-0.45133	0.652781
IL-8 (63)pg/ml & Left FWM ml	97	0.162111	1.60124	0.112644
TNFa (75)pg/ml & Right DLPFC NAA	97	-0.088756	-0.86851	0.387302
TNFa (75)pg/ml & Right DLPFC NAA+NAAG	97	-0.015804	-0.15405	0.877895
TNFa (75)pg/ml & Right DLPFC ml	97	0.219316	2.19097	0.030900
TNFa (75)pg/ml & Left DLPFC NAA	97	-0.179425	-1.77767	0.078659
TNFa (75)pg/ml & Left DLPFC NAA+NAAG	97	-0.280502	-2.84834	0.005387
TNFa (75)pg/ml & Left DLPFC ml	97	0.111391	1.09251	0.277373
TNFa (75)pg/ml & Right ACC NAA	98	0.034720	0.34039	0.734305
TNFa (75)pg/ml & Right ACC NAA+NAAG	98	-0.005149	-0.05045	0.959872

Pair of Variables	All Groups Spearman Rank Order Correlations (Spreadsheet Chapter 4) MD pairwise deleted Marked correlations are significant at p <,01000 Valid N	Spearman R	t(N-2)	p-value
IFNg (25)pg/ml & ACC30 NAA abs	73	-0.112077	-0.95037	0.345151
IFNg (25)pg/ml & ACC30 NAA+NAAG abs	73	-0.088427	-0.74803	0.456911
IFNg (25)pg/ml & ACC30 mI abs	73	-0.087317	-0.73856	0.462606
IFNg (25)pg/ml & Thal30 NAA abs	58	0.137047	1.03534	0.304961
IFNg (25)pg/ml & Thal30 NAA+NAAG abs	71	0.025035	0.20802	0.835828
IFNg (25)pg/ml & Thal30 mI abs	70	0.024723	0.20394	0.839013
IL-10 (27)pg/ml & ACC30 NAA abs	73	-0.067490	-0.56998	0.570488
IL-10 (27)pg/ml & ACC30 NAA+NAAG abs	73	-0.063867	-0.53925	0.591398
IL-10 (27)pg/ml & ACC30 mI abs	73	0.017712	0.14927	0.881764
IL-10 (27)pg/ml & Thal30 NAA abs	58	0.099945	0.75168	0.455389
IL-10 (27)pg/ml & Thal30 NAA+NAAG abs	71	0.065863	0.54829	0.585263
IL-10 (27)pg/ml & Thal30 mI abs	70	-0.073831	-0.61049	0.543571
IL-1b (46)pg/ml & ACC30 NAA abs	73	-0.158640	-1.35387	0.180071
IL-1b (46)pg/ml & ACC30 NAA+NAAG abs	73	-0.144429	-1.22987	0.222804
IL-1b (46)pg/ml & ACC30 mI abs	73	-0.074452	-0.62909	0.531310
IL-1b (46)pg/ml & Thal30 NAA abs	58	0.039046	0.29241	0.771051
IL-1b (46)pg/ml & Thal30 NAA+NAAG abs	71	0.088958	0.74188	0.460676
IL-1b (46)pg/ml & Thal30 mI abs	70	0.164074	1.37157	0.174705
IL-8 (63)pg/ml & ACC30 NAA abs	73	-0.120652	-1.02411	0.309260
IL-8 (63)pg/ml & ACC30 NAA+NAAG abs	73	-0.140351	-1.19444	0.236279
IL-8 (63)pg/ml & ACC30 mI abs	73	-0.095290	-0.80660	0.422590
IL-8 (63)pg/ml & Thal30 NAA abs	58	0.184967	1.40847	0.164520
IL-8 (63)pg/ml & Thal30 NAA+NAAG abs	71	-0.033770	-0.28067	0.779801
IL-8 (63)pg/ml & Thal30 mI abs	70	-0.001820	-0.01501	0.988072
TNFa (75)pg/ml & ACC30 NAA abs	73	-0.148272	-1.26333	0.210604
TNFa (75)pg/ml & ACC30 NAA+NAAG abs	73	-0.154628	-1.31878	0.191480
TNFa (75)pg/ml & ACC30 mI abs	73	-0.043629	-0.36797	0.713990
TNFa (75)pg/ml & Thal30 NAA abs	58	0.056081	0.42033	0.675850
TNFa (75)pg/ml & Thal30 NAA+NAAG abs	71	0.022335	0.18558	0.853321
TNFa (75)pg/ml & Thal30 mI abs	70	0.038407	0.31694	0.752257

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
	Group=CON Spearman Rank Order Correlations (Spreadsheet C MD pairwise deleted Marked correlations are significant at p <,01000			
Years of education - School (years) & Right DLPFC NAA	34	0.133649	0.76287	0.451126
Years of education - School (years) & Right DLPFC NAA+NAAG	34	0.131592	0.75093	0.458182
Years of education - School (years) & Right DLPFC ml	34	0.214212	1.24056	0.223787
Years of education - School (years) & Left DLPFC NAA	34	-0.144957	-0.82876	0.413382
Years of education - School (years) & Left DLPFC NAA+NAAG	34	-0.033003	-0.18680	0.852999
Years of education - School (years) & Left DLPFC ml	34	0.055927	0.31687	0.753404
Years of education - School (years) & Right ACC NAA	34	-0.054076	-0.30635	0.761323
Years of education - School (years) & Right ACC NAA+NAAG	34	-0.042151	-0.23865	0.812897
Years of education - School (years) & Right ACC ml	34	-0.032081	-0.18157	0.857067
Years of education - School (years) & Left ACC NAA	34	0.102316	0.58184	0.564751
Years of education - School (years) & Left ACC NAA+NAAG	34	0.003907	0.02210	0.982504
Years of education - School (years) & Left ACC ml	34	-0.134492	-0.76777	0.448250
Years of education - School (years) & Right FWM NAA	34	-0.076077	-0.43161	0.668921
Years of education - School (years) & Right FWM NAA+NAAG	34	-0.091923	-0.52221	0.605123
Years of education - School (years) & Right FWM ml	34	0.066418	0.37655	0.708994
Years of education - School (years) & Left FWM NAA	34	-0.057370	-0.32507	0.747243
Years of education - School (years) & Left FWM NAA+NAAG	34	-0.126863	-0.72349	0.474633
Years of education - School (years) & Left FWM ml	34	-0.207068	-1.19731	0.239982
Years of education - Post school (years) & Right DLPFC NAA	34	-0.095100	-0.54041	0.592654
Years of education - Post school (years) & Right DLPFC NAA+NAAG	34	-0.019861	-0.11238	0.911227
Years of education - Post school (years) & Right DLPFC ml	34	0.056488	0.32005	0.751007
Years of education - Post school (years) & Left DLPFC NAA	34	-0.230764	-1.34161	0.189167
Years of education - Post school (years) & Left DLPFC NAA+NAAG	34	-0.060178	-0.34104	0.735305
Years of education - Post school (years) & Left DLPFC ml	34	-0.027099	-0.15335	0.879083
Years of education - Post school (years) & Right ACC NAA	34	-0.015654	-0.08856	0.929983
Years of education - Post school (years) & Right ACC NAA+NAAG	34	-0.060594	-0.34340	0.733540
Years of education - Post school (years) & Right ACC ml	34	-0.223560	-1.29749	0.203740
Years of education - Post school (years) & Left ACC NAA	34	0.112294	0.63927	0.527196
Years of education - Post school (years) & Left ACC NAA+NAAG	34	0.002272	0.01286	0.989823
Years of education - Post school (years) & Left ACC ml	34	-0.123227	-0.70243	0.487488
Years of education - Post school (years) & Right FWM NAA	34	-0.131793	-0.75209	0.457492
Years of education - Post school (years) & Right FWM NAA+NAAG	34	-0.126510	-0.72145	0.475874
Years of education - Post school (years) & Right FWM ml	34	0.017338	0.09809	0.922470
Years of education - Post school (years) & Left FWM NAA	34	-0.082819	-0.47011	0.641466
Years of education - Post school (years) & Left FWM NAA+NAAG	34	0.033832	0.19149	0.849350
Years of education - Post school (years) & Left FWM ml	34	-0.220176	-1.27684	0.210847
Age on day & Right DLPFC NAA	34	-0.268507	-1.57681	0.124675
Age on day & Right DLPFC NAA+NAAG	34	-0.264216	-1.54970	0.131048
Age on day & Right DLPFC ml	34	-0.043002	-0.24348	0.809187
Age on day & Left DLPFC NAA	34	-0.314178	-1.87205	0.070364
Age on day & Left DLPFC NAA+NAAG	34	-0.237031	-1.38018	0.177098
Age on day & Left DLPFC ml	34	0.000920	0.00520	0.995882
Age on day & Right ACC NAA	34	0.262990	1.54197	0.132912
Age on day & Right ACC NAA+NAAG	34	0.275404	1.62059	0.114920
Age on day & Right ACC ml	34	-0.079936	-0.45364	0.653151
Age on day & Left ACC NAA	34	0.184334	1.06093	0.296662
Age on day & Left ACC NAA+NAAG	34	0.173501	0.99658	0.326444
Age on day & Left ACC ml	34	0.066601	0.37759	0.708230
Age on day & Right FWM NAA	34	-0.027586	-0.15611	0.876926
Age on day & Right FWM NAA+NAAG	34	-0.122012	-0.69540	0.491826
Age on day & Right FWM ml	34	-0.133344	-0.76111	0.452167
Age on day & Left FWM NAA	34	-0.266842	-1.56628	0.127121
Age on day & Left FWM NAA+NAAG	34	-0.417473	-2.59889	0.014028
Age on day & Left FWM ml	34	-0.111273	-0.63339	0.530980

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
	Group=CON Spearman Rank Order Correlations (Spreadsheet Ch MD pairwise deleted Marked correlations are significant at p <,01000			
Years of education - School (years) & ACC30 NAA abs	25	-0.394736	-2.06040	0.050847
Years of education - School (years) & ACC30 NAA+NAAG abs	25	-0.400160	-2.09407	0.047471
Years of education - School (years) & ACC30 mI abs	25	-0.362193	-1.86354	0.075203
Years of education - School (years) & Thal30 NAA abs	21	-0.483504	-2.40768	0.026380
Years of education - School (years) & Thal30 NAA+NAAG abs	24	-0.510422	-2.78407	0.010820
Years of education - School (years) & Thal30 mI abs	24	-0.170810	-0.81312	0.424861
Years of education - Post school (years) & ACC30 NAA abs	25	-0.278601	-1.39120	0.177476
Years of education - Post school (years) & ACC30 NAA+NAAG abs	25	-0.243830	-1.20576	0.240168
Years of education - Post school (years) & ACC30 mI abs	25	-0.182981	-0.89262	0.381306
Years of education - Post school (years) & Thal30 NAA abs	21	-0.195905	-0.87080	0.394731
Years of education - Post school (years) & Thal30 NAA+NAAG abs	24	-0.466286	-2.47229	0.021635
Years of education - Post school (years) & Thal30 mI abs	24	-0.271666	-1.32402	0.199088
Age on day & ACC30 NAA abs	25	0.157794	0.76635	0.451260
Age on day & ACC30 NAA+NAAG abs	25	0.137732	0.66690	0.511474
Age on day & ACC30 mI abs	25	0.277007	1.38258	0.180071
Age on day & Thal30 NAA abs	21	0.101530	0.44486	0.661450
Age on day & Thal30 NAA+NAAG abs	24	0.107696	0.50809	0.616444
Age on day & Thal30 mI abs	24	0.245477	1.18773	0.247604

Group=CON
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
PANSS positive score & Right DLPFC NAA	32	-0.069957	-0.38411	0.703604
PANSS positive score & Right DLPFC NAA+NAAG	32	0.014136	0.07744	0.938791
PANSS positive score & Right DLPFC mI	32	-0.417646	-2.51762	0.017387
PANSS positive score & Left DLPFC NAA	32	-0.063433	-0.34814	0.730169
PANSS positive score & Left DLPFC NAA+NAAG	32	-0.084826	-0.46629	0.644373
PANSS positive score & Left DLPFC mI	32	-0.061258	-0.33615	0.739094
PANSS positive score & Right ACC NAA	32	-0.080831	-0.44419	0.660096
PANSS positive score & Right ACC NAA+NAAG	32	-0.085181	-0.46826	0.642984
PANSS positive score & Right ACC mI	32	0.063444	0.34820	0.730121
PANSS positive score & Left ACC NAA	32	-0.050574	-0.27736	0.783405
PANSS positive score & Left ACC NAA+NAAG	32	-0.101139	-0.55682	0.581783
PANSS positive score & Left ACC mI	32	-0.118369	-0.65292	0.518777
PANSS positive score & Right FWM NAA	32	0.029723	0.16287	0.871713
PANSS positive score & Right FWM NAA+NAAG	32	0.020665	0.11321	0.910619
PANSS positive score & Right FWM mI	32	0.006344	0.03475	0.972511
PANSS positive score & Left FWM NAA	32	0.221854	1.24620	0.222335
PANSS positive score & Left FWM NAA+NAAG	32	0.309190	1.78076	0.085082
PANSS positive score & Left FWM mI	32	-0.156240	-0.86640	0.393146
PANSS negative score & Right DLPFC NAA	32	0.087087	0.47882	0.635541
PANSS negative score & Right DLPFC NAA+NAAG	32	0.052252	0.28659	0.776397
PANSS negative score & Right DLPFC mI	32	-0.203241	-1.13692	0.264570
PANSS negative score & Left DLPFC NAA	32	-0.226427	-1.27326	0.212704
PANSS negative score & Left DLPFC NAA+NAAG	32	0.017419	0.09542	0.924614
PANSS negative score & Left DLPFC mI	32	0.110310	0.60791	0.547825
PANSS negative score & Right ACC NAA	32	-0.272873	-1.55355	0.130780
PANSS negative score & Right ACC NAA+NAAG	32	-0.307708	-1.77133	0.086666
PANSS negative score & Right ACC mI	32	0.017421	0.09543	0.924607
PANSS negative score & Left ACC NAA	32	-0.185820	-1.03582	0.308564
PANSS negative score & Left ACC NAA+NAAG	32	-0.203222	-1.13682	0.264615
PANSS negative score & Left ACC mI	32	-0.139365	-0.77086	0.446821
PANSS negative score & Right FWM NAA	32	0.145145	0.80350	0.428005
PANSS negative score & Right FWM NAA+NAAG	32	0.075489	0.41466	0.681344
PANSS negative score & Right FWM mI	32	-0.011613	-0.06361	0.949703
PANSS negative score & Left FWM NAA	32	0.249673	1.41224	0.168169
PANSS negative score & Left FWM NAA+NAAG	32	0.110310	0.60791	0.547825
PANSS negative score & Left FWM mI	32	-0.063870	-0.35055	0.728379
PANSS general psychopathology score & Right DLPFC NAA	32	-0.096096	-0.52879	0.600845
PANSS general psychopathology score & Right DLPFC NAA+NAAG	32	-0.029939	-0.16406	0.870785
PANSS general psychopathology score & Right DLPFC mI	32	-0.284960	-1.62830	0.113920
PANSS general psychopathology score & Left DLPFC NAA	32	-0.159838	-0.88687	0.382204
PANSS general psychopathology score & Left DLPFC NAA+NAAG	32	-0.056504	-0.30998	0.758720
PANSS general psychopathology score & Left DLPFC mI	32	-0.078229	-0.42979	0.670417
PANSS general psychopathology score & Right ACC NAA	32	0.098993	0.54488	0.589861
PANSS general psychopathology score & Right ACC NAA+NAAG	32	0.155009	0.85941	0.396932
PANSS general psychopathology score & Right ACC mI	32	0.283028	1.61629	0.116500
PANSS general psychopathology score & Left ACC NAA	32	-0.199955	-1.11777	0.272537
PANSS general psychopathology score & Left ACC NAA+NAAG	32	-0.105763	-0.58256	0.564545
PANSS general psychopathology score & Left ACC mI	32	0.211305	1.18410	0.245671
PANSS general psychopathology score & Right FWM NAA	32	-0.063259	-0.34718	0.730880
PANSS general psychopathology score & Right FWM NAA+NAAG	32	-0.113501	-0.62571	0.536235
PANSS general psychopathology score & Right FWM mI	32	0.007486	0.04100	0.967567
PANSS general psychopathology score & Left FWM NAA	32	-0.043464	-0.23829	0.813277
PANSS general psychopathology score & Left FWM NAA+NAAG	32	0.263660	1.49710	0.144816
PANSS general psychopathology score & Left FWM mI	32	0.107212	0.59063	0.559192
PANSS total score & Right DLPFC NAA	32	-0.064347	-0.35318	0.726425
PANSS total score & Right DLPFC NAA+NAAG	32	-0.025924	-0.14204	0.887998
PANSS total score & Right DLPFC mI	32	-0.264035	-1.49939	0.144224
PANSS total score & Left DLPFC NAA	32	-0.247900	-1.40155	0.171311
PANSS total score & Left DLPFC NAA+NAAG	32	-0.009954	-0.05452	0.956880
PANSS total score & Left DLPFC mI	32	0.022221	0.12174	0.903918
PANSS total score & Right ACC NAA	32	0.080087	0.44007	0.663042
PANSS total score & Right ACC NAA+NAAG	32	0.084253	0.46312	0.646619
PANSS total score & Right ACC mI	32	0.253733	1.43677	0.161131
PANSS total score & Left ACC NAA	32	-0.139484	-0.77152	0.446431
PANSS total score & Left ACC NAA+NAAG	32	-0.040510	-0.22207	0.825768
PANSS total score & Left ACC mI	32	0.129644	0.71614	0.479445
PANSS total score & Right FWM NAA	32	0.016897	0.09256	0.926867
PANSS total score & Right FWM NAA+NAAG	32	-0.044450	-0.24370	0.809121
PANSS total score & Right FWM mI	32	-0.036806	-0.20173	0.841487
PANSS total score & Left FWM NAA	32	0.012500	0.06847	0.945864
PANSS total score & Left FWM NAA+NAAG	32	0.241419	1.36261	0.183148
PANSS total score & Left FWM mI	32	0.019792	0.10843	0.914379
CGI score & Right DLPFC NAA	33			
CGI score & Right DLPFC NAA+NAAG	33			
CGI score & Right DLPFC mI	33			
CGI score & Left DLPFC NAA	33			
CGI score & Left DLPFC NAA+NAAG	33			
CGI score & Left DLPFC mI	33			
CGI score & Right ACC NAA	33			
CGI score & Right ACC NAA+NAAG	33			
CGI score & Right ACC mI	33			
CGI score & Left ACC NAA	33			
CGI score & Left ACC NAA+NAAG	33			
CGI score & Left ACC mI	33			
CGI score & Right FWM NAA	33			
CGI score & Right FWM NAA+NAAG	33			
CGI score & Right FWM mI	33			
CGI score & Left FWM NAA	33			
CGI score & Left FWM NAA+NAAG	33			
CGI score & Left FWM mI	33			
GAF score & Right DLPFC NAA	33	0.011236	0.06256	0.950518
GAF score & Right DLPFC NAA+NAAG	33	0.015211	0.08470	0.933043
GAF score & Right DLPFC mI	33	0.092854	0.51923	0.607286
GAF score & Left DLPFC NAA	33	0.131888	0.74079	0.464393
GAF score & Left DLPFC NAA+NAAG	33	0.057738	0.32201	0.749606
GAF score & Left DLPFC mI	33	0.258418	1.48940	0.146486
GAF score & Right ACC NAA	33	0.053758	0.29974	0.766373
GAF score & Right ACC NAA+NAAG	33	0.029040	0.16175	0.872549
GAF score & Right ACC mI	33	-0.088776	-0.49624	0.623224
GAF score & Left ACC NAA	33	0.220013	1.25575	0.218589
GAF score & Left ACC NAA+NAAG	33	0.040884	0.22782	0.821282
GAF score & Left ACC mI	33	0.023166	0.12902	0.898175
GAF score & Right FWM NAA	33	-0.176831	-1.00031	0.324903
GAF score & Right FWM NAA+NAAG	33	-0.191642	-1.08717	0.285344
GAF score & Right FWM mI	33	-0.330181	-1.94759	0.060570
GAF score & Left FWM NAA	33	-0.170276	-0.96211	0.343440
GAF score & Left FWM NAA+NAAG	33	-0.319263	-1.87575	0.070135
GAF score & Left FWM mI	33	-0.193009	-1.09522	0.281857
Height (metres) & Right DLPFC NAA	34	0.181846	1.04612	0.303344
Height (metres) & Right DLPFC NAA+NAAG	34	0.248069	1.44857	0.157186
Height (metres) & Right DLPFC mI	34	-0.103802	-0.59038	0.559082
Height (metres) & Left DLPFC NAA	34	-0.073564	-0.41727	0.679265
Height (metres) & Left DLPFC NAA+NAAG	34	0.308351	1.83365	0.076022
Height (metres) & Left DLPFC mI	34	-0.027529	-0.15579	0.877179
Height (metres) & Right ACC NAA	34	-0.050011	-0.28326	0.778800
Height (metres) & Right ACC NAA+NAAG	34	0.020341	0.11509	0.909093
Height (metres) & Right ACC mI	34	-0.329790	-1.97613	0.056815
Height (metres) & Left ACC NAA	34	0.022487	0.12724	0.899547
Height (metres) & Left ACC NAA+NAAG	34	0.098883	0.56212	0.577948
Height (metres) & Left ACC mI	34	-0.450402	-2.85370	0.007518
Height (metres) & Right FWM NAA	34	-0.071117	-0.40332	0.689394
Height (metres) & Right FWM NAA+NAAG	34	-0.099732	-0.56700	0.574672

Pair of Variables	Group=CON Spearman Rank Order Correlations (Spreadsheet Chapte MD pairwise deleted Marked correlations are significant at p <,01000 Valid N	Spearman R	t(N-2)	p-value
PANSS positive score & ACC30 NAA abs	23	-0.064282	-0.29519	0.770748
PANSS positive score & ACC30 NAA+NAAG abs	23	-0.128565	-0.59409	0.558799
PANSS positive score & ACC30 ml abs	23	-0.257130	-1.21931	0.236244
PANSS positive score & Thal30 NAA abs	20	0.218822	0.95144	0.353983
PANSS positive score & Thal30 NAA+NAAG abs	22	0.292366	1.36724	0.186722
PANSS positive score & Thal30 ml abs	22	0.154782	0.70065	0.491594
PANSS negative score & ACC30 NAA abs	23	-0.064282	-0.29519	0.770748
PANSS negative score & ACC30 NAA+NAAG abs	23	-0.128565	-0.59409	0.558799
PANSS negative score & ACC30 ml abs	23	-0.257130	-1.21931	0.236244
PANSS negative score & Thal30 NAA abs	20	0.218822	0.95144	0.353983
PANSS negative score & Thal30 NAA+NAAG abs	22	0.292366	1.36724	0.186722
PANSS negative score & Thal30 ml abs	22	0.154782	0.70065	0.491594
PANSS general psychopathology score & ACC30 NAA abs	23	-0.183369	-0.85480	0.402310
PANSS general psychopathology score & ACC30 NAA+NAAG abs	23	-0.239503	-1.13044	0.271037
PANSS general psychopathology score & ACC30 ml abs	23	-0.298630	-1.43393	0.166317
PANSS general psychopathology score & Thal30 NAA abs	20	-0.342542	-1.54686	0.139297
PANSS general psychopathology score & Thal30 NAA+NAAG abs	22	-0.151223	-0.68416	0.501726
PANSS general psychopathology score & Thal30 ml abs	22	-0.194910	-0.88871	0.384725
PANSS total score & ACC30 NAA abs	23	-0.191494	-0.89408	0.381412
PANSS total score & ACC30 NAA+NAAG abs	23	-0.248343	-1.17486	0.253202
PANSS total score & ACC30 ml abs	23	-0.310429	-1.49650	0.149403
PANSS total score & Thal30 NAA abs	20	-0.327209	-1.46910	0.159066
PANSS total score & Thal30 NAA+NAAG abs	22	-0.141053	-0.63718	0.531234
PANSS total score & Thal30 ml abs	22	-0.193109	-0.88018	0.389218
GAF score & ACC30 NAA abs	24	-0.047484	-0.22297	0.825617
GAF score & ACC30 NAA+NAAG abs	24	-0.053815	-0.25278	0.802785
GAF score & ACC30 ml abs	24	-0.147425	-0.69913	0.491800
GAF score & Thal30 NAA abs	20	0.072470	0.30827	0.761413
GAF score & Thal30 NAA+NAAG abs	23	-0.094029	-0.43281	0.669563
GAF score & Thal30 ml abs	23	-0.296037	-1.42027	0.170205
Height (metres) & ACC30 NAA abs	25	-0.269469	-1.34197	0.192705
Height (metres) & ACC30 NAA+NAAG abs	25	-0.219353	-1.07824	0.292106
Height (metres) & ACC30 ml abs	25	-0.268312	-1.33576	0.194696
Height (metres) & Thal30 NAA abs	21	0.215777	0.96324	0.347526
Height (metres) & Thal30 NAA+NAAG abs	24	0.133217	0.63046	0.534886
Height (metres) & Thal30 ml abs	24	0.054419	0.25563	0.800615
Weight (kg) & ACC30 NAA abs	25	0.103077	0.49699	0.623916
Weight (kg) & ACC30 NAA+NAAG abs	25	0.170769	0.83119	0.414412
Weight (kg) & ACC30 ml abs	25	0.280000	1.39878	0.175218
Weight (kg) & Thal30 NAA abs	21	0.106494	0.46685	0.645917
Weight (kg) & Thal30 NAA+NAAG abs	24	0.640000	3.90677	0.000757
Weight (kg) & Thal30 ml abs	24	0.526957	2.90819	0.008151

Pair of Variables	Group=CON Spearman Rank Order Correlations (Spreadsheet Chapter 4) MD pairwise deleted Marked correlations are significant at p <,01000 Valid N	Spearman R	t(N-2)	p-value
Alcohol life time - Frequency score & Right DLPFC NAA	34	-0.093690	-0.53233	0.598174
Alcohol life time - Frequency score & Right DLPFC NAA+NAAG	34	-0.062460	-0.35402	0.725648
Alcohol life time - Frequency score & Right DLPFC ml	34	0.176969	1.01714	0.316715
Alcohol life time - Frequency score & Left DLPFC NAA	34	-0.149282	-0.85404	0.399433
Alcohol life time - Frequency score & Left DLPFC NAA+NAAG	34	-0.132042	-0.75354	0.456634
Alcohol life time - Frequency score & Left DLPFC ml	34	-0.298728	-1.77071	0.086135
Alcohol life time - Frequency score & Right ACC NAA	34	-0.240356	-1.40072	0.170921
Alcohol life time - Frequency score & Right ACC NAA+NAAG	34	-0.179367	-1.03138	0.310094
Alcohol life time - Frequency score & Right ACC ml	34	-0.368111	-2.23961	0.032193
Alcohol life time - Frequency score & Left ACC NAA	34	-0.191102	-1.10133	0.278967
Alcohol life time - Frequency score & Left ACC NAA+NAAG	34	-0.277002	-1.63078	0.112742
Alcohol life time - Frequency score & Left ACC ml	34	-0.322976	-1.93049	0.062448
Alcohol life time - Frequency score & Right FWM NAA	34	-0.175443	-1.00809	0.320972
Alcohol life time - Frequency score & Right FWM NAA+NAAG	34	-0.195421	-1.12720	0.268039
Alcohol life time - Frequency score & Right FWM ml	34	-0.345926	-2.08562	0.045072
Alcohol life time - Frequency score & Left FWM NAA	34	0.025346	0.14342	0.886856
Alcohol life time - Frequency score & Left FWM NAA+NAAG	34	0.001308	0.00740	0.994142
Alcohol life time - Frequency score & Left FWM ml	34	-0.224921	-1.30581	0.200928
Alcohol life time - Duration score & Right DLPFC NAA	34	-0.085589	-0.48595	0.630317
Alcohol life time - Duration score & Right DLPFC NAA+NAAG	34	-0.259102	-1.51752	0.138953
Alcohol life time - Duration score & Right DLPFC ml	34	0.193426	1.11524	0.273052
Alcohol life time - Duration score & Left DLPFC NAA	34	0.092262	0.52415	0.603787
Alcohol life time - Duration score & Left DLPFC NAA+NAAG	34	-0.408287	-2.53011	0.016522
Alcohol life time - Duration score & Left DLPFC ml	34	0.018185	0.10289	0.918693
Alcohol life time - Duration score & Right ACC NAA	34	-0.090927	-0.51650	0.609054
Alcohol life time - Duration score & Right ACC NAA+NAAG	34	-0.366212	-2.22627	0.033162
Alcohol life time - Duration score & Right ACC ml	34	0.217759	1.26212	0.216028
Alcohol life time - Duration score & Left ACC NAA	34	-0.060243	-0.34140	0.735031
Alcohol life time - Duration score & Left ACC NAA+NAAG	34	-0.203560	-1.17613	0.248218
Alcohol life time - Duration score & Left ACC ml	34	0.290679	1.71853	0.095362
Alcohol life time - Duration score & Right FWM NAA	34	-0.059895	-0.33943	0.736505
Alcohol life time - Duration score & Right FWM NAA+NAAG	34	-0.065578	-0.37176	0.712518
Alcohol life time - Duration score & Right FWM ml	34	0.153504	0.87876	0.386080
Alcohol life time - Duration score & Left FWM NAA	34	-0.004672	-0.02643	0.979080
Alcohol life time - Duration score & Left FWM NAA+NAAG	34	-0.084921	-0.48213	0.632996
Alcohol life time - Duration score & Left FWM ml	34	0.228421	1.32723	0.193825
Alcohol life time - Amount score & Right DLPFC NAA	25	0.014580	0.06993	0.944854
Alcohol life time - Amount score & Right DLPFC NAA+NAAG	25	0.068170	0.32770	0.746105
Alcohol life time - Amount score & Right DLPFC ml	25	0.069353	0.33341	0.741848
Alcohol life time - Amount score & Left DLPFC NAA	25	-0.195448	-0.95577	0.349127
Alcohol life time - Amount score & Left DLPFC NAA+NAAG	25	-0.076066	-0.36586	0.717813
Alcohol life time - Amount score & Left DLPFC ml	25	-0.101271	-0.48819	0.630040
Alcohol life time - Amount score & Right ACC NAA	25	-0.126096	-0.60960	0.548103
Alcohol life time - Amount score & Right ACC NAA+NAAG	25	-0.020885	-0.10018	0.921069
Alcohol life time - Amount score & Right ACC ml	25	-0.266874	-1.32805	0.197191
Alcohol life time - Amount score & Left ACC NAA	25	-0.079447	-0.38222	0.705806
Alcohol life time - Amount score & Left ACC NAA+NAAG	25	0.182051	0.88792	0.383774
Alcohol life time - Amount score & Left ACC ml	25	-0.167471	-0.81467	0.423618
Alcohol life time - Amount score & Right FWM NAA	25	-0.000788	-0.00378	0.997017
Alcohol life time - Amount score & Right FWM NAA+NAAG	25	0.066410	0.31920	0.752459
Alcohol life time - Amount score & Right FWM ml	25	-0.076460	-0.36777	0.716410
Alcohol life time - Amount score & Left FWM NAA	25	0.254162	1.26030	0.220197
Alcohol life time - Amount score & Left FWM NAA+NAAG	25	0.242734	1.20000	0.242354
Alcohol life time - Amount score & Left FWM ml	25	-0.169835	-0.82651	0.417008
Alcohol life time - Total score & Right DLPFC NAA	25	0.028818	0.13827	0.891234
Alcohol life time - Total score & Right DLPFC NAA+NAAG	25	0.001558	0.00747	0.994104
Alcohol life time - Total score & Right DLPFC ml	25	0.083340	0.40108	0.692064
Alcohol life time - Total score & Left DLPFC NAA	25	-0.218475	-1.07371	0.294090
Alcohol life time - Total score & Left DLPFC NAA+NAAG	25	-0.168464	-0.81964	0.420833
Alcohol life time - Total score & Left DLPFC ml	25	-0.198224	-0.96990	0.342188
Alcohol life time - Total score & Right ACC NAA	25	-0.197835	-0.96791	0.343157
Alcohol life time - Total score & Right ACC NAA+NAAG	25	-0.204455	-1.00169	0.326915
Alcohol life time - Total score & Right ACC ml	25	-0.194599	-0.95145	0.351266
Alcohol life time - Total score & Left ACC NAA	25	-0.200482	-0.98140	0.336606
Alcohol life time - Total score & Left ACC NAA+NAAG	25	-0.019082	-0.09153	0.927862
Alcohol life time - Total score & Left ACC ml	25	-0.161227	-0.78347	0.441345
Alcohol life time - Total score & Right FWM NAA	25	0.037776	0.18129	0.857725
Alcohol life time - Total score & Right FWM NAA+NAAG	25	0.039730	0.19069	0.850441
Alcohol life time - Total score & Right FWM ml	25	-0.052390	-0.25160	0.803587
Alcohol life time - Total score & Left FWM NAA	25	0.167848	0.81655	0.422560
Alcohol life time - Total score & Left FWM NAA+NAAG	25	0.179531	0.87522	0.390502
Alcohol life time - Total score & Left FWM ml	25	-0.144482	-0.70026	0.490790
Tobacco life time - Frequency score & Right DLPFC NAA	34	0.193591	1.11623	0.272635
Tobacco life time - Frequency score & Right DLPFC NAA+NAAG	34	0.102025	0.58017	0.565863
Tobacco life time - Frequency score & Right DLPFC ml	34	0.075496	0.42829	0.671307
Tobacco life time - Frequency score & Left DLPFC NAA	34	0.047311	0.26793	0.790470
Tobacco life time - Frequency score & Left DLPFC NAA+NAAG	34	-0.009093	-0.05144	0.959295
Tobacco life time - Frequency score & Left DLPFC ml	34	-0.087220	-0.49528	0.623786
Tobacco life time - Frequency score & Right ACC NAA	34	0.044898	0.25424	0.800940
Tobacco life time - Frequency score & Right ACC NAA+NAAG	34	0.055358	0.31363	0.755837
Tobacco life time - Frequency score & Right ACC ml	34	0.057137	0.32374	0.748240
Tobacco life time - Frequency score & Left ACC NAA	34	0.013279	0.07513	0.940583
Tobacco life time - Frequency score & Left ACC NAA+NAAG	34	-0.025508	-0.14434	0.886134
Tobacco life time - Frequency score & Left ACC ml	34	-0.044904	-0.25427	0.800910
Tobacco life time - Frequency score & Right FWM NAA	34	0.215959	1.25117	0.219941
Tobacco life time - Frequency score & Right FWM NAA+NAAG	34	0.098098	0.55761	0.580988
Tobacco life time - Frequency score & Right FWM ml	34	0.135347	0.77275	0.445342
Tobacco life time - Frequency score & Left FWM NAA	34	0.133416	0.76152	0.451922
Tobacco life time - Frequency score & Left FWM NAA+NAAG	34	0.207913	1.20241	0.238027
Tobacco life time - Frequency score & Left FWM ml	34	0.071455	0.40525	0.687991
Tobacco life time - Duration score & Right DLPFC NAA	34	0.225905	1.31182	0.198913
Tobacco life time - Duration score & Right DLPFC NAA+NAAG	34	0.135476	0.77350	0.444904
Tobacco life time - Duration score & Right DLPFC ml	34	0.130978	0.74736	0.460303
Tobacco life time - Duration score & Left DLPFC NAA	34	0.083706	0.47518	0.637886
Tobacco life time - Duration score & Left DLPFC NAA+NAAG	34	0.045554	0.25796	0.798088
Tobacco life time - Duration score & Left DLPFC ml	34	-0.090093	-0.51172	0.612357
Tobacco life time - Duration score & Right ACC NAA	34	0.010757	0.06086	0.951852
Tobacco life time - Duration score & Right ACC NAA+NAAG	34	0.099506	0.56570	0.575545
Tobacco life time - Duration score & Right ACC ml	34	0.037825	0.21412	0.831810
Tobacco life time - Duration score & Left ACC NAA	34	-0.028076	-0.15889	0.874756
Tobacco life time - Duration score & Left ACC NAA+NAAG	34	0.034628	0.19600	0.845847
Tobacco life time - Duration score & Left ACC ml	34	-0.034799	-0.19697	0.845096
Tobacco life time - Duration score & Right FWM NAA	34	0.271960	1.59870	0.119717
Tobacco life time - Duration score & Right FWM NAA+NAAG	34	0.226780	1.31718	0.197133
Tobacco life time - Duration score & Right FWM ml	34	0.236344	1.37595	0.178392
Tobacco life time - Duration score & Left FWM NAA	34	0.159356	0.91312	0.368007
Tobacco life time - Duration score & Left FWM NAA+NAAG	34	0.232629	1.35307	0.185517
Tobacco life time - Duration score & Left FWM ml	34	0.117164	0.66737	0.509318
Tobacco life time Amount score & Right DLPFC NAA	32	0.263797	1.49793	0.144600
Tobacco life time Amount score & Right DLPFC NAA+NAAG	32	0.133248	0.73640	0.467209
Tobacco life time Amount score & Right DLPFC ml	32	-0.014947	-0.08188	0.935287
Tobacco life time Amount score & Left DLPFC NAA	32	0.044545	0.24422	0.808720
Tobacco life time Amount score & Left DLPFC NAA+NAAG	32	0.064123	0.35194	0.727343
Tobacco life time Amount score & Left DLPFC ml	32	-0.095838	-0.52736	0.601825
Tobacco life time Amount score & Right ACC NAA	32	-0.028732	-0.15744	0.875955
Tobacco life time Amount score & Right ACC NAA+NAAG	32	0.127463	0.70389	0.486932
Tobacco life time Amount score & Right ACC ml	32	0.013597	0.07448	0.941121
Tobacco life time Amount score & Left ACC NAA	32	-0.127402	-0.70354	0.487143
Tobacco life time Amount score & Left ACC NAA+NAAG	32	-0.050238	-0.27551	0.784812
Tobacco life time Amount score & Left ACC ml	32	-0.158124	-0.87711	0.387395
Tobacco life time Amount score & Right FWM NAA	32	0.247213	1.39742	0.172538
Tobacco life time Amount score & Right FWM NAA+NAAG	32	0.203844	1.14045	0.263124

Group=CON
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Alcohol life time - Frequency score & ACC30 NAA abs	25	-0.35886	-1.8438	0.07812
Alcohol life time - Frequency score & ACC30 NAA+NAAG abs	25	-0.25716	-1.2762	0.21460
Alcohol life time - Frequency score & ACC30 ml abs	25	-0.25674	-1.2740	0.21537
Alcohol life time - Frequency score & Thal30 NAA abs	21	0.05191	0.2265	0.82316
Alcohol life time - Frequency score & Thal30 NAA+NAAG abs	24	-0.30920	-1.5250	0.14150
Alcohol life time - Frequency score & Thal30 ml abs	24	-0.15741	-0.7476	0.46256
Alcohol life time - Duration score & ACC30 NAA abs	25	0.11273	0.5441	0.59160
Alcohol life time - Duration score & ACC30 NAA+NAAG abs	25	0.11063	0.5338	0.59855
Alcohol life time - Duration score & ACC30 ml abs	25	0.13955	0.6758	0.50585
Alcohol life time - Duration score & Thal30 NAA abs	21	0.26281	1.1873	0.24973
Alcohol life time - Duration score & Thal30 NAA+NAAG abs	24	0.27984	1.3672	0.18536
Alcohol life time - Duration score & Thal30 ml abs	24	0.28460	1.3924	0.17769
Alcohol life time - Amount score & ACC30 NAA abs	19	-0.14787	-0.6164	0.54575
Alcohol life time - Amount score & ACC30 NAA+NAAG abs	19	-0.13795	-0.5742	0.57329
Alcohol life time - Amount score & ACC30 ml abs	19	-0.13344	-0.5551	0.58601
Alcohol life time - Amount score & Thal30 NAA abs	15	0.23276	0.8629	0.40380
Alcohol life time - Amount score & Thal30 NAA+NAAG abs	19	0.11811	0.4904	0.63009
Alcohol life time - Amount score & Thal30 ml abs	19	0.01082	0.0446	0.96493
Alcohol life time - Total score & ACC30 NAA abs	19	-0.08409	-0.3479	0.73213
Alcohol life time - Total score & ACC30 NAA+NAAG abs	19	-0.08230	-0.3405	0.73764
Alcohol life time - Total score & ACC30 ml abs	19	-0.10825	-0.4489	0.65912
Alcohol life time - Total score & Thal30 NAA abs	15	0.34211	1.3127	0.21198
Alcohol life time - Total score & Thal30 NAA+NAAG abs	19	0.07783	0.3218	0.75146
Alcohol life time - Total score & Thal30 ml abs	19	0.01878	0.0774	0.93915
Tobacco life time - Frequency score & ACC30 NAA abs	25	-0.31953	-1.6172	0.11946
Tobacco life time - Frequency score & ACC30 NAA+NAAG abs	25	-0.36722	-1.8934	0.07094
Tobacco life time - Frequency score & ACC30 ml abs	25	-0.38511	-2.0013	0.05729
Tobacco life time - Frequency score & Thal30 NAA abs	21	-0.00807	-0.0351	0.97229
Tobacco life time - Frequency score & Thal30 NAA+NAAG abs	24	-0.19629	-0.9389	0.35794
Tobacco life time - Frequency score & Thal30 ml abs	24	-0.30389	-1.4961	0.14882
Tobacco life time - Duration score & ACC30 NAA abs	25	-0.25277	-1.2529	0.22280
Tobacco life time - Duration score & ACC30 NAA+NAAG abs	25	-0.29685	-1.4908	0.14959
Tobacco life time - Duration score & ACC30 ml abs	25	-0.30117	-1.5146	0.14347
Tobacco life time - Duration score & Thal30 NAA abs	21	-0.01766	-0.0770	0.93940
Tobacco life time - Duration score & Thal30 NAA+NAAG abs	24	-0.19628	-0.9389	0.35796
Tobacco life time - Duration score & Thal30 ml abs	24	-0.33101	-1.6453	0.11410
Tobacco life time Amount score & ACC30 NAA abs	23	-0.34739	-1.6977	0.10433
Tobacco life time Amount score & ACC30 NAA+NAAG abs	23	-0.37498	-1.8536	0.07788
Tobacco life time Amount score & ACC30 ml abs	23	-0.38826	-1.9307	0.06712
Tobacco life time Amount score & Thal30 NAA abs	19	0.09948	0.4122	0.68531
Tobacco life time Amount score & Thal30 NAA+NAAG abs	22	-0.31969	-1.5088	0.14696
Tobacco life time Amount score & Thal30 ml abs	22	-0.43583	-2.1656	0.04260
Tobacco life time - Total score & ACC30 NAA abs	23	-0.30322	-1.4582	0.15957
Tobacco life time - Total score & ACC30 NAA+NAAG abs	23	-0.34726	-1.6970	0.10447
Tobacco life time - Total score & ACC30 ml abs	23	-0.39434	-1.9664	0.06259
Tobacco life time - Total score & Thal30 NAA abs	19	0.11631	0.4828	0.63536
Tobacco life time - Total score & Thal30 NAA+NAAG abs	22	-0.23507	-1.0816	0.29229
Tobacco life time - Total score & Thal30 ml abs	22	-0.39759	-1.9378	0.06688
Cocaine life time - Frequency score & ACC30 NAA abs	25	-0.33012	-1.6772	0.10702
Cocaine life time - Frequency score & ACC30 NAA+NAAG abs	25	-0.35137	-1.7999	0.08500
Cocaine life time - Frequency score & ACC30 ml abs	25	-0.41184	-2.1674	0.04079
Cocaine life time - Frequency score & Thal30 NAA abs	21	-0.11078	-0.4858	0.63260
Cocaine life time - Frequency score & Thal30 NAA+NAAG abs	24	-0.24659	-1.1934	0.24539
Cocaine life time - Frequency score & Thal30 ml abs	24	-0.34722	-1.7366	0.09643
Cocaine life time - Duration score & ACC30 NAA abs	25	-0.32359	-1.6401	0.11458
Cocaine life time - Duration score & ACC30 NAA+NAAG abs	25	-0.34320	-1.7523	0.09303
Cocaine life time - Duration score & ACC30 ml abs	25	-0.40530	-2.1262	0.04443
Cocaine life time - Duration score & Thal30 NAA abs	21	-0.11078	-0.4858	0.63260
Cocaine life time - Duration score & Thal30 NAA+NAAG abs	24	-0.23208	-1.1191	0.27515
Cocaine life time - Duration score & Thal30 ml abs	24	-0.34903	-1.7469	0.09458
Cocaine life time - Amount score & ACC30 NAA abs	25	-0.32359	-1.6401	0.11458
Cocaine life time - Amount score & ACC30 NAA+NAAG abs	25	-0.34320	-1.7523	0.09303
Cocaine life time - Amount score & ACC30 ml abs	25	-0.40530	-2.1262	0.04443
Cocaine life time - Amount score & Thal30 NAA abs	21	-0.11078	-0.4858	0.63260
Cocaine life time - Amount score & Thal30 NAA+NAAG abs	24	-0.23208	-1.1191	0.27515
Cocaine life time - Amount score & Thal30 ml abs	24	-0.34903	-1.7469	0.09458
Cocaine life time - Total score & ACC30 NAA abs	25	-0.32359	-1.6401	0.11458
Cocaine life time - Total score & ACC30 NAA+NAAG abs	25	-0.34320	-1.7523	0.09303
Cocaine life time - Total score & ACC30 ml abs	25	-0.40530	-2.1262	0.04443
Cocaine life time - Total score & Thal30 NAA abs	21	-0.11078	-0.4858	0.63260
Cocaine life time - Total score & Thal30 NAA+NAAG abs	24	-0.23208	-1.1191	0.27515
Cocaine life time - Total score & Thal30 ml abs	24	-0.34903	-1.7469	0.09458
Cannabis life time - Frequency score & ACC30 NAA abs	25	-0.55842	-3.2283	0.00371
Cannabis life time - Frequency score & ACC30 NAA+NAAG abs	25	-0.56949	-3.3226	0.00296
Cannabis life time - Frequency score & ACC30 ml abs	25	-0.51537	-2.8841	0.00837
Cannabis life time - Frequency score & Thal30 NAA abs	21	-0.38400	-1.8128	0.08569
Cannabis life time - Frequency score & Thal30 NAA+NAAG abs	24	-0.52013	-2.8564	0.00917
Cannabis life time - Frequency score & Thal30 ml abs	24	-0.27942	-1.3649	0.18605
Cannabis life time - Duration score & ACC30 NAA abs	25	-0.45788	-2.4701	0.02135
Cannabis life time - Duration score & ACC30 NAA+NAAG abs	25	-0.46244	-2.5013	0.01993
Cannabis life time - Duration score & ACC30 ml abs	25	-0.39826	-2.0823	0.04862
Cannabis life time - Duration score & Thal30 NAA abs	21	-0.30933	-1.4179	0.17240
Cannabis life time - Duration score & Thal30 NAA+NAAG abs	24	-0.44990	-2.3629	0.02739
Cannabis life time - Duration score & Thal30 ml abs	24	-0.21011	-1.0080	0.32440
Cannabis life time - Amount score & ACC30 NAA abs	22	-0.54120	-2.8783	0.00929
Cannabis life time - Amount score & ACC30 NAA+NAAG abs	22	-0.55654	-2.9957	0.00714
Cannabis life time - Amount score & ACC30 ml abs	22	-0.45430	-2.2806	0.03366
Cannabis life time - Amount score & Thal30 NAA abs	19	-0.38048	-1.6963	0.10804
Cannabis life time - Amount score & Thal30 NAA+NAAG abs	21	-0.42287	-2.0340	0.05614
Cannabis life time - Amount score & Thal30 ml abs	21	-0.30952	-1.4188	0.17213
Cannabis life time - Total score & ACC30 NAA abs	22	-0.46603	-2.3555	0.02881
Cannabis life time - Total score & ACC30 NAA+NAAG abs	22	-0.48578	-2.4854	0.02190
Cannabis life time - Total score & ACC30 ml abs	22	-0.40245	-1.9660	0.06332
Cannabis life time - Total score & Thal30 NAA abs	19	-0.27453	-1.1771	0.25535
Cannabis life time - Total score & Thal30 NAA+NAAG abs	21	-0.42723	-2.0597	0.05339
Cannabis life time - Total score & Thal30 ml abs	21	-0.28314	-1.2868	0.21360
Methamphetamine life time - Frequency score & ACC30 NAA abs	25	-0.13655	-0.6611	0.51511
Methamphetamine life time - Frequency score & ACC30 NAA+NAAG abs	25	-0.18776	-0.9168	0.36875
Methamphetamine life time - Frequency score & ACC30 ml abs	25	-0.15362	-0.7456	0.46344
Methamphetamine life time - Frequency score & Thal30 NAA abs	21	-0.13395	-0.5891	0.56267
Methamphetamine life time - Frequency score & Thal30 NAA+NAAG abs	24	-0.33671	-1.6772	0.10764
Methamphetamine life time - Frequency score & Thal30 ml abs	24	-0.08190	-0.3854	0.70360
Methamphetamine life time - Duration score & ACC30 NAA abs	25	-0.13655	-0.6611	0.51511
Methamphetamine life time - Duration score & ACC30 NAA+NAAG abs	25	-0.18776	-0.9168	0.36875
Methamphetamine life time - Duration score & ACC30 ml abs	25	-0.15362	-0.7456	0.46344
Methamphetamine life time - Duration score & Thal30 NAA abs	21	-0.13395	-0.5891	0.56267
Methamphetamine life time - Duration score & Thal30 NAA+NAAG abs	24	-0.33671	-1.6772	0.10764

Group=CON
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
IFNg (25)pg/ml & Right DLPFC NAA	34	0.102827	0.58477	0.562800
IFNg (25)pg/ml & Right DLPFC NAA+NAAG	34	0.130634	0.74537	0.461491
IFNg (25)pg/ml & Right DLPFC mI	34	0.195018	1.12478	0.269048
IFNg (25)pg/ml & Left DLPFC NAA	34	-0.021849	-0.12362	0.902386
IFNg (25)pg/ml & Left DLPFC NAA+NAAG	34	-0.152494	-0.87285	0.389249
IFNg (25)pg/ml & Left DLPFC mI	34	0.106188	0.60411	0.550033
IFNg (25)pg/ml & Right ACC NAA	34	0.283117	1.66987	0.104700
IFNg (25)pg/ml & Right ACC NAA+NAAG	34	0.301146	1.78647	0.083502
IFNg (25)pg/ml & Right ACC mI	34	0.126070	0.71889	0.477424
IFNg (25)pg/ml & Left ACC NAA	34	-0.007488	-0.04236	0.966474
IFNg (25)pg/ml & Left ACC NAA+NAAG	34	0.017114	0.09682	0.923471
IFNg (25)pg/ml & Left ACC mI	34	0.070599	0.40037	0.691546
IFNg (25)pg/ml & Right FWM NAA	34	-0.048128	-0.27257	0.786934
IFNg (25)pg/ml & Right FWM NAA+NAAG	34	-0.124083	-0.70739	0.484446
IFNg (25)pg/ml & Right FWM mI	34	-0.054855	-0.31078	0.757986
IFNg (25)pg/ml & Left FWM NAA	34	-0.437772	-2.75437	0.009617
IFNg (25)pg/ml & Left FWM NAA+NAAG	34	-0.211306	-1.22294	0.230281
IFNg (25)pg/ml & Left FWM mI	34	0.239132	1.39315	0.173176
IL-10 (27)pg/ml & Right DLPFC NAA	34	0.009190	0.05199	0.958862
IL-10 (27)pg/ml & Right DLPFC NAA+NAAG	34	-0.056058	-0.31761	0.752844
IL-10 (27)pg/ml & Right DLPFC mI	34	0.159262	0.91257	0.368294
IL-10 (27)pg/ml & Left DLPFC NAA	34	-0.025425	-0.14387	0.886503
IL-10 (27)pg/ml & Left DLPFC NAA+NAAG	34	-0.355519	-2.15169	0.039072
IL-10 (27)pg/ml & Left DLPFC mI	34	0.136622	0.78016	0.441027
IL-10 (27)pg/ml & Right ACC NAA	34	0.118395	0.67449	0.504845
IL-10 (27)pg/ml & Right ACC NAA+NAAG	34	0.234187	1.36265	0.182506
IL-10 (27)pg/ml & Right ACC mI	34	0.391162	2.40432	0.022165
IL-10 (27)pg/ml & Left ACC NAA	34	-0.069552	-0.39440	0.695901
IL-10 (27)pg/ml & Left ACC NAA+NAAG	34	0.035613	0.20159	0.841516
IL-10 (27)pg/ml & Left ACC mI	34	0.240886	1.40400	0.169950
IL-10 (27)pg/ml & Right FWM NAA	34	-0.060653	-0.34374	0.733293
IL-10 (27)pg/ml & Right FWM NAA+NAAG	34	0.012332	0.06976	0.944816
IL-10 (27)pg/ml & Right FWM mI	34	0.175921	1.01093	0.319634
IL-10 (27)pg/ml & Left FWM NAA	34	-0.286744	-1.69317	0.100139
IL-10 (27)pg/ml & Left FWM NAA+NAAG	34	-0.030173	-0.17076	0.865485
IL-10 (27)pg/ml & Left FWM mI	34	0.076051	0.43146	0.669026
IL-1b (46)pg/ml & Right DLPFC NAA	34	-0.006112	-0.03458	0.972633
IL-1b (46)pg/ml & Right DLPFC NAA+NAAG	34	-0.073038	-0.41427	0.681437
IL-1b (46)pg/ml & Right DLPFC mI	34	0.253191	1.48050	0.148519
IL-1b (46)pg/ml & Left DLPFC NAA	34	-0.040950	-0.23185	0.818135
IL-1b (46)pg/ml & Left DLPFC NAA+NAAG	34	-0.159077	-0.91148	0.368857
IL-1b (46)pg/ml & Left DLPFC mI	34	0.598059	4.22126	0.000187
IL-1b (46)pg/ml & Right ACC NAA	34	0.401559	2.48032	0.018576
IL-1b (46)pg/ml & Right ACC NAA+NAAG	34	0.340133	2.04607	0.049040
IL-1b (46)pg/ml & Right ACC mI	34	0.156644	0.89719	0.376319
IL-1b (46)pg/ml & Left ACC NAA	34	0.275562	1.62159	0.114703
IL-1b (46)pg/ml & Left ACC NAA+NAAG	34	0.208435	1.20557	0.236824
IL-1b (46)pg/ml & Left ACC mI	34	0.226179	1.31350	0.198355
IL-1b (46)pg/ml & Right FWM NAA	34	-0.089235	-0.50681	0.615761
IL-1b (46)pg/ml & Right FWM NAA+NAAG	34	-0.061129	-0.34645	0.731274
IL-1b (46)pg/ml & Right FWM mI	34	0.084658	0.48062	0.634055
IL-1b (46)pg/ml & Left FWM NAA	34	-0.350703	-2.11842	0.041998
IL-1b (46)pg/ml & Left FWM NAA+NAAG	34	-0.151272	-0.86569	0.393106
IL-1b (46)pg/ml & Left FWM mI	34	0.143032	0.81752	0.419679
IL-8 (63)pg/ml & Right DLPFC NAA	34	-0.051795	-0.29339	0.771117
IL-8 (63)pg/ml & Right DLPFC NAA+NAAG	34	-0.120550	-0.68694	0.497067
IL-8 (63)pg/ml & Right DLPFC mI	34	0.157114	0.89995	0.374869
IL-8 (63)pg/ml & Left DLPFC NAA	34	0.052101	0.29513	0.769803
IL-8 (63)pg/ml & Left DLPFC NAA+NAAG	34	-0.288945	-1.70734	0.097445
IL-8 (63)pg/ml & Left DLPFC mI	34	0.277311	1.63274	0.112326
IL-8 (63)pg/ml & Right ACC NAA	34	0.391291	2.40525	0.022117
IL-8 (63)pg/ml & Right ACC NAA+NAAG	34	0.167303	0.95994	0.344283
IL-8 (63)pg/ml & Right ACC mI	34	0.387683	2.37913	0.023487
IL-8 (63)pg/ml & Left ACC NAA	34	0.146099	0.83543	0.409672
IL-8 (63)pg/ml & Left ACC NAA+NAAG	34	0.044006	0.24918	0.804815
IL-8 (63)pg/ml & Left ACC mI	34	0.406632	2.51782	0.017009
IL-8 (63)pg/ml & Right FWM NAA	34	-0.181360	-1.04323	0.304661
IL-8 (63)pg/ml & Right FWM NAA+NAAG	34	-0.158619	-0.90879	0.370256
IL-8 (63)pg/ml & Right FWM mI	34	0.238062	1.38655	0.175164
IL-8 (63)pg/ml & Left FWM NAA	34	-0.373291	-2.27619	0.029667
IL-8 (63)pg/ml & Left FWM NAA+NAAG	34	-0.113216	-0.64459	0.523786
IL-8 (63)pg/ml & Left FWM mI	34	0.317519	1.89418	0.067271
TNFa (75)pg/ml & Right DLPFC NAA	34	0.098128	0.55779	0.580872
TNFa (75)pg/ml & Right DLPFC NAA+NAAG	34	-0.002293	-0.01297	0.989733
TNFa (75)pg/ml & Right DLPFC mI	34	0.288357	1.70356	0.098158
TNFa (75)pg/ml & Left DLPFC NAA	34	0.210776	1.21973	0.231481
TNFa (75)pg/ml & Left DLPFC NAA+NAAG	34	-0.243351	-1.41926	0.165490
TNFa (75)pg/ml & Left DLPFC mI	34	0.234773	1.36626	0.181382
TNFa (75)pg/ml & Right ACC NAA	34	0.315476	1.88064	0.069149
TNFa (75)pg/ml & Right ACC NAA+NAAG	34	0.244402	1.42578	0.163613

	Group=CON Spearman Rank Order Correlations (Spreadsheet Chapter 4) MD pairwise deleted Marked correlations are significant at p <,01000			
Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
IFNg (25)pg/ml & ACC30 NAA abs	25	0.110000	0.53076	0.600672
IFNg (25)pg/ml & ACC30 NAA+NAAG abs	25	0.026154	0.12547	0.901240
IFNg (25)pg/ml & ACC30 ml abs	25	0.123846	0.59855	0.555320
IFNg (25)pg/ml & Thal30 NAA abs	21	0.070130	0.30644	0.762600
IFNg (25)pg/ml & Thal30 NAA+NAAG abs	24	0.153043	0.72639	0.475255
IFNg (25)pg/ml & Thal30 ml abs	24	0.025217	0.11832	0.906890
IL-10 (27)pg/ml & ACC30 NAA abs	25	0.252512	1.25156	0.223310
IL-10 (27)pg/ml & ACC30 NAA+NAAG abs	25	0.122395	0.59143	0.560000
IL-10 (27)pg/ml & ACC30 ml abs	25	0.225098	1.10797	0.279328
IL-10 (27)pg/ml & Thal30 NAA abs	21	0.321616	1.48055	0.155119
IL-10 (27)pg/ml & Thal30 NAA+NAAG abs	24	0.319654	1.58233	0.127846
IL-10 (27)pg/ml & Thal30 ml abs	24	0.092577	0.43610	0.667015
IL-1b (46)pg/ml & ACC30 NAA abs	25	0.000000	0.00000	1.000000
IL-1b (46)pg/ml & ACC30 NAA+NAAG abs	25	-0.073077	-0.35140	0.728484
IL-1b (46)pg/ml & ACC30 ml abs	25	0.050000	0.24009	0.812386
IL-1b (46)pg/ml & Thal30 NAA abs	21	-0.066234	-0.28934	0.775454
IL-1b (46)pg/ml & Thal30 NAA+NAAG abs	24	0.157391	0.74755	0.462649
IL-1b (46)pg/ml & Thal30 ml abs	24	0.068696	0.32297	0.749764
IL-8 (63)pg/ml & ACC30 NAA abs	25	-0.002308	-0.01107	0.991265
IL-8 (63)pg/ml & ACC30 NAA+NAAG abs	25	-0.142308	-0.68950	0.497406
IL-8 (63)pg/ml & ACC30 ml abs	25	-0.047692	-0.22898	0.820905
IL-8 (63)pg/ml & Thal30 NAA abs	21	-0.170130	-0.75255	0.460943
IL-8 (63)pg/ml & Thal30 NAA+NAAG abs	24	-0.051304	-0.24096	0.811821
IL-8 (63)pg/ml & Thal30 ml abs	24	-0.151304	-0.71795	0.480346
TNFa (75)pg/ml & ACC30 NAA abs	25	0.007695	0.03691	0.970878
TNFa (75)pg/ml & ACC30 NAA+NAAG abs	25	-0.081570	-0.39250	0.698300
TNFa (75)pg/ml & ACC30 ml abs	25	0.021162	0.10151	0.920024
TNFa (75)pg/ml & Thal30 NAA abs	21	-0.056512	-0.24672	0.807768
TNFa (75)pg/ml & Thal30 NAA+NAAG abs	24	0.038278	0.17967	0.859057
TNFa (75)pg/ml & Thal30 ml abs	24	-0.166159	-0.79034	0.437765

Group=SCZ
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Duration of current diagnosis (years) & Right DLPFC NAA	36	0.020683	0.12063	0.904698
Duration of current diagnosis (years) & Right DLPFC NAA+NAAG	36	-0.011412	-0.06655	0.947333
Duration of current diagnosis (years) & Right DLPFC mI	36	-0.020423	-0.11911	0.905888
Duration of current diagnosis (years) & Left DLPFC NAA	36	-0.026970	-0.15732	0.875925
Duration of current diagnosis (years) & Left DLPFC NAA+NAAG	36	-0.003242	-0.01890	0.985030
Duration of current diagnosis (years) & Left DLPFC mI	36	0.086874	0.50848	0.614399
Duration of current diagnosis (years) & Right ACC NAA	36	0.031767	0.18533	0.854073
Duration of current diagnosis (years) & Right ACC NAA+NAAG	36	-0.078317	-0.45807	0.649818
Duration of current diagnosis (years) & Right ACC mI	36	0.006743	0.03932	0.968864
Duration of current diagnosis (years) & Left ACC NAA	36	0.059073	0.34505	0.732179
Duration of current diagnosis (years) & Left ACC NAA+NAAG	36	0.160220	0.94646	0.350593
Duration of current diagnosis (years) & Left ACC mI	36	-0.172723	-1.02250	0.313763
Duration of current diagnosis (years) & Right FWM NAA	36	-0.227877	-1.36464	0.181329
Duration of current diagnosis (years) & Right FWM NAA+NAAG	36	-0.063280	-0.36972	0.713883
Duration of current diagnosis (years) & Right FWM mI	36	0.000584	0.00340	0.997305
Duration of current diagnosis (years) & Left FWM NAA	36	0.342399	2.12496	0.040939
Duration of current diagnosis (years) & Left FWM NAA+NAAG	36	0.294484	1.79680	0.081256
Duration of current diagnosis (years) & Left FWM mI	36	0.098939	0.57976	0.565902
Duration of current diagnosis (months) & Right DLPFC NAA	8	-0.227549	-0.57239	0.587845
Duration of current diagnosis (months) & Right DLPFC NAA+NAAG	8	-0.131739	-0.32553	0.755833
Duration of current diagnosis (months) & Right DLPFC mI	8	0.359288	0.94304	0.382065
Duration of current diagnosis (months) & Left DLPFC NAA	8	-0.155691	-0.38607	0.712762
Duration of current diagnosis (months) & Left DLPFC NAA+NAAG	8	-0.179644	-0.44731	0.670344
Duration of current diagnosis (months) & Left DLPFC mI	8	0.071858	0.17647	0.865730
Duration of current diagnosis (months) & Right ACC NAA	8	-0.119763	-0.29548	0.777583
Duration of current diagnosis (months) & Right ACC NAA+NAAG	8	0.083834	0.20608	0.843546
Duration of current diagnosis (months) & Right ACC mI	8	0.311383	0.80263	0.452799
Duration of current diagnosis (months) & Left ACC NAA	8	0.179644	0.44731	0.670344
Duration of current diagnosis (months) & Left ACC NAA+NAAG	8	-0.035929	-0.08806	0.932691
Duration of current diagnosis (months) & Left ACC mI	8	0.167668	0.41660	0.691465
Duration of current diagnosis (months) & Right FWM NAA	8	0.143715	0.35572	0.734221
Duration of current diagnosis (months) & Right FWM NAA+NAAG	8	-0.071858	-0.17647	0.865730
Duration of current diagnosis (months) & Right FWM mI	8	0.538932	1.56717	0.168118
Duration of current diagnosis (months) & Left FWM NAA	8	0.602410	1.84868	0.113998
Duration of current diagnosis (months) & Left FWM NAA+NAAG	8	0.730552	2.62058	0.039556
Duration of current diagnosis (months) & Left FWM mI	8	0.634742	2.01209	0.090890
Number of psychotic episodes & Right DLPFC NAA	36	0.197803	1.17663	0.247515
Number of psychotic episodes & Right DLPFC NAA+NAAG	36	0.141372	0.83270	0.410827
Number of psychotic episodes & Right DLPFC mI	36	-0.162250	-0.95878	0.344441
Number of psychotic episodes & Left DLPFC NAA	36	0.125313	0.73650	0.466477
Number of psychotic episodes & Left DLPFC NAA+NAAG	36	0.066127	0.38643	0.701588
Number of psychotic episodes & Left DLPFC mI	36	-0.189345	-1.12440	0.268719
Number of psychotic episodes & Right ACC NAA	36	0.072674	0.42488	0.673600
Number of psychotic episodes & Right ACC NAA+NAAG	36	0.202308	1.20456	0.236692
Number of psychotic episodes & Right ACC mI	36	-0.314961	-1.93500	0.061344
Number of psychotic episodes & Left ACC NAA	36	0.235745	1.41448	0.166313
Number of psychotic episodes & Left ACC NAA+NAAG	36	0.165534	0.97873	0.334629
Number of psychotic episodes & Left ACC mI	36	-0.059059	-0.34498	0.732238
Number of psychotic episodes & Right FWM NAA	36	-0.090767	-0.53145	0.598559
Number of psychotic episodes & Right FWM NAA+NAAG	36	-0.052708	-0.30777	0.760137
Number of psychotic episodes & Right FWM mI	36	-0.157012	-0.92703	0.360447
Number of psychotic episodes & Left FWM NAA	36	0.250953	1.51167	0.139858
Number of psychotic episodes & Left FWM NAA+NAAG	36	0.072024	0.42106	0.676361
Number of psychotic episodes & Left FWM mI	36	-0.017482	-0.10195	0.919393
Onset of Meth use (age in years) & Right DLPFC NAA	13	0.096419	0.32128	0.754018
Onset of Meth use (age in years) & Right DLPFC NAA+NAAG	13	0.096419	0.32128	0.754018
Onset of Meth use (age in years) & Right DLPFC mI	13	0.140496	0.47064	0.647091
Onset of Meth use (age in years) & Left DLPFC NAA	13	-0.140496	-0.47064	0.647091
Onset of Meth use (age in years) & Left DLPFC NAA+NAAG	13	-0.077135	-0.25659	0.802229
Onset of Meth use (age in years) & Left DLPFC mI	13	0.190083	0.64214	0.533934
Onset of Meth use (age in years) & Right ACC NAA	13	-0.258954	-0.88918	0.392934
Onset of Meth use (age in years) & Right ACC NAA+NAAG	13	-0.184574	-0.62286	0.546071
Onset of Meth use (age in years) & Right ACC mI	13	-0.352618	-1.24978	0.237317
Onset of Meth use (age in years) & Left ACC NAA	13	0.110193	0.36771	0.720067
Onset of Meth use (age in years) & Left ACC NAA+NAAG	13	0.079890	0.26582	0.795298
Onset of Meth use (age in years) & Left ACC mI	13	0.157025	0.52734	0.608432
Onset of Meth use (age in years) & Right FWM NAA	13	-0.435263	-1.60347	0.137135
Onset of Meth use (age in years) & Right FWM NAA+NAAG	13	-0.179064	-0.60364	0.558322
Onset of Meth use (age in years) & Right FWM mI	13	-0.022069	-0.07321	0.942951
Onset of Meth use (age in years) & Left FWM NAA	13	0.096419	0.32128	0.754018
Onset of Meth use (age in years) & Left FWM NAA+NAAG	13	0.132232	0.44245	0.666738
Onset of Meth use (age in years) & Left FWM mI	13	-0.115703	-0.38634	0.706615
Duration of meth use (months) & Right DLPFC NAA	12	-0.060182	-0.19066	0.852610
Duration of meth use (months) & Right DLPFC NAA+NAAG	12	-0.060182	-0.19066	0.852610
Duration of meth use (months) & Right DLPFC mI	12	-0.520394	-1.92713	0.082826
Duration of meth use (months) & Left DLPFC NAA	12	0.180545	0.58047	0.574443
Duration of meth use (months) & Left DLPFC NAA+NAAG	12	0.113283	0.36055	0.725933
Duration of meth use (months) & Left DLPFC mI	12	-0.042481	-0.13446	0.895708
Duration of meth use (months) & Right ACC NAA	12	0.562875	2.15351	0.056727
Duration of meth use (months) & Right ACC NAA+NAAG	12	0.329229	1.10258	0.296036
Duration of meth use (months) & Right ACC mI	12	-0.046021	-0.14569	0.887064
Duration of meth use (months) & Left ACC NAA	12	0.113283	0.36055	0.725933
Duration of meth use (months) & Left ACC NAA+NAAG	12	0.141604	0.45235	0.660672
Duration of meth use (months) & Left ACC mI	12	-0.215946	-0.69938	0.500257
Duration of meth use (months) & Right FWM NAA	12	0.155764	0.49866	0.628807
Duration of meth use (months) & Right FWM NAA+NAAG	12	0.276127	0.90851	0.384979
Duration of meth use (months) & Right FWM mI	12	-0.413144	-1.43464	0.181915
Duration of meth use (months) & Left FWM NAA	12	0.092042	0.29230	0.776028
Duration of meth use (months) & Left FWM NAA+NAAG	12	0.010620	0.03359	0.973868
Duration of meth use (months) & Left FWM mI	12	0.127443	0.40632	0.693063
Duration of methamphetamine abstinence (clinical day) (months) & Right DLPFC NAA	13	-0.005517	-0.01830	0.985728
Duration of methamphetamine abstinence (clinical day) (months) & Right DLPFC NAA+NAAG	13	-0.005517	-0.01830	0.985728
Duration of methamphetamine abstinence (clinical day) (months) & Right DLPFC mI	13	0.548970	2.17832	0.052018
Duration of methamphetamine abstinence (clinical day) (months) & Left DLPFC NAA	13	-0.325520	-1.14182	0.277777
Duration of methamphetamine abstinence (clinical day) (months) & Left DLPFC NAA+NAAG	13	-0.284140	-0.98290	0.346782
Duration of methamphetamine abstinence (clinical day) (months) & Left DLPFC mI	13	0.457935	1.70846	0.115578
Duration of methamphetamine abstinence (clinical day) (months) & Right ACC NAA	13	-0.474487	-1.78776	0.101364
Duration of methamphetamine abstinence (clinical day) (months) & Right ACC NAA+NAAG	13	-0.587591	-2.40845	0.034709
Duration of methamphetamine abstinence (clinical day) (months) & Right ACC mI	13	0.206898	0.70138	0.497636
Duration of methamphetamine abstinence (clinical day) (months) & Left ACC NAA	13	-0.342072	-1.20736	0.252614
Duration of methamphetamine abstinence (clinical day) (months) & Left ACC NAA+NAAG	13	-0.388969	-1.40034	0.188982
Duration of methamphetamine abstinence (clinical day) (months) & Left ACC mI	13	-0.044138	-0.14653	0.886152
Duration of methamphetamine abstinence (clinical day) (months) & Right FWM NAA	13	-0.005517	-0.01830	0.985728
Duration of methamphetamine abstinence (clinical day) (months) & Right FWM NAA+NAAG	13	0.019311	0.06406	0.950074
Duration of methamphetamine abstinence (clinical day) (months) & Right FWM mI	13	0.671273	3.00369	0.012001
Duration of methamphetamine abstinence (clinical day) (months) & Left FWM NAA	13	-0.093794	-0.31246	0.760537
Duration of methamphetamine abstinence (clinical day) (months) & Left FWM NAA+NAAG	13	0.168277	0.56619	0.582633
Duration of methamphetamine abstinence (clinical day) (months) & Left FWM mI	13	0.140691	0.47131	0.646631
cpzeq(HT) & Right DLPFC NAA	33	0.162241	0.91545	0.367024
cpzeq(HT) & Right DLPFC NAA+NAAG	33	0.130902	0.73516	0.467770
cpzeq(HT) & Right DLPFC mI	33	-0.099541	-0.55699	0.581534
cpzeq(HT) & Left DLPFC NAA	33	0.041233	0.22977	0.819780
cpzeq(HT) & Left DLPFC NAA+NAAG	33	0.028221	0.15719	0.876115
cpzeq(HT) & Left DLPFC mI	33	-0.212923	-1.21333	0.234169
cpzeq(HT) & Right ACC NAA	33	0.297247	1.73335	0.092971
cpzeq(HT) & Right ACC NAA+NAAG	33	0.310766	1.82041	0.078364
cpzeq(HT) & Right ACC mI	33	-0.004732	-0.02635	0.979148
cpzeq(HT) & Left ACC NAA	33	0.423297	2.60137	0.014107
cpzeq(HT) & Left ACC NAA+NAAG	33	0.335917	1.98569	0.055973
cpzeq(HT) & Left ACC mI	33	0.220189	1.25681	0.218211
cpzeq(HT) & Right FWM NAA	33	-0.084669	-0.47312	0.639444
cpzeq(HT) & Right FWM NAA+NAAG	33	-0.149228	-0.84027	0.407190

Pair of Variables	Group=SCZ Spearman Rank Order Correlations (Spreadsheet Ch MD pairwise deleted Marked correlations are significant at p <,01000			
	Valid N	Spearman R	t(N-2)	p-value
Duration of current diagnosis (years) & ACC30 NAA abs	27	-0.175218	-0.88986	0.382025
Duration of current diagnosis (years) & ACC30 NAA+NAAG abs	27	-0.109627	-0.55146	0.586215
Duration of current diagnosis (years) & ACC30 mI abs	27	-0.218022	-1.11698	0.274623
Duration of current diagnosis (years) & Thal30 NAA abs	19	-0.083041	-0.34357	0.735380
Duration of current diagnosis (years) & Thal30 NAA+NAAG abs	27	0.008006	0.04003	0.968384
Duration of current diagnosis (years) & Thal30 mI abs	26	0.056131	0.27542	0.785352
Duration of current diagnosis (months) & ACC30 NAA abs	5	-0.600000	-1.29904	0.284757
Duration of current diagnosis (months) & ACC30 NAA+NAAG abs	5	-0.600000	-1.29904	0.284757
Duration of current diagnosis (months) & ACC30 mI abs	5	-0.700000	-1.69775	0.188120
Duration of current diagnosis (months) & Thal30 NAA abs	4	0.600000	1.06066	0.400000
Duration of current diagnosis (months) & Thal30 NAA+NAAG abs	5	0.100000	0.17408	0.872889
Duration of current diagnosis (months) & Thal30 mI abs	5	0.700000	1.69775	0.188120
Number of psychotic episodes & ACC30 NAA abs	27	0.045530	0.22789	0.821589
Number of psychotic episodes & ACC30 NAA+NAAG abs	27	0.041813	0.20925	0.835950
Number of psychotic episodes & ACC30 mI abs	27	-0.134111	-0.67667	0.504829
Number of psychotic episodes & Thal30 NAA abs	19	0.061229	0.25293	0.803358
Number of psychotic episodes & Thal30 NAA+NAAG abs	27	0.021371	0.10688	0.915737
Number of psychotic episodes & Thal30 mI abs	26	-0.107961	-0.53201	0.599610
Onset of Meth use (age in years) & ACC30 NAA abs	11	-0.537587	-1.91265	0.088088
Onset of Meth use (age in years) & ACC30 NAA+NAAG abs	11	-0.414580	-1.36673	0.204877
Onset of Meth use (age in years) & ACC30 mI abs	11	-0.405468	-1.33070	0.216016
Onset of Meth use (age in years) & Thal30 NAA abs	8	0.261905	0.66474	0.530923
Onset of Meth use (age in years) & Thal30 NAA+NAAG abs	11	0.077449	0.23305	0.820939
Onset of Meth use (age in years) & Thal30 mI abs	10	-0.243162	-0.70905	0.498434
Duration of meth use (months) & ACC30 NAA abs	10	0.438347	1.37942	0.205094
Duration of meth use (months) & ACC30 NAA+NAAG abs	10	0.333391	1.00019	0.346506
Duration of meth use (months) & ACC30 mI abs	10	0.129652	0.36983	0.721106
Duration of meth use (months) & Thal30 NAA abs	7	-0.504525	-1.30664	0.248203
Duration of meth use (months) & Thal30 NAA+NAAG abs	10	-0.271652	-0.79837	0.447706
Duration of meth use (months) & Thal30 mI abs	9	-0.204302	-0.55218	0.598006
Duration of methamphetamine abstinence (clinical day) (months) & ACC30 NAA abs	11	-0.547951	-1.96513	0.080974
Duration of methamphetamine abstinence (clinical day) (months) & ACC30 NAA+NAAG abs	11	-0.465758	-1.57900	0.148793
Duration of methamphetamine abstinence (clinical day) (months) & ACC30 mI abs	11	-0.360734	-1.16033	0.275768
Duration of methamphetamine abstinence (clinical day) (months) & Thal30 NAA abs	8	-0.035929	-0.08806	0.932691
Duration of methamphetamine abstinence (clinical day) (months) & Thal30 NAA+NAAG abs	11	0.077626	0.23358	0.820534
Duration of methamphetamine abstinence (clinical day) (months) & Thal30 mI abs	10	0.492403	1.60016	0.148230
cpzeq(HT) & ACC30 NAA abs	24	-0.094344	-0.44449	0.661028
cpzeq(HT) & ACC30 NAA+NAAG abs	24	-0.043003	-0.20189	0.841858
cpzeq(HT) & ACC30 mI abs	24	0.027206	0.12766	0.899582
cpzeq(HT) & Thal30 NAA abs	16	-0.248710	-0.96078	0.352965
cpzeq(HT) & Thal30 NAA+NAAG abs	24	-0.180789	-0.86218	0.397889
cpzeq(HT) & Thal30 mI abs	23	-0.043372	-0.19894	0.844222
Years of education - School (years) & ACC30 NAA abs	27	-0.129368	-0.65232	0.520148
Years of education - School (years) & ACC30 NAA+NAAG abs	27	-0.116746	-0.58775	0.561971
Years of education - School (years) & ACC30 mI abs	27	0.044490	0.22267	0.825602
Years of education - School (years) & Thal30 NAA abs	19	0.183229	0.76848	0.452744
Years of education - School (years) & Thal30 NAA+NAAG abs	27	0.179853	0.91417	0.369361
Years of education - School (years) & Thal30 mI abs	26	0.212931	1.06763	0.296311
Years of education - Post school (years) & ACC30 NAA abs	27	-0.153211	-0.77521	0.445489
Years of education - Post school (years) & ACC30 NAA+NAAG abs	27	-0.206969	-1.05775	0.300284
Years of education - Post school (years) & ACC30 mI abs	27	-0.135739	-0.68504	0.499623
Years of education - Post school (years) & Thal30 NAA abs	19	-0.055944	-0.23103	0.820053
Years of education - Post school (years) & Thal30 NAA+NAAG abs	27	-0.049726	-0.24894	0.805441
Years of education - Post school (years) & Thal30 mI abs	26	0.022928	0.11235	0.911479
Age on day & ACC30 NAA abs	27	-0.286990	-1.49797	0.146663
Age on day & ACC30 NAA+NAAG abs	27	-0.244939	-1.26317	0.218181
Age on day & ACC30 mI abs	27	-0.170046	-0.86279	0.396453
Age on day & Thal30 NAA abs	19	0.209879	0.88507	0.388467
Age on day & Thal30 NAA+NAAG abs	27	0.104667	0.52623	0.603369
Age on day & Thal30 mI abs	26	0.250002	1.26492	0.218043

Group=SCZ
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
PANSS positive score & Right DLPFC NAA	36	0.185658	1.10172	0.278322
PANSS positive score & Right DLPFC NAA+NAAG	36	0.087721	0.51347	0.610940
PANSS positive score & Right DLPFC mI	36	-0.178732	-1.05923	0.296962
PANSS positive score & Left DLPFC NAA	36	0.284942	1.73334	0.092097
PANSS positive score & Left DLPFC NAA+NAAG	36	0.243386	1.46317	0.152605
PANSS positive score & Left DLPFC mI	36	-0.318991	-1.96255	0.057924
PANSS positive score & Right ACC NAA	36	0.095930	0.56196	0.577832
PANSS positive score & Right ACC NAA+NAAG	36	0.223578	1.33753	0.189928
PANSS positive score & Right ACC mI	36	-0.099438	-0.58271	0.563934
PANSS positive score & Left ACC NAA	36	0.191509	1.13774	0.263184
PANSS positive score & Left ACC NAA+NAAG	36	0.154919	0.91437	0.366964
PANSS positive score & Left ACC mI	36	0.144487	0.85143	0.400487
PANSS positive score & Right FWM NAA	36	-0.165882	-0.98084	0.333602
PANSS positive score & Right FWM NAA+NAAG	36	-0.167144	-0.98852	0.329883
PANSS positive score & Right FWM mI	36	-0.340438	-2.11119	0.042186
PANSS positive score & Left FWM NAA	36	0.045841	0.26758	0.790642
PANSS positive score & Left FWM NAA+NAAG	36	-0.054377	-0.31754	0.752777
PANSS positive score & Left FWM mI	36	-0.280300	-1.70267	0.097757
PANSS negative score & Right DLPFC NAA	36	0.058258	0.34028	0.735740
PANSS negative score & Right DLPFC NAA+NAAG	36	-0.022389	-0.13058	0.896877
PANSS negative score & Right DLPFC mI	36	0.052387	0.30589	0.761555
PANSS negative score & Left DLPFC NAA	36	0.036772	0.21456	0.831392
PANSS negative score & Left DLPFC NAA+NAAG	36	0.091994	0.53870	0.593604
PANSS negative score & Left DLPFC mI	36	-0.218438	-1.30522	0.200581
PANSS negative score & Right ACC NAA	36	0.227599	1.36289	0.181877
PANSS negative score & Right ACC NAA+NAAG	36	0.261403	1.57914	0.123564
PANSS negative score & Right ACC mI	36	-0.019550	-0.11402	0.909896
PANSS negative score & Left ACC NAA	36	0.284037	1.72735	0.093180
PANSS negative score & Left ACC NAA+NAAG	36	0.306408	1.87693	0.069131
PANSS negative score & Left ACC mI	36	0.002839	0.01655	0.986890
PANSS negative score & Right FWM NAA	36	0.138866	0.81764	0.419255
PANSS negative score & Right FWM NAA+NAAG	36	-0.094710	-0.55474	0.582702
PANSS negative score & Right FWM mI	36	-0.076774	-0.44899	0.656285
PANSS negative score & Left FWM NAA	36	0.187392	1.11238	0.273780
PANSS negative score & Left FWM NAA+NAAG	36	0.178968	1.06068	0.296312
PANSS negative score & Left FWM mI	36	-0.214968	-1.28348	0.208004
PANSS general psychopathology score & Right DLPFC NAA	36	0.153192	0.90392	0.372396
PANSS general psychopathology score & Right DLPFC NAA+NAAG	36	0.051910	0.30309	0.763667
PANSS general psychopathology score & Right DLPFC mI	36	-0.100443	-0.58866	0.559983
PANSS general psychopathology score & Left DLPFC NAA	36	0.115988	0.68092	0.500536
PANSS general psychopathology score & Left DLPFC NAA+NAAG	36	0.105750	0.62010	0.539326
PANSS general psychopathology score & Left DLPFC mI	36	-0.340059	-2.10853	0.042431
PANSS general psychopathology score & Right ACC NAA	36	0.134131	0.78925	0.435438
PANSS general psychopathology score & Right ACC NAA+NAAG	36	0.259191	1.56481	0.126889
PANSS general psychopathology score & Right ACC mI	36	-0.076666	-0.44835	0.656743
PANSS general psychopathology score & Left ACC NAA	36	0.229623	1.37568	0.177917
PANSS general psychopathology score & Left ACC NAA+NAAG	36	0.236737	1.42079	0.164485
PANSS general psychopathology score & Left ACC mI	36	0.166800	0.98642	0.330894
PANSS general psychopathology score & Right FWM NAA	36	-0.015685	-0.09147	0.927656
PANSS general psychopathology score & Right FWM NAA+NAAG	36	-0.085215	-0.49870	0.621205
PANSS general psychopathology score & Right FWM mI	36	-0.298802	-1.82571	0.076689
PANSS general psychopathology score & Left FWM NAA	36	0.162944	0.96299	0.342354
PANSS general psychopathology score & Left FWM NAA+NAAG	36	0.027541	0.16065	0.873320
PANSS general psychopathology score & Left FWM mI	36	-0.252792	-1.52350	0.136881
PANSS total score & Right DLPFC NAA	36	0.170273	1.00757	0.320779
PANSS total score & Right DLPFC NAA+NAAG	36	0.062472	0.36498	0.717385
PANSS total score & Right DLPFC mI	36	-0.045466	-0.26539	0.792315
PANSS total score & Left DLPFC NAA	36	0.094404	0.55293	0.583926
PANSS total score & Left DLPFC NAA+NAAG	36	0.141027	0.83062	0.411983
PANSS total score & Left DLPFC mI	36	-0.321334	-1.97862	0.056006
PANSS total score & Right ACC NAA	36	0.180179	1.06810	0.293002
PANSS total score & Right ACC NAA+NAAG	36	0.265825	1.60786	0.117113
PANSS total score & Right ACC mI	36	-0.095511	-0.55948	0.579503
PANSS total score & Left ACC NAA	36	0.285779	1.73888	0.091104
PANSS total score & Left ACC NAA+NAAG	36	0.282154	1.71490	0.095466
PANSS total score & Left ACC mI	36	0.093509	0.54764	0.587514
PANSS total score & Right FWM NAA	36	0.029758	0.17360	0.863212
PANSS total score & Right FWM NAA+NAAG	36	-0.096278	-0.56401	0.576449
PANSS total score & Right FWM mI	36	-0.247166	-1.48736	0.146135
PANSS total score & Left FWM NAA	36	0.168502	0.99678	0.325912
PANSS total score & Left FWM NAA+NAAG	36	0.095183	0.55754	0.580812
PANSS total score & Left FWM mI	36	-0.288769	-1.75872	0.087624
CGI score & Right DLPFC NAA	36	0.169282	1.00153	0.323646
CGI score & Right DLPFC NAA+NAAG	36	0.104816	0.61456	0.542934
CGI score & Right DLPFC mI	36	0.004334	0.02527	0.979987
CGI score & Left DLPFC NAA	36	0.145871	0.85976	0.395943
CGI score & Left DLPFC NAA+NAAG	36	0.210139	1.25329	0.218649
CGI score & Left DLPFC mI	36	-0.190938	-1.13422	0.264636
CGI score & Right ACC NAA	36	0.149337	0.88065	0.384688
CGI score & Right ACC NAA+NAAG	36	0.251473	1.51501	0.139011
CGI score & Right ACC mI	36	-0.154557	-0.91218	0.368098
CGI score & Left ACC NAA	36	0.234118	1.40416	0.169342
CGI score & Left ACC NAA+NAAG	36	0.214500	1.28054	0.209021
CGI score & Left ACC mI	36	-0.016668	-0.09720	0.923134
CGI score & Right FWM NAA	36	0.142307	0.83832	0.407707
CGI score & Right FWM NAA+NAAG	36	0.019268	0.11237	0.911188
CGI score & Right FWM mI	36	-0.143680	-0.84657	0.403152
CGI score & Left FWM NAA	36	0.167114	0.98833	0.329971
CGI score & Left FWM NAA+NAAG	36	0.115344	0.67708	0.502934
CGI score & Left FWM mI	36	-0.319162	-1.96372	0.057782
GAF score & Right DLPFC NAA	36	-0.155570	-0.91830	0.364929
GAF score & Right DLPFC NAA+NAAG	36	-0.090257	-0.52844	0.600625
GAF score & Right DLPFC mI	36	0.156544	0.92420	0.361897
GAF score & Left DLPFC NAA	36	-0.160624	-0.94891	0.349361
GAF score & Left DLPFC NAA+NAAG	36	-0.294500	-1.79690	0.081239
GAF score & Left DLPFC mI	36	0.258531	1.56054	0.127894
GAF score & Right ACC NAA	36	-0.279307	-1.69613	0.099001
GAF score & Right ACC NAA+NAAG	36	-0.366696	-2.29829	0.027821
GAF score & Right ACC mI	36	0.124282	0.73035	0.470181
GAF score & Left ACC NAA	36	-0.356507	-2.22497	0.032823
GAF score & Left ACC NAA+NAAG	36	-0.385185	-2.43378	0.020348
GAF score & Left ACC mI	36	-0.042529	-0.24821	0.805467
GAF score & Right FWM NAA	36	-0.026626	-0.15531	0.877495
GAF score & Right FWM NAA+NAAG	36	0.067721	0.39579	0.694735
GAF score & Right FWM mI	36	0.322698	1.98799	0.054913
GAF score & Left FWM NAA	36	-0.246129	-1.48072	0.147890
GAF score & Left FWM NAA+NAAG	36	-0.174270	-1.03195	0.309381
GAF score & Left FWM mI	36	0.287571	1.75077	0.089005
Height (metres) & Right DLPFC NAA	36	0.058778	0.34333	0.733467
Height (metres) & Right DLPFC NAA+NAAG	36	0.069868	0.40839	0.685545
Height (metres) & Right DLPFC mI	36	-0.093516	-0.54769	0.587482
Height (metres) & Left DLPFC NAA	36	0.217181	1.29734	0.203248
Height (metres) & Left DLPFC NAA+NAAG	36	0.052588	0.30706	0.760670
Height (metres) & Left DLPFC mI	36	-0.090482	-0.52977	0.599717
Height (metres) & Right ACC NAA	36	-0.011600	-0.06764	0.946465
Height (metres) & Right ACC NAA+NAAG	36	-0.137913	-0.81192	0.422483
Height (metres) & Right ACC mI	36	-0.105769	-0.62021	0.539254
Height (metres) & Left ACC NAA	36	-0.106936	-0.62713	0.534761
Height (metres) & Left ACC NAA+NAAG	36	-0.050854	-0.29691	0.768340
Height (metres) & Left ACC mI	36	-0.290217	-1.76835	0.085975
Height (metres) & Right FWM NAA	36	-0.088055	-0.51545	0.609575
Height (metres) & Right FWM NAA+NAAG	36	0.041763	0.24373	0.808902

Pair of Variables	Group=SCZ Spearman Rank Order Correlations (Spreadsheet Chapte MD pairwise deleted Marked correlations are significant at p <,01000			
	Valid N	Spearman R	t(N-2)	p-value
PANSS positive score & ACC30 NAA abs	27	0.342811	1.82462	0.080032
PANSS positive score & ACC30 NAA+NAAG abs	27	0.335746	1.78218	0.086871
PANSS positive score & ACC30 ml abs	27	0.230998	1.18710	0.246347
PANSS positive score & Thal30 NAA abs	19	-0.428335	-1.95444	0.067300
PANSS positive score & Thal30 NAA+NAAG abs	27	-0.107512	-0.54070	0.593502
PANSS positive score & Thal30 ml abs	26	-0.203138	-1.01636	0.319595
PANSS negative score & ACC30 NAA abs	27	0.400981	2.18855	0.038185
PANSS negative score & ACC30 NAA+NAAG abs	27	0.388431	2.10765	0.045258
PANSS negative score & ACC30 ml abs	27	0.308541	1.62183	0.117385
PANSS negative score & Thal30 NAA abs	19	-0.009675	-0.03989	0.968645
PANSS negative score & Thal30 NAA+NAAG abs	27	0.159780	0.80930	0.425979
PANSS negative score & Thal30 ml abs	26	0.060700	0.29792	0.768330
PANSS general psychopathology score & ACC30 NAA abs	27	0.512453	2.98384	0.006277
PANSS general psychopathology score & ACC30 NAA+NAAG abs	27	0.463911	2.61836	0.014792
PANSS general psychopathology score & ACC30 ml abs	27	0.298624	1.56451	0.130270
PANSS general psychopathology score & Thal30 NAA abs	19	-0.300495	-1.29901	0.211285
PANSS general psychopathology score & Thal30 NAA+NAAG abs	27	0.030415	0.15215	0.880292
PANSS general psychopathology score & Thal30 ml abs	26	-0.189399	-0.94496	0.354094
PANSS total score & ACC30 NAA abs	27	0.440880	2.45598	0.021345
PANSS total score & ACC30 NAA+NAAG abs	27	0.410022	2.24774	0.033659
PANSS total score & ACC30 ml abs	27	0.280477	1.46103	0.156463
PANSS total score & Thal30 NAA abs	19	-0.254498	-1.08505	0.293049
PANSS total score & Thal30 NAA+NAAG abs	27	0.055912	0.28000	0.781783
PANSS total score & Thal30 ml abs	26	-0.073238	-0.35976	0.722176
CGI score & ACC30 NAA abs	27	0.214174	1.09631	0.283392
CGI score & ACC30 NAA+NAAG abs	27	0.212270	1.08610	0.287795
CGI score & ACC30 ml abs	27	0.103438	0.51998	0.607651
CGI score & Thal30 NAA abs	19	-0.168612	-0.70530	0.490175
CGI score & Thal30 NAA+NAAG abs	27	0.005394	0.02697	0.978697
CGI score & Thal30 ml abs	26	-0.153823	-0.76265	0.453103
GAF score & ACC30 NAA abs	27	-0.325544	-1.72150	0.097514
GAF score & ACC30 NAA+NAAG abs	27	-0.307373	-1.61505	0.118852
GAF score & ACC30 ml abs	27	-0.135207	-0.68230	0.501322
GAF score & Thal30 NAA abs	19	0.098942	0.40996	0.686954
GAF score & Thal30 NAA+NAAG abs	27	-0.022175	-0.11090	0.912579
GAF score & Thal30 ml abs	26	0.066473	0.32637	0.746971
Height (metres) & ACC30 NAA abs	27	-0.205748	-1.05123	0.303209
Height (metres) & ACC30 NAA+NAAG abs	27	-0.204219	-1.04308	0.306894
Height (metres) & ACC30 ml abs	27	-0.177316	-0.90086	0.376262
Height (metres) & Thal30 NAA abs	19	-0.260220	-1.11120	0.281953
Height (metres) & Thal30 NAA+NAAG abs	27	-0.028737	-0.14375	0.886853
Height (metres) & Thal30 ml abs	26	0.015066	0.07382	0.941769
Weight (kg) & ACC30 NAA abs	27	-0.202137	-1.03199	0.311958
Weight (kg) & ACC30 NAA+NAAG abs	27	-0.180153	-0.91575	0.368549
Weight (kg) & ACC30 ml abs	27	-0.074198	-0.37202	0.713014
Weight (kg) & Thal30 NAA abs	19	0.576569	2.90956	0.009763
Weight (kg) & Thal30 NAA+NAAG abs	27	0.240000	1.23613	0.227900
Weight (kg) & Thal30 ml abs	26	0.366279	1.92841	0.065715

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
	Group=SCZ Spearman Rank Order Correlations (Spreadsheet Chapter 4) MD pairwise deleted Marked correlations are significant at p <,01000			
Alcohol life time - Frequency score & Right DLPFC NAA	33	-0.047057	-0.26229	0.794833
Alcohol life time - Frequency score & Right DLPFC NAA+NAAG	33	-0.005567	-0.03099	0.975472
Alcohol life time - Frequency score & Right DLPFC mI	33	-0.272424	-1.57641	0.125082
Alcohol life time - Frequency score & Left DLPFC NAA	33	0.083321	0.46553	0.644807
Alcohol life time - Frequency score & Left DLPFC NAA+NAAG	33	0.072014	0.40200	0.690442
Alcohol life time - Frequency score & Left DLPFC mI	33	-0.212041	-1.20807	0.236157
Alcohol life time - Frequency score & Right ACC NAA	33	-0.056707	-0.31624	0.753941
Alcohol life time - Frequency score & Right ACC NAA+NAAG	33	-0.195168	-1.10796	0.276403
Alcohol life time - Frequency score & Right ACC mI	33	-0.252244	-1.45137	0.156723
Alcohol life time - Frequency score & Left ACC NAA	33	0.093425	0.52245	0.605068
Alcohol life time - Frequency score & Left ACC NAA+NAAG	33	-0.008263	-0.04601	0.963598
Alcohol life time - Frequency score & Left ACC mI	33	-0.064192	-0.35814	0.722663
Alcohol life time - Frequency score & Right FWM NAA	33	-0.279121	-1.61840	0.115707
Alcohol life time - Frequency score & Right FWM NAA+NAAG	33	-0.290603	-1.69098	0.100872
Alcohol life time - Frequency score & Right FWM mI	33	-0.307042	-1.79631	0.082198
Alcohol life time - Frequency score & Left FWM NAA	33	0.067166	0.37481	0.710353
Alcohol life time - Frequency score & Left FWM NAA+NAAG	33	-0.101072	-0.56564	0.575711
Alcohol life time - Frequency score & Left FWM mI	33	-0.157957	-0.89065	0.379978
Alcohol life time - Duration score & Right DLPFC NAA	35	0.101506	0.58613	0.561774
Alcohol life time - Duration score & Right DLPFC NAA+NAAG	35	0.171343	0.99907	0.325032
Alcohol life time - Duration score & Right DLPFC mI	35	-0.341616	-2.08805	0.044589
Alcohol life time - Duration score & Left DLPFC NAA	35	0.068074	0.39196	0.697606
Alcohol life time - Duration score & Left DLPFC NAA+NAAG	35	0.409207	2.57629	0.014650
Alcohol life time - Duration score & Left DLPFC mI	35	-0.165365	-0.96321	0.342446
Alcohol life time - Duration score & Right ACC NAA	35	-0.098210	-0.56691	0.574610
Alcohol life time - Duration score & Right ACC NAA+NAAG	35	-0.052317	-0.30095	0.765339
Alcohol life time - Duration score & Right ACC mI	35	-0.253726	-1.50685	0.141362
Alcohol life time - Duration score & Left ACC NAA	35	0.010022	0.05757	0.954435
Alcohol life time - Duration score & Left ACC NAA+NAAG	35	-0.027004	-0.15518	0.877624
Alcohol life time - Duration score & Left ACC mI	35	-0.012239	-0.07031	0.944370
Alcohol life time - Duration score & Right FWM NAA	35	-0.272524	-1.62712	0.113224
Alcohol life time - Duration score & Right FWM NAA+NAAG	35	-0.108619	-0.62768	0.534530
Alcohol life time - Duration score & Right FWM mI	35	-0.387664	-2.41588	0.021394
Alcohol life time - Duration score & Left FWM NAA	35	-0.166330	-0.96899	0.339599
Alcohol life time - Duration score & Left FWM NAA+NAAG	35	-0.067619	-0.38934	0.699529
Alcohol life time - Duration score & Left FWM mI	35	-0.093015	-0.53666	0.595104
Alcohol life time - Amount score & Right DLPFC NAA	30	0.067595	0.35850	0.722659
Alcohol life time - Amount score & Right DLPFC NAA+NAAG	30	0.198217	1.07010	0.293712
Alcohol life time - Amount score & Right DLPFC mI	30	-0.178578	-0.96039	0.345082
Alcohol life time - Amount score & Left DLPFC NAA	30	-0.056399	-0.29891	0.767215
Alcohol life time - Amount score & Left DLPFC NAA+NAAG	30	0.196369	1.05972	0.298329
Alcohol life time - Amount score & Left DLPFC mI	30	-0.048179	-0.25523	0.800407
Alcohol life time - Amount score & Right ACC NAA	30	-0.178330	-0.95901	0.345764
Alcohol life time - Amount score & Right ACC NAA+NAAG	30	-0.134490	-0.71818	0.478598
Alcohol life time - Amount score & Right ACC mI	30	-0.191595	-1.03296	0.310462
Alcohol life time - Amount score & Left ACC NAA	30	-0.199746	-1.07870	0.289929
Alcohol life time - Amount score & Left ACC NAA+NAAG	30	-0.147309	-0.78809	0.437268
Alcohol life time - Amount score & Left ACC mI	30	0.008449	0.04471	0.964655
Alcohol life time - Amount score & Right FWM NAA	30	-0.270241	-1.48525	0.148652
Alcohol life time - Amount score & Right FWM NAA+NAAG	30	0.006622	0.03504	0.972294
Alcohol life time - Amount score & Right FWM mI	30	-0.225596	-1.22533	0.230659
Alcohol life time - Amount score & Left FWM NAA	30	-0.123356	-0.65776	0.516062
Alcohol life time - Amount score & Left FWM NAA+NAAG	30	-0.176066	-0.94644	0.352021
Alcohol life time - Amount score & Left FWM mI	30	-0.135403	-0.72315	0.475588
Alcohol life time - Total score & Right DLPFC NAA	30	0.156084	0.83617	0.410141
Alcohol life time - Total score & Right DLPFC NAA+NAAG	30	0.250436	1.36880	0.181942
Alcohol life time - Total score & Right DLPFC mI	30	-0.227103	-1.23396	0.227475
Alcohol life time - Total score & Left DLPFC NAA	30	0.019480	0.10310	0.918620
Alcohol life time - Total score & Left DLPFC NAA+NAAG	30	0.253240	1.38517	0.176937
Alcohol life time - Total score & Left DLPFC mI	30	-0.109632	-0.58363	0.564139
Alcohol life time - Total score & Right ACC NAA	30	-0.179624	-0.96619	0.342219
Alcohol life time - Total score & Right ACC NAA+NAAG	30	-0.175773	-0.94481	0.352836
Alcohol life time - Total score & Right ACC mI	30	-0.224158	-1.21711	0.233723
Alcohol life time - Total score & Left ACC NAA	30	-0.159971	-0.85753	0.398434
Alcohol life time - Total score & Left ACC NAA+NAAG	30	-0.153156	-0.82010	0.419086
Alcohol life time - Total score & Left ACC mI	30	-0.039191	-0.20754	0.837092
Alcohol life time - Total score & Right FWM NAA	30	-0.327455	-1.83383	0.077328
Alcohol life time - Total score & Right FWM NAA+NAAG	30	-0.075437	-0.40031	0.691963
Alcohol life time - Total score & Right FWM mI	30	-0.287670	-1.58939	0.123202
Alcohol life time - Total score & Left FWM NAA	30	-0.117159	-0.62424	0.537521
Alcohol life time - Total score & Left FWM NAA+NAAG	30	-0.115421	-0.61486	0.543614
Alcohol life time - Total score & Left FWM mI	30	-0.166260	-0.89218	0.379900
Tobacco life time - Frequency score & Right DLPFC NAA	35	0.098914	0.57102	0.571855
Tobacco life time - Frequency score & Right DLPFC NAA+NAAG	35	0.117980	0.68251	0.499679
Tobacco life time - Frequency score & Right DLPFC mI	35	-0.089626	-0.51694	0.608645
Tobacco life time - Frequency score & Left DLPFC NAA	35	0.048069	0.27645	0.783924
Tobacco life time - Frequency score & Left DLPFC NAA+NAAG	35	0.148931	0.86519	0.393179
Tobacco life time - Frequency score & Left DLPFC mI	35	0.013850	0.07957	0.937059
Tobacco life time - Frequency score & Right ACC NAA	35	0.090760	0.52354	0.604098
Tobacco life time - Frequency score & Right ACC NAA+NAAG	35	0.153331	0.89136	0.379190
Tobacco life time - Frequency score & Right ACC mI	35	-0.181044	-1.05749	0.297966
Tobacco life time - Frequency score & Left ACC NAA	35	-0.109685	-0.63392	0.530506
Tobacco life time - Frequency score & Left ACC NAA+NAAG	35	-0.127603	-0.73907	0.465091
Tobacco life time - Frequency score & Left ACC mI	35	-0.311572	-1.88360	0.068456
Tobacco life time - Frequency score & Right FWM NAA	35	0.292567	1.75757	0.088094
Tobacco life time - Frequency score & Right FWM NAA+NAAG	35	0.394353	2.46517	0.019068
Tobacco life time - Frequency score & Right FWM mI	35	-0.109832	-0.63478	0.529950
Tobacco life time - Frequency score & Left FWM NAA	35	0.184505	1.07841	0.288669
Tobacco life time - Frequency score & Left FWM NAA+NAAG	35	0.024117	0.13858	0.890621
Tobacco life time - Frequency score & Left FWM mI	35	0.029495	0.16951	0.866431
Tobacco life time - Duration score & Right DLPFC NAA	35	0.170700	0.99520	0.326879
Tobacco life time - Duration score & Right DLPFC NAA+NAAG	35	0.215447	1.26741	0.213879
Tobacco life time - Duration score & Right DLPFC mI	35	-0.130097	-0.75375	0.456342
Tobacco life time - Duration score & Left DLPFC NAA	35	0.071258	0.41039	0.684172
Tobacco life time - Duration score & Left DLPFC NAA+NAAG	35	0.185603	1.08506	0.285759
Tobacco life time - Duration score & Left DLPFC mI	35	-0.024857	-0.14284	0.887286
Tobacco life time - Duration score & Right ACC NAA	35	0.038115	0.21911	0.827912
Tobacco life time - Duration score & Right ACC NAA+NAAG	35	0.094458	0.54506	0.589378
Tobacco life time - Duration score & Right ACC mI	35	-0.278423	-1.66527	0.105327
Tobacco life time - Duration score & Left ACC NAA	35	-0.120998	-0.70023	0.488692
Tobacco life time - Duration score & Left ACC NAA+NAAG	35	-0.178999	-1.04515	0.303549
Tobacco life time - Duration score & Left ACC mI	35	-0.419292	-2.65313	0.012169
Tobacco life time - Duration score & Right FWM NAA	35	0.197258	1.15587	0.256034
Tobacco life time - Duration score & Right FWM NAA+NAAG	35	0.286710	1.71920	0.094947
Tobacco life time - Duration score & Right FWM mI	35	-0.125953	-0.72936	0.470930
Tobacco life time - Duration score & Left FWM NAA	35	0.195600	1.14577	0.260131
Tobacco life time - Duration score & Left FWM NAA+NAAG	35	0.079550	0.45843	0.649648
Tobacco life time - Duration score & Left FWM mI	35	-0.036460	-0.20959	0.835278
Tobacco life time Amount score & Right DLPFC NAA	33	0.195215	1.10824	0.276285
Tobacco life time Amount score & Right DLPFC NAA+NAAG	33	0.275264	1.59419	0.121040
Tobacco life time Amount score & Right DLPFC mI	33	-0.120159	-0.67390	0.505369
Tobacco life time Amount score & Left DLPFC NAA	33	0.022549	0.12558	0.900874
Tobacco life time Amount score & Left DLPFC NAA+NAAG	33	0.172305	0.97392	0.337634
Tobacco life time Amount score & Left DLPFC mI	33	-0.055255	-0.30812	0.760055
Tobacco life time Amount score & Right ACC NAA	33	0.228421	1.30633	0.201050
Tobacco life time Amount score & Right ACC NAA+NAAG	33	0.191068	1.08379	0.286817
Tobacco life time Amount score & Right ACC mI	33	-0.187727	-1.06414	0.295485
Tobacco life time Amount score & Left ACC NAA	33	0.010588	0.05895	0.953367
Tobacco life time Amount score & Left ACC NAA+NAAG	33	-0.040455	-0.22543	0.823127
Tobacco life time Amount score & Left ACC mI	33	-0.404375	-2.46171	0.019592
Tobacco life time Amount score & Right FWM NAA	33	0.159449	0.89928	0.375437
Tobacco life time Amount score & Right FWM NAA+NAAG	33	0.297643	1.73588	0.092516

Group=SCZ
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Alcohol life time - Frequency score & ACC30 NAA abs	24	-0.156153	-0.74152	0.466222
Alcohol life time - Frequency score & ACC30 NAA+NAAG abs	24	-0.045901	-0.21552	0.831347
Alcohol life time - Frequency score & ACC30 ml abs	24	-0.189453	-0.90500	0.375268
Alcohol life time - Frequency score & Thal30 NAA abs	17	-0.143014	-0.55964	0.583983
Alcohol life time - Frequency score & Thal30 NAA+NAAG abs	24	-0.061201	-0.28760	0.776347
Alcohol life time - Frequency score & Thal30 ml abs	23	-0.014385	-0.06593	0.948061
Alcohol life time - Duration score & ACC30 NAA abs	26	-0.222217	-1.11655	0.275239
Alcohol life time - Duration score & ACC30 NAA+NAAG abs	26	-0.186015	-0.92747	0.362915
Alcohol life time - Duration score & ACC30 ml abs	26	-0.263811	-1.33987	0.192837
Alcohol life time - Duration score & Thal30 NAA abs	19	-0.131576	-0.54726	0.591312
Alcohol life time - Duration score & Thal30 NAA+NAAG abs	26	-0.186015	-0.92747	0.362915
Alcohol life time - Duration score & Thal30 ml abs	25	-0.076450	-0.36772	0.716444
Alcohol life time - Amount score & ACC30 NAA abs	22	0.024862	0.11122	0.912548
Alcohol life time - Amount score & ACC30 NAA+NAAG abs	22	-0.026019	-0.11640	0.908497
Alcohol life time - Amount score & ACC30 ml abs	22	-0.009829	-0.04396	0.965372
Alcohol life time - Amount score & Thal30 NAA abs	17	-0.291494	-1.18021	0.256297
Alcohol life time - Amount score & Thal30 NAA+NAAG abs	22	-0.039896	-0.17856	0.860079
Alcohol life time - Amount score & Thal30 ml abs	22	-0.202369	-0.92414	0.366428
Alcohol life time - Total score & ACC30 NAA abs	22	-0.064228	-0.28783	0.776438
Alcohol life time - Total score & ACC30 NAA+NAAG abs	22	-0.094621	-0.42507	0.675326
Alcohol life time - Total score & ACC30 ml abs	22	-0.075124	-0.33692	0.739691
Alcohol life time - Total score & Thal30 NAA abs	17	-0.205117	-0.81167	0.429671
Alcohol life time - Total score & Thal30 NAA+NAAG abs	22	-0.001720	-0.00769	0.993938
Alcohol life time - Total score & Thal30 ml abs	22	-0.136484	-0.61614	0.544750
Tobacco life time - Frequency score & ACC30 NAA abs	26	-0.066533	-0.32667	0.746752
Tobacco life time - Frequency score & ACC30 NAA+NAAG abs	26	-0.135107	-0.66801	0.510501
Tobacco life time - Frequency score & ACC30 ml abs	26	-0.295112	-1.51314	0.143303
Tobacco life time - Frequency score & Thal30 NAA abs	19	-0.186323	-0.78192	0.445016
Tobacco life time - Frequency score & Thal30 NAA+NAAG abs	26	-0.110616	-0.54525	0.590613
Tobacco life time - Frequency score & Thal30 ml abs	25	-0.155394	-0.75441	0.458261
Tobacco life time - Duration score & ACC30 NAA abs	26	-0.075150	-0.36920	0.715216
Tobacco life time - Duration score & ACC30 NAA+NAAG abs	26	-0.144518	-0.71550	0.481202
Tobacco life time - Duration score & ACC30 ml abs	26	-0.306379	-1.57677	0.127939
Tobacco life time - Duration score & Thal30 NAA abs	19	-0.212132	-0.89501	0.383278
Tobacco life time - Duration score & Thal30 NAA+NAAG abs	26	0.005781	0.02832	0.977641
Tobacco life time - Duration score & Thal30 ml abs	25	-0.074125	-0.35647	0.724737
Tobacco life time Amount score & ACC30 NAA abs	24	0.155590	0.73878	0.467852
Tobacco life time Amount score & ACC30 NAA+NAAG abs	24	0.107506	0.50719	0.617068
Tobacco life time Amount score & ACC30 ml abs	24	-0.190064	-0.90803	0.373701
Tobacco life time Amount score & Thal30 NAA abs	18	-0.309776	-1.30321	0.210946
Tobacco life time Amount score & Thal30 NAA+NAAG abs	24	0.040825	0.19165	0.849776
Tobacco life time Amount score & Thal30 ml abs	23	-0.155621	-0.72194	0.478293
Tobacco life time - Total score & ACC30 NAA abs	24	0.112026	0.52878	0.602255
Tobacco life time - Total score & ACC30 NAA+NAAG abs	24	0.063436	0.29814	0.768391
Tobacco life time - Total score & ACC30 ml abs	24	-0.230800	-1.11259	0.277895
Tobacco life time - Total score & Thal30 NAA abs	18	-0.294498	-1.23266	0.235509
Tobacco life time - Total score & Thal30 NAA+NAAG abs	24	-0.002699	-0.01266	0.990012
Tobacco life time - Total score & Thal30 ml abs	23	-0.191737	-0.89526	0.380796
Cocaine life time - Frequency score & ACC30 NAA abs	26	0.109593	0.54015	0.594072
Cocaine life time - Frequency score & ACC30 NAA+NAAG abs	26	0.102505	0.50483	0.618282
Cocaine life time - Frequency score & ACC30 ml abs	26	-0.012541	-0.06144	0.951517
Cocaine life time - Frequency score & Thal30 NAA abs	19	0.096257	0.39873	0.695057
Cocaine life time - Frequency score & Thal30 NAA+NAAG abs	26	0.080150	0.39392	0.697117
Cocaine life time - Frequency score & Thal30 ml abs	25	0.089965	0.43321	0.668896
Cocaine life time - Duration score & ACC30 NAA abs	26	0.109593	0.54015	0.594072
Cocaine life time - Duration score & ACC30 NAA+NAAG abs	26	0.102505	0.50483	0.618282
Cocaine life time - Duration score & ACC30 ml abs	26	-0.012541	-0.06144	0.951517
Cocaine life time - Duration score & Thal30 NAA abs	19	0.096257	0.39873	0.695057
Cocaine life time - Duration score & Thal30 NAA+NAAG abs	26	0.080150	0.39392	0.697117
Cocaine life time - Duration score & Thal30 ml abs	25	0.089965	0.43321	0.668896
Cocaine life time - Amount score & ACC30 NAA abs	25	0.169842	0.82654	0.416990
Cocaine life time - Amount score & ACC30 NAA+NAAG abs	25	0.254762	1.26349	0.219072
Cocaine life time - Amount score & ACC30 ml abs	25	0.028307	0.13581	0.893153
Cocaine life time - Amount score & Thal30 NAA abs	18	0.303863	1.27578	0.220245
Cocaine life time - Amount score & Thal30 NAA+NAAG abs	25	0.169842	0.82654	0.416990
Cocaine life time - Amount score & Thal30 ml abs	24	0.135552	0.64172	0.527687
Cocaine life time - Total score & ACC30 NAA abs	25	0.094054	0.45308	0.654740
Cocaine life time - Total score & ACC30 NAA+NAAG abs	25	0.116545	0.56277	0.579039
Cocaine life time - Total score & ACC30 ml abs	25	-0.047027	-0.22578	0.823364
Cocaine life time - Total score & Thal30 NAA abs	18	-0.036579	-0.14642	0.885422
Cocaine life time - Total score & Thal30 NAA+NAAG abs	25	-0.020447	-0.09808	0.922720
Cocaine life time - Total score & Thal30 ml abs	24	-0.096098	-0.45284	0.655102
Heroin life time score - Frequency score & ACC30 NAA abs	26	-0.253333	-1.28293	0.211770
Heroin life time score - Frequency score & ACC30 NAA+NAAG abs	26	-0.280000	-1.42887	0.165929
Heroin life time score - Frequency score & ACC30 ml abs	26	-0.253333	-1.28293	0.211770
Heroin life time score - Frequency score & Thal30 NAA abs	19	-0.344265	-1.51186	0.148936
Heroin life time score - Frequency score & Thal30 NAA+NAAG abs	26	-0.280000	-1.42887	0.165929
Heroin life time score - Frequency score & Thal30 ml abs	25	-0.283069	-1.41544	0.170337
Heroin life time score - Duration Score & ACC30 NAA abs	26	-0.253333	-1.28293	0.211770
Heroin life time score - Duration Score & ACC30 NAA+NAAG abs	26	-0.280000	-1.42887	0.165929
Heroin life time score - Duration Score & ACC30 ml abs	26	-0.253333	-1.28293	0.211770
Heroin life time score - Duration Score & Thal30 NAA abs	19	-0.344265	-1.51186	0.148936
Heroin life time score - Duration Score & Thal30 NAA+NAAG abs	26	-0.280000	-1.42887	0.165929
Heroin life time score - Duration Score & Thal30 ml abs	25	-0.283069	-1.41544	0.170337
Heroin life time score - Total score & ACC30 NAA abs	26	-0.253333	-1.28293	0.211770
Heroin life time score - Total score & ACC30 NAA+NAAG abs	26	-0.280000	-1.42887	0.165929
Heroin life time score - Total score & ACC30 ml abs	26	-0.253333	-1.28293	0.211770
Heroin life time score - Total score & Thal30 NAA abs	19	-0.344265	-1.51186	0.148936
Heroin life time score - Total score & Thal30 NAA+NAAG abs	26	-0.280000	-1.42887	0.165929
Heroin life time score - Total score & Thal30 ml abs	25	-0.283069	-1.41544	0.170337
Cannabis life time - Frequency score & ACC30 NAA abs	26	0.006352	0.03112	0.975430
Cannabis life time - Frequency score & ACC30 NAA+NAAG abs	26	0.093169	0.45843	0.650771
Cannabis life time - Frequency score & ACC30 ml abs	26	-0.168339	-0.83663	0.411055
Cannabis life time - Frequency score & Thal30 NAA abs	19	-0.375672	-1.67136	0.112956
Cannabis life time - Frequency score & Thal30 NAA+NAAG abs	26	-0.079758	-0.39198	0.698531
Cannabis life time - Frequency score & Thal30 ml abs	25	-0.015538	-0.07453	0.941235
Cannabis life time - Duration score & ACC30 NAA abs	26	0.065965	0.32387	0.748845
Cannabis life time - Duration score & ACC30 NAA+NAAG abs	26	0.116317	0.57373	0.571490
Cannabis life time - Duration score & ACC30 ml abs	26	-0.126855	-0.62652	0.536886
Cannabis life time - Duration score & Thal30 NAA abs	19	-0.414395	-1.87738	0.077735
Cannabis life time - Duration score & Thal30 NAA+NAAG abs	26	-0.074552	-0.36625	0.717389
Cannabis life time - Duration score & Thal30 ml abs	25	-0.008283	-0.03972	0.968657
Cannabis life time - Amount score & ACC30 NAA abs	20	0.073438	0.31241	0.758316
Cannabis life time - Amount score & ACC30 NAA+NAAG abs	20	0.119736	0.51168	0.615097
Cannabis life time - Amount score & ACC30 ml abs	20	-0.126122	-0.53940	0.596223
Cannabis life time - Amount score & Thal30 NAA abs	15	-0.299099	-1.13015	0.278832
Cannabis life time - Amount score & Thal30 NAA+NAAG abs	20	0.029535	0.12536	0.901628
Cannabis life time - Amount score & Thal30 ml abs	20	-0.059868	-0.25445	0.802029
Cannabis life time - Total score & ACC30 NAA abs	20	0.068923	0.29311	0.772788
Cannabis life time - Total score & ACC30 NAA+NAAG abs	20	0.129924	0.55593	0.585101
Cannabis life time - Total score & ACC30 ml abs	20	-0.148145	-0.63554	0.533074
Cannabis life time - Total score & Thal30 NAA abs	15	-0.324609	-1.23740	0.237823
Cannabis life time - Total score & Thal30 NAA+NAAG abs	20	-0.019013	-0.08068	0.936586
Cannabis life time - Total score & Thal30 ml abs	20	-0.076845	-0.32699	0.747444
Methamphetamine life time - Frequency score & ACC30 NAA abs	26	0.158162	0.78471	0.440301
Methamphetamine life time - Frequency score & ACC30 NAA+NAAG abs	26	0.151909	0.75294	0.458809
Methamphetamine life time - Frequency score & ACC30 ml abs	26	0.033104	0.16226	0.872457
Methamphetamine life time - Frequency score & Thal30 NAA abs	19	-0.044844	-0.18508	0.855354
Methamphetamine life time - Frequency score & Thal30 NAA+NAAG abs	26	0.169565	0.84290	0.407607
Methamphetamine life time - Frequency score & Thal30 ml abs	25	0.223706	1.10076	0.282390
Methamphetamine life time - Duration score & ACC30 NAA abs	26	0.182499	0.90933	0.372218
Methamphetamine life time - Duration score & ACC30 NAA+NAAG abs	26	0.203556	1.01854	0.318578

Pair of Variables	Group=SCZ Spearman Rank Order Correlations (Spreadsheet Chapter 4) MD pairwise deleted Marked correlations are significant at p <,01000 Valid N	Spearman R	t(N-2)	p-value
IFNg (25)pg/ml & Right DLPFC NAA	36	-0.308316	-1.88984	0.067330
IFNg (25)pg/ml & Right DLPFC NAA+NAAG	36	-0.218088	-1.30303	0.201322
IFNg (25)pg/ml & Right DLPFC mI	36	0.011972	0.06981	0.944750
IFNg (25)pg/ml & Left DLPFC NAA	36	-0.304177	-1.86187	0.071284
IFNg (25)pg/ml & Left DLPFC NAA+NAAG	36	-0.081740	-0.47822	0.635551
IFNg (25)pg/ml & Left DLPFC mI	36	0.097574	0.57167	0.571303
IFNg (25)pg/ml & Right ACC NAA	36	-0.085216	-0.49870	0.621199
IFNg (25)pg/ml & Right ACC NAA+NAAG	36	-0.091137	-0.53364	0.597064
IFNg (25)pg/ml & Right ACC mI	36	0.205793	1.22622	0.228542
IFNg (25)pg/ml & Left ACC NAA	36	-0.059354	-0.34670	0.730954
IFNg (25)pg/ml & Left ACC NAA+NAAG	36	0.067010	0.39161	0.697789
IFNg (25)pg/ml & Left ACC mI	36	-0.166710	-0.98587	0.331160
IFNg (25)pg/ml & Right FWM NAA	36	0.033220	0.19381	0.847479
IFNg (25)pg/ml & Right FWM NAA+NAAG	36	-0.040358	-0.23552	0.815221
IFNg (25)pg/ml & Right FWM mI	36	0.252446	1.52127	0.137438
IFNg (25)pg/ml & Left FWM NAA	36	-0.033863	-0.19757	0.844559
IFNg (25)pg/ml & Left FWM NAA+NAAG	36	0.147915	0.87208	0.389284
IFNg (25)pg/ml & Left FWM mI	36	0.082518	0.48281	0.632328
IL-10 (27)pg/ml & Right DLPFC NAA	36	-0.055208	-0.32241	0.749120
IL-10 (27)pg/ml & Right DLPFC NAA+NAAG	36	0.003244	0.01892	0.985019
IL-10 (27)pg/ml & Right DLPFC mI	36	0.150118	0.88537	0.382179
IL-10 (27)pg/ml & Left DLPFC NAA	36	-0.123772	-0.72730	0.472022
IL-10 (27)pg/ml & Left DLPFC NAA+NAAG	36	0.050728	0.29617	0.768898
IL-10 (27)pg/ml & Left DLPFC mI	36	0.059421	0.34709	0.730661
IL-10 (27)pg/ml & Right ACC NAA	36	-0.057604	-0.33645	0.738602
IL-10 (27)pg/ml & Right ACC NAA+NAAG	36	-0.017515	-0.10214	0.919243
IL-10 (27)pg/ml & Right ACC mI	36	0.233172	1.39815	0.171122
IL-10 (27)pg/ml & Left ACC NAA	36	0.125158	0.73557	0.467034
IL-10 (27)pg/ml & Left ACC NAA+NAAG	36	0.221429	1.32401	0.194333
IL-10 (27)pg/ml & Left ACC mI	36	0.268643	1.62622	0.113136
IL-10 (27)pg/ml & Right FWM NAA	36	-0.084482	-0.49438	0.624218
IL-10 (27)pg/ml & Right FWM NAA+NAAG	36	-0.094392	-0.55286	0.583975
IL-10 (27)pg/ml & Right FWM mI	36	0.197606	1.17541	0.247997
IL-10 (27)pg/ml & Left FWM NAA	36	-0.246309	-1.48187	0.147584
IL-10 (27)pg/ml & Left FWM NAA+NAAG	36	-0.022706	-0.13243	0.895424
IL-10 (27)pg/ml & Left FWM mI	36	0.016413	0.09572	0.924307
IL-1b (46)pg/ml & Right DLPFC NAA	36	-0.118980	-0.69873	0.489472
IL-1b (46)pg/ml & Right DLPFC NAA+NAAG	36	-0.048741	-0.28455	0.777718
IL-1b (46)pg/ml & Right DLPFC mI	36	0.181110	1.07380	0.290474
IL-1b (46)pg/ml & Left DLPFC NAA	36	-0.228674	-1.36968	0.179765
IL-1b (46)pg/ml & Left DLPFC NAA+NAAG	36	-0.022661	-0.13217	0.895628
IL-1b (46)pg/ml & Left DLPFC mI	36	0.148973	0.87846	0.385861
IL-1b (46)pg/ml & Right ACC NAA	36	0.183609	1.08913	0.283755
IL-1b (46)pg/ml & Right ACC NAA+NAAG	36	0.159016	0.93917	0.354270
IL-1b (46)pg/ml & Right ACC mI	36	0.303136	1.85484	0.072307
IL-1b (46)pg/ml & Left ACC NAA	36	0.030200	0.17617	0.861203
IL-1b (46)pg/ml & Left ACC NAA+NAAG	36	0.100122	0.58676	0.561243
IL-1b (46)pg/ml & Left ACC mI	36	0.030518	0.17803	0.859756
IL-1b (46)pg/ml & Right FWM NAA	36	0.118230	0.69427	0.492233
IL-1b (46)pg/ml & Right FWM NAA+NAAG	36	0.177054	1.04896	0.301594
IL-1b (46)pg/ml & Right FWM mI	36	0.364924	2.28547	0.028643
IL-1b (46)pg/ml & Left FWM NAA	36	0.030266	0.17656	0.860901
IL-1b (46)pg/ml & Left FWM NAA+NAAG	36	0.067602	0.39509	0.695244
IL-1b (46)pg/ml & Left FWM mI	36	0.275946	1.67403	0.103302
IL-8 (63)pg/ml & Right DLPFC NAA	36	-0.179174	-1.06194	0.295749
IL-8 (63)pg/ml & Right DLPFC NAA+NAAG	36	-0.122675	-0.72076	0.475987
IL-8 (63)pg/ml & Right DLPFC mI	36	-0.115330	-0.67700	0.502985
IL-8 (63)pg/ml & Left DLPFC NAA	36	-0.173242	-1.02567	0.312289
IL-8 (63)pg/ml & Left DLPFC NAA+NAAG	36	-0.028187	-0.16442	0.870372
IL-8 (63)pg/ml & Left DLPFC mI	36	0.014029	0.08181	0.935276
IL-8 (63)pg/ml & Right ACC NAA	36	0.036682	0.21403	0.831799
IL-8 (63)pg/ml & Right ACC NAA+NAAG	36	0.108887	0.63871	0.527288
IL-8 (63)pg/ml & Right ACC mI	36	0.057411	0.33532	0.739447
IL-8 (63)pg/ml & Left ACC NAA	36	-0.001995	-0.01163	0.990785
IL-8 (63)pg/ml & Left ACC NAA+NAAG	36	0.083221	0.48695	0.629422
IL-8 (63)pg/ml & Left ACC mI	36	-0.248166	-1.49377	0.144459
IL-8 (63)pg/ml & Right FWM NAA	36	0.230190	1.37927	0.176819
IL-8 (63)pg/ml & Right FWM NAA+NAAG	36	0.165401	0.97791	0.335024
IL-8 (63)pg/ml & Right FWM mI	36	0.106964	0.62730	0.534654
IL-8 (63)pg/ml & Left FWM NAA	36	0.291986	1.78013	0.083994
IL-8 (63)pg/ml & Left FWM NAA+NAAG	36	0.244562	1.47069	0.150571
IL-8 (63)pg/ml & Left FWM mI	36	0.211482	1.26168	0.215653
TNFa (75)pg/ml & Right DLPFC NAA	36	-0.081225	-0.47519	0.637689
TNFa (75)pg/ml & Right DLPFC NAA+NAAG	36	-0.009526	-0.05555	0.956026
TNFa (75)pg/ml & Right DLPFC mI	36	0.305207	1.86882	0.070284
TNFa (75)pg/ml & Left DLPFC NAA	36	-0.410992	-2.62876	0.012772
TNFa (75)pg/ml & Left DLPFC NAA+NAAG	36	-0.280731	-1.70551	0.097220
TNFa (75)pg/ml & Left DLPFC mI	36	0.083923	0.49109	0.626521
TNFa (75)pg/ml & Right ACC NAA	36	-0.278157	-1.68856	0.100457
TNFa (75)pg/ml & Right ACC NAA+NAAG	36	-0.096795	-0.56707	0.574392

Pair of Variables	Group=SCZ Spearman Rank Order Correlations (Spreadsheet Chapter 4) MD pairwise deleted Marked correlations are significant at p <,01000 Valid N	Spearman R	t(N-2)	p-value
IFNg (25)pg/ml & ACC30 NAA abs	27	-0.440000	-2.44989	0.021636
IFNg (25)pg/ml & ACC30 NAA+NAAG abs	27	-0.363053	-1.94820	0.062702
IFNg (25)pg/ml & ACC30 ml abs	27	-0.510840	-2.97112	0.006471
IFNg (25)pg/ml & Thal30 NAA abs	19	0.019307	0.07962	0.937470
IFNg (25)pg/ml & Thal30 NAA+NAAG abs	27	-0.182595	-0.92859	0.361982
IFNg (25)pg/ml & Thal30 ml abs	26	-0.123119	-0.60778	0.549041
IL-10 (27)pg/ml & ACC30 NAA abs	27	-0.510899	-2.97159	0.006464
IL-10 (27)pg/ml & ACC30 NAA+NAAG abs	27	-0.359395	-1.92564	0.065596
IL-10 (27)pg/ml & ACC30 ml abs	27	-0.282869	-1.47457	0.152811
IL-10 (27)pg/ml & Thal30 NAA abs	19	-0.168190	-0.70349	0.491276
IL-10 (27)pg/ml & Thal30 NAA+NAAG abs	27	-0.241043	-1.24183	0.225824
IL-10 (27)pg/ml & Thal30 ml abs	26	-0.201095	-1.00570	0.324591
IL-1b (46)pg/ml & ACC30 NAA abs	27	-0.280477	-1.46103	0.156463
IL-1b (46)pg/ml & ACC30 NAA+NAAG abs	27	-0.251146	-1.29731	0.206370
IL-1b (46)pg/ml & ACC30 ml abs	27	-0.232203	-1.19364	0.243823
IL-1b (46)pg/ml & Thal30 NAA abs	19	-0.043956	-0.18141	0.858190
IL-1b (46)pg/ml & Thal30 NAA+NAAG abs	27	-0.123434	-0.62193	0.539621
IL-1b (46)pg/ml & Thal30 ml abs	26	0.234731	1.18299	0.248399
IL-8 (63)pg/ml & ACC30 NAA abs	27	-0.460998	-2.59746	0.015515
IL-8 (63)pg/ml & ACC30 NAA+NAAG abs	27	-0.425889	-2.35356	0.026763
IL-8 (63)pg/ml & ACC30 ml abs	27	-0.470768	-2.66797	0.013199
IL-8 (63)pg/ml & Thal30 NAA abs	19	0.398246	1.79009	0.091267
IL-8 (63)pg/ml & Thal30 NAA+NAAG abs	27	-0.013738	-0.06870	0.945776
IL-8 (63)pg/ml & Thal30 ml abs	26	0.080356	0.39494	0.696377
TNFa (75)pg/ml & ACC30 NAA abs	27	-0.553503	-3.32296	0.002745
TNFa (75)pg/ml & ACC30 NAA+NAAG abs	27	-0.568463	-3.45482	0.001977
TNFa (75)pg/ml & ACC30 ml abs	27	-0.386201	-2.09342	0.046617
TNFa (75)pg/ml & Thal30 NAA abs	19	0.047368	0.19552	0.847300
TNFa (75)pg/ml & Thal30 NAA+NAAG abs	27	-0.058922	-0.29512	0.770336
TNFa (75)pg/ml & Thal30 ml abs	26	0.032484	0.15922	0.874825

Group=MPD
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Duration of current diagnosis (years) & Right DLPFC NAA	25	-0.033380	-0.16017	0.874143
Duration of current diagnosis (years) & Right DLPFC NAA+NAAG	25	-0.071417	-0.34338	0.734430
Duration of current diagnosis (years) & Right DLPFC mI	25	0.409407	2.15207	0.042123
Duration of current diagnosis (years) & Left DLPFC NAA	25	-0.260779	-1.29548	0.208008
Duration of current diagnosis (years) & Left DLPFC NAA+NAAG	25	-0.049672	-0.23851	0.813595
Duration of current diagnosis (years) & Left DLPFC mI	25	0.043851	0.21051	0.835127
Duration of current diagnosis (years) & Right ACC NAA	26	-0.018283	-0.08958	0.929362
Duration of current diagnosis (years) & Right ACC NAA+NAAG	26	-0.162131	-0.80493	0.428764
Duration of current diagnosis (years) & Right ACC mI	26	-0.047260	-0.23178	0.818672
Duration of current diagnosis (years) & Left ACC NAA	26	-0.006554	-0.03211	0.974650
Duration of current diagnosis (years) & Left ACC NAA+NAAG	26	-0.157647	-0.78209	0.441811
Duration of current diagnosis (years) & Left ACC mI	26	0.055539	0.27250	0.787566
Duration of current diagnosis (years) & Right FWM NAA	25	-0.118382	-0.57176	0.573030
Duration of current diagnosis (years) & Right FWM NAA+NAAG	25	0.039582	0.18998	0.850992
Duration of current diagnosis (years) & Right FWM mI	25	0.383092	1.98899	0.058726
Duration of current diagnosis (years) & Left FWM NAA	25	0.015914	0.07633	0.939817
Duration of current diagnosis (years) & Left FWM NAA+NAAG	25	-0.023284	-0.11170	0.912034
Duration of current diagnosis (years) & Left FWM mI	25	0.066747	0.32082	0.751242
Duration of current diagnosis (months) & Right DLPFC NAA	14	-0.059869	-0.20777	0.838896
Duration of current diagnosis (months) & Right DLPFC NAA+NAAG	14	-0.210651	-0.74647	0.469758
Duration of current diagnosis (months) & Right DLPFC mI	14	0.017739	0.06146	0.952005
Duration of current diagnosis (months) & Left DLPFC NAA	14	-0.365868	-1.36182	0.198272
Duration of current diagnosis (months) & Left DLPFC NAA+NAAG	14	-0.567650	-2.38852	0.034227
Duration of current diagnosis (months) & Left DLPFC mI	14	-0.190695	-0.67294	0.513739
Duration of current diagnosis (months) & Right ACC NAA	14	0.589824	2.53019	0.026410
Duration of current diagnosis (months) & Right ACC NAA+NAAG	14	0.037695	0.13067	0.898198
Duration of current diagnosis (months) & Right ACC mI	14	0.011087	0.03841	0.969994
Duration of current diagnosis (months) & Left ACC NAA	14	0.254999	0.91354	0.378946
Duration of current diagnosis (months) & Left ACC NAA+NAAG	14	0.037695	0.13067	0.898198
Duration of current diagnosis (months) & Left ACC mI	14	-0.068739	-0.23868	0.815379
Duration of current diagnosis (months) & Right FWM NAA	14	0.000000	0.00000	1.000000
Duration of current diagnosis (months) & Right FWM NAA+NAAG	14	0.279390	1.00798	0.333359
Duration of current diagnosis (months) & Right FWM mI	14	-0.372520	-1.39053	0.189617
Duration of current diagnosis (months) & Left FWM NAA	14	0.199564	0.70550	0.493966
Duration of current diagnosis (months) & Left FWM NAA+NAAG	14	-0.124173	-0.43350	0.672339
Duration of current diagnosis (months) & Left FWM mI	14	0.305999	1.11342	0.287334
Number of psychotic episodes & Right DLPFC NAA	27	0.073231	0.36714	0.716604
Number of psychotic episodes & Right DLPFC NAA+NAAG	27	0.036934	0.18480	0.854880
Number of psychotic episodes & Right DLPFC mI	27	0.415124	2.28149	0.031302
Number of psychotic episodes & Left DLPFC NAA	27	-0.161084	-0.81607	0.422165
Number of psychotic episodes & Left DLPFC NAA+NAAG	27	0.092321	0.46358	0.646958
Number of psychotic episodes & Left DLPFC mI	27	0.357504	1.91401	0.067133
Number of psychotic episodes & Right ACC NAA	28	0.068292	0.34904	0.729873
Number of psychotic episodes & Right ACC NAA+NAAG	28	0.353126	1.92458	0.065290
Number of psychotic episodes & Right ACC mI	28	0.256094	1.35088	0.188374
Number of psychotic episodes & Left ACC NAA	28	0.250119	1.31723	0.199253
Number of psychotic episodes & Left ACC NAA+NAAG	28	0.302476	1.61813	0.117704
Number of psychotic episodes & Left ACC mI	28	0.202314	1.05339	0.301854
Number of psychotic episodes & Right FWM NAA	27	-0.164292	-0.83278	0.412856
Number of psychotic episodes & Right FWM NAA+NAAG	27	-0.023558	-0.11782	0.907151
Number of psychotic episodes & Right FWM mI	27	0.293879	1.53728	0.136787
Number of psychotic episodes & Left FWM NAA	27	0.038526	0.19277	0.848695
Number of psychotic episodes & Left FWM NAA+NAAG	27	-0.033108	-0.16563	0.869779
Number of psychotic episodes & Left FWM mI	27	0.237487	1.22241	0.232954
Onset of Meth use (age in years) & Right DLPFC NAA	27	-0.108437	-0.54540	0.590312
Onset of Meth use (age in years) & Right DLPFC NAA+NAAG	27	-0.084817	-0.42562	0.674028
Onset of Meth use (age in years) & Right DLPFC mI	27	-0.017175	-0.08589	0.932238
Onset of Meth use (age in years) & Left DLPFC NAA	27	0.108574	0.54610	0.589841
Onset of Meth use (age in years) & Left DLPFC NAA+NAAG	27	0.086797	0.43563	0.666842
Onset of Meth use (age in years) & Left DLPFC mI	27	0.063488	0.31808	0.753065
Onset of Meth use (age in years) & Right ACC NAA	28	-0.132803	-0.68322	0.500513
Onset of Meth use (age in years) & Right ACC NAA+NAAG	28	-0.136653	-0.70339	0.488063
Onset of Meth use (age in years) & Right ACC mI	28	-0.003574	-0.01823	0.985598
Onset of Meth use (age in years) & Left ACC NAA	28	-0.100633	-0.51575	0.610387
Onset of Meth use (age in years) & Left ACC NAA+NAAG	28	-0.199067	-1.03578	0.309844
Onset of Meth use (age in years) & Left ACC mI	28	0.001650	0.00841	0.993352
Onset of Meth use (age in years) & Right FWM NAA	27	0.088651	0.44501	0.660143
Onset of Meth use (age in years) & Right FWM NAA+NAAG	27	0.057047	0.28570	0.777461
Onset of Meth use (age in years) & Right FWM mI	27	-0.086197	-0.43260	0.669017
Onset of Meth use (age in years) & Left FWM NAA	27	0.023927	0.11967	0.905703
Onset of Meth use (age in years) & Left FWM NAA+NAAG	27	-0.131576	-0.66365	0.512987
Onset of Meth use (age in years) & Left FWM ml	27	-0.353631	-1.89029	0.070365
Duration of meth use (months) & Right DLPFC NAA	27	0.110890	0.55789	0.581880
Duration of meth use (months) & Right DLPFC NAA+NAAG	27	0.042062	0.21050	0.834987
Duration of meth use (months) & Right DLPFC ml	27	0.260897	1.35128	0.188707
Duration of meth use (months) & Left DLPFC NAA	27	-0.012846	-0.06424	0.949294
Duration of meth use (months) & Left DLPFC NAA+NAAG	27	0.003059	0.01529	0.987920
Duration of meth use (months) & Left DLPFC ml	27	-0.028139	-0.14075	0.889195
Duration of meth use (months) & Right ACC NAA	28	0.083619	0.42787	0.672266
Duration of meth use (months) & Right ACC NAA+NAAG	28	0.066895	0.34187	0.735200
Duration of meth use (months) & Right ACC mI	28	0.049349	0.25194	0.803070
Duration of meth use (months) & Left ACC NAA	28	0.050446	0.25755	0.798781
Duration of meth use (months) & Left ACC NAA+NAAG	28	0.153530	0.79225	0.435387
Duration of meth use (months) & Left ACC ml	28	-0.143660	-0.74020	0.465808
Duration of meth use (months) & Right FWM NAA	27	0.013001	0.06501	0.948683
Duration of meth use (months) & Right FWM NAA+NAAG	27	0.037926	0.18977	0.851023
Duration of meth use (months) & Right FWM mI	27	0.075252	0.37733	0.709111
Duration of meth use (months) & Left FWM NAA	27	0.023861	0.11934	0.905962
Duration of meth use (months) & Left FWM NAA+NAAG	27	0.179539	0.91252	0.370211
Duration of meth use (months) & Left FWM ml	27	-0.143447	-0.72473	0.475346
Duration of methamphetamine abstinence (clinical day) (months) & Right DLPFC NAA	26	0.221766	1.11417	0.276240
Duration of methamphetamine abstinence (clinical day) (months) & Right DLPFC NAA+NAAG	26	0.036732	0.18007	0.858608
Duration of methamphetamine abstinence (clinical day) (months) & Right DLPFC mI	26	-0.207312	-1.03817	0.309536
Duration of methamphetamine abstinence (clinical day) (months) & Left DLPFC NAA	26	0.117386	0.57907	0.567936
Duration of methamphetamine abstinence (clinical day) (months) & Left DLPFC NAA+NAAG	26	0.026086	0.12784	0.899343
Duration of methamphetamine abstinence (clinical day) (months) & Left DLPFC ml	26	-0.292777	-1.50004	0.146645
Duration of methamphetamine abstinence (clinical day) (months) & Right ACC NAA	27	-0.240716	-1.24004	0.226472
Duration of methamphetamine abstinence (clinical day) (months) & Right ACC NAA+NAAG	27	-0.076452	-0.38338	0.704677
Duration of methamphetamine abstinence (clinical day) (months) & Right ACC mI	27	-0.131719	-0.66438	0.512528
Duration of methamphetamine abstinence (clinical day) (months) & Left ACC NAA	27	-0.152290	-0.77044	0.448261
Duration of methamphetamine abstinence (clinical day) (months) & Left ACC NAA+NAAG	27	-0.136938	-0.69120	0.495807
Duration of methamphetamine abstinence (clinical day) (months) & Left ACC ml	27	-0.100094	-0.50300	0.619370
Duration of methamphetamine abstinence (clinical day) (months) & Right FWM NAA	26	-0.088554	-0.43554	0.667066
Duration of methamphetamine abstinence (clinical day) (months) & Right FWM NAA+NAAG	26	-0.159946	-0.79379	0.435094
Duration of methamphetamine abstinence (clinical day) (months) & Right FWM ml	26	-0.565304	-3.35734	0.002618
Duration of methamphetamine abstinence (clinical day) (months) & Left FWM NAA	26	0.170587	0.84813	0.404745
Duration of methamphetamine abstinence (clinical day) (months) & Left FWM NAA+NAAG	26	-0.113953	-0.56191	0.579385
Duration of methamphetamine abstinence (clinical day) (months) & Left FWM ml	26	-0.165781	-0.82355	0.418301
cpzeq(HT) & Right DLPFC NAA	27	-0.039576	-0.19804	0.844618
cpzeq(HT) & Right DLPFC NAA+NAAG	27	0.000000	0.00000	1.000000
cpzeq(HT) & Right DLPFC ml	27	0.179636	0.91303	0.369947
cpzeq(HT) & Left DLPFC NAA	27	-0.351421	-1.87681	0.072263
cpzeq(HT) & Left DLPFC NAA+NAAG	27	-0.222033	-1.13858	0.265670
cpzeq(HT) & Left DLPFC ml	27	0.073488	0.36843	0.715651
cpzeq(HT) & Right ACC NAA	28	0.234234	1.22854	0.230249
cpzeq(HT) & Right ACC NAA+NAAG	28	0.121779	0.62561	0.537024
cpzeq(HT) & Right ACC ml	28	-0.022604	-0.11529	0.909103
cpzeq(HT) & Left ACC NAA	28	0.253447	1.33595	0.193141
cpzeq(HT) & Left ACC NAA+NAAG	28	0.085613	0.43815	0.664897
cpzeq(HT) & Left ACC mI	28	-0.079397	-0.40613	0.687973
cpzeq(HT) & Right FWM NAA	27	-0.219240	-1.12353	0.271885
cpzeq(HT) & Right FWM NAA+NAAG	27	-0.093273	-0.46841	0.643553

Group=MPD
Spearman Rank Order Correlations (Spreadsheet Ch
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Duration of current diagnosis (years) & ACC30 NAA abs	19	0.309528	1.34213	0.197205
Duration of current diagnosis (years) & ACC30 NAA+NAAG abs	19	0.281309	1.20868	0.243331
Duration of current diagnosis (years) & ACC30 ml abs	19	0.366848	1.62591	0.122361
Duration of current diagnosis (years) & Thal30 NAA abs	16	-0.099188	-0.37297	0.714759
Duration of current diagnosis (years) & Thal30 NAA+NAAG abs	18	-0.356186	-1.52474	0.146845
Duration of current diagnosis (years) & Thal30 ml abs	18	-0.289725	-1.21083	0.243542
Duration of current diagnosis (months) & ACC30 NAA abs	10	0.332347	0.99667	0.348111
Duration of current diagnosis (months) & ACC30 NAA+NAAG abs	10	0.381584	1.16763	0.276575
Duration of current diagnosis (months) & ACC30 ml abs	10	-0.024618	-0.06965	0.946180
Duration of current diagnosis (months) & Thal30 NAA abs	10	0.043082	0.12197	0.905933
Duration of current diagnosis (months) & Thal30 NAA+NAAG abs	10	-0.203101	-0.58668	0.573594
Duration of current diagnosis (months) & Thal30 ml abs	10	-0.092319	-0.26224	0.799765
Number of psychotic episodes & ACC30 NAA abs	21	0.428810	2.06902	0.052426
Number of psychotic episodes & ACC30 NAA+NAAG abs	21	0.459972	2.25802	0.035903
Number of psychotic episodes & ACC30 ml abs	21	0.235744	1.05739	0.303595
Number of psychotic episodes & Thal30 NAA abs	18	-0.134076	-0.54119	0.595831
Number of psychotic episodes & Thal30 NAA+NAAG abs	20	-0.149943	-0.64343	0.528058
Number of psychotic episodes & Thal30 ml abs	20	0.135028	0.57817	0.570314
Onset of Meth use (age in years) & ACC30 NAA abs	21	0.272555	1.23479	0.231963
Onset of Meth use (age in years) & ACC30 NAA+NAAG abs	21	0.207194	0.92317	0.367494
Onset of Meth use (age in years) & ACC30 ml abs	21	0.441840	2.14686	0.044926
Onset of Meth use (age in years) & Thal30 NAA abs	18	0.409574	1.79583	0.091428
Onset of Meth use (age in years) & Thal30 NAA+NAAG abs	20	0.590168	3.10162	0.006158
Onset of Meth use (age in years) & Thal30 ml abs	20	0.269705	1.18829	0.250160
Duration of meth use (months) & ACC30 NAA abs	21	0.216798	0.96802	0.345195
Duration of meth use (months) & ACC30 NAA+NAAG abs	21	0.275392	1.24869	0.226946
Duration of meth use (months) & ACC30 ml abs	21	0.096354	0.42196	0.677788
Duration of meth use (months) & Thal30 NAA abs	18	0.099379	0.39950	0.694811
Duration of meth use (months) & Thal30 NAA+NAAG abs	20	-0.327178	-1.46895	0.159108
Duration of meth use (months) & Thal30 ml abs	20	-0.163589	-0.70353	0.490729
Duration of methamphetamine abstinence (clinical day) (months) & ACC30 NAA abs	20	-0.141725	-0.60742	0.551160
Duration of methamphetamine abstinence (clinical day) (months) & ACC30 NAA+NAAG abs	20	-0.199324	-0.86298	0.399502
Duration of methamphetamine abstinence (clinical day) (months) & ACC30 ml abs	20	-0.049263	-0.20926	0.836597
Duration of methamphetamine abstinence (clinical day) (months) & Thal30 NAA abs	17	0.011105	0.04301	0.966261
Duration of methamphetamine abstinence (clinical day) (months) & Thal30 NAA+NAAG abs	19	0.203639	0.85759	0.403046
Duration of methamphetamine abstinence (clinical day) (months) & Thal30 ml abs	19	0.015052	0.06207	0.951234
Duration of methamphetamine abstinence (clinical day) (months) & Thal30 NAA rel	16	-0.157159	-0.59543	0.561057
Duration of methamphetamine abstinence (clinical day) (months) & Thal30 NAA+NAAG rel	19	0.062862	0.25970	0.798213
Duration of methamphetamine abstinence (clinical day) (months) & Thal30 ml rel	19	-0.186816	-0.78407	0.443789
cpzeq(HT) & ACC30 NAA+NAAG abs	21	0.213633	0.95321	0.352453
cpzeq(HT) & ACC30 ml abs	21	0.035606	0.15530	0.878223
cpzeq(HT) & Thal30 NAA abs	18	0.031494	0.12604	0.901271
cpzeq(HT) & Thal30 NAA+NAAG abs	20	-0.170199	-0.73278	0.473126
cpzeq(HT) & Thal30 ml abs	20	-0.034670	-0.14718	0.884625
Years of education - School (years) & ACC30 NAA abs	21	0.258068	1.16433	0.258702
Years of education - School (years) & ACC30 NAA+NAAG abs	21	0.215056	0.95987	0.349178
Years of education - School (years) & ACC30 ml abs	21	0.384455	1.81532	0.085293
Years of education - School (years) & Thal30 NAA abs	18	0.198683	0.81090	0.429323
Years of education - School (years) & Thal30 NAA+NAAG abs	20	0.627947	3.42323	0.003031
Years of education - School (years) & Thal30 ml abs	20	0.517539	2.56612	0.019433
Years of education - Post school (years) & ACC30 NAA abs	21	0.161060	0.71133	0.485520
Years of education - Post school (years) & ACC30 NAA+NAAG abs	21	0.128539	0.56497	0.578702
Years of education - Post school (years) & ACC30 ml abs	21	0.313603	1.43959	0.166258
Years of education - Post school (years) & Thal30 NAA abs	18	0.512104	2.38486	0.029803
Years of education - Post school (years) & Thal30 NAA+NAAG abs	20	0.581882	3.03553	0.007113
Years of education - Post school (years) & Thal30 ml abs	20	0.484437	2.34937	0.030419
Age on day & ACC30 NAA abs	21	0.251577	1.13304	0.271294
Age on day & ACC30 NAA+NAAG abs	21	0.255518	1.15202	0.263604
Age on day & ACC30 ml abs	21	0.210851	0.94022	0.358907
Age on day & Thal30 NAA abs	18	0.281257	1.17235	0.258216
Age on day & Thal30 NAA+NAAG abs	20	-0.192779	-0.83353	0.415472
Age on day & Thal30 ml abs	20	-0.214114	-0.92998	0.364688

	Group=MPD Spearman Rank Order Correlations (Spreadsheet Chapter 4) MD pairwise deleted Marked correlations are significant at p <,01000			
Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
PANSS positive score & Right DLPFC NAA	27	-0.034635	-0.17328	0.863828
PANSS positive score & Right DLPFC NAA+NAAG	27	0.129571	0.65336	0.519486
PANSS positive score & Right DLPFC mI	27	-0.076680	-0.38453	0.703837
PANSS positive score & Left DLPFC NAA	27	-0.037103	-0.18564	0.854223
PANSS positive score & Left DLPFC NAA+NAAG	27	0.021643	0.10824	0.914667
PANSS positive score & Left DLPFC mI	27	0.319705	1.68707	0.104031
PANSS positive score & Right ACC NAA	28	0.187720	0.97451	0.338782
PANSS positive score & Right ACC NAA+NAAG	28	0.184675	0.95814	0.346818
PANSS positive score & Right ACC mI	28	-0.082231	-0.42072	0.677413
PANSS positive score & Left ACC NAA	28	0.204886	1.06736	0.295619
PANSS positive score & Left ACC NAA+NAAG	28	0.324496	1.74927	0.092042
PANSS positive score & Left ACC mI	28	-0.095245	-0.48787	0.629730
PANSS positive score & Right FWM NAA	27	-0.008659	-0.04330	0.965810
PANSS positive score & Right FWM NAA+NAAG	27	0.221072	1.13341	0.267797
PANSS positive score & Right FWM mI	27	0.167144	0.84764	0.404679
PANSS positive score & Left FWM NAA	27	-0.021183	-0.10594	0.916477
PANSS positive score & Left FWM NAA+NAAG	27	0.131407	0.66278	0.513536
PANSS positive score & Left FWM mI	27	0.030301	0.15157	0.880740
PANSS negative score & Right DLPFC NAA	27	-0.318343	-1.67907	0.105596
PANSS negative score & Right DLPFC NAA+NAAG	27	-0.073584	-0.36892	0.715291
PANSS negative score & Right DLPFC mI	27	0.101967	0.51251	0.612795
PANSS negative score & Left DLPFC NAA	27	-0.291783	-1.52529	0.139739
PANSS negative score & Left DLPFC NAA+NAAG	27	-0.151853	-0.76817	0.449581
PANSS negative score & Left DLPFC mI	27	0.376494	2.03199	0.052910
PANSS negative score & Right ACC NAA	28	0.170039	0.87984	0.387004
PANSS negative score & Right ACC NAA+NAAG	28	0.069867	0.35713	0.723878
PANSS negative score & Right ACC mI	28	-0.045175	-0.23059	0.819442
PANSS negative score & Left ACC NAA	28	0.121496	0.62414	0.537976
PANSS negative score & Left ACC NAA+NAAG	28	-0.009260	-0.04722	0.962701
PANSS negative score & Left ACC mI	28	-0.050507	-0.25786	0.798542
PANSS negative score & Right FWM NAA	27	-0.082684	-0.41484	0.681795
PANSS negative score & Right FWM NAA+NAAG	27	-0.076240	-0.38231	0.705460
PANSS negative score & Right FWM mI	27	0.149522	0.75611	0.456648
PANSS negative score & Left FWM NAA	27	0.142619	0.72046	0.477925
PANSS negative score & Left FWM NAA+NAAG	27	0.033257	0.16638	0.869199
PANSS negative score & Left FWM mI	27	0.256330	1.32595	0.196844
PANSS general psychopathology score & Right DLPFC NAA	27	0.017766	0.08885	0.929913
PANSS general psychopathology score & Right DLPFC NAA+NAAG	27	0.156156	0.79048	0.436683
PANSS general psychopathology score & Right DLPFC mI	27	-0.015894	-0.07948	0.937285
PANSS general psychopathology score & Left DLPFC NAA	27	-0.052667	-0.26370	0.794170
PANSS general psychopathology score & Left DLPFC NAA+NAAG	27	0.221577	1.13613	0.266677
PANSS general psychopathology score & Left DLPFC mI	27	0.458425	2.57909	0.016177
PANSS general psychopathology score & Right ACC NAA	28	-0.011719	-0.05976	0.952803
PANSS general psychopathology score & Right ACC NAA+NAAG	28	-0.011161	-0.05692	0.955048
PANSS general psychopathology score & Right ACC mI	28	-0.044924	-0.22930	0.820430
PANSS general psychopathology score & Left ACC NAA	28	0.057759	0.29501	0.770330
PANSS general psychopathology score & Left ACC NAA+NAAG	28	0.118588	0.60898	0.547821
PANSS general psychopathology score & Left ACC mI	28	-0.010045	-0.05122	0.959539
PANSS general psychopathology score & Right FWM NAA	27	0.048312	0.24184	0.810876
PANSS general psychopathology score & Right FWM NAA+NAAG	27	0.174831	0.88783	0.383095
PANSS general psychopathology score & Right FWM mI	27	0.333975	1.77160	0.088652
PANSS general psychopathology score & Left FWM NAA	27	0.088364	0.44355	0.661180
PANSS general psychopathology score & Left FWM NAA+NAAG	27	0.234978	1.20873	0.238074
PANSS general psychopathology score & Left FWM mI	27	0.178571	0.90744	0.372839
PANSS total score & Right DLPFC NAA	27	-0.135215	-0.68234	0.501297
PANSS total score & Right DLPFC NAA+NAAG	27	0.056723	0.28407	0.778695
PANSS total score & Right DLPFC mI	27	-0.022686	-0.11346	0.910574
PANSS total score & Left DLPFC NAA	27	-0.179646	-0.91308	0.369920
PANSS total score & Left DLPFC NAA+NAAG	27	-0.008890	-0.04445	0.964896
PANSS total score & Left DLPFC mI	27	0.399758	2.18061	0.038833
PANSS total score & Right ACC NAA	28	0.154968	0.79985	0.431048
PANSS total score & Right ACC NAA+NAAG	28	0.050832	0.25953	0.797273
PANSS total score & Right ACC mI	28	-0.111005	-0.56954	0.573880
PANSS total score & Left ACC NAA	28	0.131613	0.67698	0.504396
PANSS total score & Left ACC NAA+NAAG	28	0.105235	0.53959	0.594070
PANSS total score & Left ACC mI	28	-0.086276	-0.44157	0.662450
PANSS total score & Right FWM NAA	27	-0.058869	-0.29486	0.770538
PANSS total score & Right FWM NAA+NAAG	27	0.075721	0.37970	0.707378
PANSS total score & Right FWM mI	27	0.269664	1.40019	0.173746
PANSS total score & Left FWM NAA	27	0.079259	0.39754	0.694340
PANSS total score & Left FWM NAA+NAAG	27	0.145004	0.73277	0.470516
PANSS total score & Left FWM mI	27	0.178726	0.90826	0.372416
CGI score & Right DLPFC NAA	27	-0.251359	-1.29848	0.205972
CGI score & Right DLPFC NAA+NAAG	27	-0.050019	-0.25041	0.804317
CGI score & Right DLPFC mI	27	-0.063106	-0.31616	0.754505
CGI score & Left DLPFC NAA	27	-0.260944	-1.35155	0.188624
CGI score & Left DLPFC NAA+NAAG	27	-0.234124	-1.20409	0.239833
CGI score & Left DLPFC mI	27	0.235702	1.21267	0.236590
CGI score & Right ACC NAA	28	0.290391	1.54739	0.133857
CGI score & Right ACC NAA+NAAG	28	0.139399	0.71781	0.479277
CGI score & Right ACC mI	28	-0.154668	-0.79826	0.431951
CGI score & Left ACC NAA	28	0.192274	0.99905	0.326978
CGI score & Left ACC NAA+NAAG	28	0.144206	0.74307	0.464098
CGI score & Left ACC mI	28	-0.158344	-0.81771	0.420952
CGI score & Right FWM NAA	27	-0.192030	-0.97836	0.337271
CGI score & Right FWM NAA+NAAG	27	-0.064053	-0.32092	0.750936
CGI score & Right FWM mI	27	0.183194	0.93174	0.360384
CGI score & Left FWM NAA	27	-0.035503	-0.17763	0.860449
CGI score & Left FWM NAA+NAAG	27	0.051432	0.25750	0.798902
CGI score & Left FWM mI	27	0.064053	0.32092	0.750936
GAF score & Right DLPFC NAA	27	0.255599	1.32190	0.198169
GAF score & Right DLPFC NAA+NAAG	27	0.092764	0.46583	0.645372
GAF score & Right DLPFC mI	27	0.026062	0.13035	0.897330
GAF score & Left DLPFC NAA	27	0.304158	1.59642	0.122959
GAF score & Left DLPFC NAA+NAAG	27	0.266444	1.38219	0.179140
GAF score & Left DLPFC mI	27	-0.262152	-1.35826	0.186512
GAF score & Right ACC NAA	28	-0.249521	-1.31387	0.200365
GAF score & Right ACC NAA+NAAG	28	-0.108547	-0.55677	0.582443
GAF score & Right ACC mI	28	0.161584	0.83489	0.411384
GAF score & Left ACC NAA	28	-0.248972	-1.31079	0.201390
GAF score & Left ACC NAA+NAAG	28	-0.199782	-1.03965	0.308074
GAF score & Left ACC mI	28	0.202530	1.05456	0.301329
GAF score & Right FWM NAA	27	0.206534	1.05542	0.301325
GAF score & Right FWM NAA+NAAG	27	-0.016557	-0.08280	0.934673
GAF score & Right FWM mI	27	-0.127876	-0.64467	0.525011
GAF score & Left FWM NAA	27	-0.027292	-0.13651	0.892509
GAF score & Left FWM NAA+NAAG	27	-0.011651	-0.05826	0.954005
GAF score & Left FWM mI	27	0.030354	0.15184	0.880530
Height (metres) & Right DLPFC NAA	27	-0.003835	-0.01918	0.984854
Height (metres) & Right DLPFC NAA+NAAG	27	-0.076240	-0.38231	0.705462
Height (metres) & Right DLPFC mI	27	-0.092026	-0.46209	0.648014
Height (metres) & Left DLPFC NAA	27	0.029755	0.14884	0.882873
Height (metres) & Left DLPFC NAA+NAAG	27	-0.056136	-0.28112	0.780931
Height (metres) & Left DLPFC mI	27	0.136811	0.69055	0.496210
Height (metres) & Right ACC NAA	28	-0.034085	-0.17390	0.863290
Height (metres) & Right ACC NAA+NAAG	28	0.297419	1.58843	0.124278
Height (metres) & Right ACC mI	28	0.166852	0.86287	0.396096
Height (metres) & Left ACC NAA	28	-0.024739	-0.12618	0.900557
Height (metres) & Left ACC NAA+NAAG	28	0.092909	0.47580	0.638188
Height (metres) & Left ACC mI	28	0.335627	1.81675	0.080801
Height (metres) & Right FWM NAA	27	-0.302504	-1.58687	0.125112
Height (metres) & Right FWM NAA+NAAG	27	-0.077302	-0.38767	0.701543

Pair of Variables	Group=MPD Spearman Rank Order Correlations (Spreadsheet Chapte MD pairwise deleted Marked correlations are significant at p <,01000 Valid N	Spearman R	t(N-2)	p-value
PANSS positive score & ACC30 NAA abs	21	0.205775	0.91657	0.370856
PANSS positive score & ACC30 NAA+NAAG abs	21	0.231333	1.03647	0.312993
PANSS positive score & ACC30 ml abs	21	0.075364	0.32944	0.745428
PANSS positive score & Thal30 NAA abs	18	-0.257303	-1.06507	0.302653
PANSS positive score & Thal30 NAA+NAAG abs	20	-0.209694	-0.90989	0.374905
PANSS positive score & Thal30 ml abs	20	-0.133235	-0.57036	0.575488
PANSS negative score & ACC30 NAA abs	21	0.193532	0.85984	0.400595
PANSS negative score & ACC30 NAA+NAAG abs	21	0.215631	0.96256	0.347861
PANSS negative score & ACC30 ml abs	21	0.012054	0.05255	0.958643
PANSS negative score & Thal30 NAA abs	18	-0.045483	-0.18212	0.857777
PANSS negative score & Thal30 NAA+NAAG abs	20	-0.177684	-0.76604	0.453582
PANSS negative score & Thal30 ml abs	20	-0.089621	-0.38177	0.707103
PANSS general psychopathology score & ACC30 NAA abs	21	0.032975	0.14381	0.887164
PANSS general psychopathology score & ACC30 NAA+NAAG abs	21	0.085075	0.37218	0.713877
PANSS general psychopathology score & ACC30 ml abs	21	0.095626	0.41874	0.680098
PANSS general psychopathology score & Thal30 NAA abs	18	-0.138456	-0.55921	0.583763
PANSS general psychopathology score & Thal30 NAA+NAAG abs	20	-0.056321	-0.23933	0.813555
PANSS general psychopathology score & Thal30 ml abs	20	0.009133	0.03875	0.969516
PANS total score & ACC30 NAA abs	21	0.133814	0.58857	0.563079
PANS total score & ACC30 NAA+NAAG abs	21	0.148827	0.65603	0.519672
PANS total score & ACC30 ml abs	21	0.030027	0.13094	0.897198
PANS total score & Thal30 NAA abs	18	-0.162082	-0.65701	0.520511
PANS total score & Thal30 NAA+NAAG abs	20	-0.239793	-1.04793	0.308540
PANS total score & Thal30 ml abs	20	-0.181546	-0.78325	0.443663
CGI score & ACC30 NAA abs	21	-0.002015	-0.00878	0.993085
CGI score & ACC30 NAA+NAAG abs	21	-0.010744	-0.04684	0.963133
CGI score & ACC30 ml abs	21	-0.169894	-0.75148	0.461573
CGI score & Thal30 NAA abs	18	-0.376929	-1.62778	0.123101
CGI score & Thal30 NAA+NAAG abs	20	-0.434430	-2.04632	0.055617
CGI score & Thal30 ml abs	20	-0.381394	-1.75043	0.097070
GAF score & ACC30 NAA abs	21	-0.036602	-0.15965	0.874840
GAF score & ACC30 NAA+NAAG abs	21	-0.058171	-0.25399	0.802230
GAF score & ACC30 ml abs	21	0.137258	0.60401	0.552981
GAF score & Thal30 NAA abs	18	0.277845	1.15693	0.264281
GAF score & Thal30 NAA+NAAG abs	20	0.496037	2.42371	0.026122
GAF score & Thal30 ml abs	20	0.438482	2.06992	0.053122
Height (metres) & ACC30 NAA abs	21	0.106235	0.46570	0.646723
Height (metres) & ACC30 NAA+NAAG abs	21	0.025575	0.11152	0.912377
Height (metres) & ACC30 ml abs	21	0.276735	1.25528	0.224596
Height (metres) & Thal30 NAA abs	18	-0.623929	-3.19357	0.005654
Height (metres) & Thal30 NAA+NAAG abs	20	-0.208379	-0.90392	0.377978
Height (metres) & Thal30 ml abs	20	-0.097345	-0.41497	0.683068
Weight (kg) & ACC30 NAA abs	21	-0.196104	-0.87172	0.394242
Weight (kg) & ACC30 NAA+NAAG abs	21	-0.224675	-1.00503	0.327510
Weight (kg) & ACC30 ml abs	21	-0.166234	-0.73482	0.471422
Weight (kg) & Thal30 NAA abs	18	-0.001032	-0.00413	0.996757
Weight (kg) & Thal30 NAA+NAAG abs	20	0.151880	0.65193	0.522682
Weight (kg) & Thal30 ml abs	20	0.183459	0.79179	0.438795

Group=MPD
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Alcohol life time - Frequency score & Right DLPFC NAA	26	0.078868	0.38758	0.701743
Alcohol life time - Frequency score & Right DLPFC NAA+NAAG	26	-0.030251	-0.14827	0.883372
Alcohol life time - Frequency score & Right DLPFC ml	26	0.375549	1.98511	0.058675
Alcohol life time - Frequency score & Left DLPFC NAA	26	-0.173192	-0.86148	0.397499
Alcohol life time - Frequency score & Left DLPFC NAA+NAAG	26	-0.016563	-0.08115	0.935993
Alcohol life time - Frequency score & Left DLPFC ml	26	-0.084255	-0.41424	0.682378
Alcohol life time - Frequency score & Right ACC NAA	27	-0.083755	-0.42025	0.677891
Alcohol life time - Frequency score & Right ACC NAA+NAAG	27	-0.033246	-0.16632	0.869240
Alcohol life time - Frequency score & Right ACC ml	27	0.173265	0.87963	0.387439
Alcohol life time - Frequency score & Left ACC NAA	27	-0.014066	-0.07034	0.944486
Alcohol life time - Frequency score & Left ACC NAA+NAAG	27	-0.001598	-0.00799	0.993687
Alcohol life time - Frequency score & Left ACC ml	27	0.111247	0.55971	0.580657
Alcohol life time - Frequency score & Right FWM NAA	26	-0.044296	-0.21722	0.829875
Alcohol life time - Frequency score & Right FWM NAA+NAAG	26	-0.046088	-0.22603	0.823095
Alcohol life time - Frequency score & Right FWM ml	26	0.171961	0.85517	0.400913
Alcohol life time - Frequency score & Left FWM NAA	26	-0.066083	-0.32445	0.748408
Alcohol life time - Frequency score & Left FWM NAA+NAAG	26	-0.032046	-0.15707	0.876501
Alcohol life time - Frequency score & Left FWM ml	26	0.040327	0.19772	0.844926
Alcohol life time - Duration score & Right DLPFC NAA	26	0.205461	1.02849	0.313973
Alcohol life time - Duration score & Right DLPFC NAA+NAAG	26	-0.006390	-0.03131	0.975284
Alcohol life time - Duration score & Right DLPFC ml	26	0.390328	2.07696	0.048677
Alcohol life time - Duration score & Left DLPFC NAA	26	0.050340	0.24693	0.807064
Alcohol life time - Duration score & Left DLPFC NAA+NAAG	26	0.129335	0.63898	0.528890
Alcohol life time - Duration score & Left DLPFC ml	26	0.197488	0.98692	0.333525
Alcohol life time - Duration score & Right ACC NAA	27	-0.170001	-0.86256	0.396579
Alcohol life time - Duration score & Right ACC NAA+NAAG	27	-0.064389	-0.32261	0.749670
Alcohol life time - Duration score & Right ACC ml	27	0.290262	1.51660	0.141911
Alcohol life time - Duration score & Left ACC NAA	27	-0.119580	-0.60222	0.552452
Alcohol life time - Duration score & Left ACC NAA+NAAG	27	-0.021463	-0.10734	0.915376
Alcohol life time - Duration score & Left ACC ml	27	0.284470	1.48365	0.150401
Alcohol life time - Duration score & Right FWM NAA	26	-0.006971	-0.03415	0.973037
Alcohol life time - Duration score & Right FWM NAA+NAAG	26	0.006196	0.03035	0.976036
Alcohol life time - Duration score & Right FWM ml	26	0.184160	0.91789	0.367808
Alcohol life time - Duration score & Left FWM NAA	26	0.113284	0.55857	0.581628
Alcohol life time - Duration score & Left FWM NAA+NAAG	26	-0.001162	-0.00569	0.995506
Alcohol life time - Duration score & Left FWM ml	26	-0.000774	-0.00379	0.997004
Alcohol life time - Amount score & Right DLPFC NAA	21	0.372075	1.74729	0.096732
Alcohol life time - Amount score & Right DLPFC NAA+NAAG	21	0.323893	1.49226	0.152051
Alcohol life time - Amount score & Right DLPFC ml	21	-0.155254	-0.68504	0.501589
Alcohol life time - Amount score & Left DLPFC NAA	21	0.511268	2.59310	0.017846
Alcohol life time - Amount score & Left DLPFC NAA+NAAG	21	0.382113	1.80236	0.087376
Alcohol life time - Amount score & Left DLPFC ml	21	0.079635	0.34823	0.731499
Alcohol life time - Amount score & Right ACC NAA	22	-0.086382	-0.38776	0.702289
Alcohol life time - Amount score & Right ACC NAA+NAAG	22	0.106673	0.47979	0.636580
Alcohol life time - Amount score & Right ACC ml	22	-0.165227	-0.74922	0.462449
Alcohol life time - Amount score & Left ACC NAA	22	-0.003478	-0.01556	0.987743
Alcohol life time - Amount score & Left ACC NAA+NAAG	22	0.166386	0.75462	0.459270
Alcohol life time - Amount score & Left ACC ml	22	-0.062612	-0.28056	0.781929
Alcohol life time - Amount score & Right FWM NAA	21	0.331923	1.53377	0.141569
Alcohol life time - Amount score & Right FWM NAA+NAAG	21	0.336607	1.55816	0.135695
Alcohol life time - Amount score & Right FWM ml	21	-0.295786	-1.34970	0.192977
Alcohol life time - Amount score & Left FWM NAA	21	0.095026	0.41609	0.682004
Alcohol life time - Amount score & Left FWM NAA+NAAG	21	0.111087	0.48723	0.631667
Alcohol life time - Amount score & Left FWM ml	21	-0.103726	-0.45458	0.654560
Alcohol life time - Total score & Right DLPFC NAA	21	0.553853	2.89953	0.009188
Alcohol life time - Total score & Right DLPFC NAA+NAAG	21	0.384455	1.81532	0.085293
Alcohol life time - Total score & Right DLPFC ml	21	0.183956	0.81577	0.424743
Alcohol life time - Total score & Left DLPFC NAA	21	0.281228	1.27740	0.216851
Alcohol life time - Total score & Left DLPFC NAA+NAAG	21	0.375852	1.76793	0.093128
Alcohol life time - Total score & Left DLPFC ml	21	-0.027792	-0.12119	0.904814
Alcohol life time - Total score & Right ACC NAA	22	-0.153293	-0.69375	0.495819
Alcohol life time - Total score & Right ACC NAA+NAAG	22	-0.025262	-0.11301	0.911149
Alcohol life time - Total score & Right ACC ml	22	-0.004019	-0.01797	0.985838
Alcohol life time - Total score & Left ACC NAA	22	-0.064877	-0.29075	0.774235
Alcohol life time - Total score & Left ACC NAA+NAAG	22	0.068896	0.30885	0.760633
Alcohol life time - Total score & Left ACC ml	22	0.012631	0.05649	0.955511
Alcohol life time - Total score & Right FWM NAA	21	0.140283	0.61759	0.544180
Alcohol life time - Total score & Right FWM NAA+NAAG	21	0.222997	0.99713	0.331232
Alcohol life time - Total score & Right FWM ml	21	-0.183956	-0.81577	0.424743
Alcohol life time - Total score & Left FWM NAA	21	0.104551	0.45824	0.651980
Alcohol life time - Total score & Left FWM NAA+NAAG	21	0.038379	0.16741	0.868813
Alcohol life time - Total score & Left FWM ml	21	-0.088669	-0.38803	0.702307
Tobacco life time - Frequency score & Right DLPFC NAA	27	0.444318	2.47981	0.020238
Tobacco life time - Frequency score & Right DLPFC NAA+NAAG	27	0.253324	1.30933	0.202330
Tobacco life time - Frequency score & Right DLPFC ml	27	0.001144	0.00572	0.995483
Tobacco life time - Frequency score & Left DLPFC NAA	27	0.289306	1.51115	0.143288
Tobacco life time - Frequency score & Left DLPFC NAA+NAAG	27	0.389552	2.11482	0.044587
Tobacco life time - Frequency score & Left DLPFC ml	27	0.063274	0.31700	0.753873
Tobacco life time - Frequency score & Right ACC NAA	28	-0.319301	-1.71806	0.097675
Tobacco life time - Frequency score & Right ACC NAA+NAAG	28	-0.142872	-0.73606	0.468286
Tobacco life time - Frequency score & Right ACC ml	28	-0.038874	-0.19837	0.844298
Tobacco life time - Frequency score & Left ACC NAA	28	-0.066452	-0.33959	0.736893
Tobacco life time - Frequency score & Left ACC NAA+NAAG	28	-0.026249	-0.13389	0.894522
Tobacco life time - Frequency score & Left ACC ml	28	-0.062133	-0.31743	0.753454
Tobacco life time - Frequency score & Right FWM NAA	27	0.205480	1.04980	0.303852
Tobacco life time - Frequency score & Right FWM NAA+NAAG	27	0.282445	1.47216	0.153455
Tobacco life time - Frequency score & Right FWM ml	27	-0.151346	-0.76555	0.451112
Tobacco life time - Frequency score & Left FWM NAA	27	0.164308	0.83286	0.412810
Tobacco life time - Frequency score & Left FWM NAA+NAAG	27	0.259193	1.34182	0.191715
Tobacco life time - Frequency score & Left FWM ml	27	0.059843	0.29975	0.766844
Tobacco life time - Duration score & Right DLPFC NAA	27	0.121583	0.61246	0.545764
Tobacco life time - Duration score & Right DLPFC NAA+NAAG	27	0.133445	0.67325	0.506966
Tobacco life time - Duration score & Right DLPFC ml	27	-0.096857	-0.48657	0.630801
Tobacco life time - Duration score & Left DLPFC NAA	27	0.244612	1.26138	0.218815
Tobacco life time - Duration score & Left DLPFC NAA+NAAG	27	0.378037	2.04170	0.051867
Tobacco life time - Duration score & Left DLPFC ml	27	0.291064	1.52118	0.140763
Tobacco life time - Duration score & Right ACC NAA	28	-0.387454	-2.14303	0.041641
Tobacco life time - Duration score & Right ACC NAA+NAAG	28	-0.105371	-0.54030	0.593591
Tobacco life time - Duration score & Right ACC ml	28	-0.045100	-0.23020	0.819736
Tobacco life time - Duration score & Left ACC NAA	28	-0.215252	-1.12392	0.271316
Tobacco life time - Duration score & Left ACC NAA+NAAG	28	-0.111111	-0.57009	0.573512
Tobacco life time - Duration score & Left ACC ml	28	-0.046330	-0.23649	0.814903
Tobacco life time - Duration score & Right FWM NAA	27	0.072159	0.36174	0.720586
Tobacco life time - Duration score & Right FWM NAA+NAAG	27	0.032615	0.16316	0.871703
Tobacco life time - Duration score & Right FWM ml	27	0.205110	1.04783	0.304742
Tobacco life time - Duration score & Left FWM NAA	27	-0.050907	-0.25486	0.800912
Tobacco life time - Duration score & Left FWM NAA+NAAG	27	0.185312	0.94289	0.354759
Tobacco life time - Duration score & Left FWM ml	27	0.217927	1.11647	0.274837
Tobacco life time Amount score & Right DLPFC NAA	25	0.148889	0.72210	0.477514
Tobacco life time Amount score & Right DLPFC NAA+NAAG	25	-0.028360	-0.13606	0.892955
Tobacco life time Amount score & Right DLPFC ml	25	0.057496	0.27620	0.784861
Tobacco life time Amount score & Left DLPFC NAA	25	-0.141772	-0.68685	0.499044
Tobacco life time Amount score & Left DLPFC NAA+NAAG	25	-0.104754	-0.50516	0.618253
Tobacco life time Amount score & Left DLPFC ml	25	-0.200056	-0.97923	0.337655
Tobacco life time Amount score & Right ACC NAA	26	-0.144185	-0.71382	0.482224
Tobacco life time Amount score & Right ACC NAA+NAAG	26	-0.478639	-2.67063	0.013376
Tobacco life time Amount score & Right ACC ml	26	-0.073664	-0.36186	0.720623
Tobacco life time Amount score & Left ACC NAA	26	-0.192363	-0.96032	0.346470
Tobacco life time Amount score & Left ACC NAA+NAAG	26	-0.484225	-2.71127	0.012187
Tobacco life time Amount score & Left ACC ml	26	-0.238447	-1.20284	0.240770
Tobacco life time Amount score & Right FWM NAA	25	0.010241	0.04912	0.961250
Tobacco life time Amount score & Right FWM NAA+NAAG	25	0.060647	0.29139	0.773366

Group=MPD
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
Alcohol life time - Frequency score & ACC30 NAA abs	20	0.360141	1.63785	0.118814
Alcohol life time - Frequency score & ACC30 NAA+NAAG abs	20	0.397099	1.83569	0.082981
Alcohol life time - Frequency score & ACC30 ml abs	20	0.345201	1.56049	0.136054
Alcohol life time - Frequency score & Thal30 NAA abs	18	0.404620	1.76983	0.095807
Alcohol life time - Frequency score & Thal30 NAA+NAAG abs	19	0.234323	0.99381	0.334254
Alcohol life time - Frequency score & Thal30 ml abs	19	0.188556	0.79164	0.439478
Alcohol life time - Duration score & ACC30 NAA abs	20	0.107238	0.45761	0.652707
Alcohol life time - Duration score & ACC30 NAA+NAAG abs	20	0.140490	0.60202	0.554669
Alcohol life time - Duration score & ACC30 ml abs	20	0.294282	1.30638	0.207871
Alcohol life time - Duration score & Thal30 NAA abs	18	-0.049366	-0.19770	0.845767
Alcohol life time - Duration score & Thal30 NAA+NAAG abs	19	0.187084	0.78523	0.443126
Alcohol life time - Duration score & Thal30 ml abs	19	0.274389	1.17649	0.255610
Alcohol life time - Amount score & ACC30 NAA abs	17	0.389830	1.63951	0.121905
Alcohol life time - Amount score & ACC30 NAA+NAAG abs	17	0.403752	1.70924	0.108008
Alcohol life time - Amount score & ACC30 ml abs	17	0.398689	1.68372	0.112925
Alcohol life time - Amount score & Thal30 NAA abs	15	0.256104	0.95525	0.356876
Alcohol life time - Amount score & Thal30 NAA+NAAG abs	16	0.679885	3.46902	0.003760
Alcohol life time - Amount score & Thal30 ml abs	16	0.330011	1.30807	0.211920
Alcohol life time - Total score & ACC30 NAA abs	17	0.485086	2.14843	0.048419
Alcohol life time - Total score & ACC30 NAA+NAAG abs	17	0.500127	2.23683	0.040909
Alcohol life time - Total score & ACC30 ml abs	17	0.589122	2.82368	0.012831
Alcohol life time - Total score & Thal30 NAA abs	15	0.149811	0.54632	0.594102
Alcohol life time - Total score & Thal30 NAA+NAAG abs	16	0.472354	2.00518	0.064674
Alcohol life time - Total score & Thal30 ml abs	16	0.221931	0.85163	0.408752
Tobacco life time - Frequency score & ACC30 NAA abs	21	-0.108031	-0.47367	0.641132
Tobacco life time - Frequency score & ACC30 NAA+NAAG abs	21	-0.045855	-0.20009	0.843538
Tobacco life time - Frequency score & ACC30 ml abs	21	0.069948	0.30565	0.763197
Tobacco life time - Frequency score & Thal30 NAA abs	18	-0.003931	-0.01572	0.987648
Tobacco life time - Frequency score & Thal30 NAA+NAAG abs	20	0.203474	0.88171	0.389555
Tobacco life time - Frequency score & Thal30 ml abs	20	0.180246	0.77745	0.446989
Tobacco life time - Duration score & ACC30 NAA abs	21	-0.168690	-0.74600	0.464801
Tobacco life time - Duration score & ACC30 NAA+NAAG abs	21	-0.132678	-0.58349	0.566428
Tobacco life time - Duration score & ACC30 ml abs	21	-0.135521	-0.59622	0.558064
Tobacco life time - Duration score & Thal30 NAA abs	18	0.163611	0.66338	0.516529
Tobacco life time - Duration score & Thal30 NAA+NAAG abs	20	0.142717	0.61176	0.548348
Tobacco life time - Duration score & Thal30 ml abs	20	0.283014	1.25191	0.226626
Tobacco life time Amount score & ACC30 NAA abs	20	-0.014642	-0.06213	0.951145
Tobacco life time Amount score & ACC30 NAA+NAAG abs	20	0.028514	0.12102	0.905013
Tobacco life time Amount score & ACC30 ml abs	20	0.190351	0.82263	0.421483
Tobacco life time Amount score & Thal30 NAA abs	17	0.231977	0.92364	0.370294
Tobacco life time Amount score & Thal30 NAA+NAAG abs	19	0.085736	0.35481	0.727099
Tobacco life time Amount score & Thal30 ml abs	19	-0.222011	-0.93880	0.360979
Tobacco life time - Total score & ACC30 NAA abs	20	-0.089082	-0.37945	0.708792
Tobacco life time - Total score & ACC30 NAA+NAAG abs	20	-0.014466	-0.06138	0.951732
Tobacco life time - Total score & ACC30 ml abs	20	0.111162	0.47456	0.640805
Tobacco life time - Total score & Thal30 NAA abs	17	0.162017	0.63589	0.534431
Tobacco life time - Total score & Thal30 NAA+NAAG abs	19	0.128900	0.53594	0.598942
Tobacco life time - Total score & Thal30 ml abs	19	-0.151125	-0.63034	0.536853
Cocaine life time - Frequency score & ACC30 NAA abs	21	0.415429	1.99073	0.061092
Cocaine life time - Frequency score & ACC30 NAA+NAAG abs	21	0.347516	1.61547	0.122692
Cocaine life time - Frequency score & ACC30 ml abs	21	0.398090	1.89158	0.073891
Cocaine life time - Frequency score & Thal30 NAA abs	18	0.436643	1.94142	0.070030
Cocaine life time - Frequency score & Thal30 NAA+NAAG abs	20	0.220006	0.95685	0.351320
Cocaine life time - Frequency score & Thal30 ml abs	20	0.345358	1.56129	0.135864
Cocaine life time - Duration score & ACC30 NAA abs	21	0.471252	2.32896	0.031050
Cocaine life time - Duration score & ACC30 NAA+NAAG abs	21	0.411526	1.96819	0.063814
Cocaine life time - Duration score & ACC30 ml abs	21	0.429007	2.07018	0.052306
Cocaine life time - Duration score & Thal30 NAA abs	18	0.396969	1.73003	0.102864
Cocaine life time - Duration score & Thal30 NAA+NAAG abs	20	0.205653	0.89157	0.384387
Cocaine life time - Duration score & Thal30 ml abs	20	0.356466	1.61869	0.122902
Cocaine life time - Amount score & ACC30 NAA abs	19	0.073788	0.30507	0.764019
Cocaine life time - Amount score & ACC30 NAA+NAAG abs	19	0.000000	0.00000	1.000000
Cocaine life time - Amount score & ACC30 ml abs	19	0.302530	1.30869	0.208056
Cocaine life time - Amount score & Thal30 NAA abs	16	0.427137	1.76756	0.098914
Cocaine life time - Amount score & Thal30 NAA+NAAG abs	18	0.366934	1.57779	0.134177
Cocaine life time - Amount score & Thal30 ml abs	18	0.420942	1.85624	0.081932
Cocaine life time - Total score & ACC30 NAA abs	19	0.374856	1.66713	0.113803
Cocaine life time - Total score & ACC30 NAA+NAAG abs	19	0.287491	1.23760	0.232685
Cocaine life time - Total score & ACC30 ml abs	19	0.346412	1.52257	0.146252
Cocaine life time - Total score & Thal30 NAA abs	16	0.386785	1.56936	0.138884
Cocaine life time - Total score & Thal30 NAA+NAAG abs	18	0.276154	1.14931	0.267320
Cocaine life time - Total score & Thal30 ml abs	18	0.247799	1.02310	0.321479
Heroin life time score - Frequency score & ACC30 NAA abs	21	0.019385	0.08451	0.933532
Heroin life time score - Frequency score & ACC30 NAA+NAAG abs	21	0.011631	0.05070	0.960092
Heroin life time score - Frequency score & ACC30 ml abs	21	0.083744	0.36632	0.718176
Heroin life time score - Frequency score & Thal30 NAA abs	18	-0.040713	-0.16299	0.872568
Heroin life time score - Frequency score & Thal30 NAA+NAAG abs	20	-0.007437	-0.03155	0.975175
Heroin life time score - Frequency score & Thal30 ml abs	20	-0.238917	-1.04387	0.310362
Heroin life time score - Duration Score & ACC30 NAA abs	21	0.106676	0.46766	0.645349
Heroin life time score - Duration Score & ACC30 NAA+NAAG abs	21	0.098889	0.43317	0.669768
Heroin life time score - Duration Score & ACC30 ml abs	21	0.162739	0.71895	0.480923
Heroin life time score - Duration Score & Thal30 NAA abs	18	-0.111283	-0.44791	0.660221
Heroin life time score - Duration Score & Thal30 NAA+NAAG abs	20	-0.053081	-0.22552	0.824114
Heroin life time score - Duration Score & Thal30 ml abs	20	-0.271924	-1.19885	0.246132
Heroin life time score - Amount score & ACC30 NAA abs	21	-0.243116	-1.09250	0.288275
Heroin life time score - Amount score & ACC30 NAA+NAAG abs	21	-0.227921	-1.02034	0.320384
Heroin life time score - Amount score & ACC30 ml abs	21	-0.140551	-0.61879	0.543402
Heroin life time score - Amount score & Thal30 NAA abs	18	0.046943	0.18798	0.853258
Heroin life time score - Amount score & Thal30 NAA+NAAG abs	20	0.078755	0.33517	0.741370
Heroin life time score - Amount score & Thal30 ml abs	20	-0.057179	-0.24299	0.810764
Heroin life time score - Total score & ACC30 NAA abs	21	0.043342	0.18910	0.852018
Heroin life time score - Total score & ACC30 NAA+NAAG abs	21	0.033281	0.14515	0.886123
Heroin life time score - Total score & ACC30 ml abs	21	0.116870	0.51294	0.613907
Heroin life time score - Total score & Thal30 NAA abs	18	-0.076267	-0.30596	0.763580
Heroin life time score - Total score & Thal30 NAA+NAAG abs	20	-0.026898	-0.11416	0.910376
Heroin life time score - Total score & Thal30 ml abs	20	-0.253210	-1.11047	0.281412
Cannabis life time - Frequency score & ACC30 NAA abs	21	0.317870	1.46136	0.160260
Cannabis life time - Frequency score & ACC30 NAA+NAAG abs	21	0.259649	1.17198	0.255691
Cannabis life time - Frequency score & ACC30 ml abs	21	0.221505	0.99011	0.334561
Cannabis life time - Frequency score & Thal30 NAA abs	18	-0.167561	-0.67986	0.506313
Cannabis life time - Frequency score & Thal30 NAA+NAAG abs	20	-0.074901	-0.31867	0.753642
Cannabis life time - Frequency score & Thal30 ml abs	20	0.068724	0.29226	0.773429
Cannabis life time - Duration score & ACC30 NAA abs	21	0.289255	1.31714	0.203458
Cannabis life time - Duration score & ACC30 NAA+NAAG abs	21	0.214608	0.95777	0.350207
Cannabis life time - Duration score & ACC30 ml abs	21	0.235603	1.05672	0.303893
Cannabis life time - Duration score & Thal30 NAA abs	18	-0.360658	-1.54673	0.141478
Cannabis life time - Duration score & Thal30 NAA+NAAG abs	20	0.056787	0.24132	0.812036
Cannabis life time - Duration score & Thal30 ml abs	20	0.200531	0.86842	0.396596
Cannabis life time - Amount score & ACC30 NAA abs	18	0.154800	0.62675	0.539662
Cannabis life time - Amount score & ACC30 NAA+NAAG abs	18	0.148438	0.60040	0.556647
Cannabis life time - Amount score & ACC30 ml abs	18	0.259766	1.07600	0.297884
Cannabis life time - Amount score & Thal30 NAA abs	16	-0.285874	-1.11623	0.283118
Cannabis life time - Amount score & Thal30 NAA+NAAG abs	17	-0.041740	-0.16180	0.873623
Cannabis life time - Amount score & Thal30 ml abs	17	0.341511	1.40727	0.179729
Cannabis life time - Total score & ACC30 NAA abs	18	0.241271	0.99446	0.334801
Cannabis life time - Total score & ACC30 NAA+NAAG abs	18	0.224559	0.92178	0.370335
Cannabis life time - Total score & ACC30 ml abs	18	0.254849	1.05420	0.307450
Cannabis life time - Total score & Thal30 NAA abs	16	-0.261923	-1.01548	0.327107
Cannabis life time - Total score & Thal30 NAA+NAAG abs	17	-0.122993	-0.47999	0.638156
Cannabis life time - Total score & Thal30 ml abs	17	0.201261	0.79576	0.438582
Methamphetamine life time - Frequency score & ACC30 NAA abs	21	-0.084136	-0.36805	0.716908
Methamphetamine life time - Frequency score & ACC30 NAA+NAAG abs	21	-0.074238	-0.32449	0.749112

Group=MPD
Spearman Rank Order Correlations (Spreadsheet Chapter 4)
MD pairwise deleted
Marked correlations are significant at p <,01000

Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
IFNg (25)pg/ml & Right DLPFC NAA	27	-0.225802	-1.15894	0.257432
IFNg (25)pg/ml & Right DLPFC NAA+NAAG	27	-0.142443	-0.71955	0.478475
IFNg (25)pg/ml & Right DLPFC mI	27	0.025645	0.12827	0.898964
IFNg (25)pg/ml & Left DLPFC NAA	27	-0.246375	-1.27105	0.215409
IFNg (25)pg/ml & Left DLPFC NAA+NAAG	27	-0.123951	-0.62457	0.537913
IFNg (25)pg/ml & Left DLPFC mI	27	-0.134331	-0.67780	0.504126
IFNg (25)pg/ml & Right ACC NAA	28	-0.092240	-0.47235	0.640618
IFNg (25)pg/ml & Right ACC NAA+NAAG	28	-0.304092	-1.62765	0.115658
IFNg (25)pg/ml & Right ACC mI	28	-0.041878	-0.21372	0.832431
IFNg (25)pg/ml & Left ACC NAA	28	-0.371425	-2.03982	0.051649
IFNg (25)pg/ml & Left ACC NAA+NAAG	28	-0.353907	-1.92945	0.064655
IFNg (25)pg/ml & Left ACC mI	28	0.099630	0.51056	0.613968
IFNg (25)pg/ml & Right FWM NAA	27	0.033893	0.16956	0.866718
IFNg (25)pg/ml & Right FWM NAA+NAAG	27	-0.200580	-1.02370	0.315779
IFNg (25)pg/ml & Right FWM mI	27	0.272061	1.41363	0.169803
IFNg (25)pg/ml & Left FWM NAA	27	-0.393893	-2.14269	0.042062
IFNg (25)pg/ml & Left FWM NAA+NAAG	27	-0.197832	-1.00911	0.322591
IFNg (25)pg/ml & Left FWM mI	27	0.040604	0.20319	0.840631
IL-10 (27)pg/ml & Right DLPFC NAA	27	-0.541024	-3.21652	0.003568
IL-10 (27)pg/ml & Right DLPFC NAA+NAAG	27	-0.438104	-2.43682	0.022274
IL-10 (27)pg/ml & Right DLPFC mI	27	-0.325609	-1.72188	0.097444
IL-10 (27)pg/ml & Left DLPFC NAA	27	-0.418992	-2.30725	0.029605
IL-10 (27)pg/ml & Left DLPFC NAA+NAAG	27	-0.340354	-1.80982	0.082363
IL-10 (27)pg/ml & Left DLPFC mI	27	-0.185843	-0.94569	0.353358
IL-10 (27)pg/ml & Right ACC NAA	28	-0.155246	-0.80132	0.430210
IL-10 (27)pg/ml & Right ACC NAA+NAAG	28	-0.364994	-1.99902	0.056160
IL-10 (27)pg/ml & Right ACC mI	28	-0.026975	-0.13760	0.891618
IL-10 (27)pg/ml & Left ACC NAA	28	-0.424174	-2.38838	0.024474
IL-10 (27)pg/ml & Left ACC NAA+NAAG	28	-0.398025	-2.21233	0.035933
IL-10 (27)pg/ml & Left ACC mI	28	-0.006331	-0.03228	0.974493
IL-10 (27)pg/ml & Right FWM NAA	27	-0.270358	-1.40408	0.172597
IL-10 (27)pg/ml & Right FWM NAA+NAAG	27	-0.277997	-1.44702	0.160315
IL-10 (27)pg/ml & Right FWM mI	27	0.024885	0.12446	0.901943
IL-10 (27)pg/ml & Left FWM NAA	27	-0.347779	-1.85467	0.075475
IL-10 (27)pg/ml & Left FWM NAA+NAAG	27	-0.354484	-1.89551	0.069643
IL-10 (27)pg/ml & Left FWM mI	27	-0.252194	-1.30309	0.204420
IL-1b (46)pg/ml & Right DLPFC NAA	27	-0.218473	-1.11941	0.273606
IL-1b (46)pg/ml & Right DLPFC NAA+NAAG	27	-0.331450	-1.75654	0.091240
IL-1b (46)pg/ml & Right DLPFC mI	27	0.311098	1.63670	0.114221
IL-1b (46)pg/ml & Left DLPFC NAA	27	-0.178293	-0.90598	0.373594
IL-1b (46)pg/ml & Left DLPFC NAA+NAAG	27	-0.244848	-1.26267	0.218357
IL-1b (46)pg/ml & Left DLPFC mI	27	0.186842	0.95095	0.350731
IL-1b (46)pg/ml & Right ACC NAA	28	0.101820	0.52190	0.606161
IL-1b (46)pg/ml & Right ACC NAA+NAAG	28	-0.153278	-0.79091	0.436151
IL-1b (46)pg/ml & Right ACC mI	28	0.121254	0.62287	0.538795
IL-1b (46)pg/ml & Left ACC NAA	28	-0.097441	-0.49923	0.621817
IL-1b (46)pg/ml & Left ACC NAA+NAAG	28	-0.174901	-0.90578	0.373368
IL-1b (46)pg/ml & Left ACC mI	28	0.267689	1.41665	0.168457
IL-1b (46)pg/ml & Right FWM NAA	27	0.100458	0.50484	0.618090
IL-1b (46)pg/ml & Right FWM NAA+NAAG	27	-0.240879	-1.24094	0.226149
IL-1b (46)pg/ml & Right FWM mI	27	0.253130	1.30826	0.202688
IL-1b (46)pg/ml & Left FWM NAA	27	-0.125802	-0.63404	0.531811
IL-1b (46)pg/ml & Left FWM NAA+NAAG	27	-0.086399	-0.43362	0.668286
IL-1b (46)pg/ml & Left FWM mI	27	0.039994	0.20013	0.842998
IL-8 (63)pg/ml & Right DLPFC NAA	27	-0.314151	-1.65452	0.110525
IL-8 (63)pg/ml & Right DLPFC NAA+NAAG	27	-0.190811	-0.97191	0.340406
IL-8 (63)pg/ml & Right DLPFC mI	27	-0.113553	-0.57146	0.572789
IL-8 (63)pg/ml & Left DLPFC NAA	27	-0.489621	-2.80767	0.009536
IL-8 (63)pg/ml & Left DLPFC NAA+NAAG	27	-0.184982	-0.94115	0.355634
IL-8 (63)pg/ml & Left DLPFC mI	27	-0.269231	-1.39777	0.174464
IL-8 (63)pg/ml & Right ACC NAA	28	-0.043788	-0.22349	0.824902
IL-8 (63)pg/ml & Right ACC NAA+NAAG	28	-0.185003	-0.95990	0.345947
IL-8 (63)pg/ml & Right ACC mI	28	0.003284	0.01675	0.986767
IL-8 (63)pg/ml & Left ACC NAA	28	-0.308703	-1.65491	0.109966
IL-8 (63)pg/ml & Left ACC NAA+NAAG	28	-0.165846	-0.85753	0.398990
IL-8 (63)pg/ml & Left ACC mI	28	0.021894	0.11166	0.911948
IL-8 (63)pg/ml & Right FWM NAA	27	-0.321783	-1.69929	0.101676
IL-8 (63)pg/ml & Right FWM NAA+NAAG	27	-0.133089	-0.67142	0.508111
IL-8 (63)pg/ml & Right FWM mI	27	0.147153	0.74386	0.463894
IL-8 (63)pg/ml & Left FWM NAA	27	-0.457945	-2.57568	0.016304
IL-8 (63)pg/ml & Left FWM NAA+NAAG	27	-0.324786	-1.71702	0.098342
IL-8 (63)pg/ml & Left FWM mI	27	-0.142857	-0.72169	0.477183
TNFa (75)pg/ml & Right DLPFC NAA	27	-0.306917	-1.61241	0.119428
TNFa (75)pg/ml & Right DLPFC NAA+NAAG	27	-0.166132	-0.84237	0.407569
TNFa (75)pg/ml & Right DLPFC mI	27	-0.060763	-0.30438	0.763358
TNFa (75)pg/ml & Left DLPFC NAA	27	-0.256489	-1.32683	0.196558
TNFa (75)pg/ml & Left DLPFC NAA+NAAG	27	-0.327023	-1.73025	0.095914
TNFa (75)pg/ml & Left DLPFC mI	27	0.004885	0.02443	0.980705
TNFa (75)pg/ml & Right ACC NAA	28	0.199288	1.03698	0.309296
TNFa (75)pg/ml & Right ACC NAA+NAAG	28	-0.132768	-0.68303	0.500629
TNFa (75)pg/ml & Right ACC mI	28	0.154941	0.79971	0.431128
TNFa (75)pg/ml & Left ACC NAA	28	-0.057761	-0.29502	0.770325
TNFa (75)pg/ml & Left ACC NAA+NAAG	28	-0.188612	-0.97931	0.336450
TNFa (75)pg/ml & Left ACC mI	28	0.158226	0.81709	0.421301
TNFa (75)pg/ml & Right FWM NAA	27	-0.173462	-0.88066	0.386891
TNFa (75)pg/ml & Right FWM NAA+NAAG	27	-0.039695	-0.19863	0.844159
TNFa (75)pg/ml & Right FWM mI	27	0.123683	0.62320	0.538797
TNFa (75)pg/ml & Left FWM NAA	27	-0.412277	-2.26262	0.032600
TNFa (75)pg/ml & Left FWM NAA+NAAG	27	-0.442137	-2.46468	0.020935
TNFa (75)pg/ml & Left FWM mI	27	-0.276947	-1.44110	0.161965

	Group=MPD Spearman Rank Order Correlations (Spreadsheet Chapter 4) MD pairwise deleted Marked correlations are significant at p <,01000			
Pair of Variables	Valid N	Spearman R	t(N-2)	p-value
IFNg (25)pg/ml & ACC30 NAA abs	21	-0.105879	-0.46412	0.647834
IFNg (25)pg/ml & ACC30 NAA+NAAG abs	21	-0.079247	-0.34652	0.732762
IFNg (25)pg/ml & ACC30 ml abs	21	0.027282	0.11896	0.906554
IFNg (25)pg/ml & Thal30 NAA abs	18	0.246773	1.01860	0.323551
IFNg (25)pg/ml & Thal30 NAA+NAAG abs	20	0.063934	0.27180	0.788866
IFNg (25)pg/ml & Thal30 ml abs	20	0.029334	0.12451	0.902292
IL-10 (27)pg/ml & ACC30 NAA abs	21	-0.037280	-0.16261	0.872540
IL-10 (27)pg/ml & ACC30 NAA+NAAG abs	21	-0.030740	-0.13406	0.894769
IL-10 (27)pg/ml & ACC30 ml abs	21	0.055593	0.24270	0.810838
IL-10 (27)pg/ml & Thal30 NAA abs	18	-0.047995	-0.19220	0.850004
IL-10 (27)pg/ml & Thal30 NAA+NAAG abs	20	0.077334	0.32909	0.745889
IL-10 (27)pg/ml & Thal30 ml abs	20	-0.240342	-1.05048	0.307399
IL-1b (46)pg/ml & ACC30 NAA abs	21	-0.249432	-1.12273	0.275538
IL-1b (46)pg/ml & ACC30 NAA+NAAG abs	21	-0.194868	-0.86601	0.397287
IL-1b (46)pg/ml & ACC30 ml abs	21	-0.144203	-0.63520	0.532871
IL-1b (46)pg/ml & Thal30 NAA abs	18	0.034073	0.13637	0.893228
IL-1b (46)pg/ml & Thal30 NAA+NAAG abs	20	0.134637	0.57647	0.571440
IL-1b (46)pg/ml & Thal30 ml abs	20	0.164724	0.70854	0.487684
IL-8 (63)pg/ml & ACC30 NAA abs	21	-0.062338	-0.27225	0.788364
IL-8 (63)pg/ml & ACC30 NAA+NAAG abs	21	-0.027273	-0.11892	0.906584
IL-8 (63)pg/ml & ACC30 ml abs	21	0.075325	0.32927	0.745555
IL-8 (63)pg/ml & Thal30 NAA abs	18	0.219814	0.90130	0.380795
IL-8 (63)pg/ml & Thal30 NAA+NAAG abs	20	-0.222556	-0.96852	0.345621
IL-8 (63)pg/ml & Thal30 ml abs	20	-0.189474	-0.81870	0.423665
TNFa (75)pg/ml & ACC30 NAA abs	21	-0.037025	-0.16150	0.873405
TNFa (75)pg/ml & ACC30 NAA+NAAG abs	21	-0.000650	-0.00283	0.997770
TNFa (75)pg/ml & ACC30 ml abs	21	0.129263	0.56821	0.576547
TNFa (75)pg/ml & Thal30 NAA abs	18	0.219928	0.90179	0.380543
TNFa (75)pg/ml & Thal30 NAA+NAAG abs	20	0.038360	0.16287	0.872436
TNFa (75)pg/ml & Thal30 ml abs	20	0.108311	0.46225	0.649444