TOWARD AN INDEX OF PREMORBID INTELLECTUAL FUNCTIONING: INVESTIGATION OF THE NATIONAL ADULT READING TEST (NART) IN A NEUROLOGICALLY UNIMPAIRED SOUTH AFRICAN SAMPLE.

A DISSERTATION SUBMITTED AS PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN PSYCHOLOGY IN THE FACULTY OF SOCIAL SCIENCE AND HUMANITIES, UNIVERSITY OF CAPE TOWN, 1989

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ABSTRACT

The utility of the National Adult Reading Test (NART) as a predictor of premorbid intellectual functioning is dependant on its ability to adequately predict IQ from irregular word reading ability. The primary aim of this study is the replication, on a South African sample, of the findings reported by Nelson (1977 unpub. manuscript) in her standardisation study. A total of 234 subjects are divided into groups according to language usage and availability/type of IQ score and utilised in a correlational study which investigates the psychometric characteristics of the NART and the degree of correspondence between predicted and observed I.Q. values. The research yields regression formulae for the prediction of IQ from performance on the NART. While correlation coefficients obtained for English speaking subjects do not differ significantly from those derived from Nelson's data (1977 unpub. manuscript), it is concluded that the use of the test for Afrikaans subjects is not justified. Satisfactory reliability and validity characteristics reported for the sample utilised in

this study suggest that the instrument can be usefully applied under local conditions. An investigation of 24 potential additional items for the test does not yield encouraging results. The lack of an adequate model explaining the mechanisms underlying the functioning of the test is addressed, and a number of areas of interest for further research are identified.

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INTRODUCTION AND RATIONALE

The National Adult Reading Test (NART) was developed as an instrument for clinical use in the estimation of premorbid intellectual functioning. (Nelson, 1977; Nelson and O'Connell, 1978) After an initial hiatus, the bulk of the work reported in this paper having been published since 1985, a respectable body of research supporting the utility of the NART as a useful clinical instrument has accumulated in the last few years. (Crawford, Parker, Besson & Crighton, 1986; Crawford, Besson, Parker, Sutherland, & Keen, 1987; Crawford, Parker, Besson, Stewart, Moore, Gemmel, Sharp & Crighton, submitted for publication; Crawford, Stewart, Garthwaite, Parker, & Besson, in press; O'Carroll, 1986; O'Carroll, Baikie, & Whittick, in press; O'Carroll & Gilleard, 1986)

In their 1987 study, Crawford et al. (in press) claim that the NART can be used in clinical practice with confidence. Communication with practicing neuropsychologists suggests that the NART is already part of the armamentarium of some South African clinicians, (Prof. M Saling, personal communication) despite the absence of data affirming the utility of the instrument under South African conditions. It is clear therefore that there is a need for work to be done on establishing the predictive utility of the NART in a South African context. Issues to be addressed include the

extent to which the 'scoring key' for the NART can be usefully broadened to take account of pronunciations considered correct in terms of 'Standard South African English' (Lanham & Prinsloo, 1978) and the development of regression equations appropriate to South African conditions.

The main aim of this study has been the replication, in a South African sample, of Nelson's (1977 unpub. man) findings regarding the utility of the NART as a predictor of intellectual functioning in a neurologically unimpaired sample, and hence its utility as a predictor of premorbid intellectual functioning. An attempt has also been made to address the need for an adequate model of the cognitive processes involved in reading, as well as the relevance of such a model in contributing to an explanation of the functioning of the NART. In an effort to further investigate the usefulness of the NART in a South African context, a comparison has been made between the performance of Afrikaans and English speaking subjects on the test. The investigation of 24 additional potential items is also undertaken with a view to increasing the utility of the test in South Africa.

The layout of the thesis proceeds from a brief review of methods of assessing premorbid intellectual functioning to a discussion of models of reading and their relevance to the

NART. This is followed by an overview of the NART and its development, and a brief introduction to the other instruments used in the research. Due to the volume of data generated by this research, much of the discussion has been integrated into the results section in an attempt to improve the readability of this portion of the thesis. A brief discussion of the main issues arising from the research is followed by the reference list and an appendix containing scoring keys for the NART, additional statistical material, and a print out of the raw data.

While the effect of cross-cultural variables on the performance of the NART has not been addressed in the literature, it is clear that one needs to bear cross cultural differences firmly in mind when measuring reading ability, as working vocabulary may differ markedly between cultures. This consideration may serve to restrict the applicability of the NART in a South African context to use with subjects whose language usage approximates respectable South African English. (Lanham and Prinsloo, 1978)

CHAPTER 1 PREMORBID INTELLECTUAL FUNCTIONING AND THE PRINT TO SOUND PROCESS - ISSUES AND STEPS TOWARDS A MODEL

1.1 The Estimation of Premorbid Intellectual Functioning.

The estimation of premorbid intellectual functioning is an endeavour fraught with problems and surrounded by controversy. That it is a crucial aspect of the neuropsychologist's task cannot be disputed and the results of such procedures contribute not only to an assessment of degree of intellectual impairment the patient has suffered, but to the design of remedial programs and may also be involved in medico-legal processes.

"For almost thirty years, clinicians and researchers have been discussing the importance of establishing premorbid levels of intellectual functioning (e.g. Wechsler, 1958). At some level, every neuropsychologist must, either willingly or unwillingly, make some determination of the extent and pervasiveness of neuropsychological deterioration relative to that individual's functioning prior to the injury or insult". (Klesges & Troster, 1987,p1)

Lezak (1983) identifies the distinguishing characteristic of neuropsychological assessment as being the emphasis placed by the clinician "on the identification and measurement of psychological deficits...",(p85) noting that "brain damage always implies behavioral impairment" and that it is

primarily in deficiencies of intellect, emotionality and control that brain damage is manifest behaviorally." (p85) In assessing the presence and extent of a deficit the clinician may, where appropriate, make use of normative standards derived from the population as a whole. This approach is however limited to these functions which are not normally distributed in the population and for which species-wide norms are available. In the case of normally distributed functions and abilities, the clinician must resort to individual comparison standards which require an assessment of the level of premorbid functioning. In discussing the limitations of normative standards, Lezak makes the point that "although the average score may be, statistically, the most likely score a person will receive, statistical likelihood is a far cry from the individual case". (Lezak, 1983,p90)

In an 'ideal' situation the clinician confronted by a suspected case of 'brain damage' would have access to a recent and accurate assessment of the individual's premorbid level of cognitive functioning. In this instance the extent of deficit may be assessed directly by simply comparing past (premorbid) and present samples of behaviour and evaluating any discrepancies. Carter (1951) utilised this approach in studying the effects of multiple sclerosis on intellectual functioning. In this study, the scores obtained by subjects on the Army General Classification Test when they joined the service were compared to those obtained after the onset of

the disease. (Lezak, 1983) As reliable premorbid data is rarely available, the clinician must rely on one or a number of techniques in order to arrive at an estimate of the individual's prior cognitive capacity.

The use of terms such as cognitive function and cognitive capacity is in itself an issue on which a considerable amount could be, and has been, written. This debate will not be taken up here, and in keeping with the approach taken by Nelson & McKenna(1975) and Nelson & O`Connell(1978) the concept of IQ will be accepted essentially without question for use in this research. While the use of 'IQ' in an endevour such as this may be taken as perfectly natural by many researchers, attention must be drawn to the possible bias inherent in the IQ score itself. Gould (1981) contends that "what craniometry was for the nineteenth century, intelligence testing has become for the twentieth, when it assumes that intelligence (or at least a dominant part of it) is a single, innate, heritable, and measurable thing." (p25) These issues loom especially large in as heterogeneous a society as South Africa.

Bearing these reservations in mind, attention must now be focussed on the various techniques used by clinicians and researchers in their attempts to arrive at an estimate of 'premorbid IQ'. These include the clinical interview and gathering of anecdotal data, the use of patterns of subtest

scatter on various IQ tests, the use of vocabulary scores, attempts to develop regression equations using demographic data, and the use of reading tests. Klesges et al (1981) note that the subjective nature of the material gathered in clinical interviews and the amount of reliance placed on the clinical intuition of the neuropsychologist may result in unreliable and inconsistent estimates of premorbid functioning using this technique. While this may be the case, it should be borne in mind that the clinical interview must perforce provide the backdrop to any attempt at estimation of premorbid functioning. It can provide valuable pointers to the direction the investigation should follow, and in the nature of differential diagnosis, it may serve to exclude certain options and focus the assessment.

The use of WAIS subtest scatter has long been a feature of clinical practise in the detection of organic impairment. Wechsler (1958) describes characteristic test performances indicative of various clinical conditions. These include organic brain disease, schizophrenia, anxiety states, adolescent sociopaths (delinquents), and mental defectives (sic). He cautions that the lists which indicate how subjects within each category tend to perform on each subtest should not be regarded as patterns, but rather as "bases from which patterns may be evolved from tried test combinations". (p169) He notes that as there may be "considerable overlap between the performance profiles of

different clinical groups" the clinician should be wary of overemphasing single signs as symptoms in arriving at a diagnosis. All indicators should be read in conjunction with other signs and the presence or absence of accompanying symptoms noted. This is of special relevance to a situation such as neuropsychological assessment, in which use is made perforce of imperfect' instruments. At best, 'tests' for organicity should be considered as contributing an input to the overall diagnostic equation. As such they may explain more or less of the 'variance' with a greater or lesser degree of error. The danger always exists however that the seductive 'precision' of an apparently objective and reliable test score may lead to undue reliance on the results of such tests, especially in situations where the clinical resources are overextended.

Bearing the above in mind it is instructive to look in greater detail at Wechslers scheme for identifying organic brain disease using the subtests of the W-BI and the WAIS.

> "The meanings of the symbols used are as follows:+ and ++ signify relatively good, high or considerably above the mean of the subject's remaining subtest scores; - and --, relatively poor, low or considerably below the mean of the subject's remaining subtest scores; 0, no significant deviation from the mean of the remaining subtest scores. The combined symbols + to 0, - to 0, etc;

signify that the deviation in subtest scores may be either above or approximately at the mean of the remaining subtests, etc. In general, the symbol placed first represents the general tendency. Thus, Object Assembly under Organic Brain Disease is marked O to --. This means that, in general, the organic subject's score on Object Assembly in not outstanding but that in some cases it may be extremely low.

On a quantitative basis the symbols have approximately the following significance:

+ a deviation of from 1.5 to 2.5 units above the mean subtest score
++ a deviation of 3 or more units above the mean subtest score
- a deviation of from 1.5 to 2.5 units below the mean subtest score
__ a deviation of 3 or more units below the mean subtest score
O a deviation of +1.5 to -1.5 units from the mean subtest score

All deviations are in terms of weighted score units."

Organic Brain Disease

Information .....+
Comprehension .....+
Arithmetic .....-
Digit Span$*% .....--
Similarities .....-
Vocabulary .....++
Picture Arrangement ...Oto-
Picture Completion ....O
Object Assembly .....Oto--
Block Design$ .....--toO
Digit Symbol .....--

Verbal higher than Performance

Inter-test variability; omitting the 2 or 3 tests on which subject is likely to do very badly, scatter of remainder generally small.

*Except id paretics

%Particularly digits backward

$Depending on type of impairment

(Wechsler, 1958, pp.170 - 171)

Prominent among the typical subtest scores for organicity is the superior performance of vocabulary, relative to the other subtests, and more generally the higher verbal as opposed to performance scores. Wechsler notes that "organic patients, with few exceptions, do consistently better on verbal than on performance tests." (1958, p174) and that the extent to which Verbal score is favoured in mental disorders "varies with the disease entity and in the case of organic brain disease with the type of impairment." (p159) Wechsler's deterioration quotient (DQ) index involves the comparison of scores on those tests less prone to deterioration with age, the so called 'Hold' tests comprising Vocabulary, Information, Object Assembly and Picture Completion with those more prone to decline with ageing, the so called 'Don't Hold'Tests, comprising Digit span, Similarities, Digit Symbol and Block Design.

The questionable efficacy of both the Wechsler-Bellevue based mental deterioration index, and the DQ has led subsequent researchers (e.g. Hunt, 1949 ; Gonen, 1970 ; Norman, 1966 ; Hewson, 1949; - quoted in Lezak, 1983) to modify Wechsler's original schema in attempts to arrive at a more reliable and robust formula for identifying organic conditions. While the most successful of these report 85 - 88% accuracy in identifying nonpsychotic psychiatric patients as not organic, Lezak, (1983) makes the point that "actuarial techniques alone do not give a clue as to which of every seven to ten of these patients has been misclassified by the test". (p.251) The relevance of this work to the current research lies in the implicit assumption that due to the differential deterioration of abilities, scores on the relevant subtests can be used to provide an indication of the patient's level of premorbid functioning, thus providing a basis for comparison with scales which are known to deteriorate in organic conditions. Klesges et al. (1981) observe that WAIS based deterioration indices have yielded contradictory research results, that such research is "almost atheoretical in terms of explicit hypotheses", (p34) and that it is based on an unstated and implicit understanding that " the brain is equipotential for function, and that brain damage is expressed in a unitary manner regardless of the localisation or acuteness of the injury." (p.34) Reitan's (1959) demonstration that both Verbal and Performance tasks and IQ are prone to decline in

a heterogeneous brain damaged group suggests that care needs to be exercised when utilising so called 'Hold' tasks in the assessment of brain damage, and concomitantly, the prediction of premorbid levels of functioning.

Klesges et al (1981) suggest that particular predictors of premorbid functioning may be accurate only for homogeneous groups with clearly defined pathology, and that in some populations, as in dementia resulting from severe diffuse damage, there may be no accurate "hold" tests. They note however that "classical wisdom" (p34) has Vocabulary as the best single predictor of premorbid functioning in accordance with the notion that it is highly resistant to decline in brain damaged patients. Yates (1956) makes the point that the problem of determining the presence and degree of intellectual deterioration in an individual is one "which has exercised the ingenuity of clinical psychologists for a long time", (p409) and that in the absence of opportunities for test-retest, and without access to any other direct estimate of premorbid functioning, an alternative solution to the problem had to be sought. "Babcock (1930) hit on the method of using the Vocabulary test as an estimate of previous level of intellectual ability and contrasting it with performance on other tests supposedly sensitive to deterioration in order to measure the amount of decline which had take place." (p409) The notion that a strong relationship exists between vocabulary and performance on a

number of `intelligence' measures is amply supported by research which includes Thurstone's (1941) study (quoted in Yates 1956) where a correlation of 0,72 was found between verbal comprehension and "g". Binet Mental Age and Vocabulary have been shown to be highly correlated (greater than .9 (Spache, 1943; Oberlin, 1937; Elwood ,1939 - all quoted in Yates, 1956) while a correlation of .809 was reported between Wechsler vocabulary and the Wechsler verbal scale by Lewinski (1948 quoted in Yates 1956)

Yates notes that these relatively strong correlations do not hold for the relationship between Vocabulary and Performance scales (Lewinski (1948) quoted in Yates 1956) or that between Vocabulary and Full Scale IQ measures incorporating both verbal and non-verbal items. Even where a relatively good correlation does exist i.e where IQ is measured on a verbal type intelligence test, the correlation rarely rises above 0,9 and averages between .8 and .85. The resultant shared variance only amount to approximately 60-70 per cent and he notes that as a result it follows that "the accuracy with which intelligence level could be predicted from a knowledge of vocabulary level is not very great in individual cases". (Yates, 1956,p419) Yates further presents evidence which indicates vocabulary does in fact decline in patients suffering from brain damage. "This loss includes both a decline in the quality of responses and an absolute decline in terms of the number of words whose meaning is known."

(p.436) This contention is supported by Russel (1972 quoted in Klesges et al 1981) who found, using factor analysis on WAIS performance in a sample of 103 subjects, 26 with left hemisphere damage, 16 with right hemisphere damage, 40 with diffuse damage and 26 normal controls, that all subtests including Vocabulary were equally affected by brain damage. Swiercinsky & Warnock (1977 reported in Klesges et al. 1981) found Vocabulary score functioned at a high level of significance and ranked 4th behind Digit Symbol, TPT left and Auditory suppressions - left in its ability to discriminate between brain damaged and normal students in an investigation of the discriminative efficacy, of the WAIS and Reitan variables ($F(4,255) = 15.54$, $p<.0001$) The evidence presented above strongly calls into question the efficacy of Vocabulary scores as predictors of premorbid functioning. Klesges & Troster (1987) review some recent studies utilising the WAIS deterioration quotient. An investigation by Bauer, Schlottman, Kane and Johnson (1984 reported in Klesges and Troster 1987) of the utility of the Digit Symbol subtest in differentiating controls and brain damaged subjects suggested some success for this method, but resulted in a perturbingly high rate of false positives, some 40%, amongst the controls. Data collected on 23 Alzheimers disease (AD) and 39 multi-infarct dementia (MID) patients utilising the WAIS DQ and Fulds (1982 reported in Klesges & Troster 1987) formula from a study conducted by Brinkman and Braun (1984 reported in Klesges & Troster 1987)

indicates that the 2 measures were able to correctly classify 56,5% of the Ad patients and 79,5% and 94,9% of the MID patients respectively. The inability of the measures to correctly classify 45,5% of the AD patients and the relative success, with few false positives, of Fulds formula with AD patients suggests a need to develop indices for homogeneous pathology "particularly given the poor results obtained with the various indices in heterogeneous populations." (Klesges & Troster 1987, p.3) While research by Mahan (1979 reported in Klesges & Troster 1987) comparing WAIS Performance and Verbal scores utilising the Picture Completion subtest score as a 'hold' variable in a regression approach shows some merit, especially in the reduction of false positive classifications, Klesges and Troster note that "decades of research have failed to produce a reliable deterioration quotient." (Klesges & Troster 1987, p.4) and are pessimistic about the possibility that "the further modification of WAIS, WISC-R and WAIS-R subtest scores will produce an improved and reliable premorbid index." (Klesges & Troster 1987, p.4)

A further technique for the assessment of premorbid functioning involves the use of multiple regression techniques utilising demographic data as predictors. Klesges (1981) mentions 2 studies applying this approach to the prediction of WAIS and WISC-R IQ scores respectively.

Wilson et al (1978 in Klesges 1981) utilised step wise regression on the data from the original standard ration sample of the WAIS (excluding the Kansas City elderly patients) (n=1700) to arrive at equations for predicting verbal, performance and full scale IQ from the demographic variables of age, sex, race, education and occupation. The R^2 values for these equations were .53,.42, and .54 respectively corresponding to the following correlations:

	R^2	R
Demographic variables WAIS V.I.Q.	.53	0.72
Demographic variables WAIS P.I.Q.	.42	0.64
Demographic variables WAIS F.S.I.Q.	.54	0.73

A crosss validational study carried out by Wilson, Rosenbaum & Brown (1979 in Klesges 1981) on 140 neurologic and 140 non-neurologic patients found that Wilson's formula correctly classified 72% of the patients against 61% for Wechsler's original (1958) deterioration quotient, an improvement over the D.Q. of some 11%.

A further cross validation study conducted by Klesges, Sanchez and Stanton (1981 quoted in Klesges 1981) utilised 166 neurologically unimpaired subjects consisting of 60 psychiatric inpatients and 10% outpatients. Correlations between actual and predicted I.Q. scores utilising the

Wilson et al (1979 quoted in Klesges 1981) formula were as follows:

	r OUTPATIENTS	r INPATIENTS
V.I.Q	.54	.66
P.I.Q	.36	.56
F.S.I.Q	.50	.54

(p <0,001)

A tendency to overpredict I.Q. was corrected by adjusting the weighting applied to education, resulted in fewer non organic patients being classified organic as a result of their predicted us obtained I.Q. score falling outside the standard error of estimate. A further evaluation of the Wilson full scale I.Q. formula conducted by Bolter, Gouvier, Veneklasen and Long (1982 quoted in Klesges 1987) produced equivocal results. While correlations of between .63 and.73 were obtained the predicted classification of head injured patients was only accurate in approximately 50% of the cases and in 67-71% of the control group. Klesges, Fisher, Vasey and Pheley (1985) (c141) found only weak relationships between predicted and obtained I.Q. (r=0.10 to 0.17) using Wilson's formula on a sample of 125 brain injured and 75 normal subjects. Classification of subjects using predicted- actual difference scores correlated to preserve/absence of brain damage also produced disappointing

results. (r=0.09 to r=0.18) Correcting the formulae for the educational variable (Wilson 1978 quoted in Klesges 1987) failed to consistently enhance the relationship between predicted and obtained I.Q. or the ability of the equations to reliably discriminate brain damaged subjects from normals. These researchers conclude that "It appeared that performance on the WAIS alone was more highly correlated with neurological status." (Klesges, 1987, p.6)

Goldstein, Gary and Levin (1986) examined the accuracy of the Wilson (1978 quoted in Goldstein et al. 1986) regression equations using a sample of 69 neurologically normal adults. Comparing predicted and obtained WAIS verbal performance and full scale I.Q. scores using regression and the Chi-square goodness of fit test, they conclude that while the equations provided "an adequate overall fit to the data" (Goldstein et al 1986 p .405) problems of over and under estimation are encountered at the extreme ends of the I.Q. scale. Klesges and Troster (1986) make the point that an inherent problem in the use of regression equations, especially when looking at individual scores which deviate more than one standard deviation from the mean, is the tendency to over and under estimation of predicted scores associated with regression to the mean. This may have clinical relevance and it is suggested that these equations are best applied to patients whose premorbid I.Q. scores are not extremely high or low. It should always be borne in mind that such predictions of

I.Q. are estimates and should not be regarded as exact predictions.

An investigation of the efficacy of regression techniques in predicting performance on the Halstead-Reitan Battery 'without doubt the most widely used standardised neuropsychological battery, at least in North America and perhaps throughout the world." (Goldstein & Hersen, 1984) Average Impairment Rating (AIR) was undertaken by Karzmark and Heaton (1984) They found that utilising the demographic variables of age, education, race and occupation resulted in an equation which explained 65% of the variance in AIR with a standard error of 0.33. Klesges et al (1984) and Klesges et al (1985) using the Karzmark et al (1984) AIR formula find only modest empirical and cross validational support for the formula and note that 39% of the subjects in their study were misclassified on the basis of their predicted AIR scores.

Based on their review of recent studies in which consistent, but weak findings are reported, and in which the ability of the equation to correctly classify subjects was rarely beyond chance levels Klesges & Troster (1987) conclude that, in relation to the utility of demographically based regression equations as predictors of premorbid functioning, "the guarded optimism expressed by Klesges et al (1981) in their review may be unfounded." (p.7)

With the introduction of the WAIS-R , new attempts have been made to predict I.Q. using demographic variables.Barona et al (1984) have used the variables of age, race, sex, education, occupation, region of residence, urban versus rural residence and handedness in a stepwise regression technique to arrive at equations for predicting WAIS-R Verbal Performance and Full scale I.Q.'s utilising various combinations of certain of these variables. The resultant multiple correlations are as follows:

	R	R^2
V.I.Q.	.62	.38
P.I.Q.	.49	.24
F.S.I.Q.	.60	.36

and it would seem that these equations hold some promise. Klesges (1987) however cautions against undue optimism until such time as cross validational studies have been carried out, a valid point in view of the failure of Wilson's (1978 quoted in Klesges 1987) regression formulas to live up to their early promise. Due to the inevitable obsolescence of prediction systems utilising WAIS scores, future efforts in this area should focus on the validation and development of regression equations based on the WAIS-R. It should be noted that while no attempt has been made here to address the question of premorbid predictors of I.Q. for children, this is nonetheless recognised as being an important area

for study. Klesges (1982b) draws attention to the specific difficulties of assessing premorbid intellectual functioning in children and notes that it is necessary to take into account the variable effect which maturational, developmental and educational factors may have on intellectual processes, and the resultant instability of I.Q. in children. Klesges (1982b) assessed the diagnostic utility of Reynolds and Gutkin's (1979) in Klesges (1982a) multiple regression equations for prediction of childrens I.Q. from the demographic variables of socio economic status, race, sex, region and residence. His results indicate no significant correlation between predicted and obtained I.Q.'s in normal subjects and failure to distinguish between normals and brain damaged subjects. A poor prognosis for the use of demographic regression techniques in the assessment of childrens premorbid cognitive functioning is ascribed to a dearth of empirical research in this area. (Klesges and Troster, 1987) Interest in the assessment of premorbid I.Q. through the use of reading tests stems largely from the work of Nelson and McKenna (1975) and Nelson and O'Connell (1978). The use of the Schonell Graded Word Reading Test and the development of the National Adult Reading Test, NART, (formerly the New Adult Reading Test - Nelson & O'Connell, 1978) will be discussed more fully in the following section. It is interesting to note however that Klesges and Troster referring to reading and vocabulary based indices of

premorbid functioning in their 1987 review of premorbid indices of intellectual functioning maintain that "to our knowledge, no research on these techniques has occurred since the last review". (p1) The paucity of research into reading based indices since the publication of Nelson & O'Connell's 1978 paper has to a large extent been redressed by the recent upsurge of interest in this area. In view of the equivocal results returned by other techniques for assessing premorbid intellectual functioning, it would seem that this is a most welcome and overdue development.

1.2 Discussion of orthography and the relevance of 'print to sound' models to an explanation of the mechanisms involved in the functioning of the NART.

The exact nature of the route taken by individual words from print to sound is a source of lively ongoing debate amongst linguists and the linguistically inclined. While Henderson (1982) examines the question in some detail, the extent of the debate is possibly best exemplified by Humphreys and Evett's (1985a) paper and the extensive ongoing peer commentary which it has generated. Henderson (1984) notes that "the last two decades have seen a remarkable rebirth of psychological interest in the process of reading". (p1) Despite the apparent narrowness of such an approach he notes that it is an endeavor which has "turned out to raise a rich

collection of questions about the readers access to phonology and meaning" (Henderson, 1982, p1) while at the same time providing a useful focus for research into reading and acquired disorders of reading. (Henderson, 1985) Before steaming full steam ahead into these turbulent, if interesting, waters attention should be drawn to a note of caution sounded by Bub and Kertesz (1985). "Psychologists have often been accused of placing too much emphasis on experimentation while failing to develop adequate theoretical accounts of mental processing. The controversy on the nature of spelling-to-sound translation appears to have suffered from exactly the opposite tendency: The information now available is simply not detailed enough to allow any firm conclusions about the nature of the process." (pp706-707) Attempts to explain the process of word recognition have resulted in several classes of complex and sophisticated models, each containing a number of competing representatives. Carr (1985) maintains that the current batch, while each having a domain of phenomena in which they are successful, are all deficient when it comes to coping with the demands of reading a connected discourse as opposed to individual words. This he attributes to their reliance on an assumption of the simultaneous availability of all the letters in a word, something which can only be sustained in words containing four, plus or minus two or three, letters. Pollatsek (1985) concludes that any "reasonable model of word processing will be quite complex, perhaps inelegant,

and extremely difficult to test." (p.723) Any attempt to utilise models of reading in explaining the functioning of the NART must be qualified by such considerations. At the same time they add a further complication to efforts aimed at selecting items for the test on theoretical as opposed to empirical grounds.

In the context of the present research, it becomes clear that while there is ample empirical support for the efficacy of the NART as a clinical instrument (Nelson and O'Connell (1978), Nelson (1982), O'Carroll et al. (in press), O'Carroll (1986), O'Carroll and Gilleard (1986), Crawford et al. (1986), Crawford et al. (1987), Hart et al. (1986), Crawford et al. (sub. for pub.)), little attempt has been made thus far to develop adequate theoretical accounts of the processes involved or to locate its operation within an accepted model of the reading process. As noted, despite the "confusing and seemingly contradictory nature of the literature on lexical and nonlexical routes in word processing", (Chastain, 1985) the debate is alive and well and it is beyond the scope of this thesis to even pretend to grapple in any great depth with the issues involved. It does seem however that research into reading processes has something important to offer towards the formulation of a theoretical explanation for the observed and clinically verified efficacy of the NART, and an attempt will

therefore be made to briefly present those aspects of the debate which have relevance to the current research.

It may be useful for the purposes of this paper, if something of a simplification, to view the different approaches to the study of reading as being concerned essentially with the question of the existence of separate lexical and non-lexical processing systems, and the role they play in the process of getting from print to sound. Henderson (1982) identifies 3 strategies which might be involved in the process of reading, namely "(i) prelexical translation according to grapheme-phoneme correspondence rules (GPCs), (ii) access to word-specific phonology in the lexicon, and (iii) the use of lexical analogies." (p.113) Before discussing these more fully, it is interesting to note that although historically "reading was seen as parasitic on speech, and so there had to be grapheme-to-phoneme conversion before anything else could happen" (Morton, 1985, p.718) the development of a dual-route theory may have originated from the pedagogical debate on the teaching of reading which arose as a result of the taxonomic distinction which came to be made between 'regular' and 'exception' words. This distinction necessitates the development of a separate system for coping with the 'exception' words which occur in English. "It is doubtful that a dual-route theory would have evolved from the study of languages such as Spanish that have regular spelling-to-

sound structure, since their orthographies do not compel the arbitrary separation of lexical and phonological knowledge into completely independent mechanisms". (Glushko, 1985, p.713) Clear evidence that both lexical and phonological information are used in word processing, coupled with most investigators preference for parsimonious models, has resulted in the dual-route theory as a means of coping with both these types of information in preference to more complicated interaction models. (Danks, 1987) Perfetti (1985) uses the parsimony argument to predict the opposite, namely that if one model can in fact be claimed to account for all word and non-word reading, then it will be claimed, on the basis of parsimony, to have 'privileged status' over a formulation requiring two mechanisms to do the same job.

Approaching one aspect of the issue, so-called single route theories utilise the notion of an internal 'dictionary' which the reader always accesses in order to arrive at a phonological representation of the word in question. Dual-route theory on the other hand proposes the existence of independent and non-interactive lexical and non-lexical word processing routes (Humphreys and Evett, 1985a.) in which the lexical route is the primary mode of processing, while grapheme-phoneme rules are used for unfamiliar words. (Glushko, 1985) "The most fully specified version of the classic theory is that advanced by Coltheart (e.g. 1978) in which the two routes are held to be independent and the

nonlexical procedure uses minimal sized translation units (grapheme to phoneme correspondences, or GPCs)". (Henderson, 1985, p.713) Underwood (1985) on the other hand suggests that on the basis of evidence concerning the frequency effect associated with regular as opposed irregular words, exactly the opposite emphasis is applied and that "regular words are named without using the lexical route whereas exception words are not. When the nonlexical route fails to produce a satisfactory pronunciation the lexical route is used, and this additional process is responsible for the delayed pronunciation time associated with exception words." (p.728) In analysing the respective merits of a dual-route as opposed to a unitary system however, care must be taken not to ignore the possible effects of postaccess decision processes on lexical production tasks. Evidence for such processes is contained in the unique effect that word regularity is found to have on pronunciation as opposed to lexical decision tasks, evidence which suggests that pronunciation and lexical decision tasks may involve task specific components which do not "reflect the word-recognition processes that are normally involved in accessing lexical information". (Balota, 1985, p.705)

In conceptualising the dual-route process, Mitchell (1985) usefully splits the path from print to sound into an input and an output component. The input phase can consist of only two routes; a visual-orthographic route and a phonological

route. The output phase, in which overt speech is generated from an internal representation, can likewise consist of either a process in which the appropriate motor program is recovered from the lexicon, or one which involves "assembling the pronunciation directly from a nonlexical phonemic representation." (p.717) (see figure 1.1) Thus the input phase may be conceptualised as being on the one hand a process in which the visual information gathered from reading the word directly accesses the appropriate entry in the mental dictionary i.e. processing involves immediate access to the lexicon at the initial stage in processing the data, and on the other a system in which the visual material is first translated into a speech code which may in turn be used to access the appropriate entry in the mental dictionary or lexicon. According to the dual route theory this latter process forms part of a functionally independent, nonlexical processing route which operates "by translating the words graphemic code into a phonological code on the basis of a small set of abstracted spelling to sound rules. These rules are nonlexical because their operation does not depend on word specific spelling-to-sound knowledge." (Humphreys and Evett, 1985a, p.690) By definition, the naming of non-words must make use of such a nonlexical mechanism. (Baron, 1985) Evidence from delays in the reading of irregular words has contributed to the formulation of an interference model in which the phonological code generated by the output phase of the two

routes described above constitutes the input to a system responsible for converting it to a form suitable for production. The arrival of a conflicting code during the pre-production transformation process results in a lexical check being made to ascertain the correct form for the output. (Patterson and Morton, 1985 - quoted in Brown, 1987) The issue of single as opposed to separate lexicons in relation to the functioning of the NART will be discussed below. A note of caution must be sounded at this point regarding the tendency identified by Seidenberg (1985) for models to be elaborated and complicated in an ad hoc attempt to cope with new or conflicting data. Thus through the addition of a completely new pathway concerned with the "assembly of output phonology ... the theorist gains an entire new set of free parameters with which to accommodate the empirical evidence." (p.725)

Although it has been alluded to above, explicit reference must be made at this stage to the important distinction drawn by Forster and Chambers (1973 quoted in Christowitz et al. 1985 ; Doctor, 1981) between pre and post lexical phonology, and to Fennel's (1983 in Christowitz et al. 1985) distinction between lexical and non lexical phonology. 'Prelexical' processes involve the translation of the graphemes comprising a word into phonemes prior to lexical access, as opposed to 'postlexical' or 'lexical' processing in which a visual access code is used to directly locate

the word in the lexicon. Christowitz et al (1985) go on to state that "as soon as the meaning of the word has been located in the lexicon its phonological representation also becomes available ". (p.126) Before proceeding, it should be noted that this assertion assumes a 'single-lexicon' view in which graphemic, semantic and phonetic articulatory representations are directly linked, with access to one automatically making the others available (Henderson 1982). In the separate lexicon approach, the various forms of representation of the word may be stored separately, requiring some processing to move between them. The implication here is that a reader might be able to move from graphemic-lexical entries to phonetic/articulatory entries without accessing a semantic representation in the process. The notion of multiple lexicons may be of particular relevance to an explanation of the clinical efficacy of a test such as the NART in view of Crawford et al's(1987) finding regarding the NARTs apparent resistance to decline in a variety of organic conditions relative to the WAIS Vocabulary Subtest.

Introducing the notion of separate lexicons into the discussion further complicates the process of developing a model of the print to sound process. It does however offer a needed refinement over the simple "pre or post"-lexical processing option offered earlier. Addressing the issue of a pre-lexical GPC route, Taft (1985) notes that the available

evidence points to the fact that "simple non-lexical rules are usually resorted to when no lexical entry is found for the presented letter string" (p.727). While this may be the case in considering non-word naming, the processing of words makes it necessary to consider, amongst others, the questions of how the reader confronts the problems associated with, on the one hand, the segmentation of grapheme strings, and on the other, the fact that a single grapheme may correspond to more than one phoneme. Thus 'C' may correspond to 'S' as in cider or to 'K' as in cat. (Hass 1970 in Nelson 1982) The issue of segmentation is clearly demonstrated by the performance of 'PH' "as a single unit (a diagraph) in *morpheme* but as two independently functional graphemes in *uphill*." (Henderson, 1982,p.70-71) This problem Henderson (1982) describes as being due to the 'unreliability' of the functional units into which the grapheme string must be broken before translation from one 'language' or modality to another. The full development of this argument is beyond the scope of this thesis and the reader is referred to Henderson (1982) for a fuller exposition. The fundamental contention is however that uncertainty in segmenting grapheme strings may be reduced by the use of rules, but that the reliance of these rules on morphological information does not accord with a non-lexical translation process. Henderson (1982) therefore concludes that in the absence of necessary information provided by "such morphological constraints it seems clear that no

segmenting procedure can be formulated so as to result in a correct translation of all English words." (p.72)

A similar phenomenon is encountered when considering correspondences in phonographic translation. In place of the gross and somewhat loosely applied notion of 'regularity' of correspondences, Venezky 1970 (in Henderson 1982) has suggested a classification of correspondences into predictable or unpredictable.

> **I. Predictable:** patterns that can be predicted upon the basis of regular graphemic, morphemic or phonemic features of the words or sentences in which they occur.
>
> **A. Invariant:** patterns which admit to no (or very few) variations or exceptions.
>
> **B. Variant:** patterns which have predictable variations or exceptions. (Variant patterns could be divided further on the basis of the features needed to predict each pattern.)
>
> **II. Unpredictable:** all patterns which do not fit into I above.
>
> **A. Affix-aided:** patterns which could be derived by relating the word to one of its prefixed or suffixed forms, e.g. *sign-signal.*
>
> **B. High-frequency:** occurs frequently (frequent enough to allow an association group to be profitable employed in teaching).
>
> **C. Low-frequency:** occurs too infrequently to merit the formation of an association group.
>
> (after Venesky, 1970, p.126)

According to this scheme we can for example classify the sound of 'F' as being largely invarient while that of 'C' is varient, but normally predictably so except for example in the case of 'cellist' in which the unpredictable and low frequency nature of the C results from its Italian origins.

Venezky's concern with the teaching of reading leads him to further analyse words into one of three classes:

> **Class** I - Transfer Words: Words which contain predictable patterns. The patterns in these words can be transferred to the pronunciation (or spelling) of other words in which the same spellings (or pronunciations) occur.
>
> **Class** II - Association words: Words grouped according to frequently occurring, but unpredictable patterns.
>
> **Class** III - Isolated words: Words which should be handled as whole words to inhibit transfer of unpredictable, low frequency patterns.

(after Venezky, 1970, p.127)

While arising out of a different concern, namely the development of a suitable pedagogy for the teaching of reading, this scheme may have considerable utility in considering the optimal choice of words for inclusion in a test such as the NART. Given that the test relies on tapping the patients previous familiarity with particular words, and seeks explicitly to minimise the effects of his "current cognitive ability to analyse a complex visual stimulus and from this synthesize the correct oral response"

(Nelson and O'Connell, 1978, p.235) Venezky's Class III Isolated words would appear to form, in one respect at least, the ideal class of items from which to select words for a test of premorbid functioning.

From what has gone before, it should by now be clear that the classification of a grapheme-phoneme (or vice versa) correspondence as regular or predictable (or vice versa) can only be undertaken with reference to a given set of hypothetical rules and cannot be regarded as being based on some absolute attribute of the items under consideration. Taken to its logical conclusion, the regular category could be expanded to include all words by simply increasing the number and complexity of the rules. Bridgeman (1987) makes the point that in the case of English and French where "the pronunciation of infrequently encountered combinations ... may be governed by an idiosyncratic rule which can be defined as part of a formal system but which may be so obscure that it has only a handful of applications" (p.331) the definition of a rule as either phonetic or lexical becomes somewhat arbitrary, and irrelevant. Caution must therefore be exercised when approaching the question of oral reading from a psychological perspective. Psychologists have tended to regard the Venezky/Wijk type count tabulations as indicating that regularity is a truly dichotomous variable without actually addressing the question adequately. (Henderson 1984)

As noted at the beginning of this chapter while this author does not wish to get too involved in the extensive and sometimes somewhat tortuous debates surrounding the problem of 'word processing' and the precise nature of the route from print to sound, it would seem important to explore in some detail at least some of the arguments advanced by writers in the field. As noted earlier, investigation of the NART has thus far been very much an empirical exercise. While there is a certain satisfaction to be gained from the fact that it appears to 'work', there is a need to explore further - a need which seems to have gone largely unmet to date. An attempt has been made in this chapter to introduce some of the issues pertinent to the debate regarding the dual route theory of reading - issues fundamental to any attempt to understand the success of the NART in predicting premorbid functioning.

The clinical impression that reading may survive despite a fall off in performance on vocabulary tests is supported by research done with the NART and the Vocabulary subscales of the WAIS. (Crawford et al., 1987 ; Crawford et al., sub. for pub. ; Nelson, 1982). This may suggest some support for a multiple levels approach to word processing (Evett and Humphreys, 1987) which allows for a dissociation between the semantic system and the ability to read words out loud. In order to accommodate this evidence the argument must be

taken beyond the simple conceptualisation of the strong form of dual-route theory. This is not a great revelation, as it is doubtful that many theorists would claim to hold the strong form of the dual-route process for adult reading (Olson and Keenan, 1985). Turvey, Feldman and Lukatela (1984) note that the data on the Serbo-Croatian language suggest that, due to its orthographic regularity and the reliability of grapheme-phoneme correspondences, visual word recognition makes use of a "phonologically analytic strategy that precedes lexical access" (p.84) In summarising their findings they state that "interpretation of the data suggests that a phonological recognition strategy in Serbo-Croatian is not optional" (p.81).

The suggestion that the process of reading words may take place without the necessity for lexical access, with reliance placed on a pure GPC route explanation as might suffice in a regular language such as Serbo-Croatian, quite obviously falls down due to the avowedly irregular nature of the items comprising the NART. With the adoption of a multiple-levels approach to word processing, the superior performance of the NART over vocabulary tests in organic conditions might be explicable in terms of a level of processing hypothesis in which functions operating at shallower levels might be less prone to decline than those requiring deeper and more complex processing for their successful completion.

Mention has been made previously of 2 of the problems encountered by the reader when confronted with a word - namely spelling-sound correspondence and segmentation. In looking at the issue of direct translation i.e. translation which avoids any sort of lexical reference and treats words simply as a non-lexical string of letters, Henderson finds it useful to divide the possible information available to the reader up into same level and higher level constraints. "Generally speaking, same level constraints take account of regularities at the graphemic or phonemic level (for example the fact that /k/ is never translated as CK in word initial positions). Higher level constraints have to do with morphological or lexical factors, that is, with regularities which occur when phonemes or graphemes are composed together into significant units (for example, TH is pronounced with voicing in functors such as *the* and without voicing in contentives such as *thin*). (Henderson, 1982,p.77)

On the basis of same level constraints alone, an argument can be made for direct GPC translation as the mechanism for reading. Henderson (1982) identifies same level constraints as applying to both the position in a syllable or word in which a grapheme or phoneme occurs, and constraints defining legitimate sequences. Thus when the sequence MB straddles the boundary between 2 syllables as in ambit, it is sounded fully, but where the sequence closes a word, as in lamb, the

B becomes silent. While this particular phonotactic regularity may appear to be amenable to translation using only a combination of sequential and positional constraints, Henderson notes that in order to give a full description of all the correspondents of MB recourse to a higher level rule is probably necessary. This is exemplified by efforts to cope with the different sounding of B with inflexional affixes as in bombing in contrast to other morphemes such as bombard. "This introduction of morphological considerations removes the regularity to a higher level." (Henderson, 1982, p.78)

Higher level constraints involve the use of etymological or morphological properties of the language in predicting correspondences, and the issues of segmentation (as in shepherd vs morpheme) and form class (as in contentives vs functors) have already been alluded to earlier in this chapter. Another example of higher level constraints involves the use of morphological factors to "disambiguate the pronunciation of homographs". (Henderson, 1982:p.80) Thus Henderson (1982) gives the example of TEAR whose vowel correspondence differs depending on whether the reference is to TEAR as in ripping or TEAR as in crying.

A further role played by higher level constraints in the reading process applies to the assignment of stress. Henderson (1982) draws attention to the work of Chomsky and

Halle in stimulating an interest in stress assignment rules. The latter note that: "It is well known that English has complex prosodic contours involving many levels of stress and pitch and intricate processes of vowel reduction. It is clear even from a superficial examination that these contours are determined in some manner by the surface structure of the utterance." (Chomsky and Halle, 1968, p15) As it would be inappropriate to launch at this stage into a full discussion of the concepts of surface structure and the syntactic component of the grammar from which it is derived, it will be accepted that the rules proposed by Chomsky and Halle rely on both same level and higher level constraints. (see Henderson 1982) Another way of looking at this issue is in terms of the dual-route model depicted below in which stress assignment is regarded as being a postlexical process, (Humphrey and Evett, 1985a) operating on a prelexical GPC modulated input - an approach which allows for the happy coexistence of a non-analogical mapping process and an analogical stress-assignment process. (Perfetti, 1985)

From the evidence presented thus far, it would seem clear that any adequate explanation of the reading process must include mechanisms for access to information available only via higher level constraints. Humphreys and Evett (1985a) depict the dual-route model of print processing as follows:

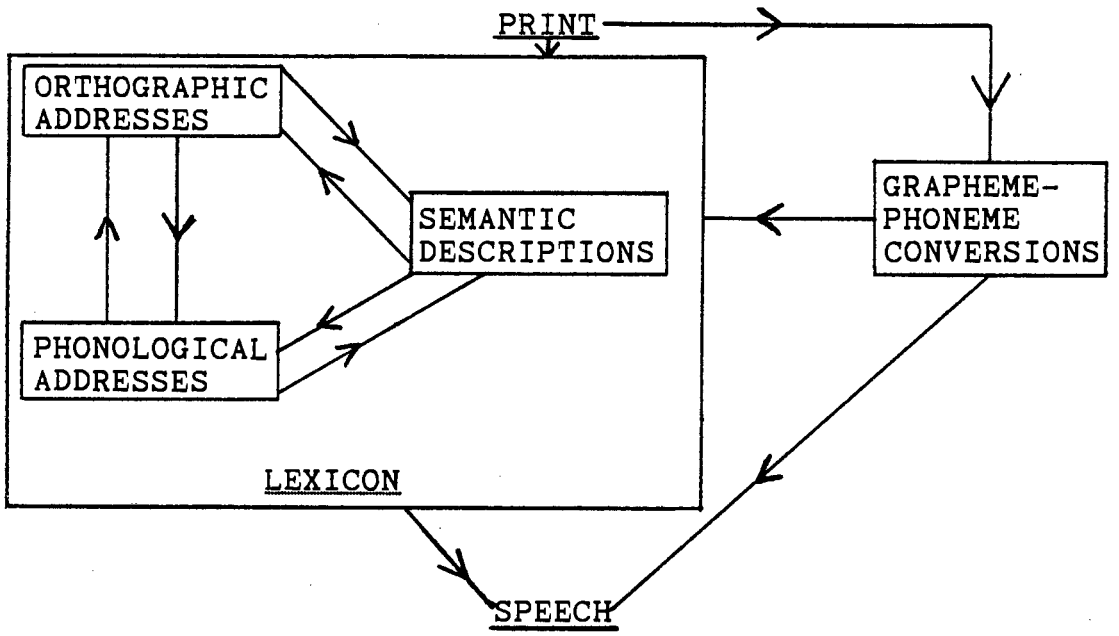

Figure 1.1. The dual route model of print processing

(after Humphreys & Evett, 1985a, p.691)

This depiction may be contrasted with the traditional Aristotelian model which can be summarised thus:

SCRIPT --> SPEECH SOUNDS --> LEXICAL MEANINGS

(HENDERSON, 1982, P.86). While there are a number of difficulties with this model, the one of most interest here relates to the paradox inherent in the argument that higher level constraints are required in certain instances before reliable access to sound can be achieved. Thus Henderson notes that according to the traditional model, "in the extreme case of reading a word aloud without context, translation into sound could not be influenced by higher level constraints because information about morphemic

structure and from class could not be available until translation had been completed and the resultant sounds used to gain access to the mental lexicon". (1982,p87)

The contributions to theory that is made by Humphrey and Evett's (1985a/b) analysis of data from acquired dyslexia is disappointing. While contributions to the dual-route debate from studies utilising dyslexic patients must take into account the dangers inherent in inferring the organisation of normal processes from impaired behaviour in individual patients, the "potential that strong neuropsychological dissociations provide for counterintuitive conclusions about normal function" (Shallice, 1985, p.726) should not be ignored. Part of the problem stems from the adoption of a symptom-complex approach by Humphreys and Evett and their resultant treatment of syndromes such as deep and surface dyslexia as functional entities. Clustering as a result of contingent anatomical phenomena, and the production of the same symptoms by damage at different stages in the processing route make this approach somewhat suspect. (Shallice, 1985) Nonetheless, some points of interest do emerge from the exercise. One is the necessity to consider specific reading related deficits in relation to the overall pattern of deficits exhibited by the patient. If not the risk exists of confusing effects specific to the reading system with those resulting from general language impairments. (Humphreys and Evett, 1985b)

The criticism by Patterson (1985) and Shallice (1985) of Humphrey and Evett's (1985a/b) analysis of the case of MP, a patient who was able to read regular words and non-words adequately, but who failed to cope with exception words, (showing a tendency to regularise them), resulted in the conclusion that MP possessed an intact nonlexical processing route, but had impaired access to the phonological lexicon. This notion is supported by the observation that "MP had a severe loss of comprehension for both written *and spoken* language." (Patterson 1985, p.721) This finding, read in conjunction with Patterson's (1985) observations regarding the "(unknown) neuroanatomical organisation of cognitive skills ... and ... the unprincipled action of most neurological damage" (p.721) suggests that the NART should be applied with care in a clinical setting where cases of this nature might be encountered. The fact that MP was able to utilise her "current cognitive ability to analyse a complex visual stimulus and from this synthesize the correct oral response" (Nelson and O'Connell, 1978, p.235) to adequately pronounce regular words, while her naming of exception words was severely impaired, probably had less to do with her premorbid level of intellectual functioning than with the specific nature of the neurological damage which she had suffered. (Assuming of course that the difficulty level of the exception words utilised by Bub et al. (1985

quoted in Patterson, 1985) in their investigation of MP was congruent with her premorbid level of IQ!)

It is informative at this point to take a another look at some of the issues raised in the dual route debate. While this thesis is not the place to argue the pros and cons of theoretical minutiae relating to the debate, it is worthwhile to look at some of the predictions generated by it. One such is the contention that if there do exist 2 functionally separate and independent routes for word processing, it may be argued that the assembly of non-word phonology (in the reading of non words) should be immune to influence by factors which form part of the lexical processing route. Suggestions by Humphrey and Evett (1985a) that evidence indicating that non-word pronunciation may be subject to lexical influences should regarded as crucial in the case for rejecting the existence of the non-lexical processing route encountered in dual-route theory is rejected by Parkin (1985) simply on the basis that "dual-route theory asserts that the processing of a letter string proceeds along both routes in parallel." (p.720) He concludes that while "the nature of English ensures that a nonlexical route cannot operate with anything like total accuracy, ... this does not imply ipso facto that such a route does not exist at all." (p.721)

In conclusion, it would appear from the evidence presented above, that the most useful model for the purposes of understanding the functioning of the NART is one which embodies a multiple level or modified dual-route processing approach. Humphreys and Evett (1987) summarise the multiple levels approach as being one in which

> "print to sound translation operates via a reading system in which orthography is parsed into multiple levels. The results of this parsing may then be mapped onto phonology at multiple levels in parallel. This mapping may proceed on a lexical-lexical basis (from orthography to phonology) or via the semantic system, and may be influenced by linguistic and contextual constraints." (P.334)

While acknowledging that the above model has an advantage in terms of parsimony, Mitchell (1985) suggests that it does not adequately account for all the available evidence and hence proposes a *three* route model of word processing. This formulation allows for the coexistence of a "visual-orthographic route, an interdependent lexical-phonological route, and a nonlexical-phonological route." (p.718) While this is an intuitively plausible notion, and can claim some support from the literature (see Mitchell, 1985), attention should be drawn to Seidenberg's (1985) cautionary note (cited earlier in this chapter) regarding the proliferation of increasingly elaborated theories.

indicate that NART scores 'held' well in 4 of the 6 conditions represented in their study, and that they were more resistant to decline than the WAIS Vocabulary subtest in the remaining two.

Although much work needs to be done before any real light will be seen at the end of this particular tunnel, it does seem useful to view the Vocabulary - NART discrepancies reported from clinical research to date, in terms of this formulation. If nothing else, the use of the above models as a frame of reference can give direction to future research. It would seem that there is a need for a more detailed look at the discrepancy, if any, between knowledge of meanings and successful naming of words on the NART in both impaired and non-impaired subjects. Clinical research should be conducted across different organic conditions with a view to replicating and expanding on the findings reported by Crawford et al. (submitted for publication). It is not inconceivable that such endeavours could result in the development of 'semantic-phonological discrepancy indices' with particular significance for specified organic populations.

CHAPTER 2 - INSTRUMENTS AND METHODOLOGY.

2.1 Design of the Research.

Without wishing to digress too extensively, it would seem apposite at this stage to consider in some detail the exact nature of the research design employed in this study.

The most fundamental and oldest research design in existence is that which relies on the simple noting and recording of events by the researcher. The success and precision of astronomy attests to the power of observation, at least in the formative stages of a science, on the formation of hypotheses. At some stage however, the simple noting and recording of events "without formal manipulation of variables operating in the events under study" (D' Amato, 1970) gives way to a process in which an ex-post-facto manipulation of specific variables chosen from the area under study is undertaken.

In correlational research the variables of interest are not manipulated through direct or experimental methods, but rather by means of selection procedures which enable the researcher to arrange for different quantities of the variables under study to be present. Thus the research question which employs this technique, or alternatively, the

well known virtue of the experimental method is that it brings situational variables under tight control. It thus permits rigorous tests of hypothesis and confident statements about causation. The correlational method, for its part, can study what man has not learned to control or can never hope to control. Nature has been experimenting since the beginning of time, with a boldness and complexity far beyond the resources of science. The correlator's mission is to observe and organise the data from Nature's experiments. As a minimum outcome, such correlations improve immediate decisions and guide experimentation. At the best, a Newton, a Lyell or a Darwin can align the correlations into a substantial theory." (Cronbach, 1957, p.672)

While aspiring to Newtonian heights, it is not impossible that the researcher may have to be content with the 'minimum outcome' and measure his success in terms of a contribution to immediate decisions rather than grand theory. Feldman (1975) however points out that when operating in the realm of applied psychology as opposed to academia, the researcher is obliged to employ the most rigorous and painstaking methods due to the more immediate impact that his work may have upon the lives and fortunes of others. This concern is particularly applicable to the current research, and requires that both the researcher and his audience keep the shortcomings of both the current and past research on the

NART firmly in mind. The lack of an adequate theoretical model explaining the survival of word reading skills in dementia leaves the whole endeavor open to criticism as an exercise in gross empiricism. In their 1975 study Nelson & McKenna do a loose logical extrapolation from the evidence that reading ability is positively correlated with " more general intellectual abilities" (p.259) in children to the notion that they should "evaluate the strength of the association between reading ability and general intelligence level in an adult population, with a view to investigating the accuracy with which one can use a regression equation to predict the I.Q. score from the reading score of an individual, non-intellectually impaired, adult subject "(Nelson and McKenna 1975 p.259). The second part of their study was undertaken to verify the observation that "In clinical practise it is apparent that reading ability is very often maintained at a high level despite the deterioration in other areas of cognitive functioning which characterise dementia....." (p.259)

While an attempt has been made to look theoretically at the mechanism involved in word reading, this study remains essentially true to its empirical lineage as described earlier. Correlation forms the basis of the study and, for the purposes of this research, the independent and dependent variables are identified as performance on the NART and performance on an I.Q. test respectively. The actual

phenomena of interest are on the one hand, the ability to accurately read 'irregular' English words, and on the other, general intellectual ability. Manipulation of the I.V. is indirect and undertaken by selection. As the extent to which I.V. or D.V. 'directly' measure the 'abilities' which they represent is a matter for some debate, care must be taken to avoid the trap of assuming that this research and its results are concerned with measuring the relationship between word reading ability and intelligence. In fact, the most that can be said is that the relationship between the subjects performance on a specific test of word reading ability and his performance on a particular I.Q. test is being investigated. From a purely empirical perspective the research thus involves the collation of large amounts of data on both the predictor and the criterion variables and their marriage by means of a regression equation. Thus on one level, the product of the endeavor is a series of three regression equations which may be used for predicting an individuals performance on an IQ test from his performance on a word reading test. In the process the validity and reliability of the NART and 24 additional items will be investigated with a view to determining the utility of the NART under local conditions. Huysamen (1980) draws the attention of the reader to the comparatively poor quality of documentation accompanying many South African tests. He notes that in the United States of America, "one of the requirements of manuals which is regarded as essential by

the authors of 'Standards', concerns the description of the criterion measure and its adequacy (Requirement E3)." (p61) and emphasizes that in the case of some local tests, "the manual does not state explicitly what the criterion is, let alone whether it is adequate or not. Some give no validity data at all." (p61). An attempt has been made in the preceding paragraphs to address at least one aspect of this problem, while the issue of intelligence testing has been briefly touched upon in an earlier section of the paper. It is however beyond the scope of this thesis to adequately debate the extent to which performance on an IQ test can be regarded as an 'adequate' criterion. The most that can be said here is that the 'IQ' score is widely used in clinical settings and hence assumes a relevance for this reason, if no other.

The generalizability of the results, and the utility of the regression equations must, as in all research, be constrained by the characteristics of the samples on which the research has been carried out. This inevitable raises the issue of the cross-cultural characteristics of the test in question. For a number of reasons this issue has not been directly addressed here. While its importance in a heterogeneous society such as South Africa is fully appreciated, the pragmatic realities of the research setting have dictated the approach taken here. Not the least of the

difficulties associated with this issue is the lack of suitable standardized measures of IQ for 'black' subjects.

The issue of English vs Afrikaans language usage has been addressed through the appropriate collection of biographical details, and their subsequent utilisation in analysing the data. This question will be addressed more fully in the sections of the paper dealing with construction of the biographical questionnaire and the results of the research. A further issue which will be dealt with in greater detail later in the paper involves the question of clinical vs statistical significance - an important topic in view of the applied nature of this research.

2.2 The National Adult Reading Test - Development and Validation

The development of the National Adult Reading Test was preceded by a study in which Nelson and McKenna (1975) utilised the Wechsler Adult Intelligence Scale (WAIS), the Schonell Graded Word Reading Test (SGWRT) and the WAIS Vocabulary subtest score to investigate the apparent relationship between reading ability and I.Q.. The study was also concerned with investigating the clinical impression that reading ability often survives in dementing patients

despite an apparent deterioration in other areas of cognitive functioning (Nelson and McKenna, 1975).

Their findings indicate that word reading ability and general intelligence level are highly correlated in a group of normal adults. In addition, there is evidence suggesting that I.Q. predicted on the basis of reading skills for a group of dementing patients closely approximates premorbid I.Q. scores and that reading ability is a better predictor of premorbid levels of functioning than is vocabulary. Age (mean = 47.2 years, S.D. = 14.5, Range = 16-69 years) does not correlate with reading ability in either the control group or the dementing subjects.

The regression formulae relating WAIS Full Scale IQ (FSIQ) to SGWRT, and WAIS Full Scale IQ to WAIS Vocabulary for the non-impaired subjects are reported as follows:

Predicted WAIS FSIQ = 44.1 + 0.71 x Schonell Raw Score
(S.E. est = 8.6 points)

Predicted WAIS FSIQ = 61.00 + 4.00 x Vocab. Age-Scaled Score
S.E. est = 5.6 points)

Relevant correlation coefficients yielded by this research are depicted below:

	Control S's		Dementing S's.	
	r	Sig.	r	Sig.
Age vs Reading Score	-0.07	n.s.	-0.12	n.s.
FSIQ vs Reading Score	0.75	p<0.001	0.61	p<0.001
VIQ vs Reading Score	0.78	p<0.001	0.62	p<0.001
PIQ vs Reading Score	0.56	p<0.001	0.44	p<0.001
Vocab. vs Reading Score	0.79	p<0.001	0.65	p<0.001

Table 2.1: Correlations Reported by Nelson and McKenna (1975)

Separate sets of discrepancy scores (Predicted IQ - Obtained IQ) were calculated using IQ predicted from reading and vocabulary measures. The results of this exercise support the use of Reading Scores as opposed to Vocabulary Scores in the clinical assessment of dementia. On the basis of these results, Nelson and McKenna contend that reading, once established as a highly practised and overlearned skill, "can be maintained at a high level despite deterioration on other areas of intellectual functioning" (Nelson and McKenna; 1975: p 264). A problem associated with the use of the abovementioned regression equations is the fact that the maximum IQ that can be predicted is only 115. In the rare cases referred for assessment where this occurs, Nelson and

McKenna (1975) recommend treating the predicted score as a lower-limit estimate only.

In a study utilising 78 non-impaired subjects Ruddle and Bradshaw (1982) investigated the relationship between the SGWRT, WAIS and Ravens Standard Progressive Matrices. Their results support the findings of Nelson and McKenna, with correlations of 0.74, 0.74 and 0.66 between the SGWRT and WAIS FSIQ, VIQ, and PIQ respectively.

The use of reading skill as a predictor of premorbid functioning is based on the test's ability to indicate the extent of the patients previous familiarity with the material as opposed to his ability to analyse a complex visual stimulus and produce an appropriate oral response (Nelson and McKenna; 1975). As noted in above, the pronunciation of many English words can be worked out using rules relating to grapheme - phoneme correspondence, and hence the correct pronunciation of such words will be influenced by the subject's current intellectual status as well as by previous familiarity with the test material. In order to minimise the confounding effect of current intellectual status, use must be made of 'irregular' words, the correct pronunciation of which is entirely dependent on previous familiarity. While the concept of regularity has been dealt with in some length above, it is as well to take note at this point of the distinction drawn by Rosson (1985)

between the notion of rules based on success in predicting pronunciations across different occurrences of the same string, and those relevant to the use frequency of a particular string. The distinction between type frequency of spelling-sound correspondences and the occurrence frequency of individual strings has implications for the informed selection of words for a test such as the NART. The extreme case is one in which a word has no phonological neighbours, and is infrequently used in the language. Where choices have to be made between words with comparably irregular spelling - sound correspondences, attention should be given to the relative occurrence frequencies of the words in the language in order to ascertain which words are likely to have the greatest exposure and hence be the 'easiest'. In their rejoinder to Goodman-Schulman (1988), Baxter and Warrington (1988) prefer the notion of a " 'continuum' of orthographical ambiguity for individual phonemes" (p.137) to an "all-or-none classification (ambiguous/unambiguous or regular/irregular)". (p.137) This accords with the caution expressed earlier in this paper concerning the tendency of psychologists to regard the Venezky-Wijk type-count tabulations as indicating that regularity is a truly dichotomous variable. Nelson (1977) does not appear to have taken these sorts of considerations into account when selecting items for the NART, preferring a more intuitive approach supported by subsequent empirical analysis.

The National Adult Reading Test (NART) (Nelson, 1982) consists of a list of 50 irregular words printed in ascending order of difficulty. (see table 2.2 on p.61) Advantages of the NART over the Schonell Graded Word Reading Test (used by Nelson and McKenna in their (1975) study - see above) is the use of only irregular words and the inclusion of more difficult items, thereby allowing reliable discriminations among higher I.Q. levels. Nelson (1982) observes that the words are all "'irregular' with respect to the common rules of pronunciation in order to minimise the possibility of reading by phonemic decoding rather than word recognition." (p.5)

Selection of items for the test involved picking 140 words from the dictionary and the administration of this list to a sample of 25 non-dementing subjects, "15 of whom were inpatients at NHQS with extra-cerebral disorders and 10 of whom were relatives of outpatients attending the psychology department." (Nelson, 1977 unpub. manuscript, p.3) Only words whose generally accepted pronunciation corresponded to that given in the Chambers English Dictionary were included. Words were excluded if they were found to be 'too easy', 'guessable', or difficult to score objectively. In addition, words were selected only if their power to discriminate between different reading abilities corresponded to the overall difficulty level of the test (Nelson,1977 unpub. manuscript). The final list of 50 words

was selected "to cover a wide range of difficulty levels." (Nelson, 1982, p.7) In the 1977 test manual Nelson emphasises the use of relatively short words to avoid the adverse effects of stimulus complexity and attentional deficits in organically impaired patients. While the matter will not be pursued here, attention should also be drawn to the possibility of different word-processing systems being implicated in the reading of words of different lengths. This issue has been more extensively dealt with in the section on print to sound models above (see Carr, 1985).

Standardisation of the test was carried out on 120 patients with extra-cerebral disorders at the National Hospital for Nervous Diseases. The Arithmetic, Similarities, Digit Span, Vocabulary, Picture Completion, Block Design and Picture Arrangement sub-tests of the WAIS were administered along with the SGWRT and the NART. All subjects fell in the 20-70 years age range, and a non-significant correlation (r=0.14, n.s.) between NART performance age accords with Nelson and McKenna's (1975) finding that age and reading ability are not related in this age range. A concern with the effect of s.e.s. on reading ability led to the collection of data on educational history and occupation. It was hypothesised that subjects from 'higher class' environments would be exposed to a richer verbal environment resulting in their having greater exposure to unusual words than people living under relatively more deprived conditions. Analysis of the data

relatively more deprived conditions. Analysis of the data did not support this hypothesis. Having excluded the effects of age and social class, Nelson used performance on the NART and SGWRT, together with VIQ, PIQ and FSIQ (prorated from the above 7 subtests on the WAIS), to develop the following regression equations for predicting VIQ, PIQ and FSIQ.

R1: Predicted VIQ = 129-0,92 x errors on NART
(SE est = 7.6)

R2: Predicted PIQ = 124-0,65 x errors on NART
(SE est = 9.4)

R3: Predicted FSIQ = 128-0,83 x errors on NART
(SE est = 7.6)

Table 2.2: Regression Equations for Predicting IQ from NART.

Table 2.2: Regression Equations for Predicting IQ from NART.

CHORD	SUPERFLUOUS
ACHE	SIMILE
DEPOT	BANAL
AISLE	QUADRUPED
BOUQUET	CELLIST
PSALM	FACADE
CAPON	ZEALOT
DENY	DRACHM
NAUSEA	AEON
DEBT	PLACEBO
COURTEOUS	ABSTEMIOUS
RAREFY	DETENTE
EQUIVOCAL	IDYLL
NAIVE	PUERPERAL
CATACOMB	AVER
GAOLED	GAUCHE
THYME	TOPIARY
HEIR	LEVIATHAN
RADIX	BEATIFY
ASSIGNATE	PRELATE
HIATUS	SIDEREAL
SUBTLE	DEMESNE
PROCREATE	SYNCOPE
GIST	LABILE
GOUGE	CAMPANILE

Table 2.3: Word List for the National Adult Reading Test

(Nelson, 1982)

While correlation coefficients applicable to the above regression equations are not provided by Nelson and O'Connell (1978) these can be derived using the formula:

$$r_{xy} = B * SD_x / SD_y$$

	B	Sy	Sx	Rxy	S.est
FSIQ	-0.83	11.30	10.10	-0.74	7.60
PIQ	-0.65	11.50	10.10	-0.57	9.40
VIQ	-0.92	12.00	10.10	-0.77	7.60

Table 2.4: Correlation Coefficients derived from Regression Equations reported in Nelson and O'Connell (1978)

The relationship between the variables under study is clearly very strong, and in terms of criterion validity, the above correlations indicate that the test is valid. The test also exhibits satisfactory reliability. Reliability data is available as follows: split-half (Cronbach's alpha): 0.93 (Nelson, 1982); split-half (Spearman Brown formula): 0.90 (Crawford et al., in press); inter-rater reliability between three raters: rho = 0.97, 0.94, and 0.90, $p < 0.001$ for all (O'Carroll et al., in press, O' Carroll, 1986). Using ten experienced clinical psychologists who utilise the NART in clinical practice, O'Carroll (1987) reports inter rater reliability in the form of Kendall's coefficient of concordance (for 10 raters by 12 subjects) of $W = 0.88$, $p < 0.001$. Evidence for the stability of NART performance is presented in a longitudinal study by O'Carroll et al (in press, O' Carroll (1986)) in which a test-re-test over a period of one year yields mean NART score at time 1 = 16.62

(sd 9.69) - mean NART score one year later = 15.1 (sd 12.3) t = 1.146 n.s..

Nelson (1982) advises caution if the above equations are to be used for very high or low IQ subjects due to ceiling effects on the one hand, and a lack of data on the relationship between reading ability and very low IQ scores on the other.

A criticism of this study is voiced by Klesges (1982) regarding the prorating of IQ scores from only seven subtests on the WAIS. He notes that "When over one third of the subtests of the WAIS were omitted one has to seriously question the reliability of the test data." (p35) In view of the results achieved in subsequent research, the effect of prorating on the equations, if any, would appear to be minimal.

In an investigation of clinical validity, Nelson and O'Carroll administered the NART to 40 patients with evidence of bilateral cortical atrophy resulting in a mean error rate of 23.9 (s.d. = 11.2) for the cortical atrophy group, as opposed to a mean error rate of 22.4 (s.d. = 10.1) for the standardisation sample (t = 0.6, n.s). This and subsequent studies have confirmed that the NART is on the one hand,a good predictor of I.Q. in normal subjects, while also holding well in patients suffering various types of organic

impairment, thus making it a good predictor of premorbid intellectual functioning (Nelson and O'Connell, 1978; O,Caroll and Gilleard, 1986; Crawford et al., submitted for publication; Crawford et al., (1987); O'Carroll et al., in press; O'Carroll (1986); Nebes et al., 1984). Qualified support is provided by Hart et al, (1986). (see discussion below.)

Crawford et al. (submitted for publication) utilised the Nart and the WAIS Vocabulary subtest in an investigation of reading and vocabulary deterioration in different organic conditions. Subjects were classified as falling into one of the following classes: (i) Korsakoff Psychosis, (ii) Alcoholic Dementia (AD), (iii) Huntington's Disease, (iv) Dementia Alzheimer Type (DAT), (v) Multi-Infarct Dementia (MID), and (vi) Closed Head Injury (CHI), and their performance on the two measures compared to that of matched healthy controls. No significant difference was found between the performance of the AD, DAT, MID and CHI groups and the matched controls on NART performance, while the differences for the Korsakoffs and Huntington's groups, while significant, were small and provided a better estimate of IQ than did Vocabulary in these last two conditions. No significant difference was found between the performance of controls and the MID and CHI groups on the Vocabulary subtest, although a significant decline was noted in the other conditions.

Differences in the performance of the groups on the two measures are summarised below:

Condition	NART Performance	WAIS Vocab Performance
Korsakoffs	t=2.83, p<0.05*	t=4.08, p<0.001
AD	no sig. diff.	t=2.46, p<0.05
DAT	no sig. diff.	t=3.12, p<0.01
MID	no sig. diff.	no sig. diff.
Huntingtons	t=2.38, p<0.05*	t=4.84, p<0.01
CHI	no sig. diff.	no sig. diff.

Table 2.5: Decline of NART vs WAIS Vocabulary Performance in Organic Conditions

(after Crawford et al., submitted for publication)

* : Significantly higher IQ estimates obtained using NART prediction than using Vocabulary prediction.

As a result of relatively small sample sizes further investigation is needed before any firm conclusions can be drawn from these results. They are however supported by Nebes et al. (1984) who report no significant difference for NART performance between 20 subjects suffering from DAT and 20 age-matched controls. In their longitudinal study of levels of performance on the Clifton Assessment Procedures

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Hart et al. (1986) compared the efficacy of the WAIS Vocabulary, NART and SGWRT as predictors of premorbid intellectual functioning in DAT subjects. Although a decline was evident in the NART scores of the clinical group compared to a control group, Hart et al. (1986) conclude that "the NART would seem to be the procedure of choice, as it yielded estimates for the DAT group which were significantly higher than those derived from performance on either the Vocabulary subtest or the SGWRT." (p.122) Crawford et al. (submitted for publication) note that the relatively higher mean IQ scores of the control group used by Hart et al. (1986) compared to their study, in the light of the close similarity between mean IQ scores for the two clinical groups, may be responsible for the significant difference obtained, rather than impaired performance on the NART.

Of relevance to the present research is the finding by Crawford et al. (in press) that there is no significant difference in NART performance resulting from age or sex, (mean age of sample 43.6 years, sd = 18.7, range 17-88 years.) and that there is no curvilinear relationship between age and NART performance over the age range tested.

Nelson and O'Connell (1978) note that two methods of reading have been identified. The first of these, described as the "graphemic-semantic route" (p.241) is held to operate

through the meaning of a word being elicited directly by the written stimulus. The second route, the "graphemic-phonemic route" (p.241) involves a "transitional stage ... in which the written stimulus is translated into its phonological equivalent." This analysis accords with the strong form of the dual-route theory described earlier, and as such it merits further attention.

In keeping with the dual-route model, Nelson and O'Conell explain the functioning of the NART in a somewhat restricted way which fails to account for recent evidence. They suggest that while the composition of the Schonell GWRT (which includes long, probably unfamiliar, regular words) favours the use of a graphemic-phonemic processing route, the irregular nature of the NART items requires 'semantic' access if they are to be pronounced correctly. This analysis is satisfactory inasfar as it goes, but difficulties are encountered when the evidence from organic clinical samples is taken into account. Evidence of declining vocabulary performance contrasted with unimpaired performance on the NART (Crawford et al., submitted for publication; Hart et al., 1986) is inconsistent with the single lexicon assumption implicit in the discussion of the dual-route approach by many researchers. As suggested earlier, a multiple lexicon model is necessary to accommodate these findings, and is in fact required by the logic of the whole endeavour which suggests that irregular word reading skill

is superior to vocabulary as a means of predicting pre-morbid intellectual functioning.

A considerable body of research, then, shows that the NART is a useful psychometric instrument. In their 1987 study, Crawford et al. (in press) claim that the NART can be used in clinical practice with confidence. Communication with practicing neuropsychologists suggests that the NART is already part of the armamentarium of some South African clinicians, (Mike Saling - personal communication) despite the absence of data affirming the utility of the instrument under South African conditions. It is clear therefore that there is a need for work to be done on establishing the predictive utility of the NART in a South African context. Issues to be addressed include the extent to which the 'scoring key' for the NART can be usefully broadened to take account of pronunciations considered correct in terms of 'Standard South African English' (Lanham & Prinsloo, 1978) (see section on development of scoring key for a more extensive discussion of this point.), and the development of regression equations appropriate to South African conditions. While the effect of cross-cultural variables on the performance of the NART has not been addressed in the literature, it is clear that one needs to bear cross cultural differences firmly in mind when measuring reading ability, as working vocabulary may differ markedly between cultures. This consideration may serve to restrict the

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continues by noting that "it allows for more than one interpretation so that each user of the dictionary may choose a pronunciation in keeping with he rest of his speech." (p.viii) In order to overcome any difficulties arising from this latitude, the current research employed the services of an English language expert in interpreting Nelsons (1982) pronunciation list onto a cassette tape. The resultant scoring template closely corresponds to the `Received Standard', (R.St) " a lect with pronunciation norms approximating those described by Gimson (1962) as `British General RP'". (Lanham & Prinsloo, 1978, p147). The conventions used in discussing the diversity encountered in the South African English community are depicted in the following diagram, each of the lects named below being "both a pattern of variable values recurring in accent profiles and the direction of trends in phonetic variation presented in significant variables." (p.146)

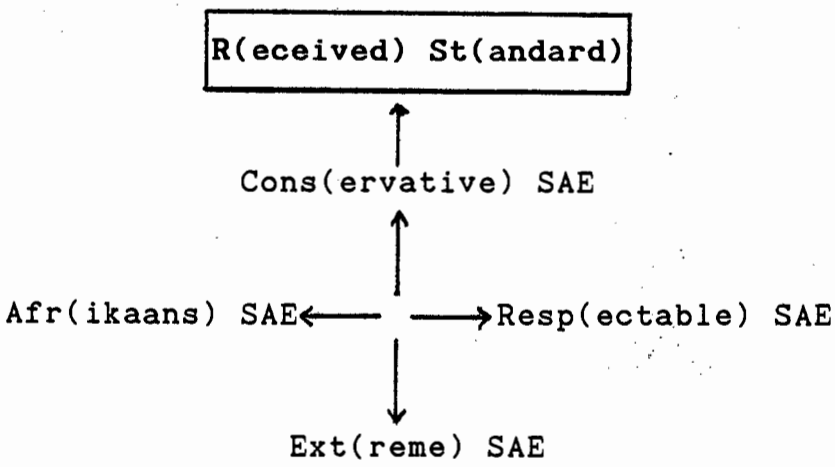

Figure 2.1 Representation of Standards in SAE

(After Lanham and Prinsloo, 1978, p146).

As the majority of South Africans are unable to distinguish between R.St and Cons SAE (Lanham and Prinsloo, 1978) it may be taken that Nelson's (1978) pronunciation list represents a Cons SAE scoring key for the NART. Applied strictly this has little utility due to the limited and shrinking usage of Cons SAE which Lanham & Prinsloo note is "available as a vernacular peer-group model mainly in the exclusive Anglican schools or other private schools of the same model". (Lanham & Prinsloo, 1982,p5) and hence the actual criteria used here probably correspond most closely to Resp SAE. The nature of the majority of the 'items', being words which appear in high-level English (Burbach - personal communication) suggests that subjects would adopt formal style speech in reading the test with resultant corrections and hypercorrections towards the prestige norms represented by Cons SAE and Resp SAE in Lanham and Prinsloo's model. It

has been suggested to this researcher that, to the extent that the various lectal forms of SAE are true dialects, use-form, as opposed dictionary correct, norms should be developed for each dialect (Burbach - personal communication). This is however an endeavor fraught with obstacles, the most significant of which is the degree that the very raison d'etre of the test may be compromised in the process. The rationale for using irregularly pronounced English words has been explained earlier, and it therefore suffices to point out that the use of norms which may serve to `regularise' the test items defeats the aims of the test. In addition to the fact that such an endeavor falls outside the ambit of the current research it should be clear that the use of the chosen scoring scheme is predicated by the reliance of the test on peculiarly English irregularities for its validity. Thus while it has been suggested for example that a common error may be the pronunciation of `cellist' as `sellist', and while the subject may be fully conversant with the word and aware of its meaning, the acceptance of this pronunciation serves to invalidate the inclusion of the item as a prediction of premorbid functioning. The very fact that cello (and hence cellist) "contains an element correspondence for c, paralleled by only a few other Italian borrowings" (Venezky, 1970, p41) make its inclusion desirable as a result of its pronunciation being unavailable to subjects relying on the normal rules of grapheme-phoneme correspondence. The

acceptance of 'sellist' as a pronunciation results in `cellist' conforming to the rule that C corresponds to (S) before the spellings i,y,e, and in facade (except in sceptic) (Venezky, 1970) and hence losing its value as an irregular word.

A potentially problematic pronunciation occurs in Nelsons depiction of the pronunciation of 'labile' as ¯l ā'b ī l.¯ While the Chambers pronunciation guide allows for a to be pronounced as a 'hard' a as in fate or a 'soft' a as in bare, the pronunciation of i is limited to a 'hard' sound as in mine or sire. The ambiguity in pronunciation of the 'a' sound, is confirmed by the Concise Oxford Dictionary which depicts it as a allowing for a pronunciation as in mate or rack. "Vowels marked v may be pronounced either way, e.g. patriot (pa or pa) (Fowler & Fowler, 1964, pxii) This renders the word potentially unsuitable for inclusion in this test as both the regular form (in which the `a' sound takes the form of a primary vowel correspondence (Venezky, 1970)) and the irregular form must be considered to be 'correct'.

Scoring of the test involved the use of a tape recording of each subjects responses, with all subjects being scored by the author. Prior to scoring the author thoroughly familiarised himself with the pronunciations on the scoring template tape and where necessary, reference was made to the

template during scoring. Inter-rater reliability for the test has been shown to be high (O'Carroll et al., in press; O' Carroll, 1986; O'Carroll, 1987) and the exercise was therefore not repeated here.

In view of possible variations in pronunciations arising from varying distances between lects and cons SAE some allowance was made for backing and lowering of vowels. Likewise where final consonants (e.g [d] and [b]) are not ploded but this energy is still present and detectable, or where final consonants have an ejective quality, possibly as a function of the list task, the pronunciation is regarded as correct. Consonantal changes are generally not considered relevant in terms of pronunciation on this task. Suggestions (Burbach - personal communication) that changes in syllabic emphasis with stress falling on 2nd and 3rd syllables as opposed to 1st and 2nd, as the speaker moves further from the received standard have also been taken into account when scoring. In practice it has been found that marked changes in emphasis usually accompany pronunciations completely at variance with the scoring template and can hence be safely scored as incorrect. An example of concessions to South African vowel usage in the NART is the acceptance of [gəst] in place of gist in accordance with the SAE pronunciation of pin ⟶ [pən], a practice which Lanham (1967b) describes as "the surest hallmark of SAE in any part of the world." (p.16) The crucial aspect of this item is

the recognition by the subjects that the `g' in gist is in fact pronounced `j' and the aforementioned treatment exemplifies Nelsons (1982) suggestion that "slight variations in pronunciation are acceptable when these are due to regional accents". (p5) For a more detailed coverage of this topic the reader is referred to Lanham (1967a; 1967b), and Lanham and Prinsloo (1978)

2.4 List of Potential New Items for the NART

As part of an exploratory investigation of alternative items for a revised NART, a list of 24 words with apparently irregular pronunciations was compiled. An attempt was made to include items more appropriate to a South African population by including words which, despite an infrequently occurring sound-spelling correspondence, had a relatively high occurrence frequency in every day usage. The resulting word list is presented below.

COMB	PHLEGM
TOMB	RECIPE
ISLE	INDICT
SEW	CROQUET
PLAID	VISCOUNT
QUAY	PARQUET
PLAIT	VICTUAL
EPOCH	GUNWALE
SUITE	LIEUTENANT
CHAISE	HICCOUGH
SCENE	EPISTLE
LICHEN	GROTESQUE

Table 2.6 New Word List.

Problems were encountered with certain words, e.g. sew, due to a discrepancy between their generally accepted correct pronunciation, and that allowed for in the Chambers dictionary. (A scoring key is given in the appendix.) As this was an exploratory study, these words were left in. The selection of words for this list followed the practice adopted by Nelson (unpublished manuscript) and hence suffered from the same shortcomings (see 2.2). As noted above, item selection for a new test, or a substantially modified one, should take into account all the relevant orthographic characteristics of the items under consideration to arrive at a list which has conceptual as well as empirical validity.

2.5 The South African Wechsler Adult Intelligence Scale.

The SAWAIS is modelled on the Wechsler Adult Intelligence Scale and was standardised on a norm group of 2761

volunteers by the NIPR (Liddicoat & Roberts, 1962). As the test is well documented and extensively used in South Africa, it will not be discused at length here. Huysamen (1980) notes that the modification of certain items for South African conditions has resulted in some divergence from the original Wechsler Bellevue material. It should be noted that reliability and validity data were not available from the test manual used in this research. (NIPR, 1969)

While the SA WAIS may be criticised for its shortcomings as a clinical tool (Pieters & Louw, 1987) it remains one of the two main individual intelligence tests found in South Africa (Huysamen, 1980) and is regarded as the instrument of choice in individual case assessments by many clinicians and researchers. Intuitive shortcomings arrived at by the author during application of the test for this research are reinforced by Pieters and Louw (1987). They point to `trivial' criticisms such as errors in the Table of Corrections leading to a faulty calculation of IQ, as well as technical errors such as the misnumbering of cards. More substantial criticisms include the relevance and accuracy of some test items. Rubber is principally a synthetic product these days, few people in this age of jet travel have ever been or considered the trip from Cape Town to London by sea, controversy surrounds the issue of population numbers due to the exclusion/inclusion of inhabitants of the so called homelands and `independent states', the ABCD arrangement of

Despite the above criticisms, in an assessment of the factorial structure of the SAWAIS in a white South African psychiatric population, Madge & Coetzee (1982) report a comparable factor pattern to overseas studies. Their results suggest that increased confidence can be placed in the construct validity of the SAWAIS for the population investigated (Madge & Coetzee, 1982).

2.6 New South African Group Test.

The New South African Group Test (NSAGT) was developed to replace the Old South African Group Test when the latter was found to be becoming too easy. (Hysamen, 1980). Being a group test, it consists entirely of multiple choice items arranged into verbal and non verbal subscales. The Subtests 1, 3, and 5 comprising the non verbal subscale are Number Series, Figure Analogies and Pattern Completion. Verbal subtests (numbers 2, 4 and 6) comprise CLassification of Pairs of Words, Verbal Reasoning and Analogies of Words. The test yields Deviation IQ scores for Verbal, Performance and Full Scale IQ with a mean of 100 and standard deviation of 15. Standardisation for the Senior test was carried out on 4434 Afrikaans and 2052 English school pupils, and a common norm table established for the 2 groups. Kuder Richardson internal consistency coefficients in excess of 0.80 are reported (Elder, 1957). Although Huysamen (1980) mentions correlations carried out with some scholastic tests, no data relating to correlation of the NSAGT with

other individual scales was available from the test manual used in this research, and no studies relating to the topic could be located by this author.

In a study of the factorial equivalence of the intermediate form of the NSAGT in two language groups, Cudeck & Claasen (1983) found no group factor differences between the English and Afrikaans versions of the test. WHile noting that test bias can only be conclusively ruled out through the use of a prediction study, they conclude that " inasmuch as similar factor structures argue against test bias, these results provide the necessary support that the tests measure the same intellectual abilities." (p5) and that it is hence "apparent that meaningful comparisons can be made of scores from the two different versions." (p5) In as far as these conclusions are generalisable to the Senior form of the test, they lend support to the combining of data from English and Afrikaans subjects in investigating performance of the NART in the overall sample group for the current study.

In an investigation of the factor structure of the NSAGT intermediate form, Claasen and Cudeck (1985) extend the above study to include four population groups. They found that for all population groups the model giving the best description of the data was comprised of 2 factors, a verbal reasoning factor and a non verbal reasoning factor. Of

relevance to this study was the finding that SES contributed more to differences in factor structure than does the language in which the test is taken and their conclusion that " large similarities were found between the factor structure of the NSAGT in the various population groups." (Claasen and Cudeck, 1985, p.9)

2.7 The Mental Alertness Test - High Level Battery.

This is a multiple choice test of general intelligence that includes items testing verbal analogies and classification of abstract concepts. While normally included in one of the three NIPR aptitude test batteries, separate norms are available enabling its use as a stand alone instrument. (Huysamen, 1980)

2.8 Biographical Questionnaire.

The primary purpose of this instrument in the current research is the establishment of language usage and the identification of medical and/or learning problems which might confound the results of the study.

A seven point scale is used on which the subject is asked to rate his language usage in five separate environments. In addition a forced choice item requires the selection of English, Afrikaans or 'Other' as the subjects 'home language'. Finally an item was included in which subjects

specify the medium of instruction during their schooling. The seven point scale follows a Likert-type rationale (Anastasi; 1976) in that it effectively measures degree of English usage or a scale from 1 to 7 with 1 being most English and 7 being most Afrikaans. This approach accords with Doctor et al. (1987) contention that "bilingualism falls on a continuum". (p.56) and that " bilingualism is not an 'all-or-none - phenomenon'". Attempts to assess bilingualism on the bases of subjective ratings of language proficiency produce unsatisfactory results., and this approach may necessitate "a reappraisal of many of the studies reported in the literature which categorise bilinguals on the basis of self-ratings." (Doctor et al 1987, p.58) On the basis of these findings it was decided that use should be made of a scale topping language usage as apposed to a subjective assessment of proficiency. Cognisance was taken of the influence the normative values attached to language usage may have by asking subjects to select one "home language", while the influence of education on language development was emphasised by the inclusion of item ascertaining medium of instruction. As not all subjects could respond to all items (e,g, someone who had never had a job) a mean language usage score was computed for each subject and used in place of an absolute score. Subjects were then ranked on mean language usage and assigned to English or Afrikaans groups according to where they fell in relation to the mean for the group under

consideration. As it was intended as a pilot study language usage data were not formally collected for the U.C.T. sample, but information on language usage was gathered during testing interviews. On the basis of this data it was decided that all the U.C.T. subjects could be reasonably assumed to be completely English speaking and they were thus assigned a language usage score of 1.

2.9 Multiple Choice Meanings Questionnaire.

The meanings questionnaire took the form of a multiple choice test with 6 choice options. Questions were phrased so as to be as unambigious as possible, and as the test was one of English words only an English version of the questions was prepared. In order to reduce the random choice element inherent in the multiple choice format, a 'Don't Know' option was provided, and subjects were encouraged to make use of this choice in preference to guessing. While the use of a sentence construction test combined with subsequent interviews to clarify ambiguities has been used with some success (Hesse, 1987) time constraints in the test situation and the requirements for a group administration test dictated to use of the multiple choice format in this research. Possible alternatives including synonym scales should be investigated for future studies.

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no significant effect of sex on NART performance. The results of the above studies go some way toward addressing the shortcomings of the sampling methods employed in the current research.

In an attempt to control for confounding variables, all subjects participating in the study were screened for possible neurological complications or learning disabilities, notably dyslexia. In the absence of school and medical records this information was obtained from subjects self report responses to either questionnaire items (groups A to E) or direct questioning by the researcher (groups F & G). In all cases where there was a possibility of either condition being present the question was explored in greater detail by the E after the word reading session. Despite these precautions however, the possibility of falsification of this data arising from a social desirability response set or the fear of compromising a chance of selection cannot be entirely ruled out.

Subjects for the pilot study comprised 41 first year psychology students participating in a practical on psychological assessment. The sample had a mean age of 18.54 years (standard deviation 3.15) and comprised 8 males and 32 females. All subjects were at first year university level and could be classified as English speaking. 35 of the subjects were members of the white racial grouping with the

remaining 6 being drawn from the so called `coloured' group. Data for these students were collected using the NART and the SAWAIS. A limited amount of demographic data were also collected by researchers during the testing interview.

The second group of subjects (N=74 - 2) comprised the members of an army camp in which the author was obliged to spend 2 months. Mean age of the subjects was 26.9 years, (std dev. 3.16). Data was collected from all but 6 members of the unit, the exceptions being the result of logistical constraints. All subjects participated on a voluntary basis although it was necessary in some cases to spend time prior to testing allaying fears and anxieties about the test procedure and the results thereof. 23 subjects can be classified as predominantly English speaking on the language usage scale as apposed to 49 Afrikaans speaking. Of the 23 English subjects 19 indicated that they would choose English as their `home language' on a dichotomous forced choice item. Data from 2 subjects were not utilised for the analysis, one as a result of brain damage which had left permanent intellectual impairment and mood changes, the other as a result of a history of reading problems and `dyslexia'. From demographic data collected it is clear that the sample was extremely heterogeneous in terms of both occupation and educational level. Occupational ranged from low level technical (lift operator) and clerical to

professional and high level managerial positions. Educational qualifications likewise ranged from Std 6 to post graduate. All subjects were male and belonged to the so called `white' group. Data for these subjects were collected using the NART. A structured interview forming part of the test session was used to collect biographical and demographic data.

Subjects for the 3rd group were drawn from civilian volunteers being tested prior to selection for the Navy. This group can be broken down into 4 subgroups A to E. Subgroups A and B consisted of members of the so called `coloured' group (with one Xhosa student) while subgroups C and D were made up of white subjects. In addition it should be noted that the groups were to an extent self selected in that groups A and B were applying for 'lower' level and non-commissioned positions, while groups C and D were applying for higher level officers positions. Both groups C and D were told during an introductory talk by Navy personnel that they should only go through with the testing if they felt themselves to be of average or above intelligence. As a result a number of potential subjects left without being tested on either the NART or the IQ measures.

Subgroups A and B combined contain 54 subjects with a mean age of 19.3 years (std dev = 1.99). In terms of mean language usage score 16 can be classified as English

speaking and the balance Afrikaans. The same subjects classify themselves as English vs Afrikaans speaking on the forced language choice item.

Subgroups C and D (n = 54) have a mean age of 18.0 years (std dev = 1.39). On mean language usage 30 subjects may be classified as English speaking while 27 of these subjects classify themselves as English on the forced choice item with one Xhosa speaker.

Combining all 4 subgroup (A,B,C,D) (n= 108) yields a mean age of 18.6 years. (std dev 1.84). mean language usage yields 45 English subjects while the forced choice scale h ad 43 of the same as English speaking 1 Afrikaans and 1 Xhosa.

A final group of subjects (n= 13) was obtained at an academy and comprised a group of young trainees in the process of completing their course. All subjects were white males with a mean age of 19.5 years (std dev = 1.9)
IQ distribution in this group van be expected to be somewhat skewed as they are partly selected on the basis of their superior performance on an IQ scale. Both mean language usage and the forced choice item had 9 of the 13 as English speaking.

In all some 234 subjects were utilised in the research. Of the total sample 120 were classified as being English speaking while 114 were classified as Afrikaans. Data from Subjects were combined in various different ways according to the requirements of the analysis and the data available for each student. This will be dealt with in greater detail under Results.

2.11 Procedure

Data for the pilot study were collected by the author and other Research Psychology interns of the University of Cape Town. Prior to testing all testers were given training in administration of the SAWAIS by a clinical psychologist. Actual administration and scoring procedures will not be elaborated here as they followed the standard procedures detailed in the manual for the test. (NIPR, 1969) Administration of the NART likewise followed the procedures specified in the manual (Nelson, 1982). Due to the anticipated high difficulty level of the test for South African subjects, special attention was paid to reassuring subjects before administration of the NART in order to minimise the confounding effect of anxiety on subjects performance. Nelson (1982) notes that subjects are usually unaware of errors due to the irregular nature of the words, but where a subject does show signs of anxiety he should be

"reassured that he is certainly not expected to know all these words (an admission that the tester did not know them all when he first saw them will often serve to allay any residual anxiety and to improve rapport.)" (p.5) In general, the test is simple to administer and problems were not encountered except in pacing subjects who did not wait for the tester to say 'next'. All subjects were informed that their responses would be tape recorded for later scoring. Testers ascertained the name of the subject and then repeated this into the tape for identification purposes. In all cases the SAWAIS and NART were administered in the same sitting and in that order. Subjects were asked to confirm their language preference and were questioned on the possible presence of neurological dysfunction and learning problems, especially those related to reading.

NART data for the Army sample was collected by the author in accordance with the procedures detailed above. Biographical data for this sample were collected using the biographical questionnaire in a structured interview format immediately after the collection of the NART data.

The NSAGT was administered by an intern psychologist who had had extensive experience with the test. Scoring of the test is a largely automatic process due to the multiple choice format and was done by a group of psychology graduates, who

together with the intern psychologist, formed an assessment team with considerable exposure to the test and its administration. As an added check on the validity of the NART-IQ correlation, a further measure of IQ, the Mental Alertness (MA) test of the NIPR High Level Battery (NIPR, 1975) was administered to the Navy subjects. Collection of NART data in this sample was undertaken by the author assisted by graduate subjects from the University of Cape Town. The one tester who was not involved in psychology had had experience as a teacher. One of the advantages of the NART is the ease of administration, a fact attested to by the facility with which testers, who had not used the test previously, handled the testing process. The use of more than one tester was dictated by the exigencies of the test situation in which large groups of subjects had to be handled in a relatively restricted time period. All testers were given training in handling the test situation and in the administration process and instructions be given to subjects. As noted above, all subjects responses were tape recorded for later scoring. The data collection process started with the completion of the biographical questionnaire in either English or Afrikaans depending on the subjects preference. This questionnaire was assessed by the author while subjects were busy with the NSAGT and in some cases, the M.A. test. Subjects mean language scores were calculated and subjects divided into 'English' and 'Afrikaans' groups. They were then assigned randomly from

these groups to testers thus ensuring that testers had a random selection from each group.

After administration of the NART and a list of 24 additional words subjects were handed meanings questionnaires and told to return to the test hall and complete them. A pilot group of sentence construction questionnaires was used to assess the effectiveness of this technique in the group setting. In the absence of a follow up interview however these data proved to be difficult to interpret in many instances, and resort was therefore made to the multiple choice format described earlier. Due to movement of subjects through areas where the test was being written and the possibilities for interaction between subjects, conditions for completion of this test were not always optimal.
Test materials utilised were the biographical questionnaires, the NSAGT senior form, the M.A. test, a word list card based on the NART Manual, (Nelson, 1982) a list of 24 additional words, a multiple choice meanings questionnaire, and a tape recorder with the requisite cassette tapes (and a lot of batteries!)

For scoring purposes, a spreadsheet was set up on a microcomputer and the subjects name, identifying number, a group code, relevant biographical data, IQ data where appropriate , and language usage ratings were entered for each of the 234 subjects. The NART tapes were played back

through a tape recorder linked to an amplifier and speakers and responses were marked by the author on scoring sheets constructed for the purpose. The resulting data were added to the spreadsheet in the form of a 1 or 0 for correct/incorrect responses for every word. A separate spreadsheet was set up to score the multiple choice data automatically for the meanings test. A printout of the raw data can be found in the appendix to the thesis. Names have been removed to ensure confidentiality, and subjects are identified by number only. From this master data-base, files were prepared as required for input to the Statgraphics microcomputer package (STSC, 1986) and BMDP statistical software (Dixon, 1981), the latter running on the U.C.T. VAX mainframe.

CHAPTER 3: RESULTS

As noted earlier, the principle aim of this study is to attempt a replication of the research done by Nelson (1977 unpub. manuscript). That this aim has been fulfilled is indicated by the satisfactory degree of relationship evident between the between subjects performance on the NART and the IQ measures employed.

The results of the procedures applied in arriving at this conclusion, and others, is presented below. On the basis of some of the results obtained, a number of potential new items selected by the author for possible inclusion in the test were empirically investigated and a modified test constructed on a post-hoc basis. This procedure did not yield encouraging results.

3.1 Regression

As noted in the earlier (see Subjects) the sample is constituted by a number of sub-groups, and the results of the regression analysis for each subgroup have thus been reported separately, proceeding hierarchically through the groupings.

a. The entire sample.

The entire sample contains 234 subjects, of which data on IQ is available for 162 subjects. The distribution of the IQ

scores and NART errors for this subject group are depicted in figures 3.1 to 3.4. Descriptive statistics for the three variables are shown as Table 3.1. (Note: the significant Chi squared indicates a lack of goodness of fit to normality: the test is considered to be fairly robust, and when the Kolmogorov Smirnov goodness of fit test is used, results are not significant).

It has previously been indicated that this is a somewhat heterogeneous sample in terms of language usage, and the results must be seen in this light. As previously discussed, the grouping of subjects in this way results in the pooling of I.Q. sores which have been measured by two different I.Q. tests, namely the NSAGT and the SA-WAIS. Regression of the I.Q. scores, the dependent variable (DV), against errors on the NART, the independent variable (IV), was undertaken for VIQ, PIQ and FSIQ. Three regression equations are reported, one for each of the I.Q. measures. The equations appear as Table 3.2. Regression plots appear as Figures 3.5 to 3.7.

As is clear from the regression tables, the correlations are substantial with variation in performance on the NART accounting for 50% of the variation on the FSIQ measure, for example.

Fig 3.3: Frequency Histogram: VIQ - all subjects

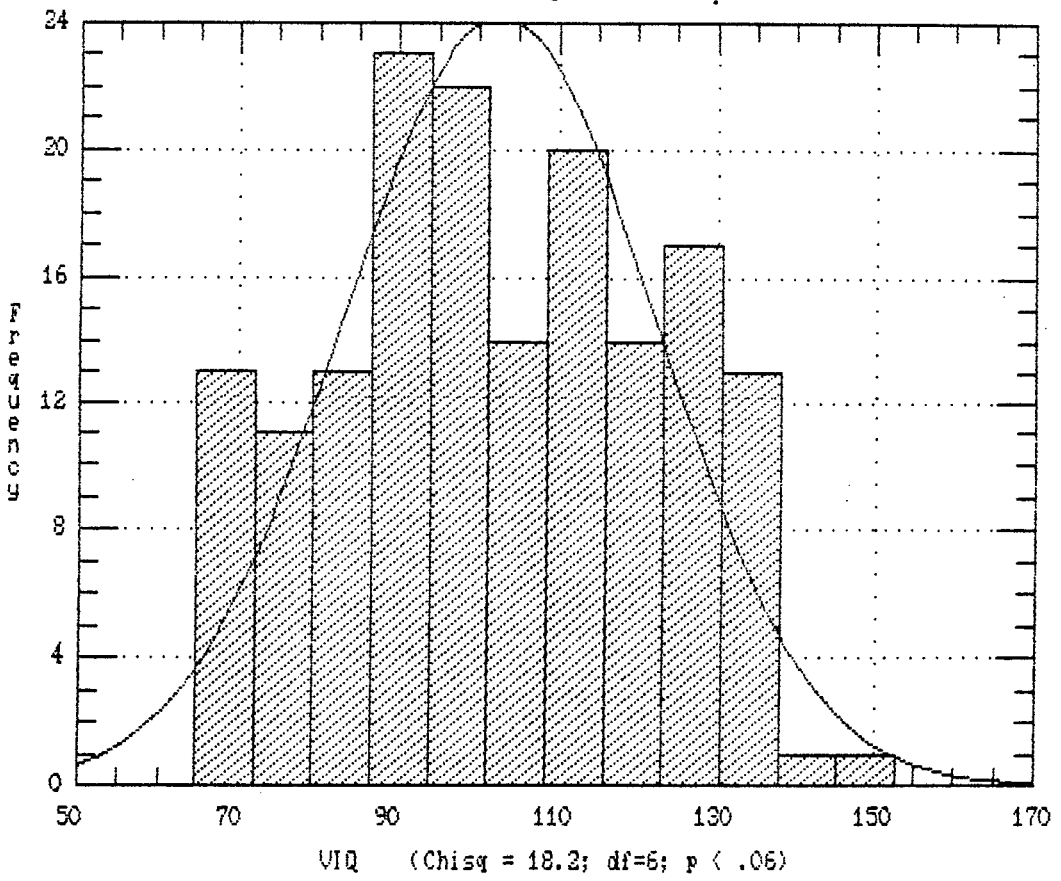


Fig 3.4: Frequency Histogram: NART - all subjects

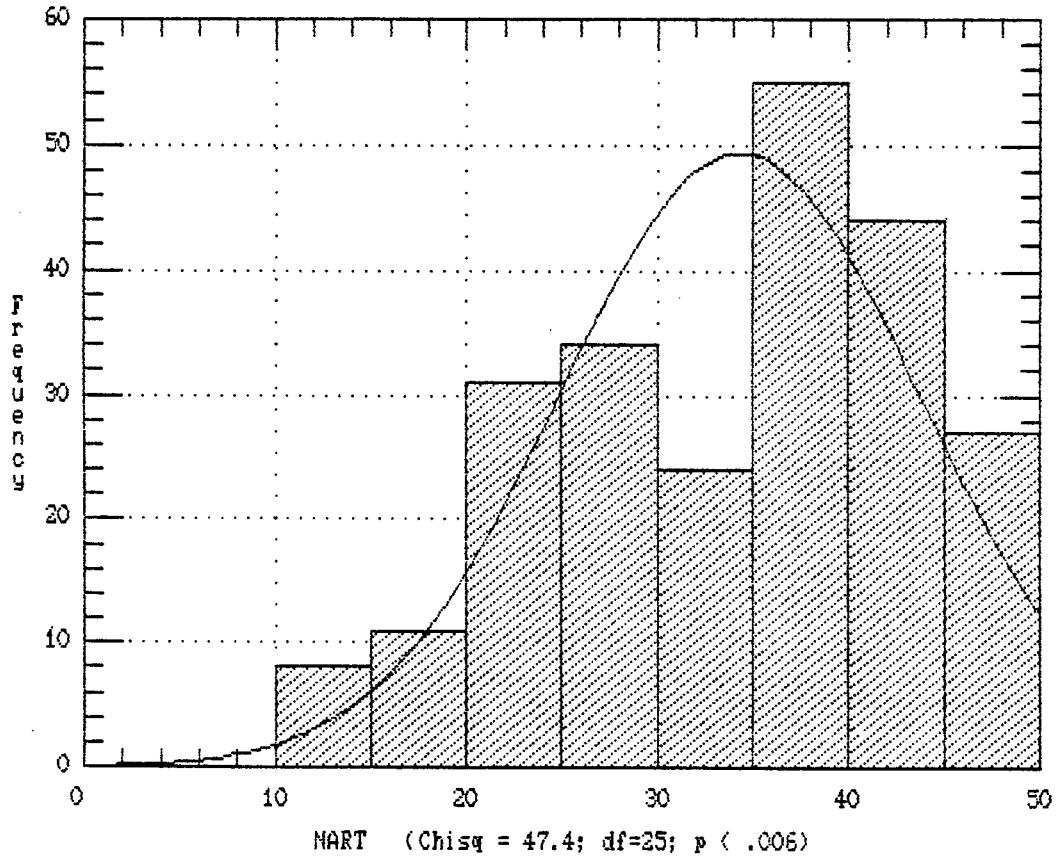


TABLE 3.1. Descriptive statistics - whole sample

	FSIQ	PIQ	VIQ	NART1
Sample size	162	162	162	234
Average	104.66	106.35	102.61	34.31
Median	104	107	101	36
Mode	88	113	70	38
Geometric mean	103.18	105.05	100.71	32.78
Variance	302.38	269.90	382.84	89.34
Standard deviation	17.38	16.42	19.56	9.45
Standard error	1.36	1.29	1.53	0.61
Minimum	70	67	70	12
Maximum	146.5	145	150	50
Range	76.5	78	80	38

Table 3.2 Regression equations: whole sample

FSIQ = 148 - 1.31 * NART

Dependent variable: FSIQ Independent variable NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	148.17	3.58117	41.3747	0.0001
Slope	-1.31895	0.104501	-12.6214	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	24288.742	1	24288.742	159.299	0.0001
Error	24395.585	160	152.472		
Total (Corr.)	48684.327	161			

Correlation Coefficient = -0.70633 R-squared = 49.89 percent
Stnd. Error of Est. = 12.348

Note: 95% confidence intervals for predictions using this equation (and all other equations reported in the thesis) may be obtained by forming the interval Y - 2*Std. Error of Est; Y + 2*Std. Error of Est.

1. Note: in all the tables that follow, FSIQ = Full Scale Intelligence Quotient, VIQ = Verbal Intelligence Quotient, PIQ = Performance Intelligence quotient. Note also that 'whole sample' means all subjects for whom the relevant data i available. This stricture applies to all tables in this chapter of the thesis.

PIQ = 140 - 1.01 * NART

Dependent variable: PIQ Independent variable: NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	139.959	3.90206	35.8681	0.0001
Slope	-1.01879	0.113865	-8.94731	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	14491.546	1	14491.546	80.054	0.0001
Error	28963.399	160	181.021		
Total (Corr.)	43454.944	161			

Correlation Coefficient = -0.577481 R-squared = 33.35 percent
Stnd. Error of Est. = 13.4544

VIQ = 153 - 1.56 * NART

Dependent variable: VIQ Independent variable: NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	153.937	3.8255	40.2399	0.0001
Slope	-1.55592	0.111631	-13.9381	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	33800.555	1	33800.555	194.270	0.0001
Error	27837.945	160	173.987		
Total (Corr.)	61638.500	161			

Correlation Coefficient = -0.740518 R-squared = 54.84 percent
Stnd. Error of Est. = 13.1904

Fig 3.5: Regression of FSIQ on NART: All subjects

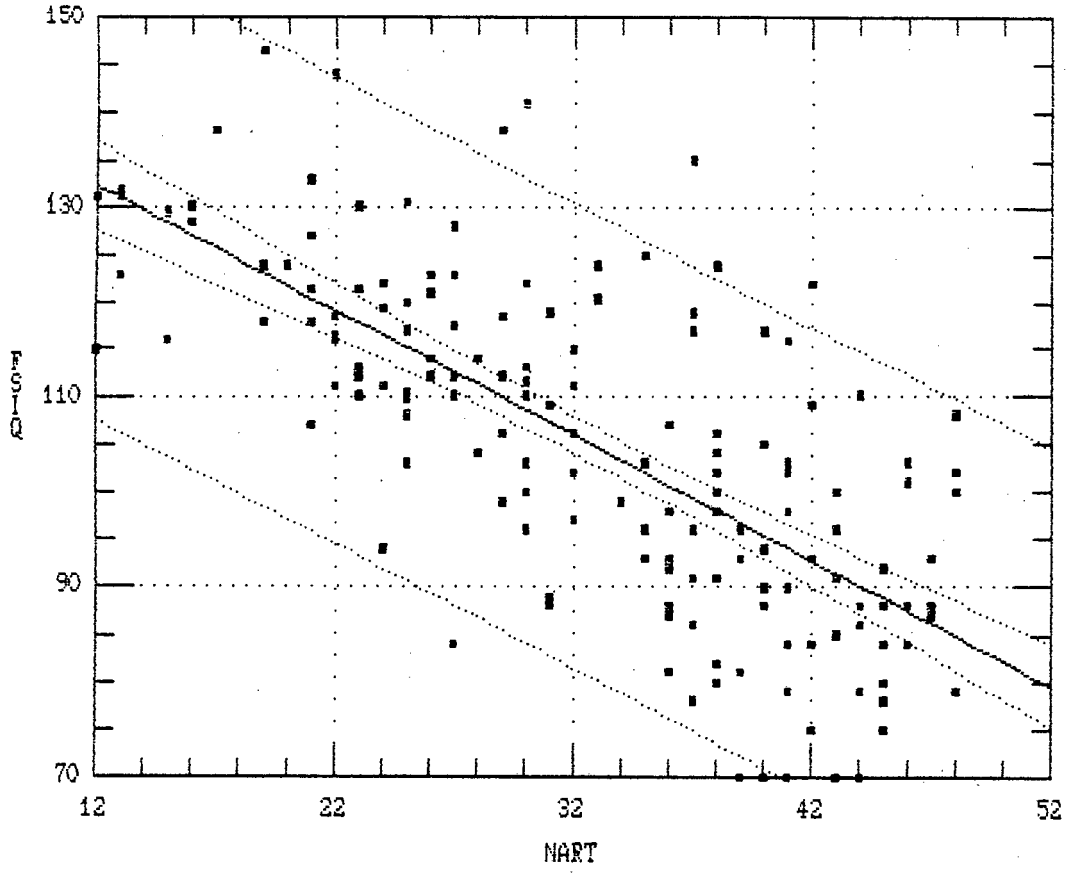


Fig 3.6: Regression of PIQ on NART: All subjects

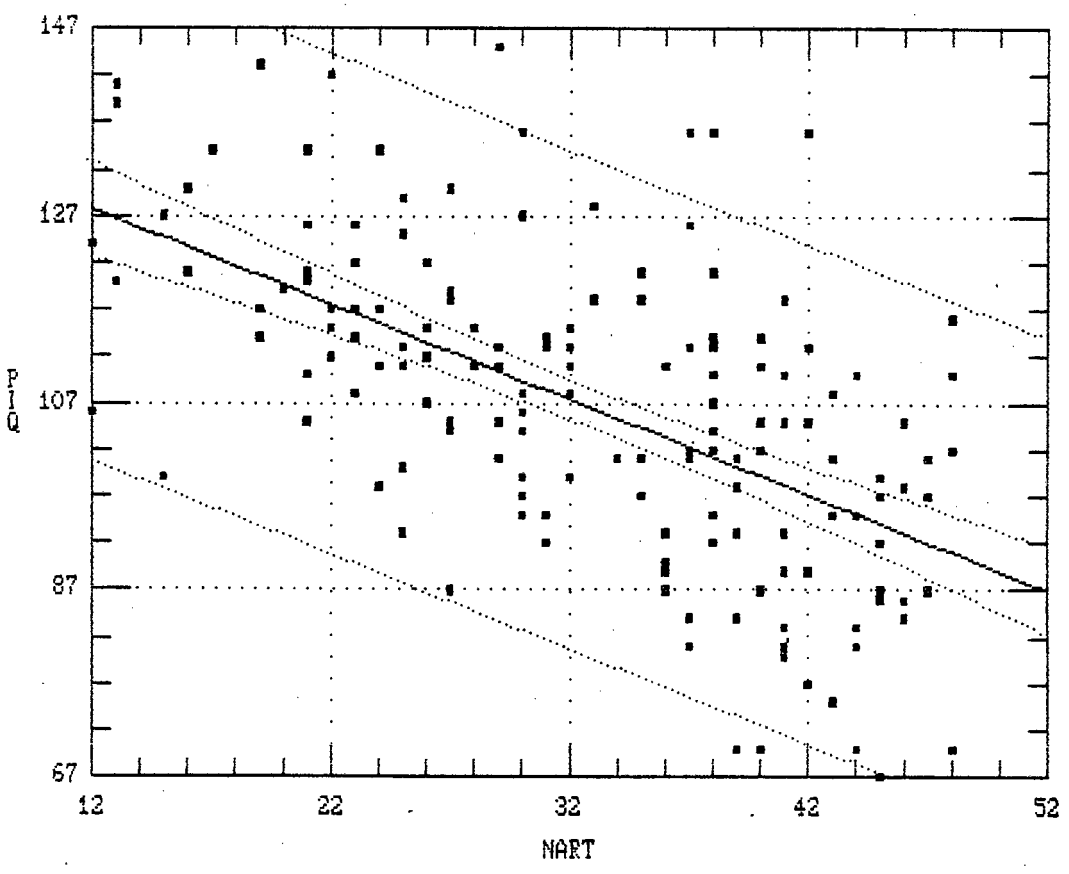


Fig 3.7: Regression of VIQ on NART: All subjects

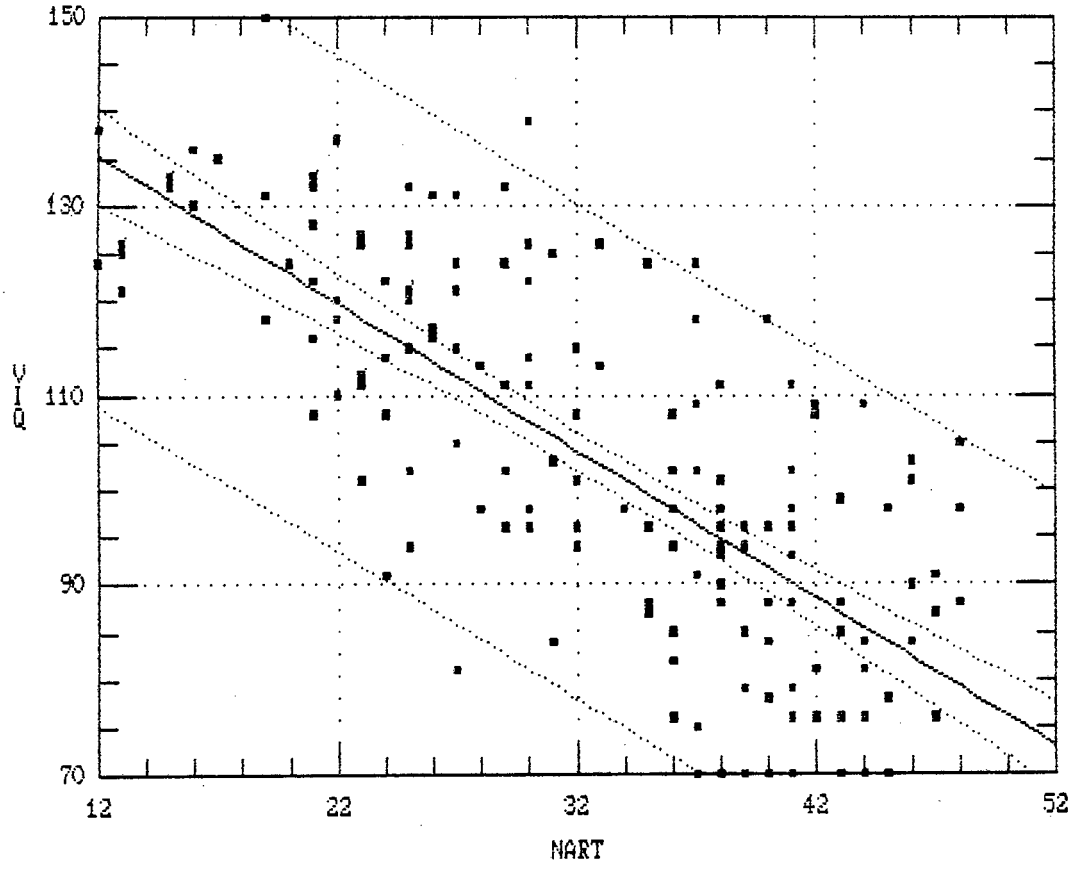


TABLE 3.3 Tests for equality of correlation coefficients - whole sample

	R1	R2	Z1	Z2	N1	N2	SDz	Z	P
FSIQ	-0.71	-0.74	0.867	0.962	162	120	0.12	-0.78	n.s.
PIQ	-0.58	-0.57	0.648	0.648	162	120	0.12	0.00	n.s.
VIQ	-0.74	-0.77	0.95	1.02	162	120	0.12	-0.57	n.s.

* Note: here, and in all tables reporting tests for equality of correlation coefficients. R1 = the correlation coefficients observed in this study, R2 = the correlation coefficients derived from Nelson's (1977 unpub. manuscript) study, Z1 & Z2 = the Z score transformations of R1 & R2, N1 & N2 = sample sizes, SDz = the standard error of the difference, Z = the test statistic, p = the probability level, n.s. = non significant at the 5% significance lev

Note also that the procedure adopted in applying the tests is derived from a method reported by Downie & Heath (1970).

In keeping with the main aim of the study, i.e. the replication of Nelson's (1977 unpub. manuscript) study, the correlations observed here have been tested against those in the above study. As correlation coefficients are not reported by Nelson (1977 unpub. manuscript) in her study, they have been derived for the purposes of this study using the following formula:

$$Rxy = B * (Sy/Sx). \quad \text{(Kerlinger \& Pedhazur, 1973).}$$

The results of tests for equality of the correlation coefficients for each of the I.Q. measures are summarised in Table 3.3. As is clearly apparent from the Table, there are no significant differences. It may thus be concluded that the equations derived for the whole sample in this study replicate Nelson's equations satisfactorily. However, as mentioned earlier, any analysis of these results must take into account the heterogeneity of the sample and the utilization of I.Q. measures from two different instruments. In view of these considerations, the validity of the equations has been examined for each of the sub-populations comprising the overall sample.

b. Afrikaans subjects only.

120 'Afrikaans' subjects were identified utilising data gathered from the biographical questionnaire completed by each subject. The method used has been explained in the

section on 'Instruments' and it will therefore suffice to reiterate the contention expressed earlier that the variable of interest here is the subjects relative degree of familiarity with, and usage of, the language in question. I.Q. data based exclusively on the NSAGT was available for 67 of these 120 subjects. The distribution of the IQ and NART variables for this subject group is demonstrated by Figures 3.8 to 3.11. Descriptive statistics for the three variables are depicted in Table 3.4.

As in the case of the overall sample, three regression equations are reported, one for each of the I.Q. measures. In each case, the relevant I.Q. measure is regressed against NART errors (the independent variable). The equations appear as Table 3.5. Regression plots appear as Figures 3.12 to 3.14.

The qualitative impression that these correlation coefficients are substantially lower than those reported in the U.K. standardization sample (Nelson and O'Connell, 1978, Nelson 1982) is supported by the results yielded by tests for equality of the correlation coefficients. The results of these analyses can be found in Table 3.6. While significant differences ($p < .01$) are reported for VIQ and FSIQ, an apparently substantial discrepancy between the correlations achieved in the two studies for the PIQ - NART errors relationship (-.41 as opposed to -.57) fails to reach significance. Nevertheless, the fact that the other two

coefficients differ markedly renders the use of any of the equations problematic. In addition, the fact that the coefficients are moderately poor, all being approximately 0.45, makes for poor predictive power with only between 16 and 22 per cent of the variance in I.Q. being explained by the equation. This is not entirely unexpected as the NART is an English test utilising English items, many of which were considered to be difficult even by an English speaking university sample. In order to test the degree of language dependence of the test the correlation between language usage and NART errors was computed for the entire Navy sample. A significant relationship was found with $r = 0.592$ ($df = 120$, $p < 0.001$). In order to control for any confounding effect arising from a difference in I.Q. in the 2 language groups, first order partial correlations were computed for the variables FSIQ, NART errors and Mean Language Usage. A reasonably strong and significant positive correlation between NART errors and language usage ($r = 0.546$, $df = 114$, $p < 0.01$) was still evident.

The above results confirm the qualitative impression that the test in it's current form is only really suitable for use with English speaking subjects. For this reason the following analysis of data will be confined to subjects identified as 'English' in terms of the language usage scale.

Fig 3.8: Frequency Histogram: FSIQ - all Afrikaans subjects (NSAGT)

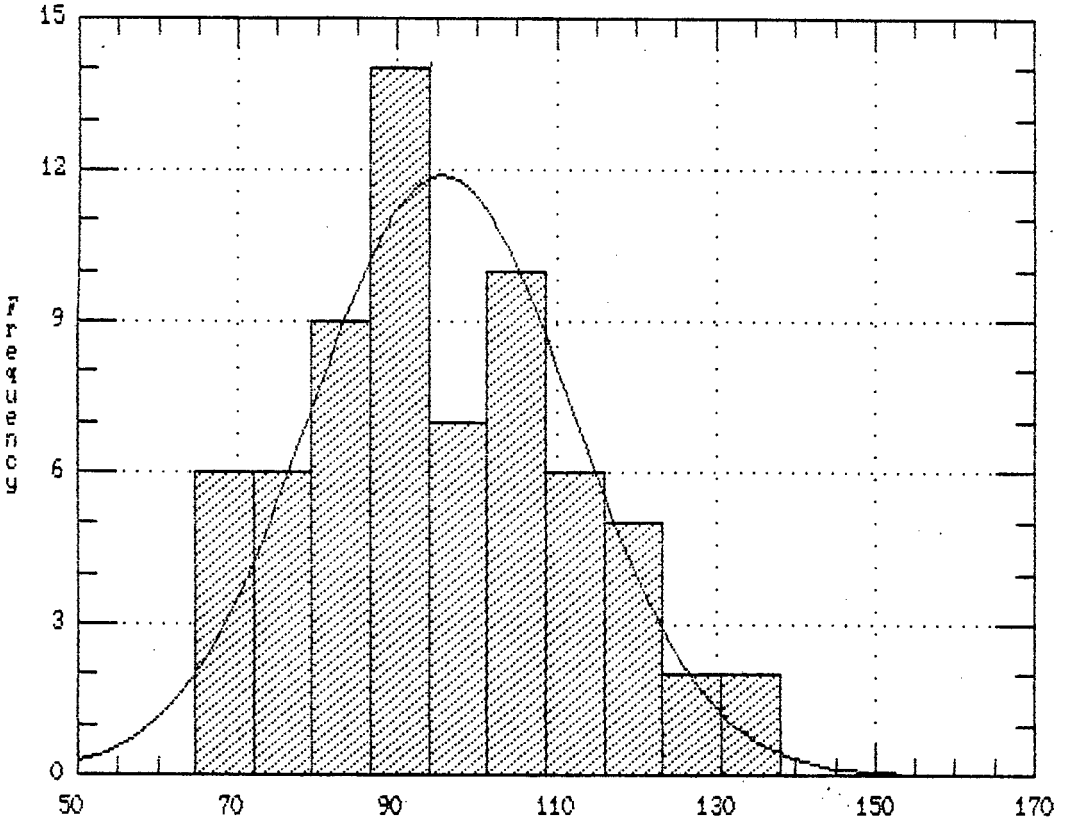


Fig 3.9: Frequency Histogram: PIQ - all Afrikaans subjects

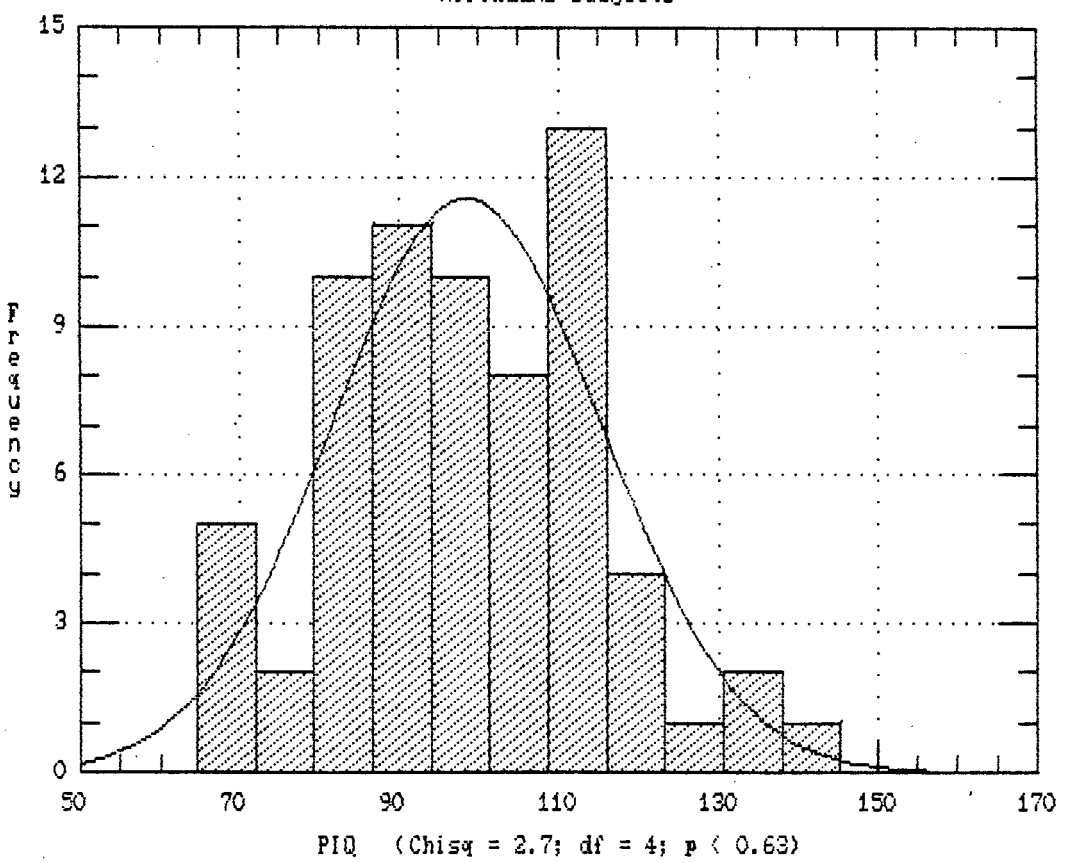


Fig 3.10: Frequency Histogram: VIQ - all Afrikaans subjects

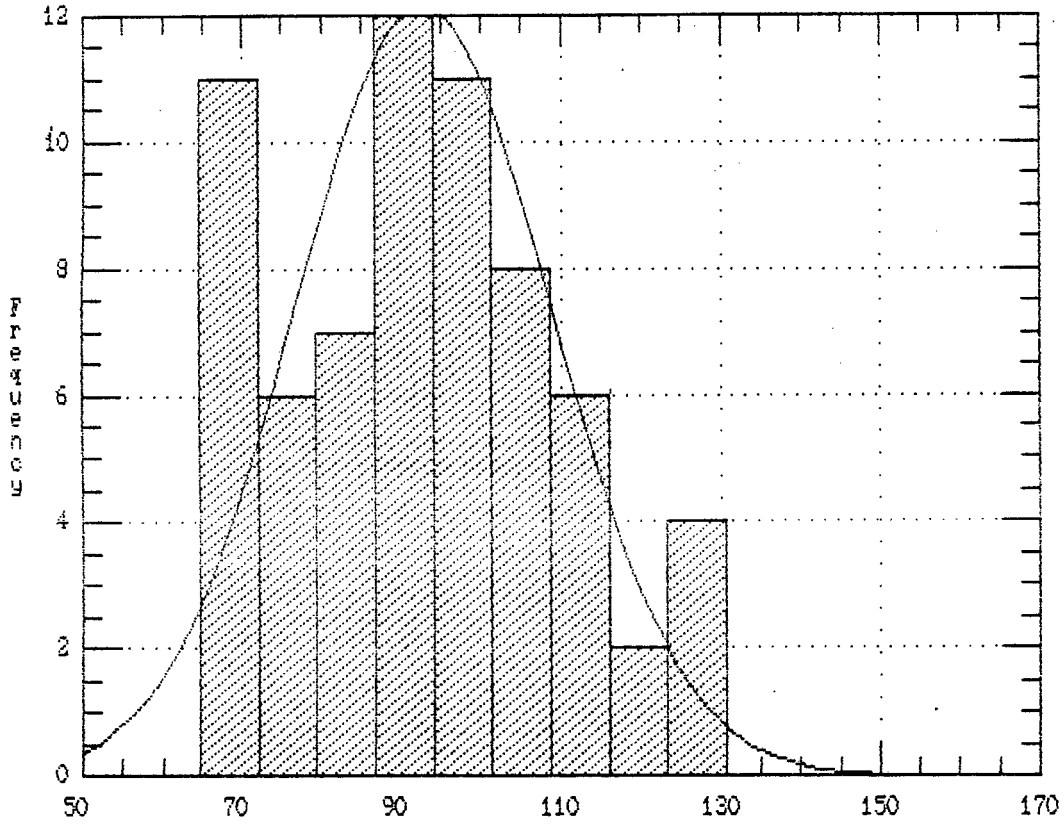


Fig 3.11: Frequency Histogram: NART -all Afrikaans subjects

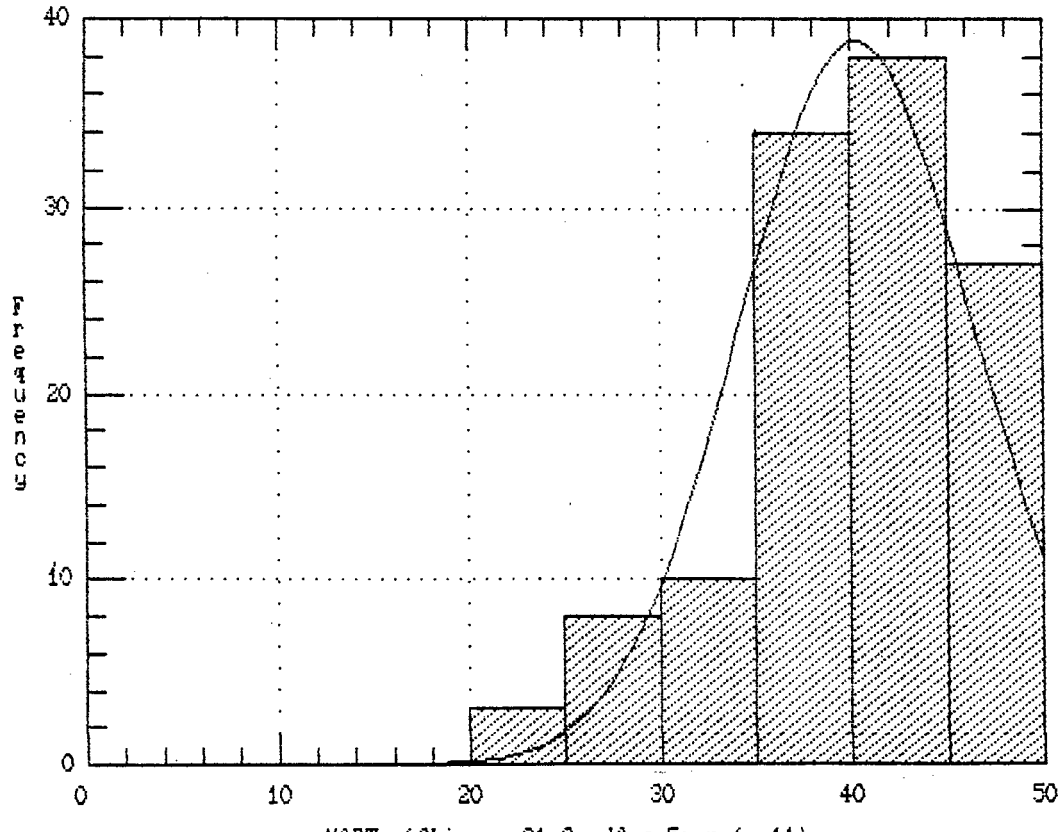


TABLE 3.4 Descriptive statistics - Afrikaans subjects

	FSIQ	PIQ	VIQ	NART
Sample size	67	67	67	120
Average	95.67	98.47	92.71	40.29
Median	93	97	94	41
Mode	70	95	70	42
Geometric mean	94.29	97.04	91.33	39.76
Variance	272.37	287.55	260.6	38.05
Standard deviation	16.50	16.95	16.14	6.16
Standard error	2.01	2.07	1.97	0.56
Minimum	70	67	70	23
Maximum	138	145	126	50
Range	68	78	56	27

Table 3.5 Regression equations: Afrikaans subjects

FSIQ = 154 - 1.45 * NART

Dependent variable: FSIQ Independent variable NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	154.306	13.8726	11.1231	0.0001
Slope	-1.45447	0.341222	-4.26254	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	3927.2214	1	3927.2214	18.1692	0.0001
Error	14049.555	65	216.147		
Total (Corr.)	17976.776	66			

Correlation Coefficient = -0.467398 R-squared = 21.85 percent
Stnd. Error of Est. = 14.7019

PIQ = 152 - 1.31 * NART

Dependent variable: PIQ Independent variable NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	151.595	14.6908	10.319	0.0001
Slope	-1.31761	0.361348	-3.64637	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	3222.9069	1	3222.9069	13.2960	0.0001
Error	15755.810	65	242.397		
Total (Corr.)	18978.716	66			

Correlation Coefficient = -0.412088 R-squared = 16.98 percent
Stnd. Error of Est. = 15.5691

VIQ = 148 - 1.38 * NART

Dependent variable: VIQ Independent variable NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	148.331	13.6822	10.8412	0.0001
Slope	-1.37956	0.336538	-4.09928	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	3533.1217	1	3533.1217	16.8041	0.0001
Error	13666.490	65	210.254		
Total (Corr.)	17199.612	66			

Correlation Coefficient = -0.453231 R-squared = 20.54 percent
Stnd. Error of Est. = 14.5001

Fig 3.12: Regression of FSIQ on NART: All Afrikaans subjects

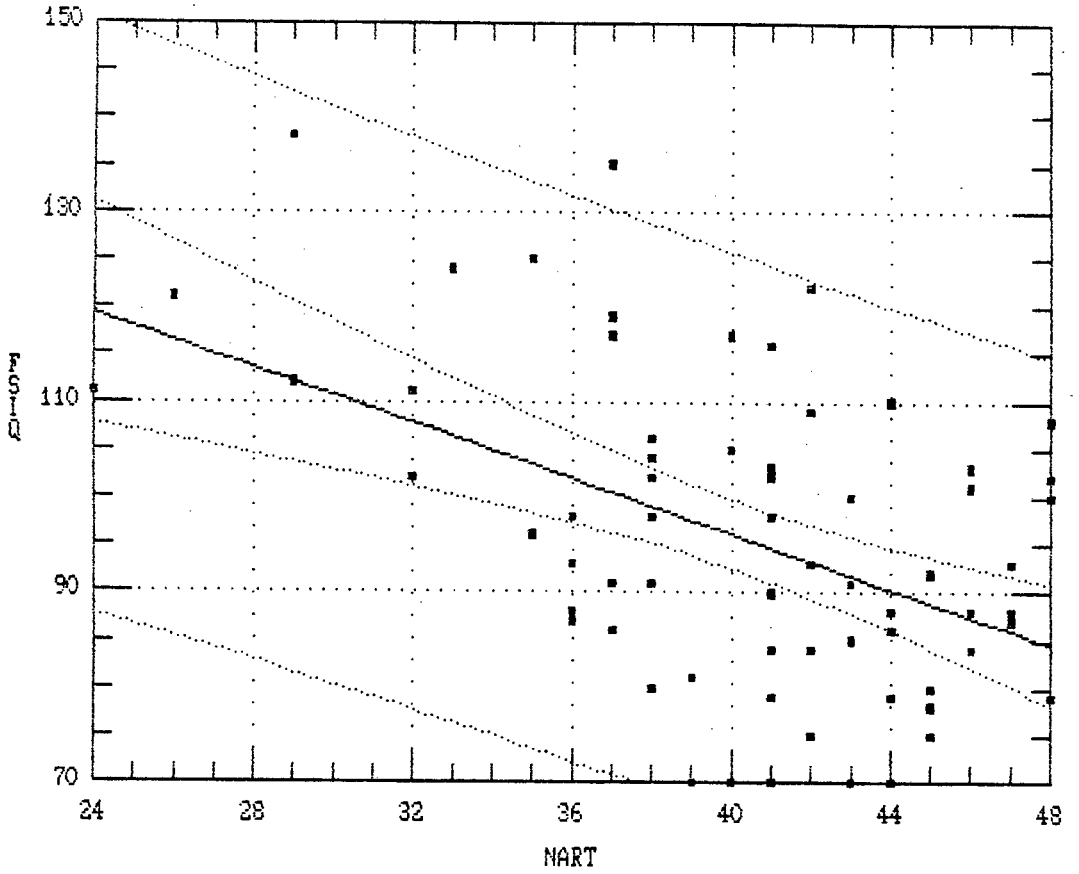


Fig 3.13: Regression of PIQ on NART: All Afrikaans subjects

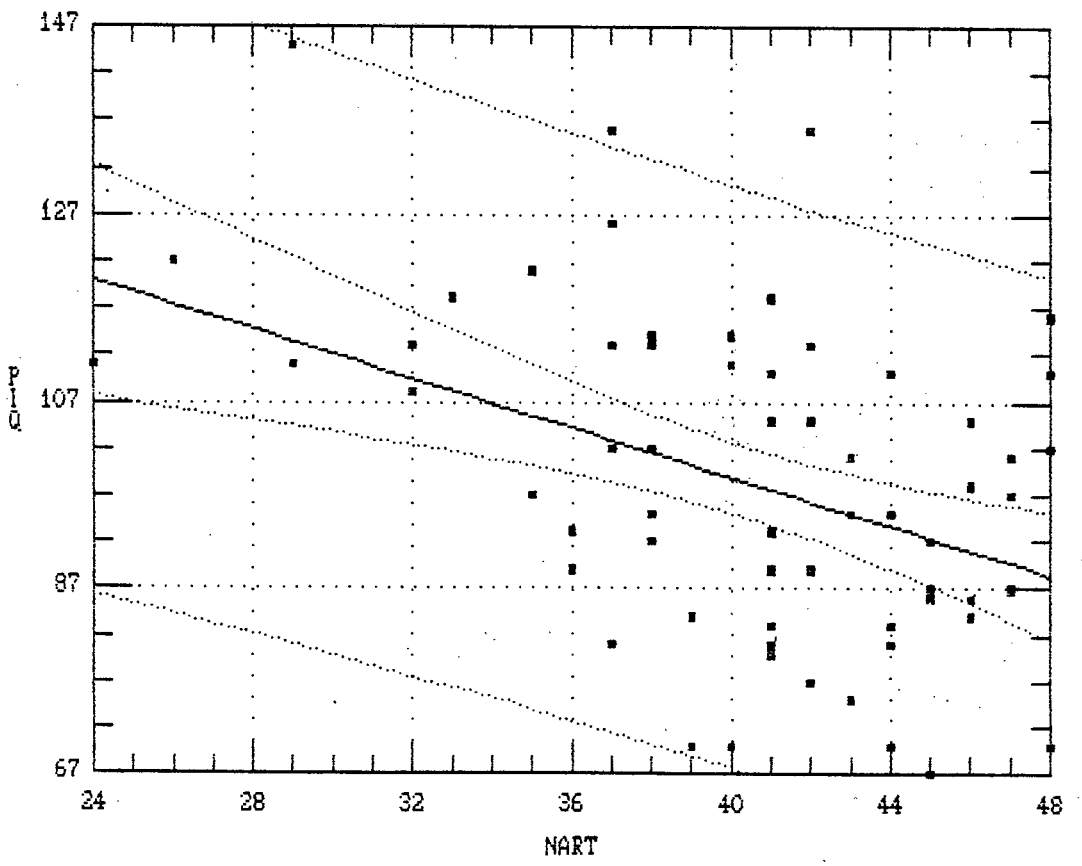


Fig 3.14: Regression of VIQ on NART: All Afrikaans subjects

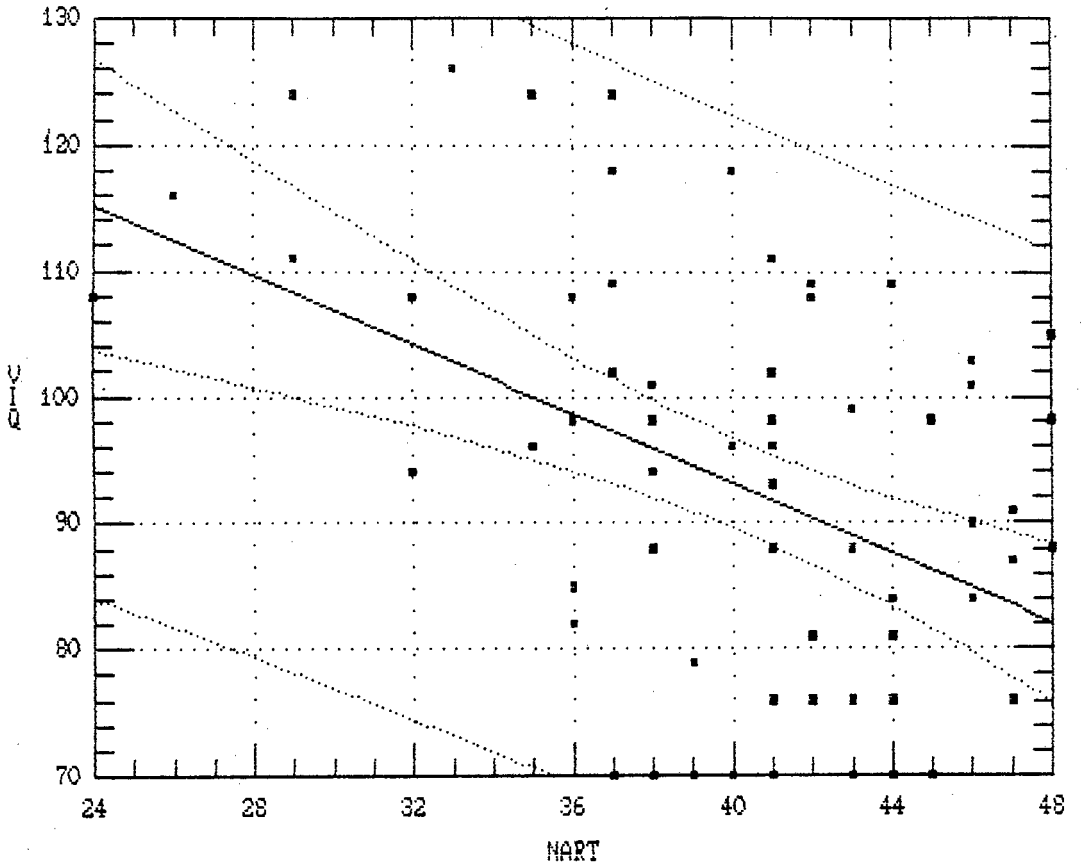


TABLE 3.6 Tests for equality of correlation coefficients - Afrikaans subjects

	R1	R2	Z1	Z2	N1	N2	SDz	Z	P
FSIQ	-0.47	-0.74	0.51	0.962	67	120	0.16	-2.91	0.01
PIQ	-0.41	-0.57	0.436	0.648	67	120	0.16	-1.36	n.s
VIQ	-0.45	-0.77	0.485	1.02	67	120	0.16	-3.44	0.01

c. English subjects only.

There were a total of 114 English subjects involved in the research, and of these I.Q. data (combining WAIS and NSAGT subjects) was available for 95. The distribution of the IQ and NART variables for this subject group is depicted in Figures 3.15 to 3.18., while descriptive statistics for the three variables are given in Table 3.7.

Three regression equations are reported, one for each of the I.Q. measures. In each case, the I.Q. measure is regressed against NART errors (the independent variable) and the resultant regression equations are derived in Table 3.8. Regression plots are reported as Figures 3.19 to 3.21. In keeping with the primary aim of this study, the correlation coefficients yielded by these models are compared for equality with those derived from Nelson's data (1977 unpub. manuscript), and the results of the comparison are depicted in Table 3.9.

It is apparent from inspection that each of the correlation coefficients is comparable to those derived from Nelson's data (1977 unpub. manuscript), an impression that is supported by the test for equality mentioned above. That there is no significant difference for any of the three correlations indicates that the relationship between each of the I.Q. measures and the NART is satisfactorily replicated here.

Fig 3.15: Frequency Histogram: FSIQ -all
English subjects'(WAIS & NSAGT)

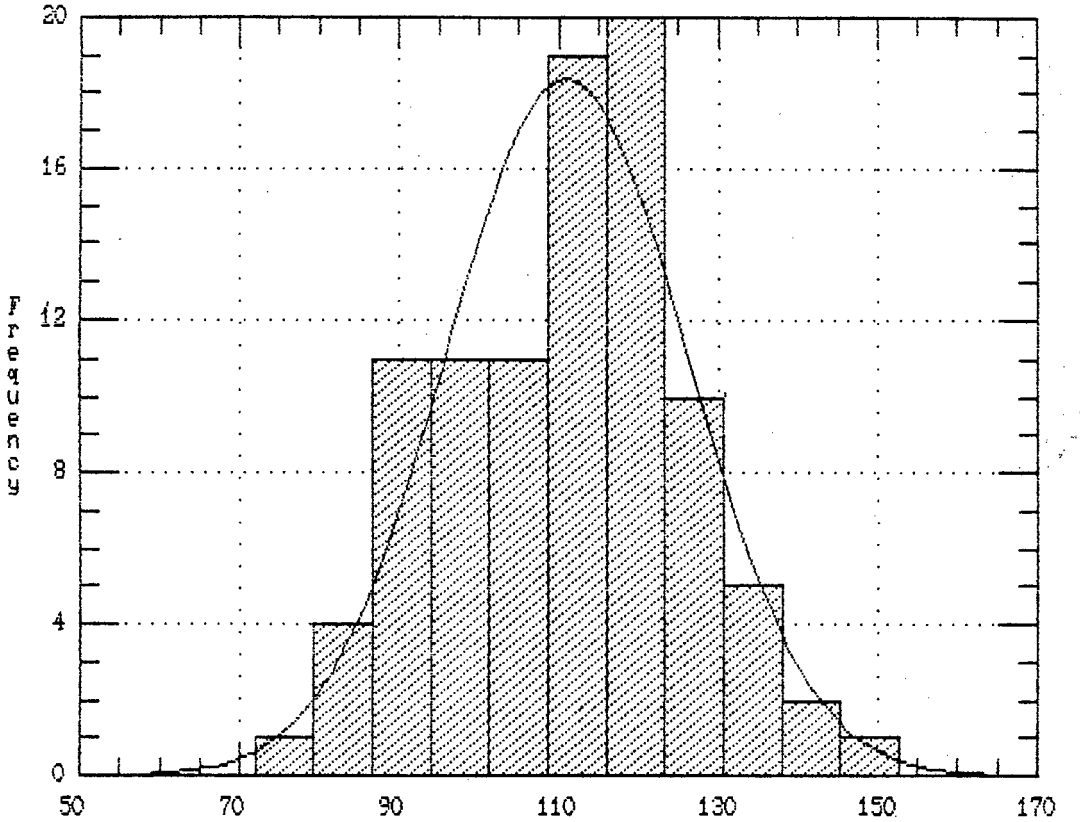


Fig 3.16: Frequency Histogram: PIQ - all
English subjects

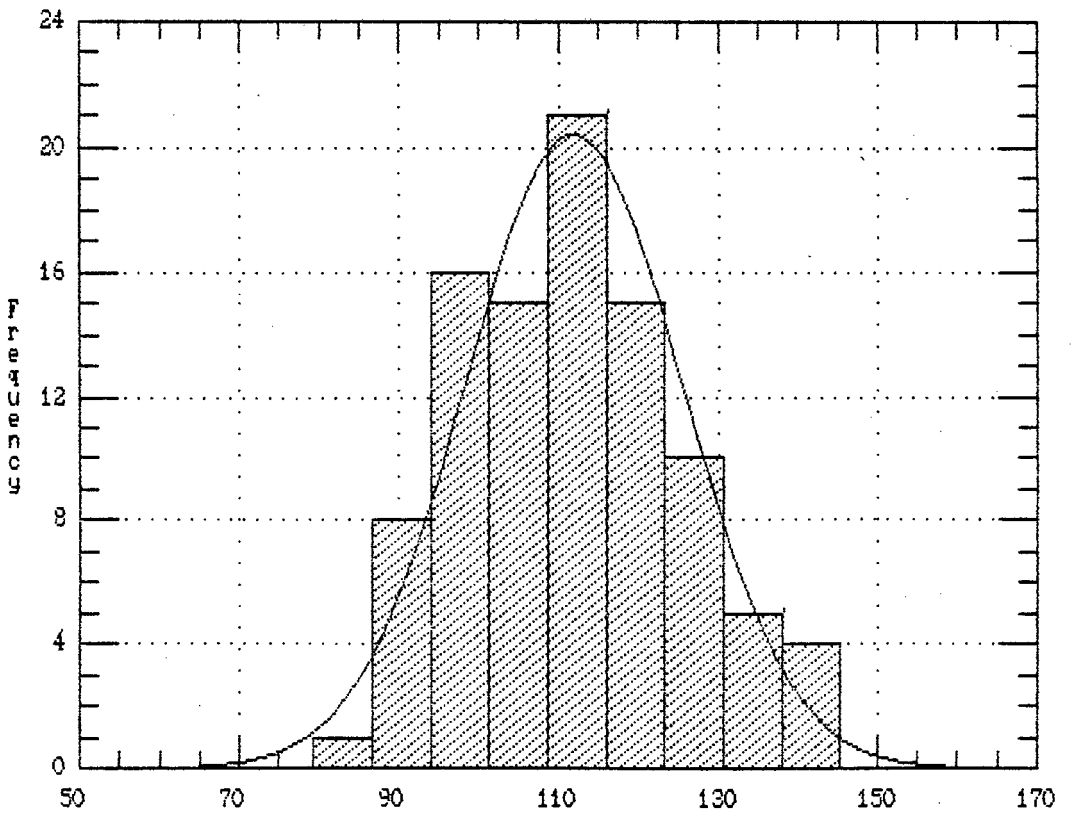
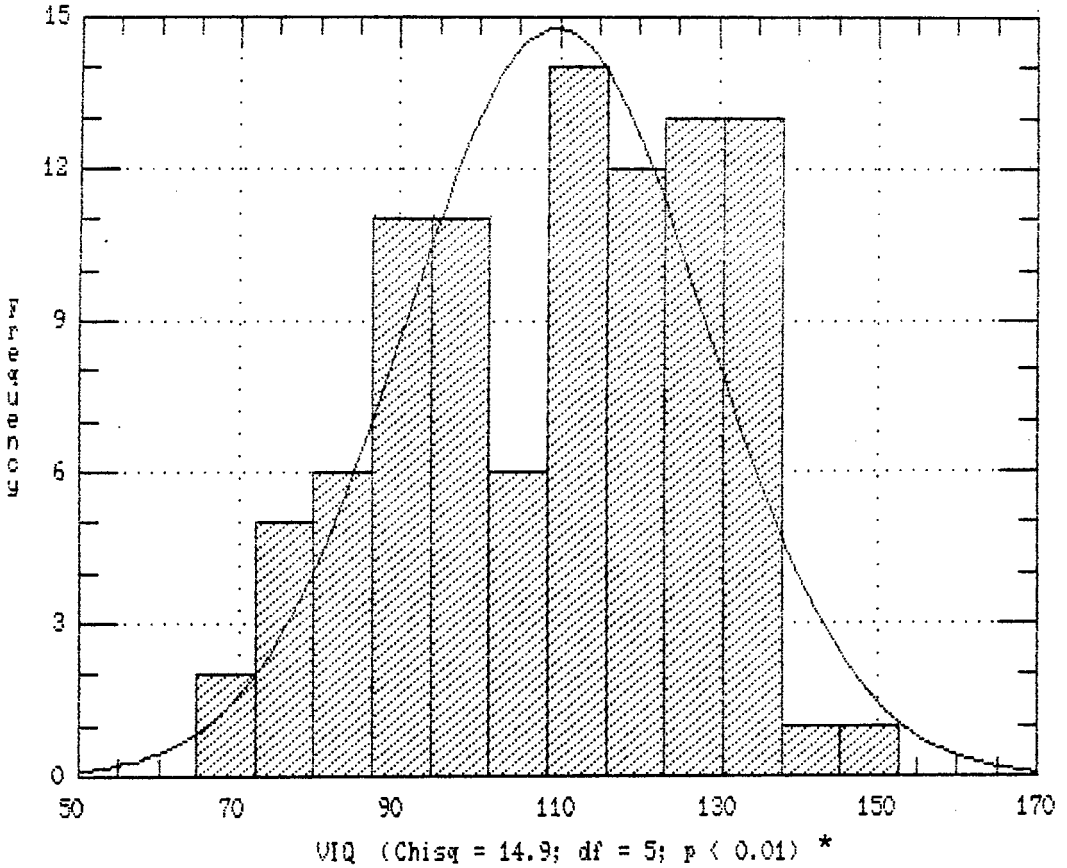


Fig 3.17: Frequency Histogram: VIQ - all English subjects



Note: Kolmogorov-Smirnoff test applied to this data failrd to achieve significance.

Fig 3.18: Frequency Histogram: NART -all English subjects

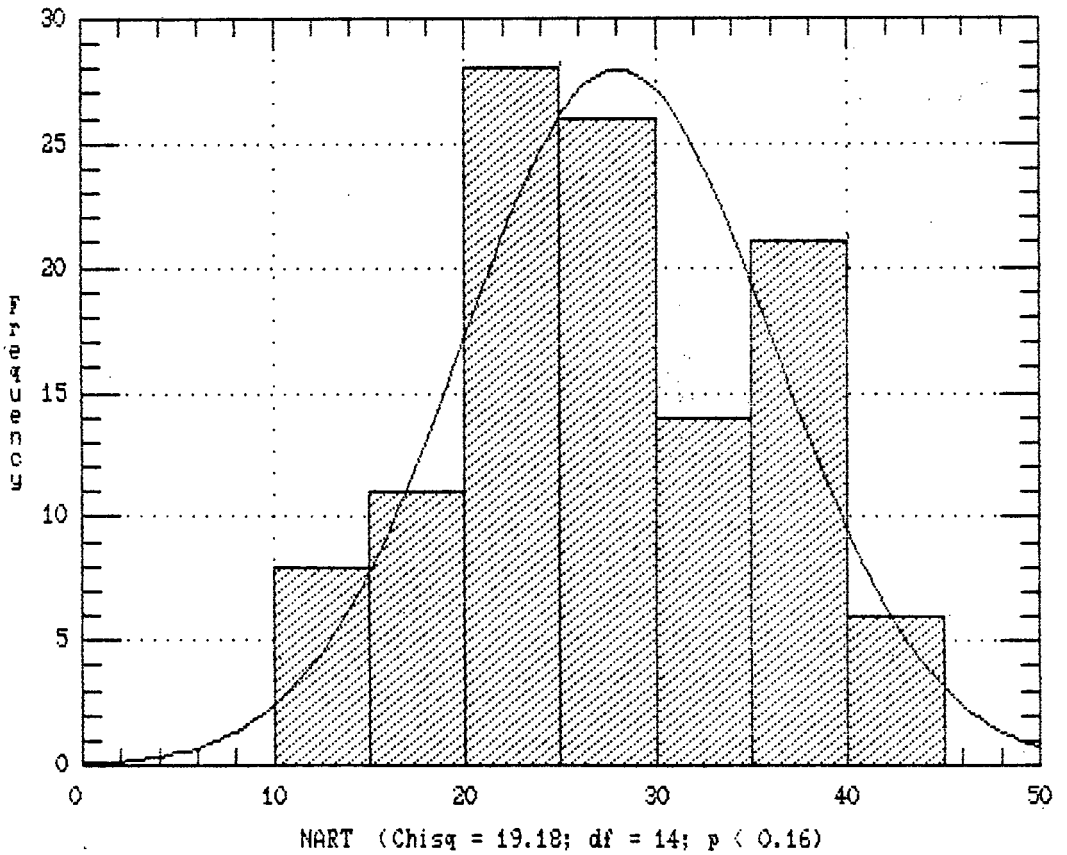


TABLE 3.7. Descriptive statistics - All English subjects

	FSIQ	PIQ	VIQ	NART
Sample size	95	95	95	114
Average	111	111.90	109.589	28.01
Median	112	112	113	27
Mode	96	111	96	30
Geometric mean	109.95	111.09	107.907	26.75
Variance	228.46	185.02	353.755	66.19
Standard deviation	15.11	13.60	18.8084	8.13
Standard error	1.55	1.39	1.9297	0.76
Minimum	78	84	70	12
Maximum	146.5	143	150	45
Range	68.5	59	80	33

Table 3.8 Regression equations: all English subjects

FSIQ = 149 - 1.37 * NART

Dependent variable: FSIQ Independent variable NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	149.148	3.9282	37.9686	0.0001
Slope	-1.3712	0.135787	-10.0982	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	11232.197	1	11232.197	101.973	0.0001
Error	10243.803	93	110.148		
Total (Corr.)	21476.000	94			

Correlation Coefficient = -0.723195 R-squared = 52.30 percent
Stnd. Error of Est. = 10.4952

PIQ = 136 - 0.87 * NART

Dependent variable: PIQ Independent variable NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	136.064	4.40601	30.8815	0.0001
Slope	-0.868371	0.152303	-5.70158	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	4504.7694	1	4504.7694	32.5081	0.0001
Error	12887.378	93	138.574		
Total (Corr.)	17392.147	94			

Correlation Coefficient = -0.508932 R-squared = 25.90 percent
Stnd. Error of Est. = 11.7717

VIQ = 160 - 1.82 * NART

Dependent variable: VIQ Independent variable NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	160.263	4.49854	35.6255	0.0001
Slope	-1.8214	0.155502	-11.713	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	19818.637	1	19818.637	137.196	0.0001
Error	13434.352	93	144.455		
Total (Corr.)	33252.989	94			

Correlation Coefficient = -0.772008 R-squared = 59.60 percent
Stnd. Error of Est. = 12.019

Fig 3.19: Regression of FSIQ on NART: All English subjects

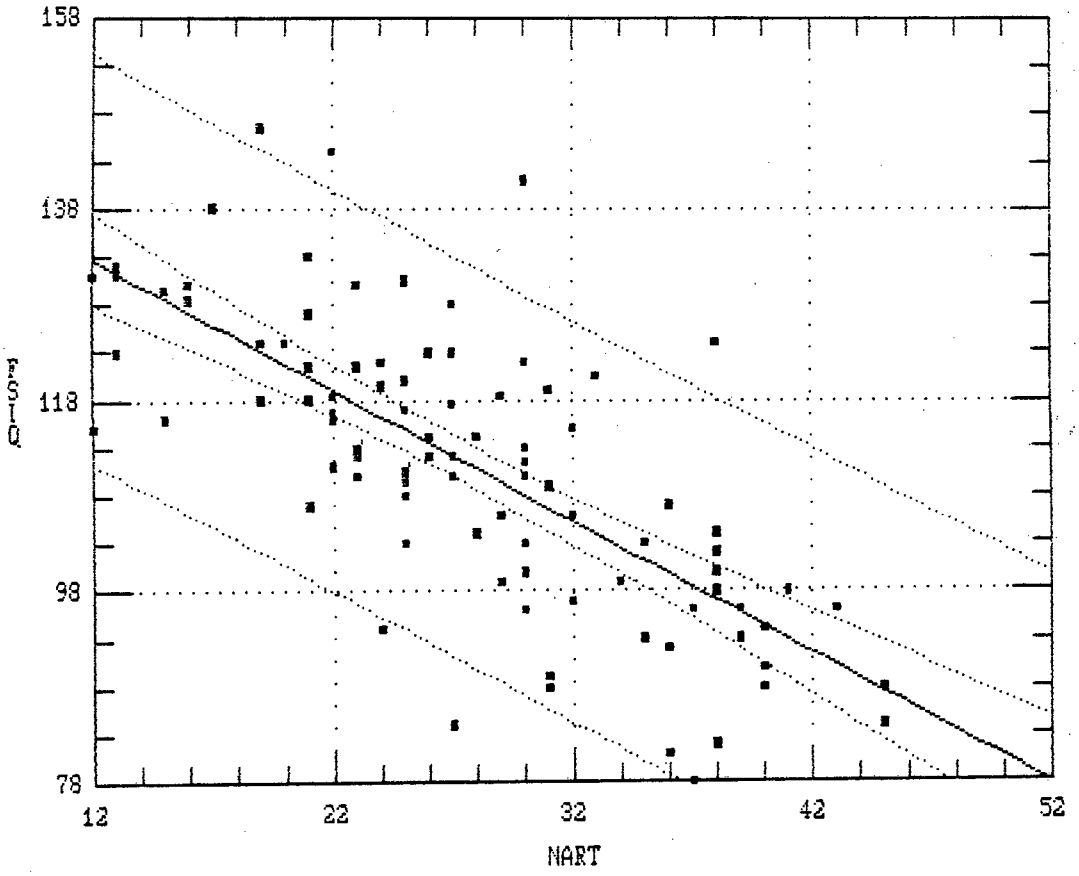


Fig 3.20: Regression of PIQ on NART: All English subjects

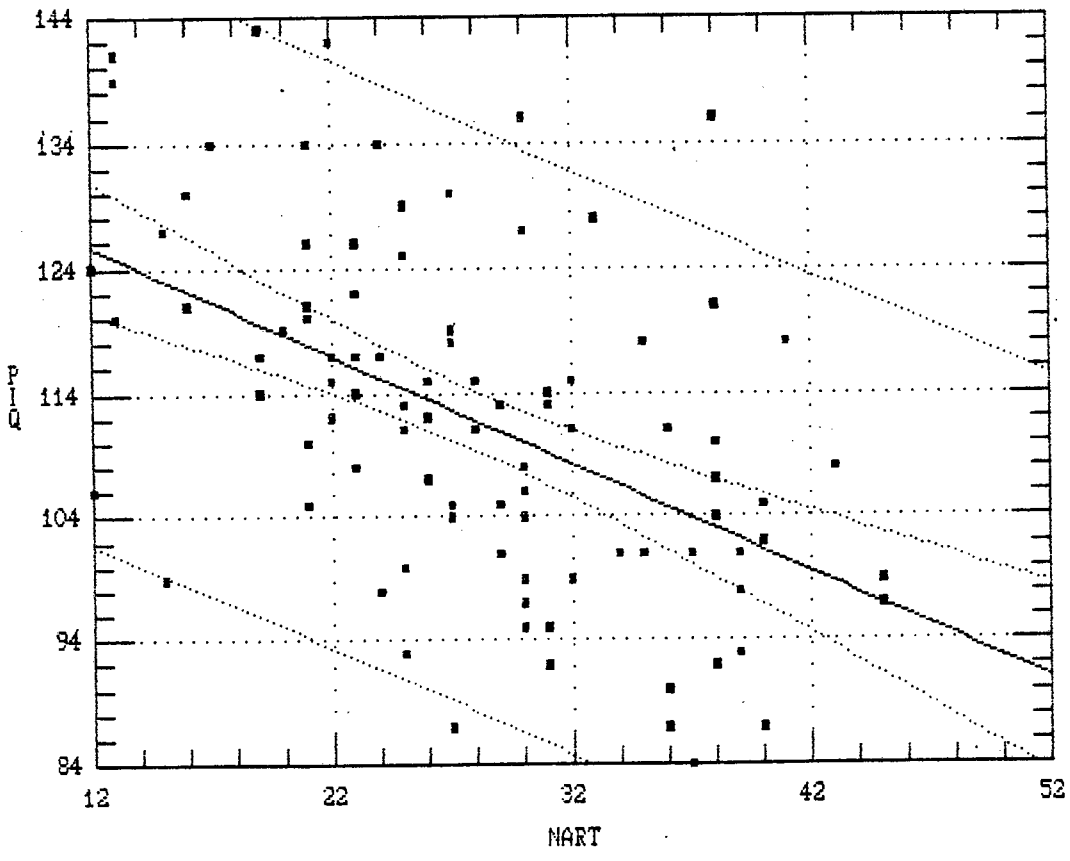


Fig 3.21: Regression of VIQ on NART: All English subjects

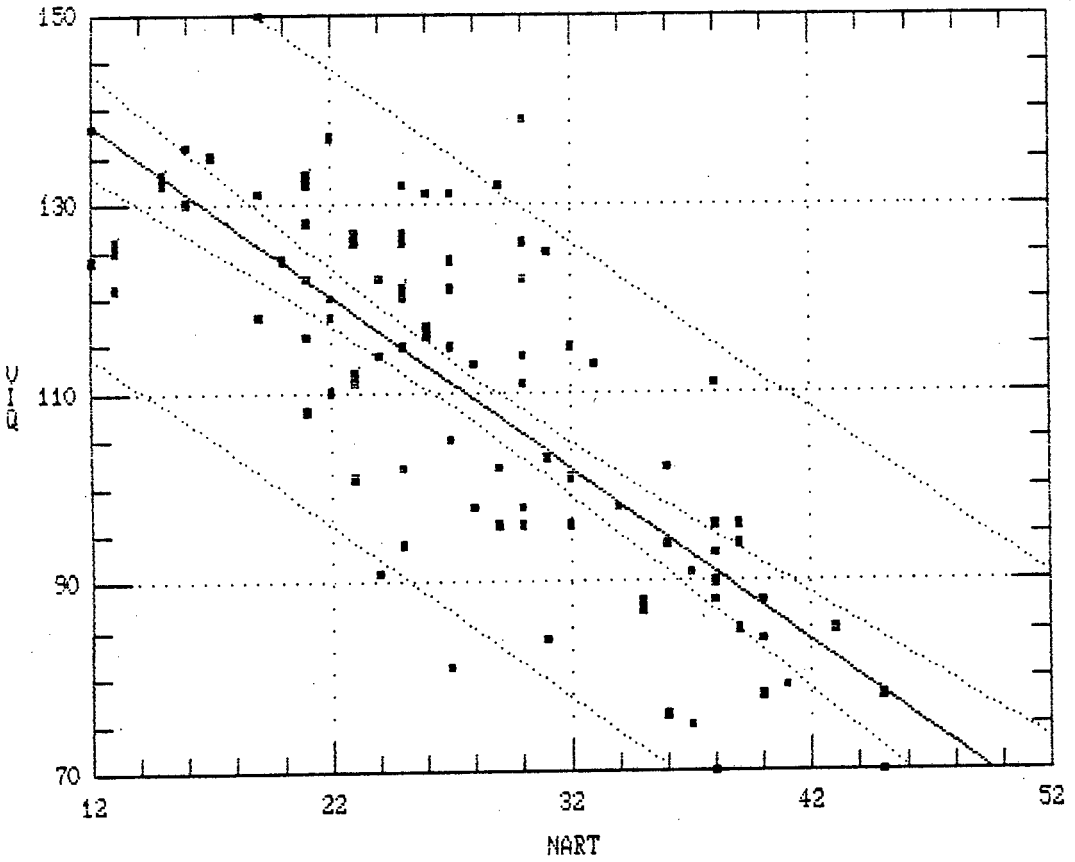


TABLE 3.9 Tests for equality of correlation coefficients - English subjects

	R1	R2	Z1	Z2	N1	N2	SDz	Z	P
FSIQ	-0.72	-0.74	0.815	0.962	95	120	0.14	-1.05	n.s
PIQ	-0.51	-0.57	0.563	0.648	95	120	0.14	-0.61	n.s
VIQ	-0.77	-0.77	1.02	1.02	95	120	0.14	0.00	n.s

(despite the fact that, as discussed earlier, these measures should be highly correlated), regression equations were computed for each of the tests separately.

d. English subjects: NSAGT.

53 English subjects were administered the NSAGT. All of these subjects were drawn from the 'Navy sample', described above.

The distribution of the IQ and NART variables for this subject group is depicted in Figures 3.22 to 3.25. Descriptive statistics for the three variables are presented in Table 3.10.

Regression equations for each of V.I.Q., P.I.Q., and F.S.I.Q. are derived in Tables 3.11. Plots appear as Figures 3.26 to 3.28. In addition, the computed correlation coefficients are compared to those derived from the Nelson & O'Connell's (1978) study and the results of this procedure are reported in Table 3.12.

While on inspection the correlation coefficients reported in this study would appear to be lower than those obtained by Nelson & O'Connell (1978), this impression is not borne out by the test for equality, which indicates that they are in fact statistically equivalent. (Possible sources of this attenuation will be addressed in more detail in the

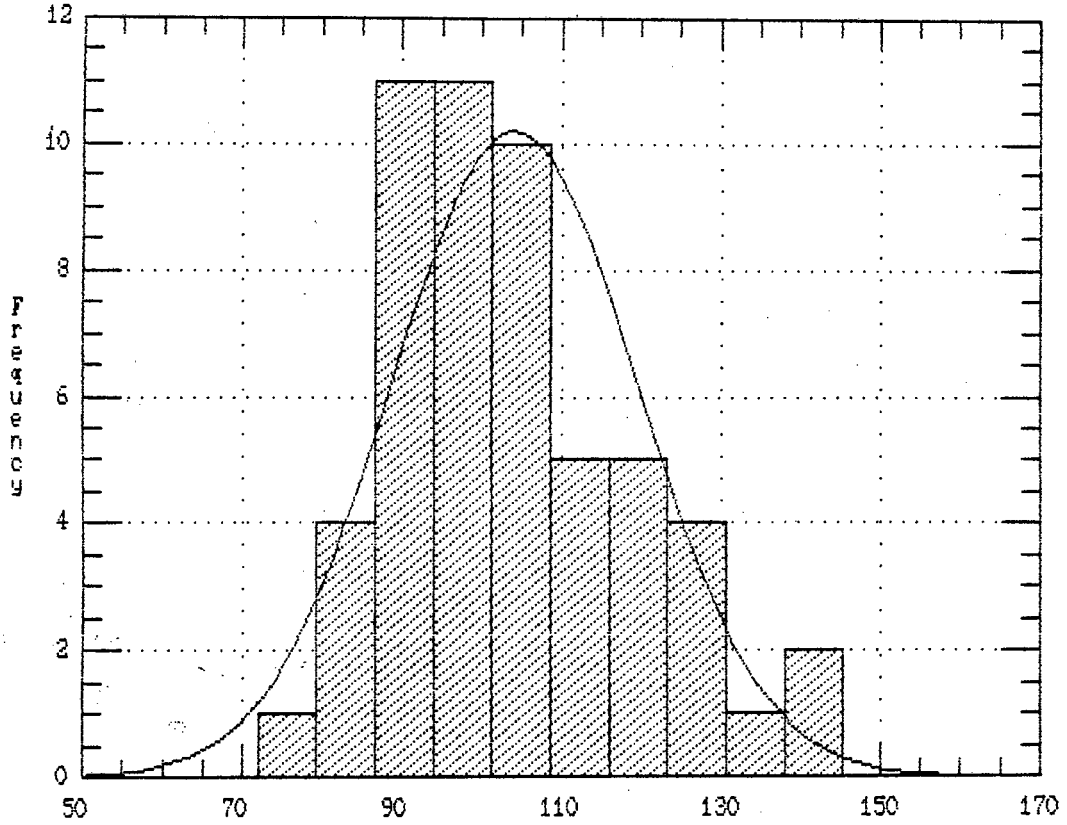
discussion of the SA-WAIS results below). The finding of no significant difference indicates that the relationship between irregular word reading ability and psychometric measures of intelligence reported for Nelson and O'Connel's (1978) United Kingdom sample is also evident in the South African sample utilised for this study. That the U.K. study utilised the WAIS while the data reported here are based on the NSAGT is not a matter of great concern as no pooling of data has taken place and as the question being addressed here is defined as a test of the comparability of independently obtained correlation coefficients between irregular word reading ability and performance on a psychometric measure of I.Q. The extent to which results will be comparable across studies will always be limited to some extent by the instruments used. (see for example Murdoch (1982) on differences between the SAWAIS and the Wechsler Bellevue Adult Intelligence Scale.)

e. English sample: WAIS.

The SAWAIS was administered to 41 English subjects drawn from the 'UCT sample', described above.

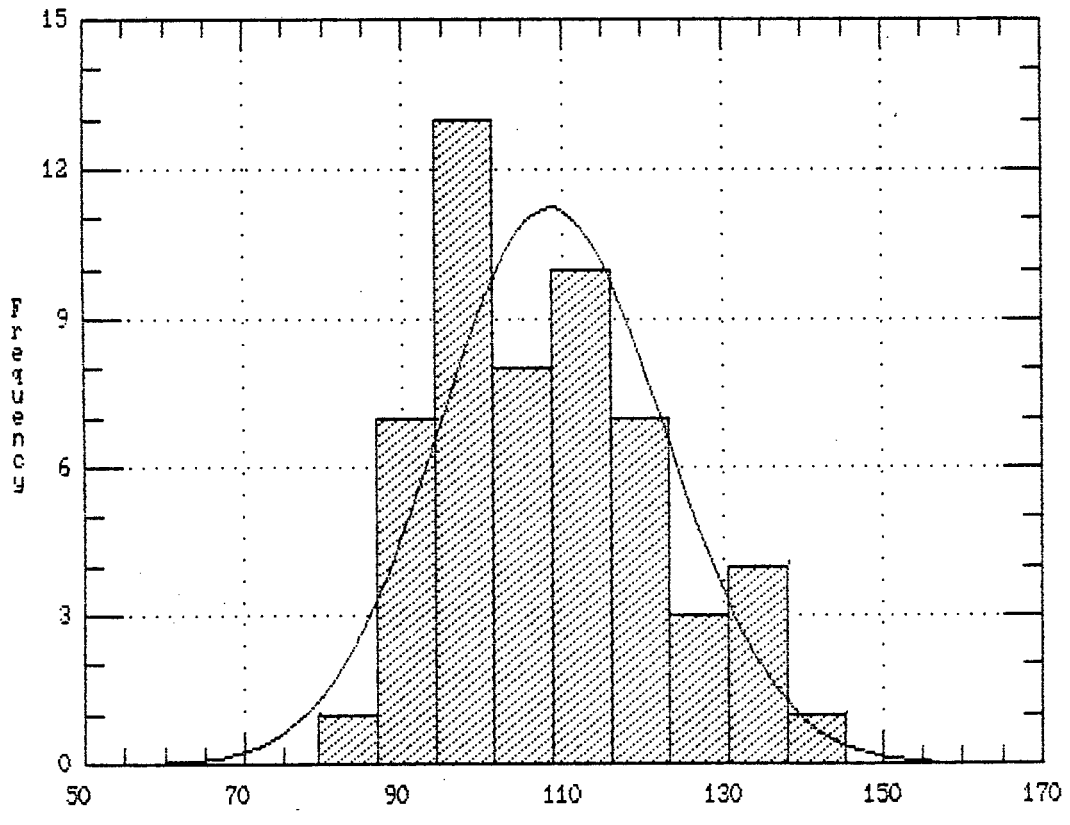
The distribution of the IQ and NART variables for this subject group is depicted by Figures 3.29 to 3.32 while descriptive statistics for the three variables are contained in Table 3.13.

Fig 3.22: Frequency Histogram: FSIQ -
English NSAGT subjects



FSIQ (Chisq = 3.9; df = 4; p < 0.4)

Fig 3.23: Frequency Histogram: PIQ -
English NSAGT subjects



PIQ (Chisq = 1.2; df = 5; p < 0.94)

Fig 3.24: Frequency Histogram: VIQ -
English NSAGT subjects

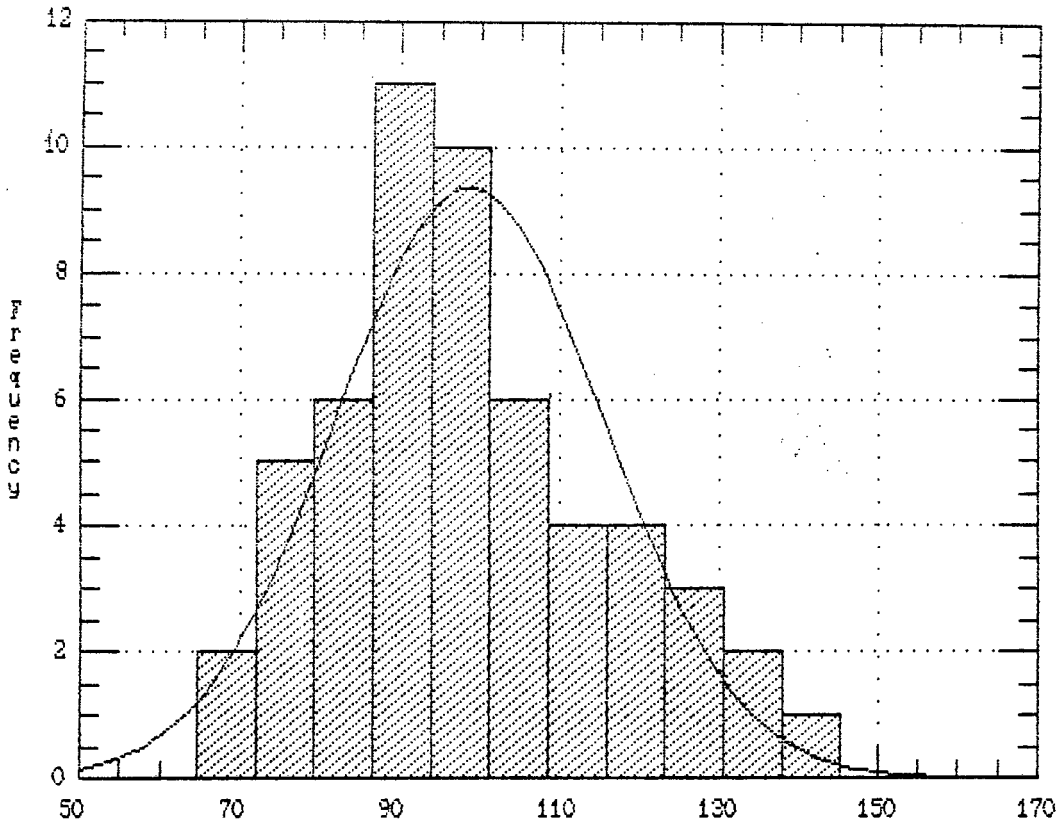


Fig 3.25: Frequency Histogram: NART -
English NSAGT subjects.

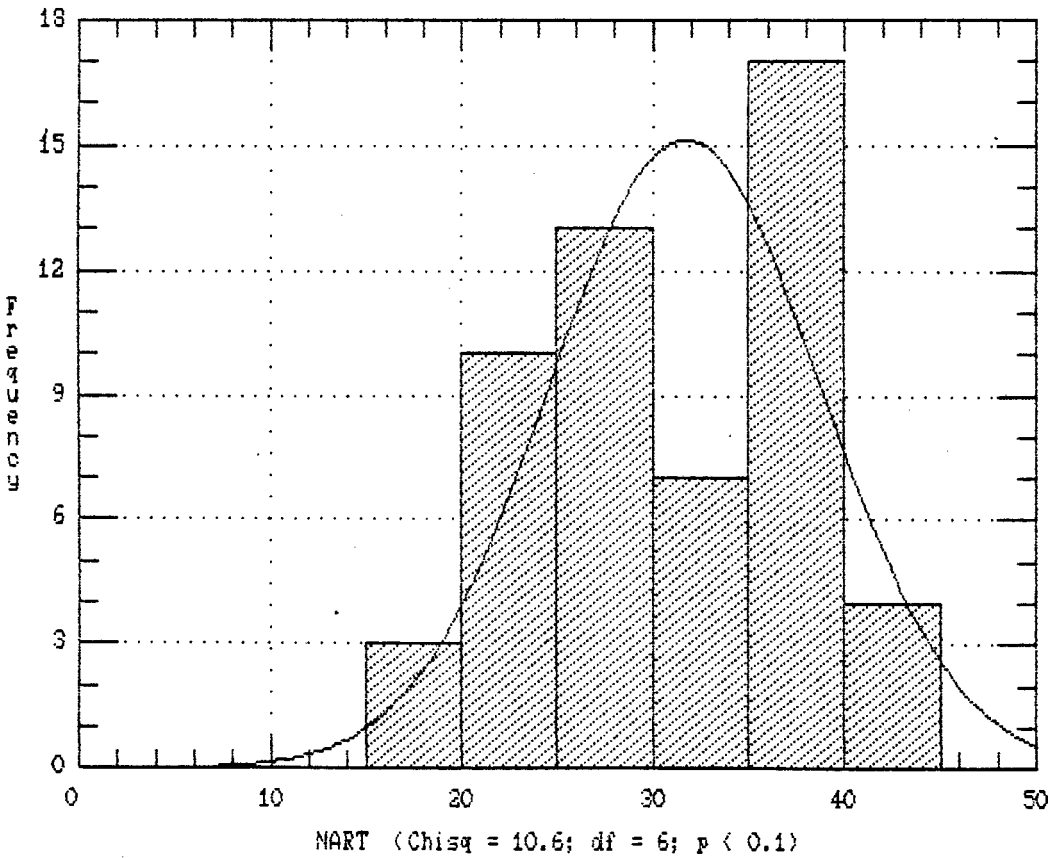


TABLE 3.10 Descriptive statistics - English NSAGT subjects

	FSIQ	PIQ	VIQ	NART
Sample size	54	54	54	54
Average	104.11	108.61	98.72	31.68
Median	101	107.5	96	31
Mode	96	101	96	38
Geometric mean	103.03	107.73	97.35	30.85
Variance	240.32	198.28	285.60	50.55
Standard deviation	15.50	14.08	16.89	7.11
Standard error	2.10	1.91	2.29	0.96
Minimum	78	84	70	17
Maximum	144	142	139	45
Range	66	58	69	28

Table 3.11 Regression equations: English NSAGT subjects

FSIQ = 148 - 1.40 * NART

Dependent variable: FSIQ Independent variable NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	148.407	7.53064	19.707	0.00010
Slope	-1.39799	0.232006	-6.02564	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	5237.0116	1	5237.0116	36.3084	0.0001
Error	7500.3217	52	144.2370		
Total (Corr.)	12737.333	53			

Correlation Coefficient = -0.641213 R-squared = 41.12 percent
Stnd. Error of Est. = 12.0099

PIQ = 137 - 0.89 * NART

Dependent variable: PIQ Independent variable NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	136.831	7.96154	17.1865	0.0001
Slope	-0.890643	0.245281	-3.63111	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	2125.6196	1	2125.6196	13.1849	0.0001
Error	8383.2137	52	161.2156		
Total (Corr.)	10508.833	53			

Correlation Coefficient = -0.449744 R-squared = 20.23 percent
Stnd. Error of Est. = 12.6971

VIQ = 160 - 1.82 * NART

Dependent variable: VIQ Independent variable NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	160.263	4.49854	35.6255	0.0001
Slope	-1.8214	0.155502	-11.713	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	19818.637	1	19818.637	137.196	0.0001
Error	13434.352	93	144.455		
Total (Corr.)	33252.989	94			

Correlation Coefficient = -0.772008 R-squared = 59.60 percent
Stnd. Error of Est. = 12.019

Fig 3.26: Regression of FSIQ on NART: English NSAGT subjects

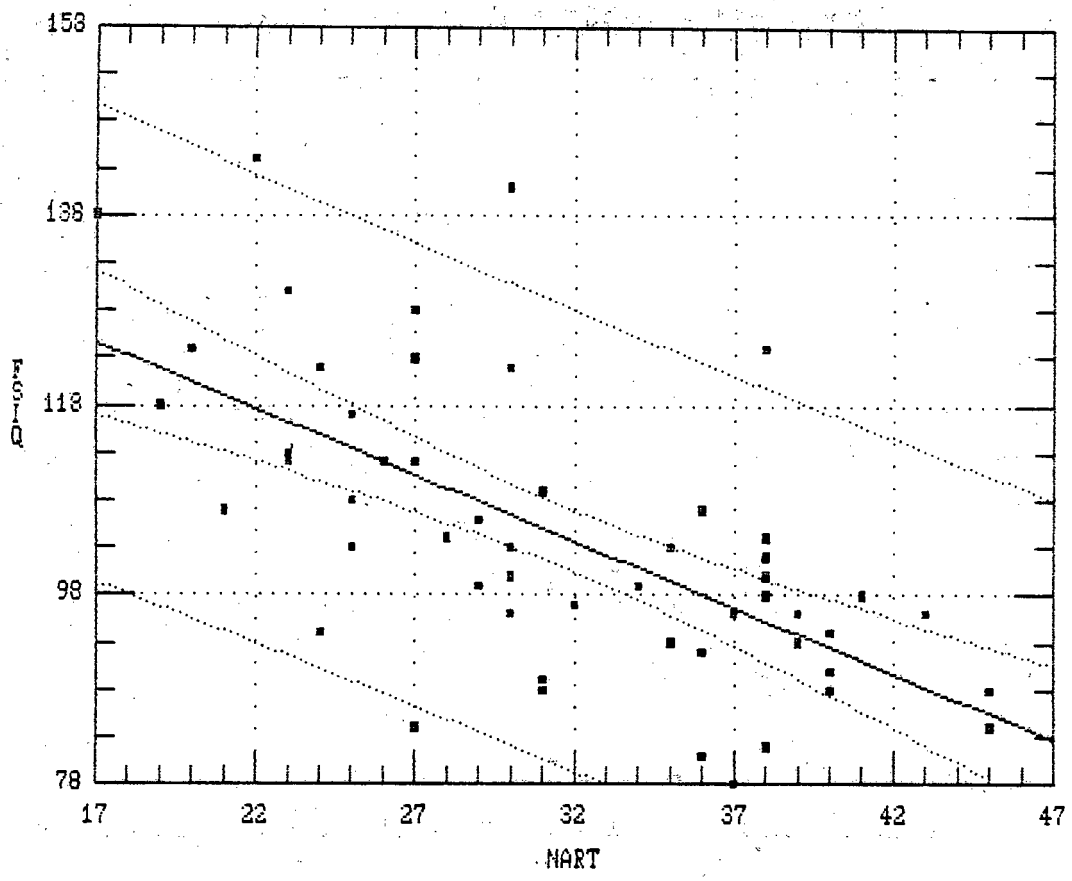
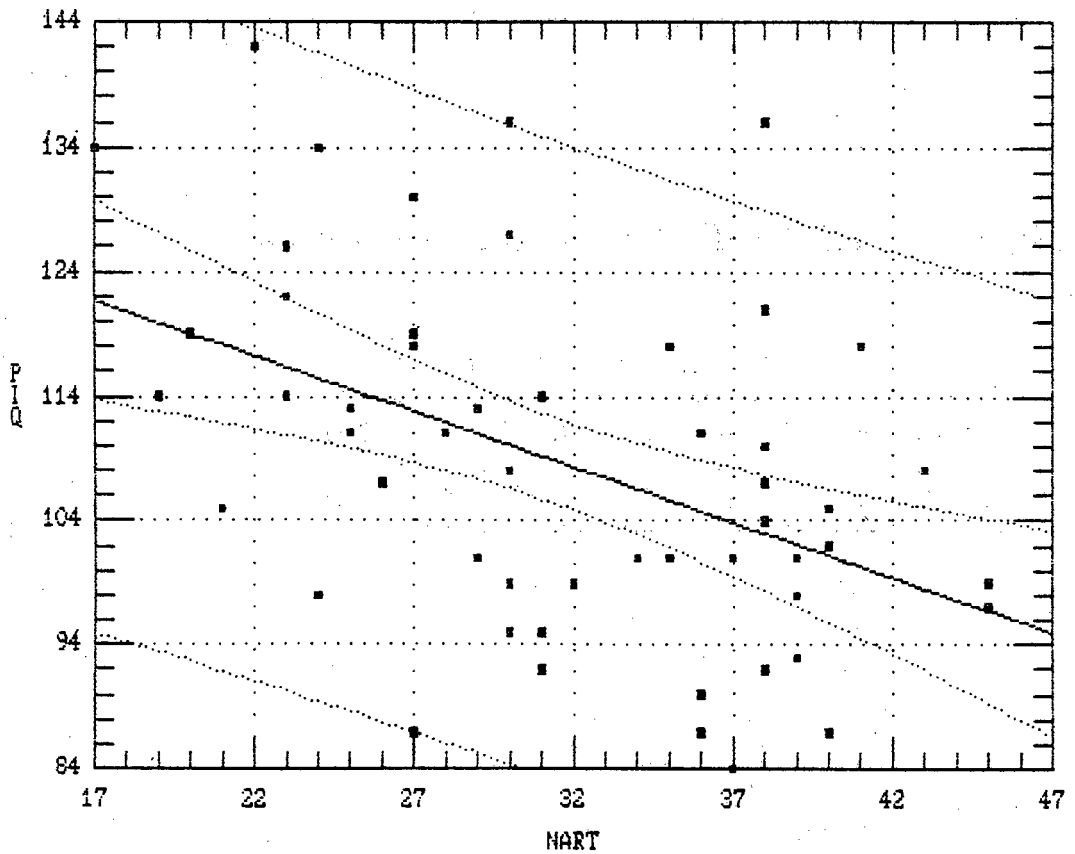


Fig 3.27: Regression of PIQ on NART: English NSAGT subjects



descriptive statistics for the three variables are contained in Table 3.13.

Three regression equations are reported, one for each of the I.Q. measures. In each case, the I.Q. measure is regressed against NART errors (the independent variable) and the resultant equations are derived in Table 3.14. Regression plots are included as Figures 3.33 to 3.35.

In addition, tests of equality between the correlation coefficients observed here and those derived from Nelson's (1977 unpub. manuscript) study are reported in Table 3.15.

As is appropriate in research where the hypothesis under investigation does not lend itself to an antecedent prediction of direction of difference, two tailed inferential tests have been utilised thus far in the tests for equality between the correlation coefficients reported in this research and those derived from Nelson's (1977 unpub. manuscript) study. For the English SAWAIS subjects, the use of a two-tailed test indicated that the correlation coefficients are equivalent in the cases of Full Scale and Performance I.Q., but not in the case of Verbal I.Q. Inspection of the data also reveals that the absolute magnitude of the difference between the correlation coefficients is large for the NART - FSIQ correlation. (-0.74 for the UK study versus -0.56 here) In order to investigate this impression further, a one tailed inferential test was utilised and revealed that Nelson's (1977 unpub. manuscript)

more satisfactory statistically in this particular situation).

This result would appear to be somewhat anomalous in the light of the concordance which has been observed thus far between the correlation coefficients obtained in the two studies. A likely explanation is revealed however in an inspection of the summary statistics for the NART and FSIQ. It is evident from inspection of the data that the variability in both the IQ and the NART are noticeably curtailed compared to the same data for Nelson and O'Connell's (1978) study. A formal test of differences between the means yields the following: that Nelson's sample scores significantly lower on the FSIQ measure ($t = -5.97$; $df = 160$; $p < 0.01$); but that there is no difference between mean performance on the NART between the two samples ($t = -0.197$; $df = 160$). When the make-up of the sample is considered this impression is not entirely surprising. The sample comprises 1st year university students studying psychology, and when restrictions for entry to the university and to the course in question are taken into account, it is likely that the sample will be (i) more homogeneous than the population as a whole, and (ii) comprised of individuals with above average IQ's. The relevant mean and standard deviation for FSIQ (120.07 and 8.36 respectively) confirm this speculation, and it may therefore be accepted that this

above average IQ's. The relevant mean and standard deviation for FSIQ (120.07 and 8.36 respectively) confirm this speculation, and it may therefore be accepted that this sample comprises a "*restricted range* of individuals" (Ghiselli et al., 1981, p.294). Since the range of variation, regardless of sample size, will affect any correlation coefficient calculated (Ghiselli et al., 1981, Downie and Heath, 1970) and "a description of the validity of the predictor based on the scores of the restricted range might not be considered satisfactory, and would generally underestimate the actual validity" (Ghiselli et al., 1981, p.294) (Before proceeding it is interesting to note that measurement error resulting from the instruments themselves will set a ceiling on the correlations that can be expected between FSIQ and NART performance)

Comparison of the variation on both measures between Nelson's (1977 unpub. manuscript) study and the results obtained here for English SAWAIS subjects reveals a restriction of range on both measures in the local sample. This is what was predicted intuitively.

	s.dev FSIQ	s.dev NART
U.K. study	11.3	10.1
S.A. study	8.36	5.97

Fig 3.29: Frequency Histogram: FSIQ -
English SAWAIS subjects

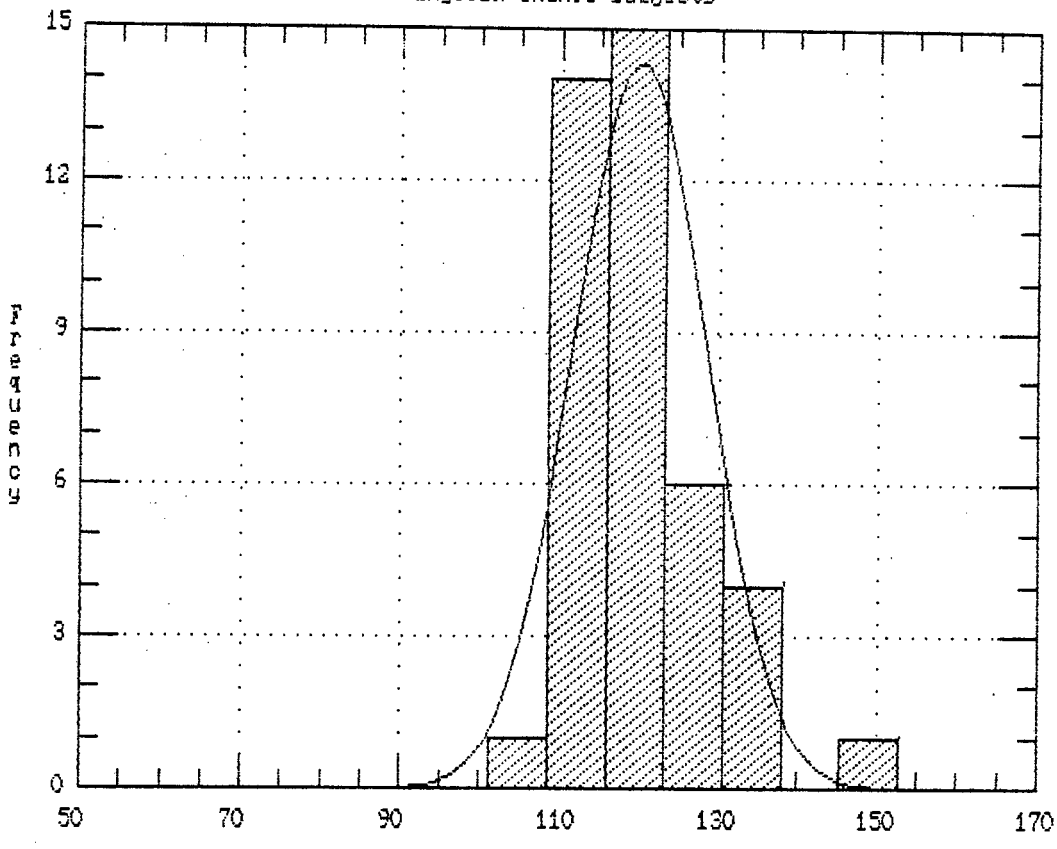


Fig 3.30: Frequency Histogram: PIQ -
English SAWAIS subjects

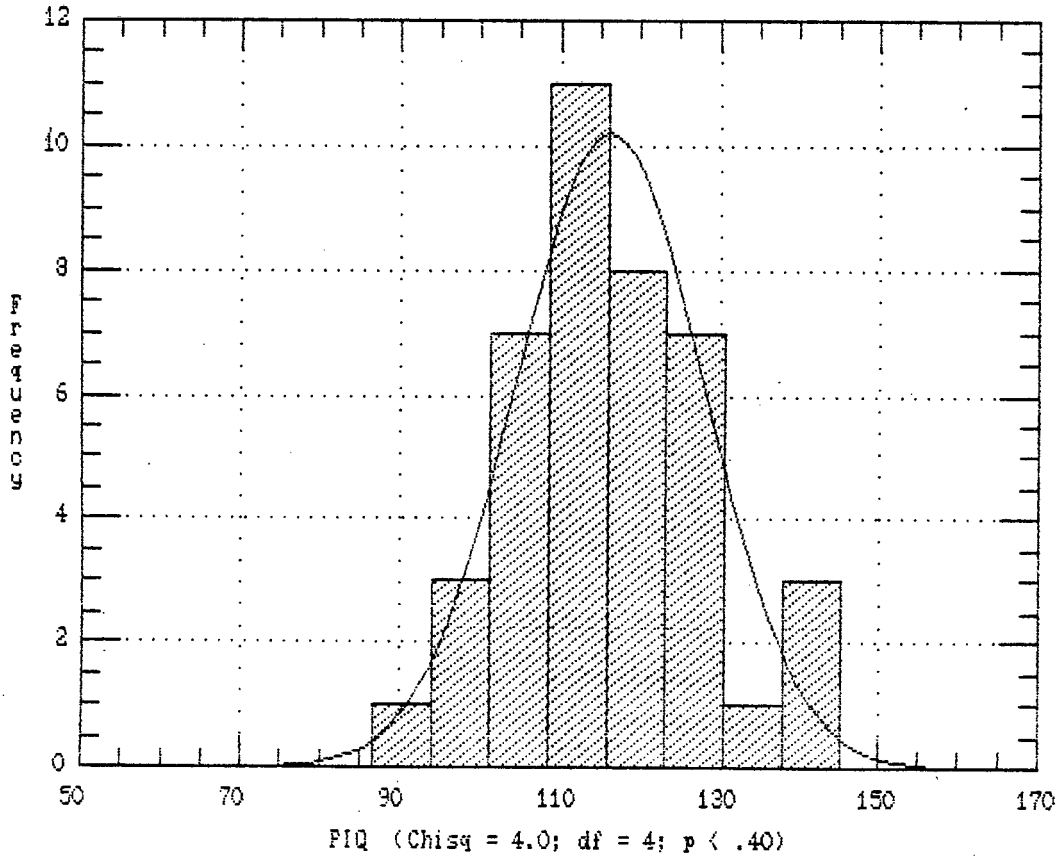


Fig 3.31: Frequency Histogram: VIQ -
English SAWAIS subjects

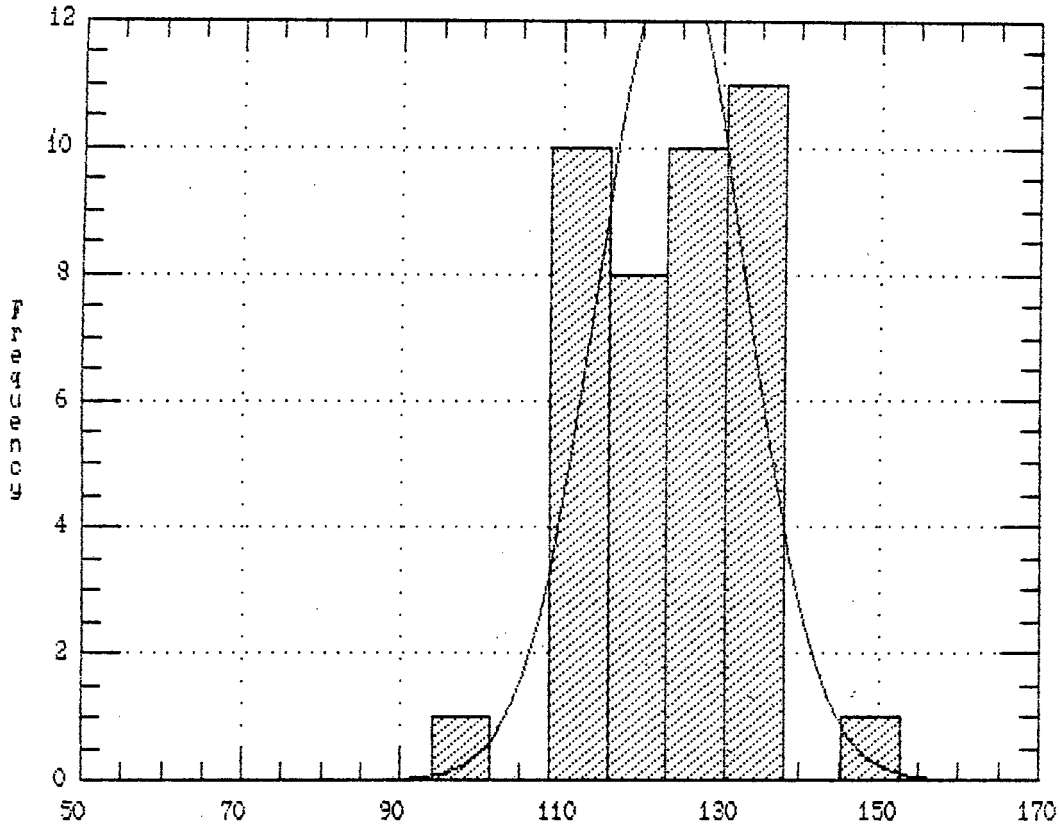


Fig 3.32: Frequency Histogram: NART -
English SAWAIS subjects

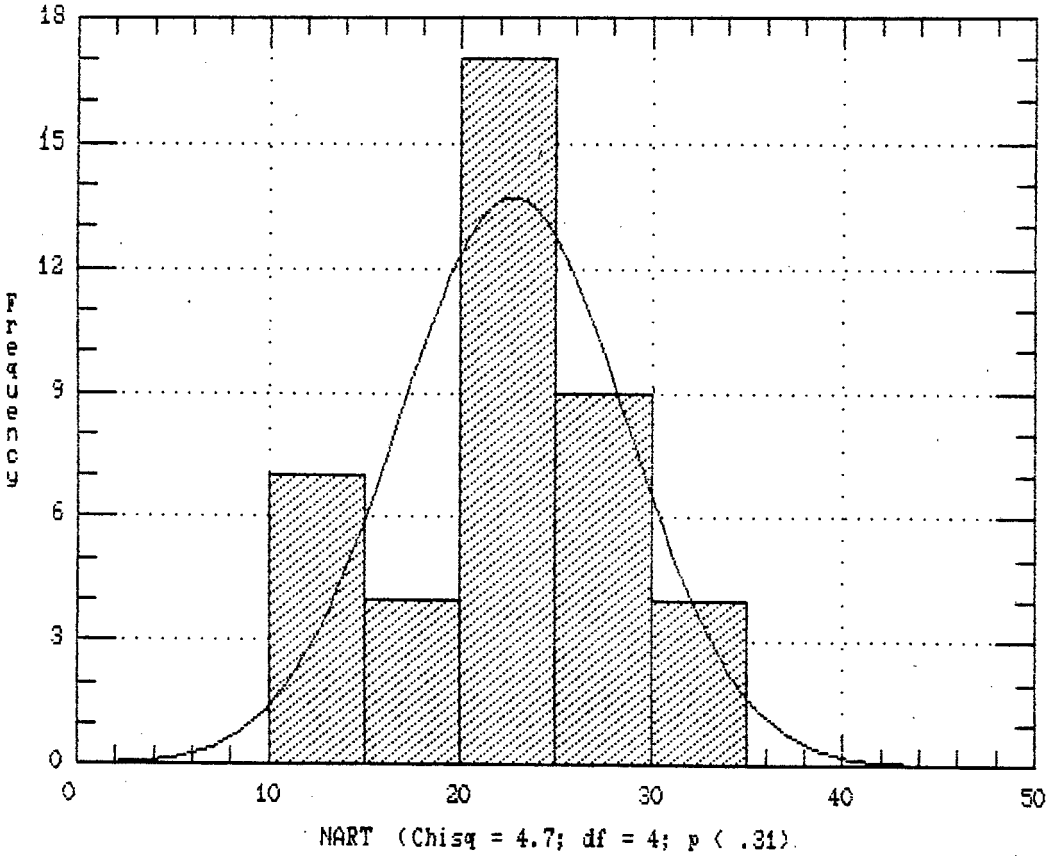


TABLE 3.13 Descriptive statistics - English SAWAIS subjects

	FSIQ	PIQ	VIQ	NART
Sample size	41	41	41	41
Average	120.07	116.24	123.90	22.73
Median	119	115	125	23
Mode	121.5	117	132	25
Geometric mean	119.79	115.67	123.57	21.88
Variance	70.01	138.13	83.49	35.65
Standard deviation	8.36	11.75	9.13	5.97
Standard error	1.30	1.83	1.42	0.93
Minimum	106	93	101	12
Maximum	146.5	143	150	33
Range	40.5	50	49	21

Table 3.14 Regression equations: English SAWAIS subjects

FSIQ = 138 - 0.78 * NART

Dependent variable: FSIQ Independent variable: NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	137.842	4.37417	31.5127	0.0001
Slope	-0.781667	0.186259	-4.19666	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	871.32027	1	871.32027	17.61192	0.0001
Error	1929.4602	39	49.4733		
Total (Corr.)	2800.7805	40			

Correlation Coefficient = -0.557763 R-squared = 31.11 percent
Stnd. Error of Est. = 7.03373

PIQ = 136 - 0.85 * NART

Dependent variable: PIQ Independent variable: NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	135.505	6.68141	20.2809	0.0001
Slope	-0.847318	0.284505	-2.97822	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	1023.8290	1	1023.8290	8.8698	0.00497
Error	4501.7319	39	115.4290		
Total (Corr.)	5525.5610	40			

Correlation Coefficient = -0.430453 R-squared = 18.53 percent
Stnd. Error of Est. = 10.7438

VIQ = 140 - 0.72 * NART

Dependent variable: VIQ Independent variable: NART ERRORS

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	140.179	5.08597	27.5618	0.0001
Slope	-0.716016	0.216569	-3.30618	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob.
Model	731.10432	1	731.10432	10.93081	0.0001
Error	2608.5054	39	66.8848		
Total (Corr.)	3339.6098	40			

Correlation Coefficient = -0.467888 R-squared = 21.89 percent
Stnd. Error of Est. = 8.17831

Fig 3.33: Regression of FSIQ on NART: English SAWAIS subjects

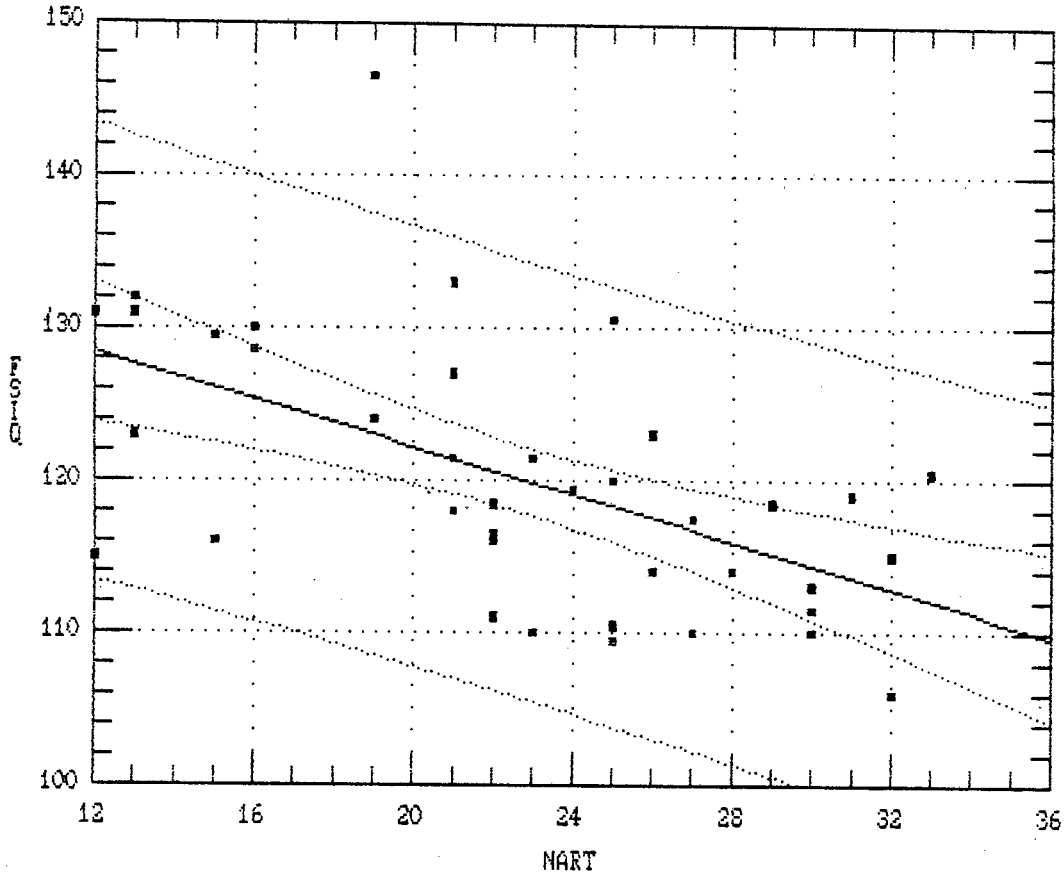


Fig 3.34: Regression of PIQ on NART: English SAWAIS subjects

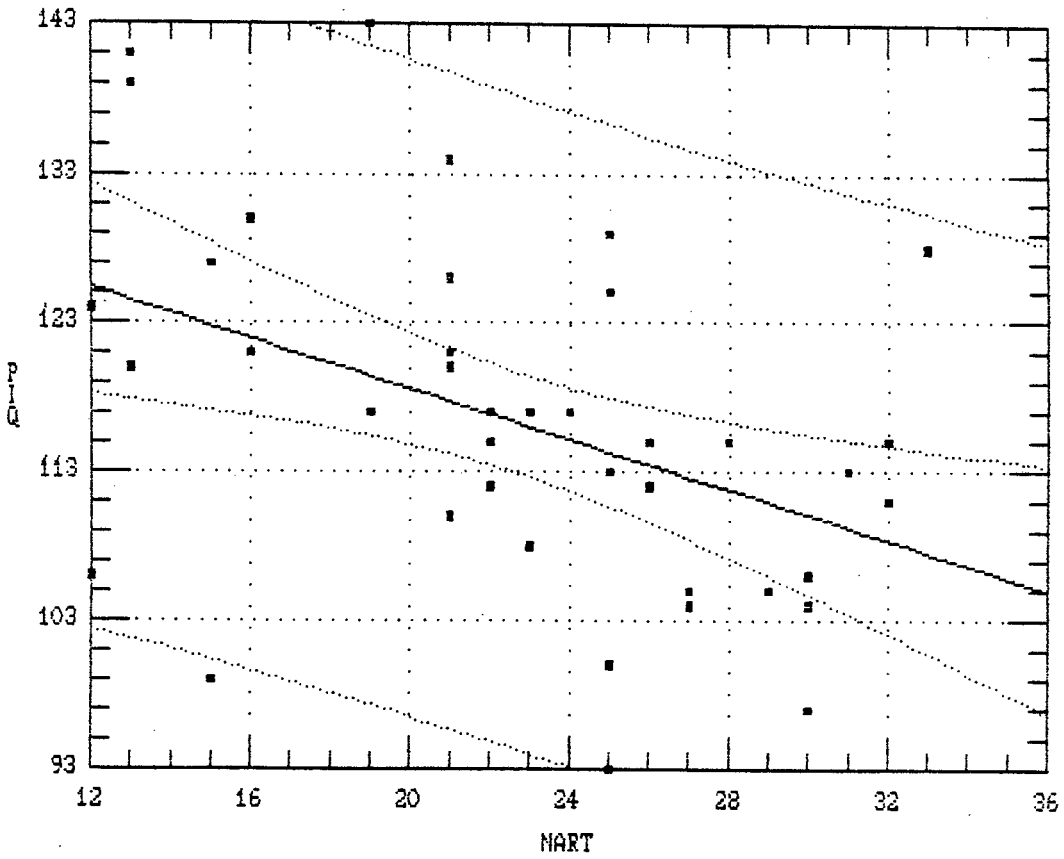


Fig 3.35: Regression of VIQ on NART: English SAWAIS subjects

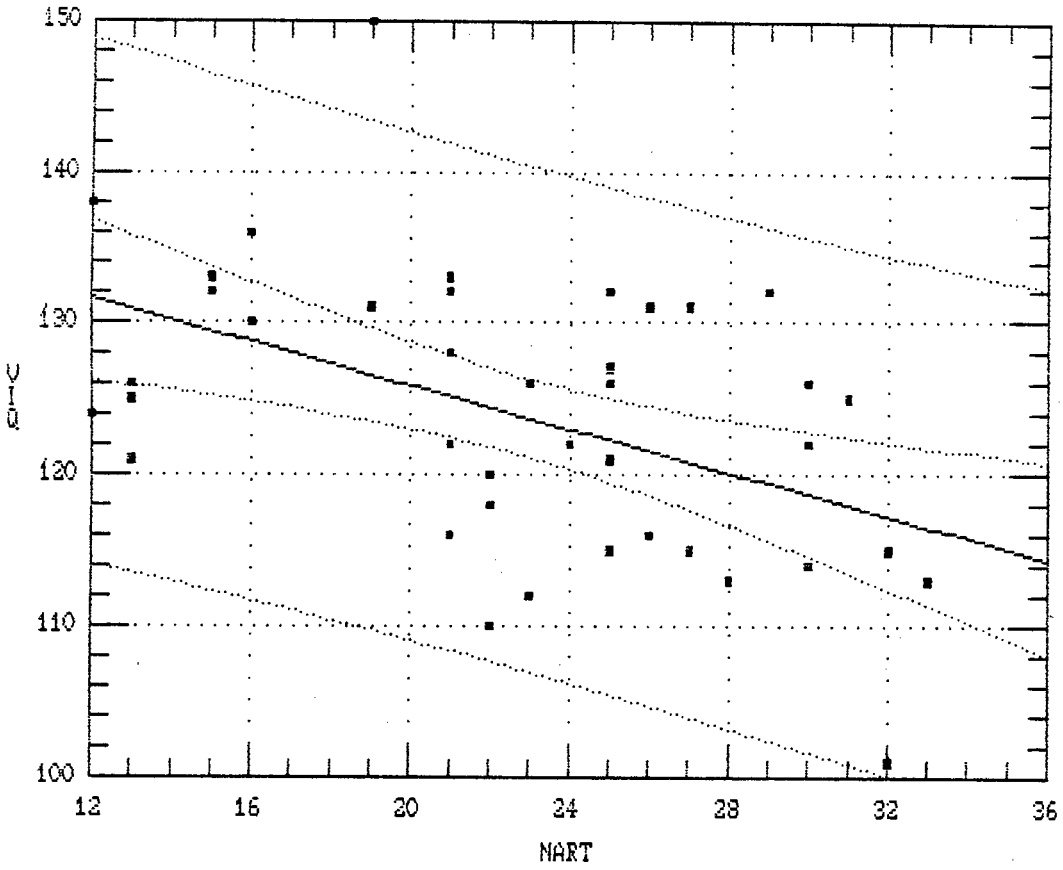


TABLE 3.15 Tests for equality of correlation coefficients - English SAWAIS subjects

	R1	R2	Z1	Z2	N1	N2	SDz	Z	P
FSIQ	-0.56	-0.74	0.633	0.962	41	120	0.19	-1.76	n.s
PIQ	-0.43	-0.57	0.46	0.648	41	120	0.19	-1.01	n.s
VIQ	-0.47	-0.77	0.51	1.02	41	120	0.19	-2.73	0.01

Correcting for the restricted range evident here using the procedure outlined in Ghiselli (1981) yields the following correlation coefficients:

FSIQ = -0.74 (as opposed to -0.55 previously)

PIQ = -0.63 (as opposed to -0.44 previously)

VIQ = -0.67 (as opposed to -0.46 previously)

Correcting for restriction in range completely eliminates differences between results here and those derived from Nelson's (1977 unpub. manuscript) study. This is most satisfactory in the light of the parallels between the two studies in the form of I.Q. measures and language usage of the subjects.

e. English sample: 27% 'most English' subjects.

From the data presented above, it is evident that performance on the NART is strongly related to subjects' 'Englishness', a not entirely unexpected result. Following Anastasi (1976) an extreme group was selected from the subjects and used to investigate the limits of the regression equation. The data for 33 subjects, constituting the top 27% of the NSAGT sample (Afrikaans and English) on the criterion measure of mean language usage were subjected to regression analysis.

The distribution of the IQ and NART variables for this subject group is contained in Figures 3.36 to 3.39. Descriptive statistics for the three variables are depicted as Table 3.16.

Three regression equations are reported, one for each of the I.Q. measures. In each case, the I.Q. measure is regressed against NART errors (the independent variable). The equations appear as Table 3.17. Regression plots are included as Figures 3.40 to 3.42.

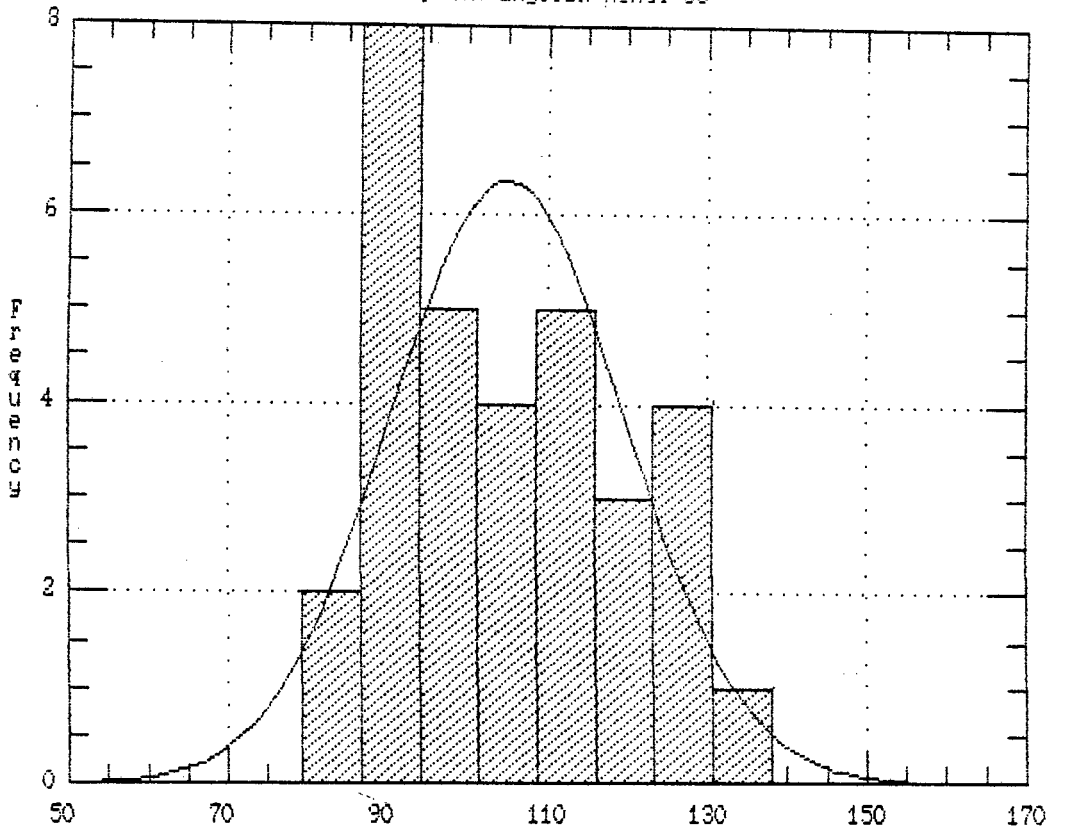
In addition, tests of equality of the correlations between coefficients observed here and those derived from Nelson's (1977 unpub. manuscript) data are reported as Table 3.18.

The tests of equality (which are two tailed inferential tests) indicate clearly that the correlation coefficients are equivalent for all three I.Q. measures. In addition, the correlation coefficients are comparable in absolute magnitude. This finding, combined with that from the UCT sample, strongly supports use of the measure with English speaking South Africans.

3.2 Conclusions from the regression analysis

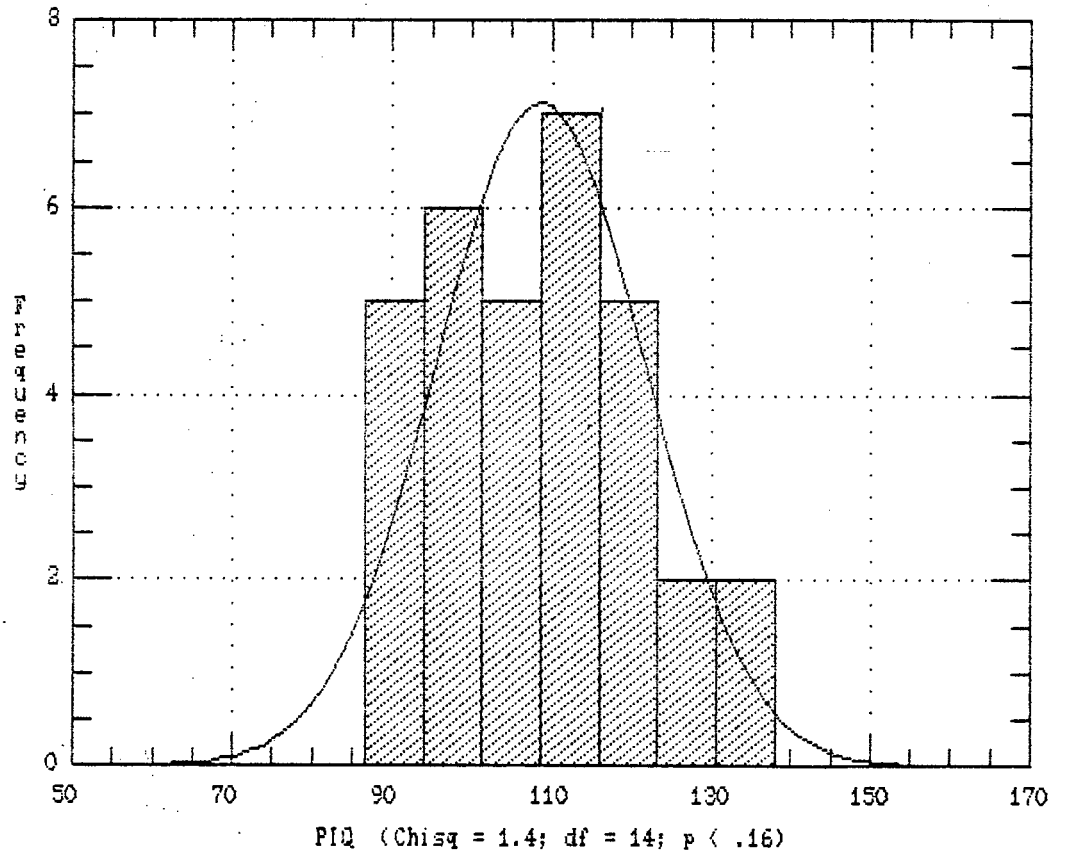
The essential fact that emerges from the above, concerns the clearly discernible relationship which exists between measures of intelligence and the ability to read irregular words in a South African sample. This is the best test of

Fig 3.36: Frequency Histogram: FSIQ -
top 27% English NSAGT SS



FSIQ (Chisq = 1.5; df = 2; p < .47)

Fig 3.37: Frequency Histogram: PIQ -
top 27% English NSAGT SS



PIQ (Chisq = 1.4; df = 14; p < .16)

Fig 3.38: Frequency Histogram: VIQ -
top 27% English NSAGT SS

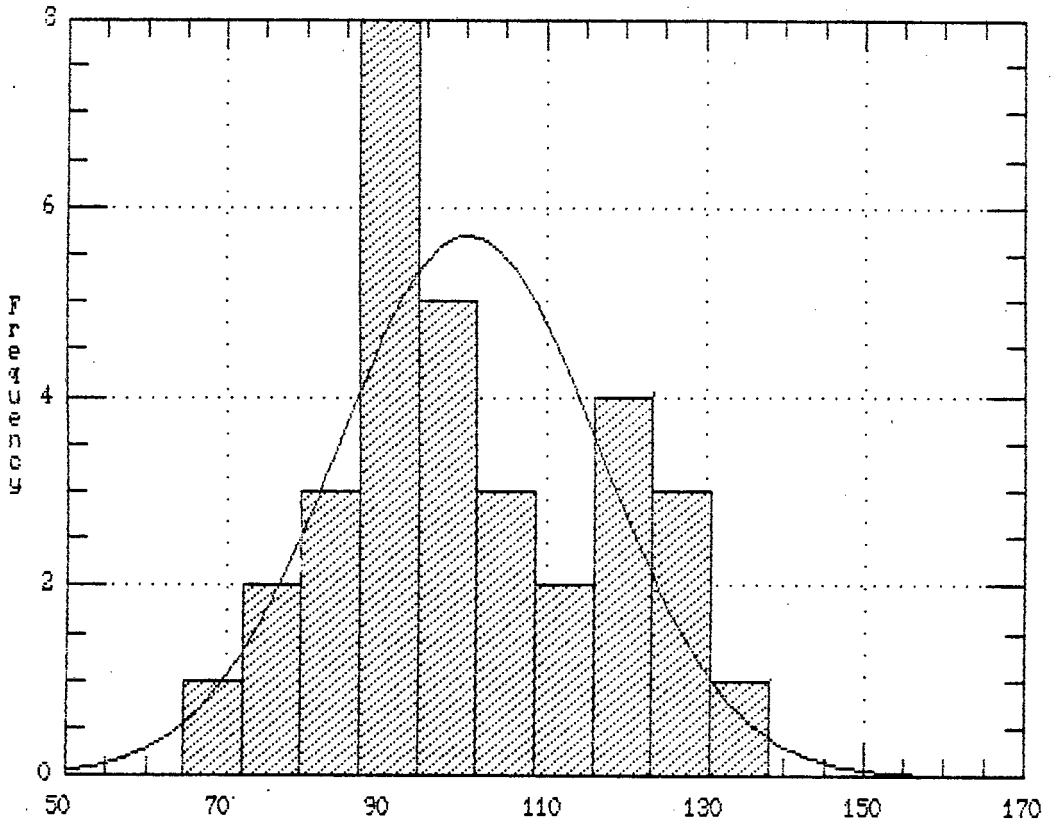


Fig 3.39: Frequency Histogram: NART -
top 27% English NSAGT SS

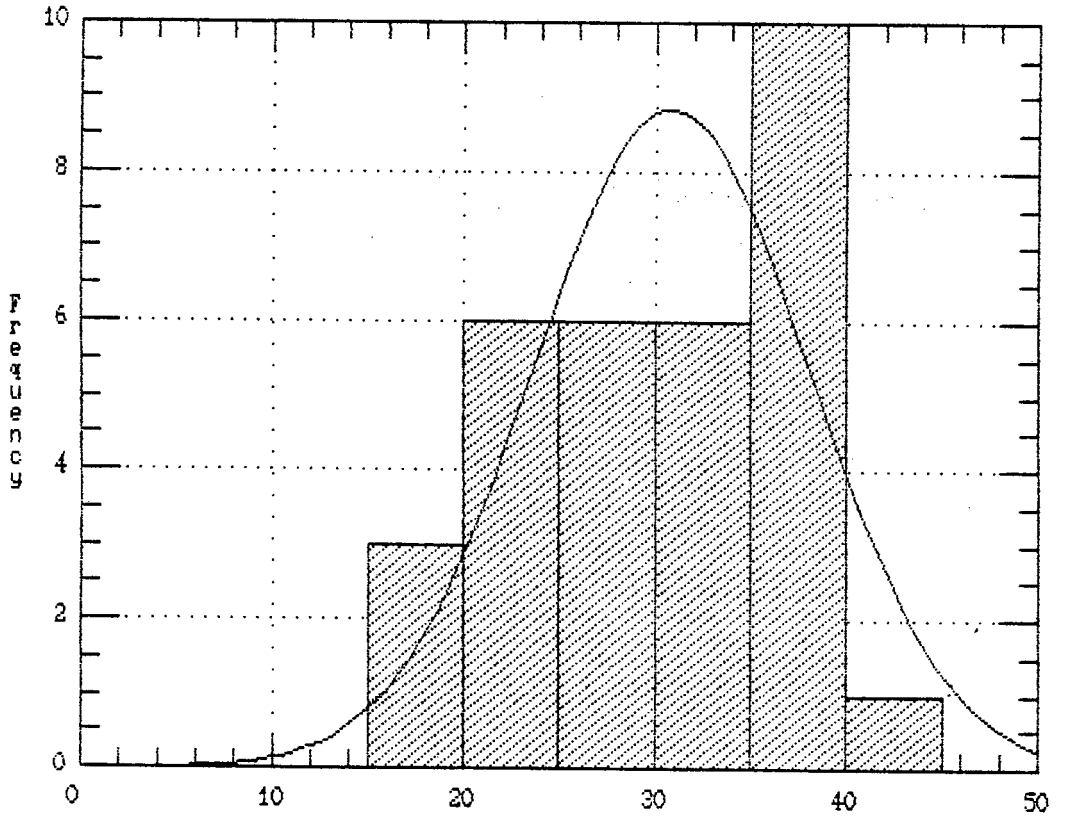


TABLE 3.16 Descriptive statistics - top 27% English NSAGT subjects

Variable:	PIQ	VIQ	FSIQ	NART
Sample size	34	34	34	34
Average	107.41	98.58	103.55	31.23
Median	107	96	101.5	31
Mode	114	84	112	38
Geometric mean	106.57	97.13	102.45	30.38
Variance	187.46	297.70	240.37	51.39
Standard deviation	13.69	17.25	15.50	7.16
Standard error	2.34	2.95	2.65	1.22
Minimum	84	70	78	17
Maximum	136	135	138	45
Range	52	65	60	28

Table 3.17 Regression equations: top 27% English subjects

FSIQ = 155 - 1.64 * NART

Dependent variable: FSIQ Independent variable: NART

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	154.874	7.96146	19.4529	0.0001
Slope	-1.64285	0.24861	-6.60815	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob. Level
Model	4577.7593	1	4577.7593	43.6676	0.0001
Error	3354.6230	32	104.8320		
Total (Corr.)	7932.3824	33			

Correlation Coefficient = -0.759669 R-squared = 57.71 percent
Stnd. Error of Est. = 10.2387

PIQ = 144 - 1.15 * NART

Dependent variable: PIQ Independent variable: NART

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	143.549	8.60185	16.6881	0.0001
Slope	-1.15693	0.268607	-4.30715	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob. Level
Model	2270.2424	1	2270.2424	18.5516	0.00015
Error	3915.9929	32	122.3748		
Total (Corr.)	6186.2353	33			

Correlation Coefficient = -0.605791 R-squared = 36.70 percent
Stnd. Error of Est. = 11.0623

VIQ = 158 - 1.91 * NART

Dependent variable: VIQ Independent variable: NART

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	158.416	8.24949	19.2031	0.0001
Slope	-1.91538	0.257604	-7.43535	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob. Level
Model	6222.4987	1	6222.4987	55.2844	0.0001
Error	3601.7366	32	112.5543		
Total (Corr.)	9824.2353	33			

Correlation Coefficient = -0.795853 R-squared = 63.34 percent
Stnd. Error of Est. = 10.6092

Fig 3.40: Regression of FSIQ on NART: English NSAGT top 27%

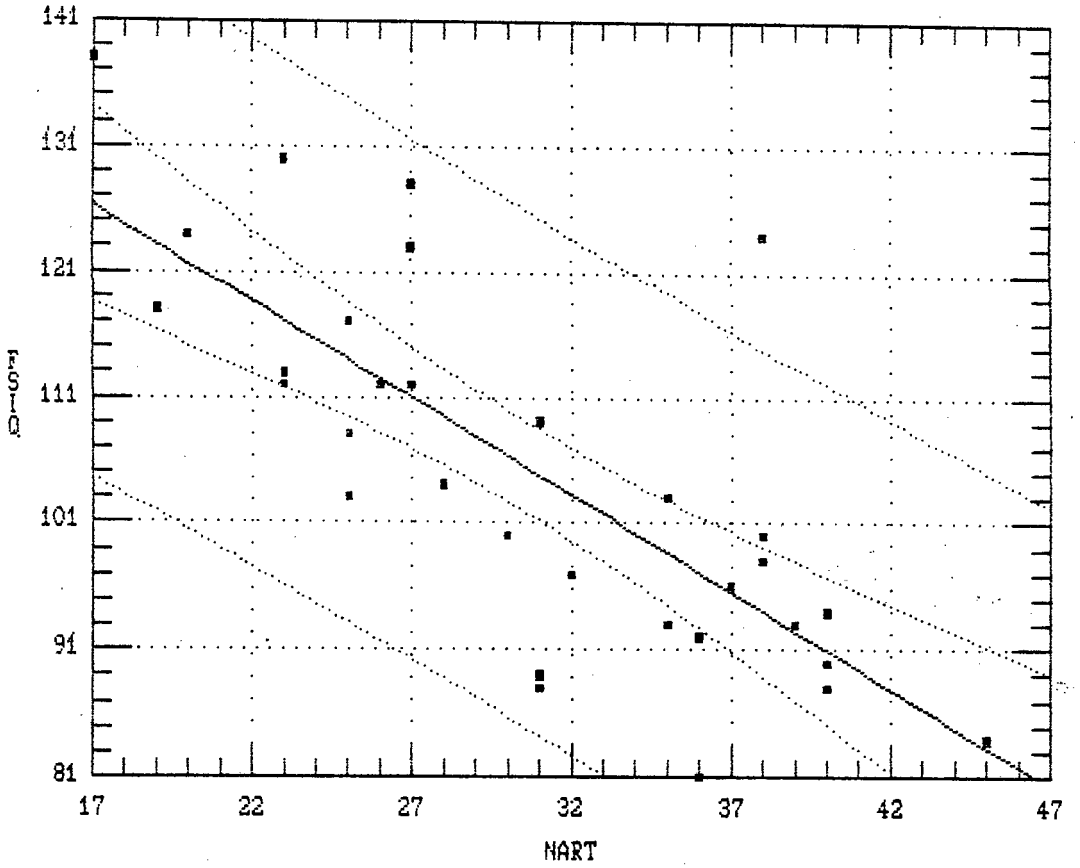


Fig 3.41: Regression of PIQ on NART: English NSAGT top 27%

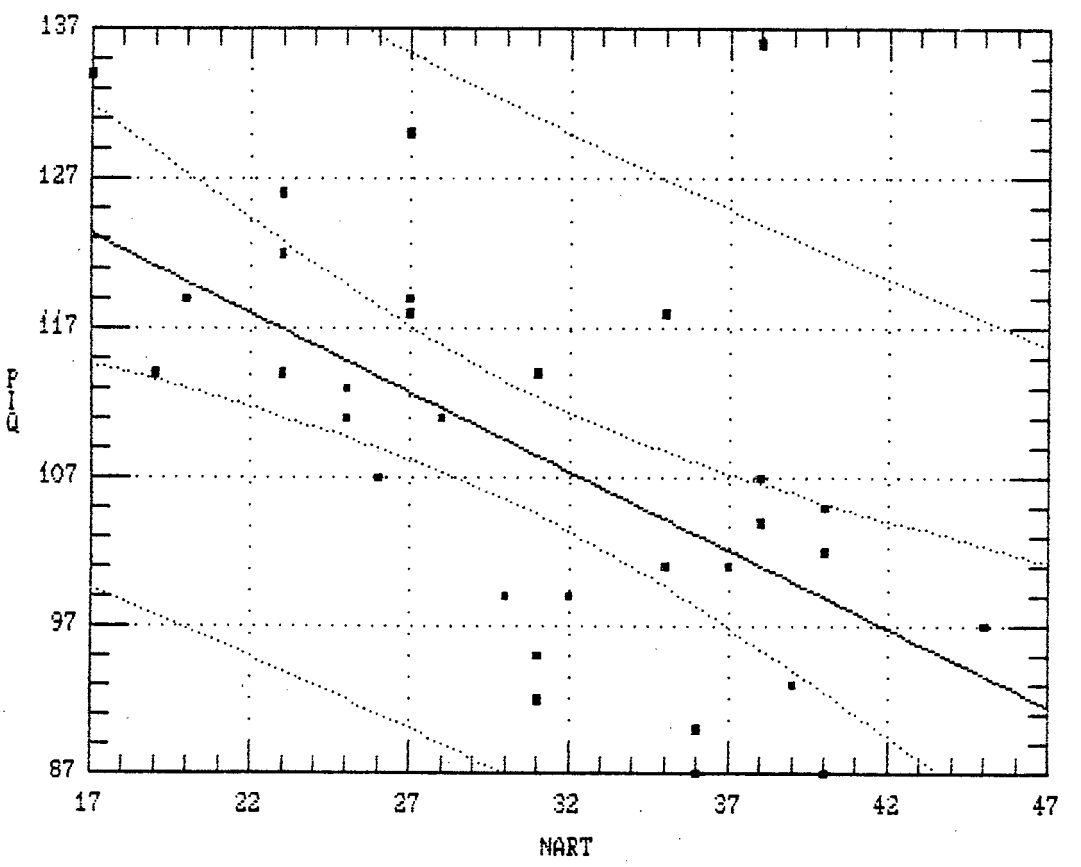


Fig 3.42: Regression of VIQ on NART: English NSAGT top 27%

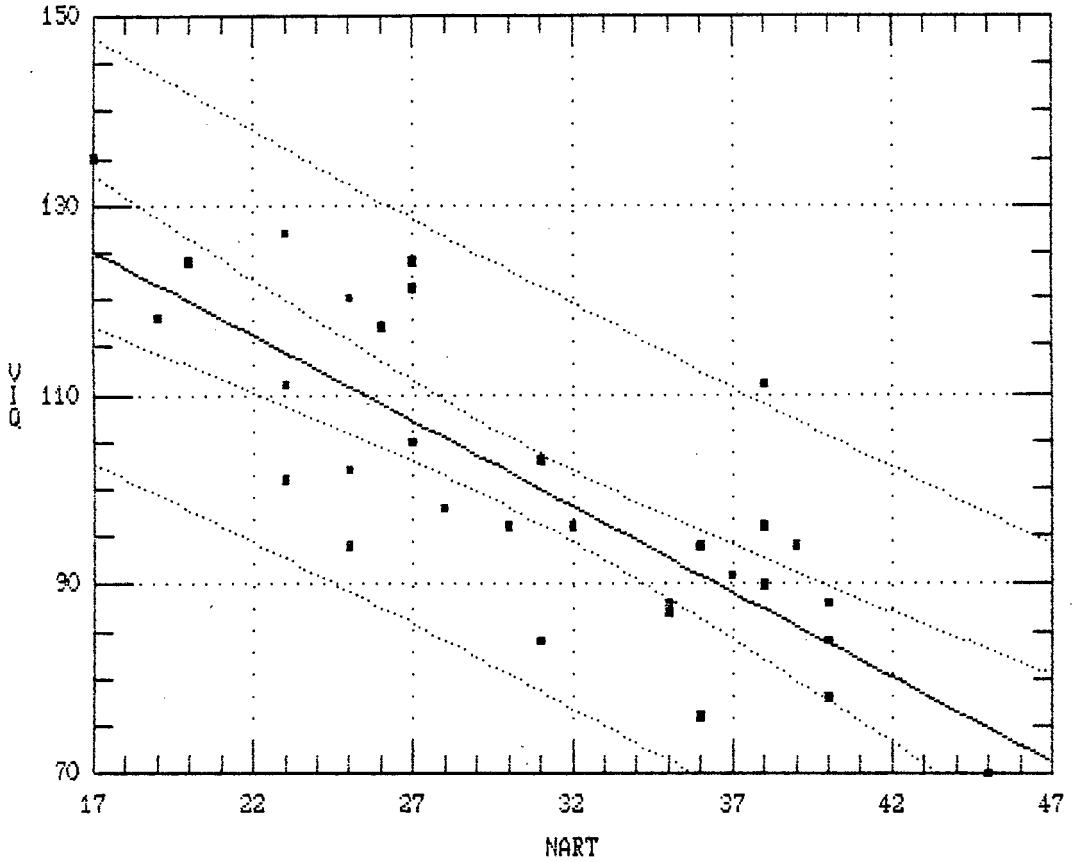


TABLE 3.18 Tests for equality of correlation coefficients - 27% 'most English' subjects

	R1	R2	Z1	Z2	N1	N2	SDz	Z	P
FSIQ	-0.76	-0.74	0.96	0.962	33	120	0.20	-0.01	n.s
PIQ	-0.61	-0.57	0.71	0.648	33	120	0.20	0.30	n.s
VIQ	-0.8	-0.77	1.1	1.02	33	120	0.20	0.39	n.s

whether this study replicates Nelson's (1977 unpub. manuscript) findings. From the above, it would appear to be quite clear that the relationship is upheld in a South African English speaking population and it's failure or Afrikaans subjects is explicable, and expected, in terms of the rationale of the test.

3.3 Test Reliability and Validity.

In addition to the empirical validity indicated by the satisfactory correlations between predictor and criterion variables reported above, a number of other measures have been computed indicating the psychometric qualities f the test. Measures available for Nelson's (1977 unpub. manuscript) data have been reported in the section 2.2 above.

Internal reliability

In estimating reliability, four basic methods are customarily used, namely test-retest, parallel forms, split half and intercorrelations between all items comprising the test. (Ghiselli, 1981). The most commonly reported statistic for internal reliability in previous studies on the NART has been split half reliability. While classical theory favours the equivalent forms and corrected split-half coefficients, (Ghiselli, 1981) the homogeneous nature of the NART is ideally suited to the use of the Kuder Richardson formula,

circumstances can be considered to be the better test of reliability. (Ghiselli, 1981, Anastasi, 1976)

The generalized formula, Coefficient Alpha, which reduces in the case of dichotomous data to Kuder Richardson Formula 21 (Ghiselli, 1981) was used for calculating the internal-consistency estimate of reliability for the NART. For the purposes of this research, Alpha was calculated using Analysis of Variance procedures (ie. (F - 1)/F) in a crossed random factors (Subjects X Items) design. (see Dixon, 1981)

Tables 3.19 to 3.28 report the Alpha coefficients for all of the various subject groupings identified and used in the regression analyses. As mentioned above, the NART, by virtue of the rationale behind it's construction is expected to be an extremely homogeneous test measuring almost exclusively one trait. This notion is supported by the substantial coefficients reported in the tables. On inspection, these coefficients also compare favourably with those obtained in various overseas studies. (see section 2.2)

Test-retest reliability

A further measure of reliability concerns the stability of a test over time. This may be computed by using the test-retest method in which the same test is administered to the same subjects at two or more different times. There are certain problems associated with this method related to various

TABLES 3.19 TO 3.28: ALPHA COEFFICIENTS FOR THE NART WITHIN SUBJECT SUB-POPULATIONS[2]

TABLE 3.19 ANALYSIS OF VARIANCE FOR ALL SUBJECTS x NART ITEMS

	SOURCE	ERROR TERM	SUM OF SQUARES	D.F.	MEAN SQUARE	F	PROB.	EXPECTED MEAN SQUARE
1	MEAN		1151.81547	1	1151.82			11700(1) + 50(2) + 234(3) + (4)
2	subjects	si	416.32453	233	1.79	13.99	0.0001	50(2) + (4)
3	items	si	644.82128	49	13.16	103.04	0.0001	234(3) + (4)
4	si		1458.03872	11417	0.13			(4)

ALPHA = 0.93

TABLE 3.20: ANALYSIS OF VARIANCE FOR ALL AFRIKAANS SUBJECTS x NART ITEMS

	SOURCE	ERROR TERM	SUM OF SQUARES	D.F.	MEAN SQUARE	F	PROB.	EXPECTED MEAN SQUARE
1	MEAN		226.20417	1	226.204			6000(1) + 50(2) + 120(3) + (4)
2	subjects	si	90.57583	119	0.761	7.17	0.0001	50(2) + (4)
3	items	si	229.03750	49	4.674	44.02	0.0001	120(3) + (4)
4	si		619.18250	5831	0.106			(4)

ALPHA = 0.86

TABLE 3.21 ANALYSIS OF VARIANCE FOR ALL ENGLISH SUBJECTS x NART ITEMS

	SOURCE	ERROR TERM	SUM OF SQUARES	D.F.	MEAN SQUARE	F	PROB.	EXPECTED MEAN SQUARE
1	MEAN		1101.76070	1	1101.76			5700(1) + 50(2) + 114(3) + (4)
2	subjects	si	149.59930	113	1.32	10.03	0.0001	50(2) + (4)
3	items	si	524.02877	49	10.69	81.05	0.0001	114(3) + (4)
4	si		730.61123	5537	0.13			(4)

ALPHA = 0.90

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2. Note: the alpha coefficients are computed in this thesis by analysis of variance procedures. Hence the lengthy tables.

TABLE 3.22 ANALYSIS OF VARIANCE FOR NSAGT (AFRIKAANS AND ENGLISH) SUBJECTS x NART ITEMS

	SOURCE	ERROR TERM	SUM OF SQUARES	D.F.	MEAN SQUARE	F	PROB.	EXPECTED MEAN SQUARE
1	MEAN		443.47835	1	443.48			6050(1) + 50(2) + 121(3) + (4)
2	subjects	si	135.24165	120	1.13	9.01	0.0001	50(2) + (4)
3	items	si	323.95967	49	6.61	52.87	0.0001	121(3) + (4)
4	si		735.32033	5880	0.13			(4)

ALPHA = 0.89

TABLE 3.23 ANALYSIS OF VARIANCE FOR NSAGT (AFRIKAANS) SUBJECTS x NART ITEMS

	SOURCE	ERROR TERM	SUM OF SQUARES	D.F.	MEAN SQUARE	F	PROB.	EXPECTED MEAN SQUARE
1	MEAN		125.73164	1	125.732			3350(1) + 50(2) + 67(3) + (4)
2	subjects	si	37.12836	66	0.563	5.26	0.0001	50(2) + (4)
3	items	si	140.52209	49	2.868	26.83	0.0001	67(3) + (4)
4	si		345.61791	3234	0.107			(4)

ALPHA = 0.81

TABLE 3.24 ANALYSIS OF VARIANCE FOR NSAGT (ENGLISH) SUBJECTS x NART ITEMS

	SOURCE	ERROR TERM	SUM OF SQUARES	D.F.	MEAN SQUARE	F	PROB.	EXPECTED MEAN SQUARE
1	MEAN		362.26704	1	362.267			2700(1) + 50(2) + 54(3) + (4)
2	subjects	si	53.59296	53	1.011	7.69	0.0001	50(2) + (4)
3	items	si	231.52926	49	4.725	35.92	0.0001	54(3) + (4)
4	si		341.61074	2597	0.132			(4)

ALPHA = 0.87

TABLE 3.25 ANALYSIS OF VARIANCE FOR ARMY (ENGLISH AND AFRIKAANS) SUBJECTS x NART ITEMS

	SOURCE	ERROR TERM	SUM OF SQUARES	D.F.	MEAN SQUARE	F	PROB.	EXPECTED MEAN SQUARE
1	MEAN		232.56250	1	232.56			3600(1) + 50(2) + 72(3) + (4)
2	subjects	si	118.61750	71	1.67	14.48	0.0001	50(2) + (4)
3	items	si	162.47917	49	3.32	28.74	0.0001	72(3) + (4)
4	si		401.34083	3479	0.12			(4)

ALPHA = 0.93

TABLE 3.26 ANALYSIS OF VARIANCE FOR ARMY (AFRIKAANS) SUBJECTS x NART ITEMS

	SOURCE	ERROR TERM	SUM OF SQUARES	D.F.	MEAN SQUARE	F	PROB.	EXPECTED MEAN SQUARE
1	MEAN		78.854400	1	78.854			2500(1) + 50(2) + 50(3) + (4)
2	subjects	si	40.225600	49	0.821	8.37	0.0001	50(2) + (4)
3	items	si	89.305600	49	1.823	18.57	0.0001	50(3) + (4)
4	si		235.614400	2401	0.098			(4)

ALPHA = 0.88

TABLE 3.27 ANALYSIS OF VARIANCE FOR ARMY (ENGLISH) SUBJECTS x NART ITEMS

	SOURCE	ERROR TERM	SUM OF SQUARES	D.F.	MEAN SQUARE	F	PROB.	EXPECTED MEAN SQUARE
1	MEAN		201.67364	1	201.674			1100(1) + 50(2) + 22(3) + (4)
2	subjects	si	30.42636	21	1.449	11.14	0.0001	50(2) + (4)
3	items	si	105.09909	49	2.145	16.50	0.0001	22(3) + (4)
4	si		133.80091	1029	0.130			(4)

ALPHA = 0.91

TABLE 3.28 ANALYSIS OF VARIANCE FOR SAWAIS SUBJECTS x NART ITEMS

	SOURCE	ERROR TERM	SUM OF SQUARES	D.F.	MEAN SQUARE	F	PROB.	EXPECTED MEAN SQUARE
1	MEAN		609.71902	1	609.719			2050(1) + 50(2) + 41(3) + (4)
2	subjects	si	28.52098	40	0.713	5.55	0.0001	50(2) + (4)
3	items	si	228.13463	49	4.656	36.27	0.0001	41(3) + (4)
4	si		251.62537	1960	0.128			(4)

ALPHA = 0.82

factors, some of them resulting in systematic improvements in test score from one session to the next. The most important of these are related to practice effects, but may also involve variables such as subjects 'swotting up', or at least enquiring about, the test material between administrations. Due to subjects curiosity regarding the unusual nature of the words comprising the NART this is a particular problem here. While attempts to control for the effects of memory carry-over may make it desirable to hold separate administrations of the test as far apart as possible, this will also increase the likelihood of a subject's true score on the test changing from one administration to another. While intervening variables may serve to reduce the correlation between different administrations of a test, memory effects may serve to inflate it by introducing spurious 'stability' as a result for example of perseveration or a desire to be consistent.

As far as this author can ascertain, there is no U.K. data available concerning the formal test-retest reliability of the NART. (see however O'Carroll et al., in press, discussed in section 2.2). Partly as a result of the above reservations, but mainly as a result of practical considerations, test-retest was not investigated in this study. Data are however available for a South African sample, and Hesse (1987), in an unpublished undergraduate research project, reports a test-retest reliability coefficient of

0.91. This coefficient is clearly satisfactory, and combined with the internal consistency data reported for this study results in the conclusion that the NART is a sufficiently reliable instrument.

Validity

The measure of choice in terms of validity, empirical or criterion-related validity, relates to the extent to which an instrument is able to predict a suitable criterion. (Roscoe, 1969) Problems are often associated with finding a suitable criterion measure, but this does not apply to the current research. In terms of the rationale of the study the criterion is performance on a particular measure of intellectual functioning, and in this light if is obvious that the NART performs satisfactorily.

As mentioned in section 2.9 an additional measure of IQ, the Mental Alertness Scale (MA) (NIPR, 1975), was administered to the Navy sample subjects and forms a further I.Q. based validity index relating ability to pronounce irregular words to FSIQ as measured on specified measures of intelligence. Evidence has been presented above regarding the strong relationship between pronunciation ability and two different indices of intelligence, the SAWAIS and the NSAGT. These findings are supported by the significant correlations ($p < 0.0001$) between NART, NSAGT and MA depicted in matrix form in

findings are supported by the significant correlations ($p < 0.0001$) between NART, NSAGT and MA depicted in matrix form in Tables 3.29(i) and 3.29(ii). (Due to an administrative problem, data for MA on one subject is missing. The correlation procedure in Statgraphics (STSC, 1986) has therefore automatically excluded the case, hence N=120 in Table 3,29(i).)

Cross Validation

Since the chief aim of this study is determining the usefulness of the NART Nelson (1977 unpub. manuscript) under South African conditions, a useful step would seem to be the cross validation of the formulae arrived at in the U.K. using a local sample. Ghiselli (1981) makes the point that the validity of a test can be best assessed by using it to generate data for a group other than the one on which it was developed, a 'holdout' group, and then testing predicted against observed values. This is a very stringent test in this case, because it assumes that subjects in the South African sample and the U.K. sample come from the same population. Cross-validational indices will usually be lower in the holdout group than the original sample, and it is to be expected that this tendency will be exaggerated here.

Using the 54 English Navy subjects, predictions were derived using Nelson's formula for FSIQ. This set of predictions

TABLE 3.29(i) NART, FSIQs' correlation matrix: all NSAGT subjects

	MA	NART	FSIQ
MA	1.0000	-.5899	.8440
	N = 120	N = 120	N = 120
	p < 0.0001	p < 0.0001	p < 0.0001
NART	-.5899	1.0000	-.5931
	N = 120	N = 120	N = 120
	p < 0.0001	p < 0.0001	p < 0.0001
FSIQ	.8440	-.5931	1.0000
	N = 120	N = 120	N = 120
	p < 0.0001	p < 0.0001	p < 0.0001

MA = mental alertness scale.

TABLE 3.29(ii) NART, FSIQs' correlation matrix: English NSAGT subjects

	MA	NART	FSIQ
MA	1.0000	-.6499	.8265
	N = 54	N = 54	N = 54
	p < 0.0001	p < 0.0001	p < 0.0001
NART	-.6499	1.0000	-.6412
	N = 54	N = 54	N = 54
	p < 0.0001	p < 0.0001	p < 0.0001
FSIQ	.8265	-.6412	1.0000
	N = 54	N = 54	N = 54
	p < 0.0001	p < 0.0001	p < 0.0001

MA = mental alertness scale.

method for testing this data, and in order to further test the accuracy of the prediction, the Chi-squared goodness-of-fit test was utilised. Despite the high correlation reported, the regression equation would not appear to working as well as it might. This is evident from inspection of Table 3.31 which reports the Chisq. statistic. These results indicate that the failure of the model is due in large part to its inability to predict low and high parts of the range. Barona et al. (1984) note that regression "artificially lowers or raises the estimated scores for individual cases falling outside one standard deviation of the population mean." (p.887)

The use of linear regression in the prediction of IQ from the NART score is predicated on the notion that as IQ increases so will the ability to pronounce irregular words, and that this will occur in a linear fashion. Assuming normality, (an assumption supported by the distribution tests reported for this sample in the current research) it is expected that each subject will occupy the same **relative** position on the two distributions. This may be represented in the form of Z scores, assuming that the relationship between the two variables holds. On this basis a new set of predictions were derived in the following manner: transform all NART scores into Z scores; convert this Z score into an IQ score by substituting the IQ mean and standard deviation. In this way one is effectively placing the subject in the same relative

position on the IQ distribution as he occupies on the NART distribution. Correlation of z-predicted IQ scores with observed scores results in the same correlation coefficient as in the case of Nelson's formula ($r = 0.64$; $df = 53$; $p < 0.01$). but results a radically reduced (but unfortunately still significant) Goodness of Fit statistic. (see Table 3.30)(i) In addition, a T-test for differences between z-predicted and observed I.Q. shows that there is no difference between the two means in the sets of scores. The advantage of the new method is that it does not, in the manner of linear prediction, artifactually squeeze the predictions into a narrow band about the mean.

3.4. Item Characteristics

In addition to investigating the general reliability and validity of the NART, the characteristics of individual items needs to be examined in the light of intuitive impressions, some of which were expressed earlier. These include the issue of validity arising out of the possibility of regular pronunciations for items, the issue of stimulus complexity, and questions related to the overall difficulty of the items.

Some aspects of the face validity of the test are poor for certain items. Concerns include regular pronunciation, eg. labile may be derived by regular grapheme - phoneme correspondences and the issue of stimulus complexity.

TABLE 3.30(i) Chi-Square Goodness-of-Fit Test: predicted and observed FSIQ

IQ RANGE	Observed Frequency	Expected Frequency	Chi-Square
85-	8	10.0	.400
95	12	9.0	1.000
105	13	11.0	.364
115	9	3.0	12.000
125+	12	21.0	3.857

Chi-square = 17.6208 with 4 d.f.
Sig. level = 0.001

TABLE 3.31 Chi-Square Goodness-of-Fit Test: predicted and observed FSIQ

IQ RANGE	Observed Frequency	Expected Frequency	Chi-Square
85-	10	2.0	32.00
95	13	19.0	1.89
105	10	19.0	4.26
115	9	13.0	1.23
125+	12	1.0	121.00

Chi-square = 160.389 with 4 d.f.
Sig. level = 0.0001

TABLE 3.30(ii) T-test for difference between means: predicted and observed FSIQ - Z score method

	FSIQ	Predicted FSIQ	Pooled
Average	104.111	104.068	104.089
Std. Deviation	15.5025	15.523	15.5127

T statistic = 0.014
Sig. Level = 0.988

with promise for future research, both in terms of the items constituting the present NART and in terms of the selection of new items in the future. It should be noted that while it is acknowledged that word-length may be a relatively crude indicator of stimulus complexity, its use here was predicated by (i) Nelson's (1977 unpub. manuscript; 1982) reference to word length, and (ii) the confounding effect of variable syllabic complexity on the use of number of syllables as an indicator of stimulus complexity.

Spelling - sound regularity: That certain words do not exhibit irregular grapheme-phoneme correspondences has been mentioned above and is dealt with in greater detail in section 2.3. Labile and radix both suffer from this shortcoming, and their lack of face validity is supported by their poor performance in terms of reliability. Their correlations of -0.14 and -0.17 with NART errors do not achieve significance at the 5% level, (the only other item to achieve this distinction being campanile) and on the basis of this measure, assuming homogeneity in the trait being measured, they are the worst and third worst items in the test. (see table 3.33) The notion that they may be ' good' items in that they are measuring some aspect of the criterion not tapped by other items is dispelled by their relatively poor performance in terms of criterion validity. (see table 3.34)

the unstandardised nature of the multiple choice meanings questionnaire utilised, and (ii) the fact that pronunciation tests expressive language while a meanings evaluation effectively tests receptive language. It is not unreasonable to speculate that these last may differ for sectors of the population in a society where exposure to written English through the print media and exposure to set-works at school may considerably exceed exposure to spoken English.

3.5 Item Analysis

Two types of item analysis were employed in the study.

Discriminability index: This was calculated for each item by determining the proportion (the so called 'Q' index (Anastasi (1976)) of subjects in the sample (the entire English speaking sample in this case) who pronounced the word constituting the item correctly. Discriminability indices are reported for each NART item in Table 3.32(ii)

There is little to say about relative discriminability here as the construction of the test does not call for high intra-item discrimability per se. It is clear that some words are meant to identify lower performance subjects, some only very highly performing subjects. The test is in fact supposed to progress from least to most difficult items, and there would appear to be relatively few causes for concern in this regard. The anomalous position of labile has been dealt with above. 'Capon' (Q-rank 7, word list position 42)

in this regard. The anomalous position of labile has been dealt with above. 'Capon' (Q-rank 7, word list position 42) would appear to suffer a different problem i.e. it's relative rarity in SAE. Probably comparable in the U.K. to the ubiquitous 'boerewors' in terms of occurrence frequency, it suffers the same fate in South Africa which boerewors may be expected to suffer in the U.K. Comment should be made on the number of low proportions, although this is consistent with other evidence indicating that the test is very difficult for this sample.

Internal consistency: Table 3.33 shows the correlation of each item with the total score on the NART (a table of inter-item correlations can be found in appendices D and F at the end of the thesis), indicating the relative homogeneity of the items. Inspection of the data indicates little cause for concern as most items correlate highly with the total test score. While the phenomenon being measure here is probably fairly homogeneous, there is a inevitably a trade-off between items which are internally consistent and those which contribute to the overall empirical validity of the test. (Anastasi, 1976)

Criterion validity: Each item was further investigated by correlating it with FSIQ as a test of item validity. The item-criterion correlations appear as Table 3.34, sorted in increasing magnitude. Very few of the items have low

values may be of less use than ranking of items. 'Bad' items on this measure will be further discussed below.

3.6 Modifying the NART by substituting new items.

As a result of difficulties with particular test items, an attempt was made to improve the test by substituting words from the list of potential new items identified by the author (see 2.4 above) for some apparently underperforming existing items. Correlations with NART total score (a measure of their homogeneity with other NART items) are reported, as are correlations with FSIQ (NSAGT). These all appear as Table 3.35. The items (words) in the table are sorted in order of their correlation with FSIQ, and inspection reveals that many of the words are highly correlated with FSIQ, and that most correlate highly with NART total score, indicating that they are homogeneous with the NART test items. Replacement of the apparently 'poor' NART items identified in the previous section with some of these is complicated by intercorrelations with existing items resulting in the new item having nothing further to add to the existing test. Selection of items using multiple regression techniques is also fraught with problems due to the effects of excessive sampling fluctuation of the interitem correlations on the regression weights. Anastasi (1976) considers this technique, however intuitively

appealing, to be theoretically indefensible "unless extremely large samples are used." (p.216)

Selection of items by simultaneously considering their homogeneity and criterion related validity (Anastasi, 1976; Ghiselli et al., 1981), selecting those with high validity and low homogeneity, appears to be an elegant solution to the problem and was attempted in this study, unfortunately without success. Table 3.36 reports the results of a correlational analysis in which a revised version of the NART was created, and correlated against FSIQ (NSAGT). (This correlation was post-hoc: since data for pronunciation of all words (old and new) and FSIQ existed within the NSAGT (Navy) subpopulation, the NART score was simply reconstituted and correlated with FSIQ.) Tables 3.36 and 3.37 report the results of regression analyses using the revised version of the NART, but both analyses, one for all NSAGT subjects, and one for English NSAGT subjects, reveal correlation coefficients significantly lower than those derived from Nelson's data. (1977 unpub. manuscript) (See Table 3.38) (The second inferential test of this assertion is omitted from the table, seeing that the first test achieves significance and that the data for the second comparison involves an even lower correlation coefficient).

While much work remains to be done in the area, this technique, as applied here appears to yield somewhat equivocal results.

TABLE 3.32(i) Comparing pronunciation with meaning

	Entire sample		English sample	
	Pronunciation	Meaning	Pronunciation	Meaning
Mean	35.9	30.28	31.21	28.1
S.D.	7.60	7.17	6.98	6.99
T	-4.81		-2.09	
df	173		88	
prob	0.001		0.04	

ALL ENGLISH SUBJECTS: RELIABILITY AND VALIDITY: SORTINGS

N = 95

Table 3.32(ii) Item analysis data - items sorted by proportion correct

	PIQ	VIQ	FSIQ	NART	Q
PIQ	1.0000				
VIQ	0.6331	1.0000			
FSIQ	0.8673	0.9313	1.0000		
NART	-0.5089	-0.7720	-0.7234	1.0000	
prelate	0.0119	0.1208	0.0769	-0.2833	0.0211
syncope	-0.0098	0.0385	0.0138	-0.1816	0.0211
campanil	0.0769	0.1521	0.1303	-0.1446	0.0211
drachm	-0.0838	-0.1047	-0.1053	0.1171	0.0421
gauche	0.0274	0.2277	0.1505	-0.2725	0.0632
beatify	-0.1293	0.0797	-0.0158	-0.2179	0.0632
idyll	0.0466	0.1289	0.1025	-0.1816	0.0737
puerpera	0.3355	0.2603	0.3267	-0.3391	0.0737
capon	-0.0735	-0.0622	-0.0620	0.0977	0.0842
demesne	0.2599	0.2822	0.2971	-0.3517	0.0842
aver	0.1900	0.2184	0.2230	-0.3123	0.1053
banal	-0.0418	-0.1441	-0.1197	0.1205	0.1263
leviatha	0.2228	0.2742	0.2771	-0.3750	0.1263
sidereal	0.2360	0.1677	0.2006	-0.2771	0.1684
detente	0.2049	0.2748	0.2681	-0.3778	0.2316
quadrupe	0.1856	0.2974	0.2817	-0.4738	0.2421
cellist	0.4481	0.4621	0.4959	-0.6162	0.2526
topiary	0.2434	0.3782	0.3563	-0.3524	0.2737
aeon	0.4345	0.3980	0.4568	-0.5386	0.2947
zealot	0.2699	0.3175	0.3249	-0.5327	0.3053
abstemio	0.0985	0.1698	0.1447	-0.3902	0.3158

equivoca	0.3521	0.4541	0.4526	-0.5772	0.3684
gaoled	0.3037	0.4961	0.4614	-0.6172	0.3789
labile	0.0664	0.0577	0.0560	-0.1411	0.3789
catacomb	0.3869	0.4248	0.4475	-0.4366	0.3895
facade	0.3247	0.5194	0.4789	-0.6707	0.3895
superflu	0.3124	0.3633	0.3711	-0.6798	0.4316
thyme	0.3404	0.5642	0.5193	-0.6259	0.4632
assignat	0.1874	0.2997	0.2720	-0.4237	0.4947
placebo	0.1860	0.3902	0.3305	-0.4631	0.5053
hiatus	0.1831	0.3762	0.3264	-0.4973	0.5158
courteou	0.3595	0.3122	0.3548	-0.4236	0.5895
gist	0.2851	0.4266	0.3945	-0.4371	0.5895
gouge	0.2927	0.2905	0.3248	-0.4345	0.6105
radix	0.0269	0.2632	0.1879	-0.1713	0.6316
rarefy	0.2617	0.4796	0.4348	-0.5301	0.6632
heir	0.3469	0.5571	0.5126	-0.6074	0.6737
procreat	0.1981	0.2793	0.2709	-0.4485	0.7263
depot	0.1678	0.4119	0.3371	-0.5691	0.7474
debt	0.2648	0.4342	0.4004	-0.5458	0.7579
subtle	0.2064	0.4961	0.4081	-0.6323	0.7684
nausea	0.2807	0.5089	0.4557	-0.6031	0.8421
bouquet	0.1557	0.4415	0.3492	-0.5150	0.8632
deny	0.2485	0.3989	0.3675	-0.3798	0.8632
aisle	0.1355	0.3405	0.2771	-0.3842	0.8737
naive	0.0728	0.2171	0.1764	-0.3815	0.8842
psalm	0.2663	0.4086	0.3814	-0.4533	0.8947
ache	0.0993	0.3288	0.2547	-0.3749	0.9579
simile	0.0954	0.1299	0.1262	-0.2096	0.9579
chord	0.1399	0.2280	0.2048	-0.2437	0.9789

Table 3.33 Item analysis data - items sorted by magnitude of correlations with NART errors

	PIQ	VIQ	FSIQ	NART	Q	
PIQ	1.0000					
VIQ	0.6331	1.0000				
FSIQ	0.8673	0.9313	1.0000			
NART	-0.5089	-0.7720	-0.7234	1.0000		
labile	0.0664	0.0577	0.0560	-0.1411	0.3789	
campanil	0.0769	0.1521	0.1303	-0.1446	0.021	
radix	0.0269	0.2632	0.1879	-0.1713	0.6316	
---	---	---	---	---	---	p < 0.05
idyll	0.0466	0.1289	0.1025	-0.1816	0.0737	
syncope	-0.0098	0.0385	0.0138	-0.1816	0.0211	
simile	0.0954	0.1299	0.1262	-0.2096	0.9579	
beatify	-0.1293	0.0797	-0.0158	-0.2179	0.0632	
chord	0.1399	0.2280	0.2048	-0.2437	0.9789	
---	---	---	---	---	---	p < 0.01
gauche	0.0274	0.2277	0.1505	-0.2725	0.0632	
sidereal	0.2360	0.1677	0.2006	-0.2771	0.1684	
prelate	0.0119	0.1208	0.0769	-0.2833	0.0211	
aver	0.1900	0.2184	0.2230	-0.3123	0.1053	
puerpera	0.3355	0.2603	0.3267	-0.3391	0.0737	
demesne	0.2599	0.2822	0.2971	-0.3517	0.0842	
topiary	0.2434	0.3782	0.3563	-0.3524	0.2737	
ache	0.0993	0.3288	0.2547	-0.3749	0.9579	

leviatha	0.2228	0.2742	0.2771	-0.3750	0.1263
detente	0.2049	0.2748	0.2681	-0.3778	0.2316
deny	0.2485	0.3989	0.3675	-0.3798	0.8632
naive	0.0728	0.2171	0.1764	-0.3815	0.8842
aisle	0.1355	0.3405	0.2771	-0.3842	0.8737
abstemio	0.0985	0.1698	0.1447	-0.3902	0.3158
courteou	0.3595	0.3122	0.3548	-0.4236	0.5895
assignat	0.1874	0.2997	0.2720	-0.4237	0.4947
gouge	0.2927	0.2905	0.3248	-0.4345	0.6105
catacomb	0.3869	0.4248	0.4475	-0.4366	0.3895
gist	0.2851	0.4266	0.3945	-0.4371	0.5895
procreat	0.1981	0.2793	0.2709	-0.4485	0.7263
psalm	0.2663	0.4086	0.3814	-0.4533	0.8947
placebo	0.1860	0.3902	0.3305	-0.4631	0.5053
quadrupe	0.1856	0.2974	0.2817	-0.4738	0.2421
hiatus	0.1831	0.3762	0.3264	-0.4973	0.5158
bouquet	0.1557	0.4415	0.3492	-0.5150	0.8632
rarefy	0.2617	0.4796	0.4348	-0.5301	0.6632
zealot	0.2699	0.3175	0.3249	-0.5327	0.3053
aeon	0.4345	0.3980	0.4568	-0.5386	0.2947
debt	0.2648	0.4342	0.4004	-0.5458	0.7579
depot	0.1678	0.4119	0.3371	-0.5691	0.7474
equivoca	0.3521	0.4541	0.4526	-0.5772	0.3684
nausea	0.2807	0.5089	0.4557	-0.6031	0.8421
heir	0.3469	0.5571	0.5126	-0.6074	0.6737
cellist	0.4481	0.4621	0.4959	-0.6162	0.2526
gaoled	0.3037	0.4961	0.4614	-0.6172	0.3789
thyme	0.3404	0.5642	0.5193	-0.6259	0.4632
subtle	0.2064	0.4961	0.4081	-0.6323	0.7684
facade	0.3247	0.5194	0.4789	-0.6707	0.3895
superflu	0.3124	0.3633	0.3711	-0.6798	0.4316
capon	-0.0735	-0.0622	-0.0620	0.0977	0.0842
drachm	-0.0838	-0.1047	-0.1053	0.1171	0.0421
banal	-0.0418	-0.1441	-0.1197	0.1205	0.1263

Note: Kuder Richardson formula 21 for internal reliability = 0.90. (Analysis of Variance tables summarizing calculation of KR 21 for this subject group (and all other subgroupings can be found in the body of the thesis.

Table 3.34 Item analysis data - items sorted by Correlations with FSIQ

	PIQ	VIQ	FSIQ	NART	Q	
PIQ	1.0000					
VIQ	0.6331	1.0000				
FSIQ	0.8673	0.9313	1.0000			
NART	-0.5089	-0.7720	-0.7234	1.0000		
beatify	-0.1293	0.0797	-0.0158	-0.2179	0.0632	
capon	-0.0735	-0.0622	-0.0620	0.0977	0.0842	
drachm	-0.0838	-0.1047	-0.1053	0.1171	0.0421	
banal	-0.0418	-0.1441	-0.1197	0.1205	0.1263	
syncope	-0.0098	0.0385	0.0138	-0.1816	0.0211	
labile	0.0664	0.0577	0.0560	-0.1411	0.3789	
prelate	0.0119	0.1208	0.0769	-0.2833	0.0211	
idyll	0.0466	0.1289	0.1025	-0.1816	0.0737	
simile	0.0954	0.1299	0.1262	-0.2096	0.9579	
campanil	0.0769	0.1521	0.1303	-0.1446	0.021	
abstemio	0.0985	0.1698	0.1447	-0.3902	0.3158	
gauche	0.0274	0.2277	0.1505	-0.2725	0.0632	
---	---	---	---	---	---	p < 0.05
naive	0.0728	0.2171	0.1764	-0.3815	0.8842	
radix	0.0269	0.2632	0.1879	-0.1713	0.6316	
sidereal	0.2360	0.1677	0.2006	-0.2771	0.1684	
chord	0.1399	0.2280	0.2048	-0.2437	0.9789	
aver	0.1900	0.2184	0.2230	-0.3123	0.1053	
---	---	---	---	---	---	p < 0.01
ache	0.0993	0.3288	0.2547	-0.3749	0.9579	
detente	0.2049	0.2748	0.2681	-0.3778	0.2316	
procreat	0.1981	0.2793	0.2709	-0.4485	0.7263	
assignat	0.1874	0.2997	0.2720	-0.4237	0.4947	
aisle	0.1355	0.3405	0.2771	-0.3842	0.8737	
leviatha	0.2228	0.2742	0.2771	-0.3750	0.1263	
quadrupe	0.1856	0.2974	0.2817	-0.4738	0.2421	
demesne	0.2599	0.2822	0.2971	-0.3517	0.0842	
gouge	0.2927	0.2905	0.3248	-0.4345	0.6105	
zealot	0.2699	0.3175	0.3249	-0.5327	0.3053	
hiatus	0.1831	0.3762	0.3264	-0.4973	0.5158	
puerpera	0.3355	0.2603	0.3267	-0.3391	0.0737	
placebo	0.1860	0.3902	0.3305	-0.4631	0.5053	
depot	0.1678	0.4119	0.3371	-0.5691	0.7474	
bouquet	0.1557	0.4415	0.3492	-0.5150	0.8632	
courteou	0.3595	0.3122	0.3548	-0.4236	0.5895	
topiary	0.2434	0.3782	0.3563	-0.3524	0.2737	
deny	0.2485	0.3989	0.3675	-0.3798	0.8632	
superflu	0.3124	0.3633	0.3711	-0.6798	0.4316	
psalm	0.2663	0.4086	0.3814	-0.4533	0.8947	
gist	0.2851	0.4266	0.3945	-0.4371	0.5895	
debt	0.2648	0.4342	0.4004	-0.5458	0.7579	
subtle	0.2064	0.4961	0.4081	-0.6323	0.7684	
rarefy	0.2617	0.4796	0.4348	-0.5301	0.6632	
catacomb	0.3869	0.4248	0.4475	-0.4366	0.3895	
equivoca	0.3521	0.4541	0.4526	-0.5772	0.3684	
nausea	0.2807	0.5089	0.4557	-0.6031	0.8421	
aeon	0.4345	0.3980	0.4568	-0.5386	0.2947	
gaoled	0.3037	0.4961	0.4614	-0.6172	0.3789	
facade	0.3247	0.5194	0.4789	-0.6707	0.3895	

cellist	0.4481	0.4621	0.4959	-0.6162	0.2526
heir	0.3469	0.5571	0.5126	-0.6074	0.6737
thyme	0.3404	0.5642	0.5193	-0.6259	0.4632

TABLE 3.35: Correlations of new words with FSIQ and NART

WORD	FSIQ	NART
PLAID	.0481	-.1130
LICHEN	.0799	-.3036
COMB	.0925	-.1503
LIEUTENANT	.0994	-.0646
INDICT	.1124	-.3662
PLAIT	.1227	-.0784
EPOCH	.1276	-.2219
VICTUAL	.1327	-.2557
TOMB	.1632	-.3037
ISLE	.1862	-.3539
CROQUET	.2375	-.3803
CHAISE	.2737	-.3690
PHLEGM	.2752	-.5569
GROTESQUE	.3002	-.7039
SEW	.3014	-.4612
QUAY	.3065	-.4187
HICCOUG	.3280	-.2992
PARQUET	.3425	-.3321
SUITE	.3760	-.4090
RECIPE	.3785	-.5003
VISCOUNT	.4500	-.4421
EPISTLE	.4564	-.6081
GUNWALE	.4918	-.3539
FSIQ	1.0000	-.6412

Table 3.36 Regression equation: revised NART X FSIQ (ALL NSAGT SUBJECTS)

FSIQ = 146 - 1.28 * NART (revised)

Dependent variable: FSIQ Independent variable NART ERRORS (revised)

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	146.01	6.13014	23.8184	0.0001
Slope	-1.27696	0.164659	-7.75517	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob. Level
Model	11026.473	1	11026.473	60.143	0.0001
Error	21817.312	119	183.339		
Total (Corr.)	32843.785	120			

Correlation Coefficient = -0.579418 R-squared = 33.57 percent
Stnd. Error of Est. = 13.5403

Table 3.37 Regression equation: revised NART X FSIQ (ENGLISH NSAGT SUBJECTS)

FSIQ = 153 - 1.39 * NART (revised)

Dependent variable: FSIQ Independent variable NART ERRORS (revised)

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept	153.153	10.4585	14.6439	0.0001
Slope	-1.39235	0.293365	-4.74615	0.0001

Analysis of Variance

Source	Sum of Squares	Df	Mean Square	F-Ratio	Prob. Level
Model	3809.1229	1	3809.1229	22.5260	0.00002
Error	8962.2589	53	169.0992		
Total (Corr.)	12771.382	54			

Correlation Coefficient = -0.546127 R-squared = 29.83 percent
Stnd. Error of Est. = 13.0038

TABLE 3.38 Tests for equality of correlation coefficients - all NSAGT subjects; revised NART

	R1	R2	Z1	Z2	N1	N2	SDz	Z	P
FSIQ	-0.58	-0.74	0.662	0.962	120	120	0.13	-2.29	0.05

It would therefore seem as well to leave the NART in its present form as the empirical validation of the test indicates that it functions satisfactorily in its present form. In terms of face validity the replacement of CAPON with GUNWALE may be considered.

CHAPTER 4 DISCUSSION.

The results obtained in this study have served to confirm a number of intuitive conclusions regarding the National Adult Reading Test. That it is a robust instrument is supported by the comparability of the correlations obtained in this study and those derived from data reported by Nelson (1977 unpub. manuscript). It might be postulated that the transporting of a test involving English reading from the comparatively homogeneous U.K. sample on which it was developed into the linguistic jungle which is South African English (SAE) (in all its forms) would result in a psychometric disaster. That this is not the case is amply demonstrated by the results of this study.

It may therefore be concluded that, given the constraints on generalisability of the results of this study mentioned earlier, the NART can be considered to be an internally consistent, valid, and stable measuring instrument under local conditions. As mentioned earlier, the clinical utility of its predictions of premorbid functioning must be viewed

in terms of the respective standard errors of estimate of the equations, but in the case of at least one of these, the UCT study, this compares favourably with Nelson's findings (1977 unpub. manuscript; 1982).

Certain problems are however apparent concerning the test and its applicability under South African conditions. It is proposed by Nelson and McKenna (1978) and Nelson (1982) that the test functions through tapping the patients previous familiarity with the words of which it is comprised. Selection of words was undertaken by Nelson (1977 unpub. manuscript; 1982) to arrive at items of an appropriate difficulty level. A 'qualitative' analysis of the difficulty of many items under local conditions was provided by the incredulity of many subjects when asked to read them out loud. Sincere doubts were (forcibly) expressed on occasion regarding the items claim to an any sort of English lineage! This impression was borne out quantitatively by the high mean error scores obtained on the whole test, as well as for individual items.

Problems regarding the 'regularization' of certain item's pronunciation using Nelson's (1982) scoring criteria have been alluded to earlier, and were borne out by the quantitative analysis of item performance. During scoring allowance was made for variations resulting from local accents according to the schema described earlier (see

development of the scoring key). In the majority of cases there was no doubt as to the correctness or otherwise of an item and these results support Nelson's (1982) recommendation that allowance be made for local variations in 'regional accents' and that other distortions "could be accepted at the discretion of the tester" (p.5) where the tester is suitably experienced. Qualitative experience with stuttering subjects indicated clearly that the test can be applied with confidence even to subjects with a quite severe stutter provided sufficient time is taken for the administration. As this is not a timed test, such constraints do not affect test administration. This impression could not be tested statistically due to the small number of stuttering subjects.

That the substitution of new items in the test did not yield encouraging results, indicates that much work remains to be done in this area, especially with regard to the selection of suitable items in terms of difficulty level. It may be that the solution lies in the development of different forms of the test for use in different groupings.

While care must be taken in the interpretation of correlational findings due to the technical statistical phenomena which may influence the strength of the obtained relationship, it is felt that the precautions adopted in this study are sufficient to allow a degree of confidence in

the findings and their applicability in a clinical setting. While explicit use has not been made of confidence intervals in reporting the results, the attention of the reader is drawn to the data provided in the tables. The absolute usefulness of a particular prediction to a specific situation, is difficult to determine depending as it does on the questions being investigated, and hence the requisite statistics are provided to facilitate the clinicians interpretation of a prediction as useful or not. The standard error of estimation obtained for the U.C.T. sample is almost identical to that reported in the U.K. study (7.03 and 7.6 respectively).

While the pooling of IQ data derived by the SAWAIS and the NSAGT may be intuitively acceptable as they both purport to return a measure of general intelligence based on a deviation IQ with a mean of 100 and a standard deviation of 15, the structures of a rigid psychometric approach have been acceded to in the separate analyses of the Navy and U.C.T. samples. The results obtained are supportive of the notion that the NART adequately predicts IQ in a South African context, although the generalisability of the findings must take into account as a result of restrictions resulting from the sample composition. As rigid random selection procedure could not be followed in choosing subjects, this must set as a constraint on generalisability. The investigations of normality in the data sets and the

fact that the Chi-square statistic was insignificant for the most part should serve to allay some concerns regarding the sampling method.

A Chi-square tending to significance and clearly apparent skewing of the NART data for Afrikaans subjects supports the speculation that the NART is not a suitable instrument for this language group. Further evidence of this is provided by the significant difference found between this group and the U.K. sample for correlation coefficients relating to FSIQ and VIQ. While the difference between coefficients for P.I.Q. does not achieve significance, the coefficient for the Afrikaans sample does appear to be lower. As the NART is a verbal test it would seem logical to assume that it would correlate better with V.I.Q. than P.I.Q. and hence the lack of significance in this instance may reflect a depression of the NART-PIQ correlation in the British sample. While formal testing of the difference between coefficients for P.I.Q., V.I.Q. and F.S.I.Q. within each sample were not carried out, inspection of the data suggests that correlation between NART and P.I.Q. is lower than that between F.S.I.Q. and V.I.Q., for English subject at least. The similarity of the three coefficients for the Afrikaans sample is a further factor pointing to the lack of the utility of the NART for Afrikaans subjects.

It is suggested that his shortcoming may be overcome through the use of irregular English words (Afrikaans grapheme-phoneme correspondences tend to be for more regular, Doctor, 1987) with an accepted irregular pronunciation and a high use frequency. This endeavor is however fraught with difficulties based as it is on the contentions and possibly incorrect assumption that IQ may be related to exposure to and familiarity with English words. This relationship may possibly be found to hold in urban industrialised populations, but is unlikely to do so in rural agricultural populations. A comment must be made on Nelson's and O'Connell's (1978) (and Nelson, 1977 unpub. manuscript; 1982) contention that the SGWRT may be used in conjunction with the NART where patients have too high an error rate on the NART. This suggestion violates the fundamental rationale of the NART in that the SGWRT contains regular words. The mingling of the 2 in the clinical setting is not theoretically defensible, and it is suggested that a profitable avenue for future research is the development of an easier scale of irregular words for use in conjunction with the NART. Another alternative is the lengthening of the test which in its present form is short enough to allow such modification without seriously compromising the advantages it has as a result of it's brevity. (personal communication - Prof. M. Saling)

A feature of this research has been the extended range of IQ which can be predicted using the locally generated equations. Assuming a (somewhat unrealistic) range of 0 to 50 errors, Nelson's (1977 unpub. manuscript) formula will predict F.S.I.Q. from 86 to 128 points, a range of 42. Considering the closeness of the beta weights, it is not surprising that the U.C.T. sample's equation reflects a similar range (39 points), although with a boosted constant due to the presence of higher IQ scores in the sample. The use of all NSAGT English subjects yields an equation with a range of 70 points and gives a predictive range from 78 to 148 points F.S.I.Q. (the boosted standard error of the estimate may be the result of the considerable range of the scores combined with a relatively small sample size (Psychology Honours statistics notes, 1984)), while that for the 27% most English "NSAGT subjects is 72 F.S.I.Q. points with a range from 83 to 153. The high correlation coefficient for this group (r=0.76 R-SQ = 57.7%) and comparable standard error suggests that this is a useful model which compares well to Nelson's (1977 unpub. manuscript) equation while avoiding the ceiling effects associated with the latter.

When the restriction of range in both measures due to the homogeneity of the U.C.T. sample is statistically compensated for, the correlation coefficient for F.S.I.Q. equals that derived from Nelson's data. (1977 unpub. script)

The current study however addresses one of the criticisms levelled at the U.K. research (see Klesges, 1982) as use is made of all the subtests of the SAWAIS (excluding Vocabulary) in computing the IQ scores. Use is not made of the Vocabulary subtest here as it is not utilised in computing the IQ score and hence is usually omitted. (Huysamen, 1980)

In assessing the correlation coefficients yielded by this research, note should be taken of the ceiling imposed on the correlation by the measurement reliability of the criterion measures. Viewed in this light the correlation coefficients appear more impressive than before. The exploratory foray into z-score prediction of IQ appears to merit further investigation, as does the use of a meanings questionnaire administered in conjunction with the NART. A more robust meanings instrument than the multiple choice format may be indicated, but the possibility of a pronunciation - vocabulary deterioration index being of clinical utility in the diagnosis of cerebral impairment is a intriguing notion. This, together with other areas identified earlier in the paper, would seem to suggest a rich field for future research.

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Pronunciation guide

CHORD	körd	SUPERFLUOUS	sōō-pûr´flŏŏ-əs, sū-pûr´flŏŏ-əs
ACHE	āk	SIMILE	sim´i-li
DEPOT	dep´ō	BANAL	bən-al´
AISLE	īl	QUADRUPED	kwod´rŏŏ-ped
BOUQUET	bōōk´ā, bōōkā´, bōkā´	CELLIST	chel´ist
PSALM	säm	FACADE	fa-säd´
CAPON	kā´pn	ZEALOT	zel´ət
DENY	di-nī	DRACHM	dram
NAUSEA	nö´si-ə, nö´zhə	AEON	ē´on
DEBT	det	PLACEBO	plə-sē´bō
COURTEOUS	kûrt´yəs	ABSTEMIOUS	ab-stē´mi-əs
RAREFY	rār´-i-fī	DETENTE	dā-tāt (Fr.)
EQUIVOCAL	i-kwiv´ə-kl	IDYLL	id´il, id´əl
NAIVE	nä-ēv	PUERPERAL	pū-ûr´pər-əl
CATACOMB	kat´ə-kōōm	AVER	ə-vûr´
GAOLED	jāld	GAUCHE	gō sh
THYME	tīm	TOPIARY	tō´pi-ə-ri
HEIR	ār	LEVIATHAN	le-vī´ə-thən
RADIX	rā´diks	BEATIFY	bi-at´i-fī
ASSIGNATE	as´-ig-nāt	PRELATE	prel´it
HIATUS	hī-ā´təs	SIDEREAL	sī-dē´ri-əl
SUBTLE	sut´l	DEMESNE	di-mān´, di-mēn´
PROCREATE	prō´kri-āt	SYNCOPE	sing´kə-pē
GIST	jist	LABILE	lā´bīl
GOUGE	gowj	CAMPANILE	kam-pan-ē´lā, kam-pan-ē´lē

PRONUNCIATION SCHEME FOR ADDITIONAL WORDS

COMB	kōm
TOMB	tōōm
ISLE	īl
SEW	sō, sū,
PLAID	plād
QUAY	kē
PLAIT	plat, plāt, plēt
EPOCH	ēp'ok, ēp'ohh, ep'ok
SUITE	sūt, sōōt
CHAISE	shāz
SCENE	sēn
LICHEN	li'kən, lich'ə n
PHLEGM	flem
RECIPE	res'i-pi
INDICT	in-dīt'
CROQUET	krō'kā
VISCOUNT	vī'kownt
PARQUET	pär'kā, -kit, pär-kā', -ket'
VICTUAL	vit'l
GUNWALE	gun'l
LIEUTENANT	lef-, lif-, ləf-ten'ə nt, also le-, lə-lōō-ten'-, lōōt'nənt
HICCOUGH	hik'ə p
EPISTLE	i-pis'l
GROTESQUE	grō-tesk'

(after McDonald, 1975)

APPENDIX B.

BIOGRAPHICAL QUESTIONNAIRE

NO:...

ALL INFORMATION PROVIDED WILL BE TREATED IN THE STRICTEST CONFIDENCE.
(AFRIKAANS OP KEERSY)

SURNAME:..... INITIALS:.....

AGE:..... SEX (M/F):.....

1.LANGUAGE USAGE:

(a).What is your 'home language': ENGLISH .....
(choose ONE only) AFRIKAANS.....
OTHER .....(Specify)

(b).From the list below select the statement that most accurately describes your language usage and write the corresponding NUMBER next to questions (i) to (iv) below.

1: ENGLISH all the time.
2: ENGLISH most of the time.
3: more ENGLISH than AFRIKAANS
4: equal amounts of ENGLISH and AFRIKAANS
5: more AFRIKAANS than ENGLISH
6: AFRIKAANS most of the time.
7: AFRIKAANS all of the time.

(i) Amongst my friends I speak .....
(ii) When I am at work I speak .....
(iii)In my parents home we speak/spoke .....
(iv)At school we speak/spoke .....
(v) If you have attended any colleges, technicons, universities etc. AFTER you left school, please indicate whether you were taught in .....

(c).In what language are/were you taught most subjects like science, geography, maths, history etc. at your school:

ENGLISH MEDIUM: .....
AFRIKAANS MEDIUM.....
DUAL MEDIUM .....

2.PARENTS OCCUPATION:

Where possible please give TYPE of job and LEVEL eg. bank clerk or technical supervisor.

FATHERS OCCUPATION:.....
MOTHERS OCCUPATION:.....

3.YOUR OCCUPATION

Where possible please give TYPE of job and LEVEL eg. bank clerk or technical supervisor. (give details of your previous job if you are currently unemployed)

YOUR OCCUPATION:.....

4.MEDICAL HISTORY:

(a).Have you ever suffered from:

severe head injuries which have resulted in hospitalisation or extended medical treatment:(Y/N)....

any significant condition involving the brain:(Y/N)....

(if yes please give details at the end of this form).

5.RESIDENCE:

Please give the name of the suburb and town in which you live:

SUBURB:.....
TOWN :.....

6.EDUCATIONAL HISTORY:

Please specify the highest level you have passed AT SCHOOL (eg. Std 8, Matric etc. - specify academic/technical and university exemption) and AFTER LEAVING SCHOOL (eg. T1, National Diploma's etc.)

HIGHEST SCHOOL LEVEL :.....
HIGHEST AFTER LEAVING SCHOOL:.....

7.LEARNING DIFFICULTIES:

Have you ever suffered from any specific learning difficulties such as dyslexia:(Y/N):.....
If yes, please specify:.....

DETAILS:.....
.....

BIOGRAFIESE VRAELYS

ALLE INLIGTING WAT VERSKAF WORD SAL STRENG VERTROULIK WEES (PTO FOR ENGLISH)

VAN:..... VOORLETTERS:.....

OUDERDOM:..... GESLAG (M/V):.....

1.TAALGEBRUIK:

(a).Wat is u huistaal: (kies slegs EEN)

ENGELS .....
AFRIKAANS .....
ANDER .....(VERDUIDELIK)

(b).Kies uit die onderstaande lys die stelling wat u taalgebruik die beste beskryf en skryf die ooreenstemmende NOMMER langsaan vrae (i) tot (v) hieronder

1:altyd ENGELS
2:meestal ENGELS
3:meer ENGELS as AFRIKAANS
4:ewe veel ENGELS en AFRIKAANS
5:meer AFRIKAANS as ENGELS
6:meestal AFRIKAANS
7:altyd AFRIKAANS

(i) Met my vreinde praat ek .....
(ii) By die werk praat ek .....
(iii)In my ouerhuis praat ons .....
(iv) By die skool praat ons/het ons gepraat .....
(iv) As u enige kolleges, tegnikons, universiteite, ens. bygewoon het NADAT u skool verlaat het, dui asb. aan of u onderrig ontvang het in

.....

(c)In watter taal word meests vakke soos wetenskap, aardrykskunde, wiskunde, geskiedenis, ens. by u skool aangebied

ENGELS MEDIUM: .....
AFRIKAANS MEDIUM .....
DUBBEL MEDIUM .....

2.OUERS SE BEROEP

Waar moontlik, dui asb. aan die TIPE van werk en die VLAK daarvan, bv. banklerk

BEROEP VAN VADER :.....
BEROEP VAN MOEDER:.....

3.U BEROEP

Waar moontlik, dui asb. aan die TIPE van werk en die VLAK daarvan, bv. banklerk (verskaf besonderheede van u vorige werk as u tans werkloos is)

U BEROEP:.....

4.MEDIESE GESKIEDENIS

(a).Het u al ooit gely aan:

ernestige hoofbeserings wat uitgeloop het op hospitalisasie of uitgebreide mediese behandeling: (J/N)...:

enige beduidende breintoestand: (J/N).....

(indien JA, verskaf besondeerhede by die einde van hierdie vraelys)

5.WONING

Verskaf asb. die naam van die voorstad en stad waarin u woon:

VOORSTAD:.....
STAD :.....

6.OPVOEDKUNDIGE AGTERGROND

Dui asb. die hoogste standard wat u OP SKOOL geslaage het (bv. St. 8, Matriek ens. - spesifiseer akademies/tegnies en universiteitsvrystelling) en NA SKOOLVERLATING (bv. T1, Nasionale Sertifikate ens.)

HOOGSTE SKOOL STANDARD :.....
HOOGSTE NA SKOOL KWALIFIKASIE:.....

7.LEERPROBLEME

Het u ooit spesifieke leerprobleme soos bv. disleksie ondervind (J/N):.....

Indien ja, verskaf besondeerhede asb.:.....
.....

BESONDERHEEDE:.....
.....
.....
.....
.....
.....

APPENDIX C.

VOCABULARY TEST

SURNAME:..... INITIALS:.....
(Please print)

The following words are each followed by 6 statements. Please select the statement which in your opinion best describes the MEANING of the word and write the corresponding LETTER in the space provided. Answer all the questions as well as you can, BUT DON'T GUESS. If you REALLY DON'T KNOW the meaning of a word, do not waste time on it, simply use the "F. DON'T KNOW" option and go on ot the next question

PLEASE DO NOT SHOW THIS PAPER TO ANYONE ELSE OR DISCUSS THE WORDS WITH ANYONE UNTIL THE END OF THE DAY.

1. ACHE ANSWER:.....

A.to rest satisfied
B.a continued pain
C.a process of the spine
D.to exert force of influence
E.the act of adding

F.DON'T KNOW

2. DEBT ANSWER:.....

A.what one owes to another
B.a poem of ten lines
C.an order by one in authority
D.to set apart
E.to give proof of

F.DON'T KNOW

3. PSALM ANSWER:.....

A.a dried plum
B.a portion of an empire
C.a moulded glass ornament of glass
D.a decree of the Athenian assembly
E.a devotional song or hymn

F.DON'T KNOW

4. DEPOT ANSWER:.....

A.one of a group of microscopic algae
B.a short American pistol
C.a place of deposit - a storehouse
D.to remove from a throne
E.a tyrant

F.DON'T KNOW

5. CHORD ANSWER:.....

A.a straight line joining any two points on a curve
B.a household task - an unenjoyable task
C.a short sleeved blouse
D.the science of geographical distribution
E.a nervous disease

F.DON'T KNOW

6. BOUQUET ANSWER:.....

A.the forepart of a ship
B.a bunch of flowers
C.a sudden outburst
D.an exchange where merchants meet
E.a young man

F.DON'T KNOW

7. DENY ANSWER:.....

A.to transport to exile
B.to seperate from an emulsion
C.to take the odour or smell from
D.to declare not to be true
E.to free from nitric acid

F.DON'T KNOW

8. CAPON ANSWER:.....

A.a castrated rooster
B.a goat fig / wild fig
C.a leap without advancing
D.an upright winding machine
E.a covered passage across a ditch

F.DON'T KNOW

9. HEIR ANSWER:.....

A.a canopy or frame over a bier
B.a common low shrub of the heath family
C.a series of vertical chords or wires
D.one who inherits property, title etc.
E.a number of sheets fastened together

F.DON'T KNOW

10. AISLE ANSWER:.....

A.a side petal in the pea family
B.a passage between rows of seats
C.loss of speech
D.a fear stricken state
E.a plant of the caraway family

F.DON'T KNOW

11. SUBTLE ANSWER:.....

A.capable of being influenced by suggestion
B.without warning or apparent preparation
C.sappy, juicy and fleshy
D.under a nail or hoof
E.fine, delicate or thin

F.DON'T KNOW

12. NAUSEA ANSWER:.....

A.a central point
B.a larval form in many Crustacea
C.a feeling of inclination to vomit
D.a deputy or vicedroy in the Mogul empire
E.a performance of professional dancers

F.DON'T KNOW

13. EQUIVOCAL ANSWER:.....

A.upright - directed upward
B.a state of balance
C.pertaining to horsemanship
D.capable of meaning two or more things - questionable
E.inner - secret - taught to a select few

F.DON'T KNOW

14. NAIVE ANSWER:.....

A.with natural or unaffected simplicity
B.feebly wishy washy
C.swimming horizontally
D.disgustingly foul - filthy - obscene
E.of or connected with birth

F.DON'T KNOW

15. THYME ANSWER:.....

A.acolyte who carries the thurible
B.a piece of reclaimed land
C.herb for cooking
D.a gas filled valve with heated cathode
E.crosswise - from side to side

F.DON'T KNOW

16. COURTEOUS ANSWER:.....

A.purporting to improve beauty
B.the opposite way - in opposition
C.ill natured - harsh - rough
D.polite, considerate, or respectful in manner
E.comfortable

F.DON'T KNOW

17. GAOLED ANSWER:.....

A.loss of strength, freshness or brightness
B.banished or exiled
C.freed or granted immunity
D.scored - pertaining to ball games
E.imprisoned

F.DON'T KNOW

18. PROCREATE ANSWER:.....

A.to deck up - smarten
B.to prepare for exhibition to the public
C.to make an open declaration of
D.to poke as with the end of a stick
E.to produce offspring - to beget

F.DON'T KNOW

19. QUADRUPED ANSWER:.....

A.having four parts, members or divisions
B.a dance for four couples or more
C.a two wheeled carriage drawn by four horses
D.a four footed animal esp. a mammal
E.telegraphic system for sending 4 messages at once

F.DON'T KNOW

20. CATACOMB ANSWER:.....

A.a block on which slaves were exposed for sale
B.subterranean excavation used as a burial place
C.accoustics - to do with echoes or reflected sound
D.a type of mental illness
E.one being taught the rudiments of Christianity

F.DON'T KNOW

21. SUPERFLUOUS ANSWER:.....

A.above or beyond the organic or physical
B.an excessive charge
C.resting on the top - overhanging
D.above what is enough - redundant - unnecessary
E.upper - higher in nature or rank

F.DON'T KNOW

22. RADIX ANSWER:.....

A.a root, root number, a source, a basis
B.a point from which rays emanate
C.straight line from the centre of a circle
D.an emmission of rays
E.the smaller branch of the brachial artery

F.DON'T KNOW

23. ASSIGNATE ANSWER:.....

A.to vindicate or defend by arguments
B.to soften, mitigate or allay
C.to designate, appoint - put forward, adduce
D.to convert into like substance
E.to join or link

F.DON'T KNOW

24. GIST ANSWER:.....

A.the main point or pith of a matter
B.a kind of cotton cloth
C.a trick or mocking deception
D.a bush of hair over the eyes
E.a game of cards for three

F:DON'T KNOW

25. HIATUS ANSWER:.....

A.a sweating esp. in excess
B.a ruler in holy things - a chief priest
C.a gap - an opening - a break in continuity
D.a genus of malvaceous plants
E.a spanish nobleman

F.DON'T KNOW

26. SIMILE ANSWER:.....

A.a particular smile
B.explicit likening of one thing to another
C.complete change of environment
D.conflict between two friends
E.measure of distance

F.DON'T KNOW

27. RAREFY ANSWER:.....

A.threaten with extinction
B.specify
C.change the environment of
D.challenge with authority
E.make, become less dense

F.DON'T KNOW

28. CELLIST ANSWER:.....

A.one who studies cell structure
B.malfunction of the kidneys
C.one who plays musical instrument
D.cultivator of herbs
E.uneveness of surface

F.DON'T KNOW

29. ZEALOT ANSWER:.....

A.actor
B.connoisseur of expensive food
C.prehistoric race
D.fanatic
E.sea lover

F.DON'T KNOW

30. ABSTEMIOUS ANSWER:.....

A.a state in which water may be found
B.temperate or sparing in food or drink
C.one who entertains
D.having a hot climate
E.greedy

F.DON'T KNOW

31. GOUGE ANSWER:.....

A.measure
B.cultivate in rich soil
C.steep valley between mountains
D.weigh
E.scoop out or force out

F.DON'T KNOW

32. PLACEBO ANSWER:.....

A.mammalian cell structure
B.higher level of ground
C.pharmacologically inactive substance
D.restricted area
E.nuclear scientist

F.DON'T KNOW

33. FACADE ANSWER:.....

A.appearance presented to the world
B.timber frame in a roof
C.shopping mall
D.ballet costume
E.Arabs dwelling place

F.DON'T KNOW

34. AVER ANSWER:.....

A.dislike
B.affirm
C.fenced area for birds
D.to be unsure
E.to hike

F.DON'T KNOW

35. LEVIATHAN ANSWER:.....

A.instrument used to lift heavy weights
B.breed of dog
C.species of dried flower
D.huge sea monster - whale
E.weight control programme

F.DON'T KNOW

36. AEON ANSWER:.....

A.a vast age
B.type of brass furnishing
C.distance between two cities
D.space age traveller
E.branch of the oak family

F.DON'T KNOW

37. DETENTE ANSWER:.....

A.tooth decay
B.piece of camping equipment
C.east European dialect
D.close relative
E.relaxation of strained relations

F.DON'T KNOW

38. GAUCHE ANSWER:.....

A.expression of surprise
B.well dressed
C.tactless
D.product of France
E.unemotional

F.DON'T KNOW

39. DRACHM ANSWER:.....

A.scottish word for dream
B.a tipple or drink
C.ancient coin
D.a rivulet
E.an Irish monarch

F.DON'T KNOW

40. IDYLL ANSWER:.....

A.unaccompanied melody
B.Homeric creature
C.lazy
D.innocent story or scene
E.16th century herb

F.DON'T KNOW

41. BEATIFY ANSWER:.....

A.make blessed
B.restructure surgically
C.to complete
D.to compose as in music
E.to worship

F.DON'T KNOW

42. BANAL ANSWER:.....

A.complicated
B.a member of the ape species
C.pure
D.man-made waterway
E.trivial

F.DON'T KNOW

43. SIDEREAL ANSWER:.....

A.change of direction
B.scientific measurement
C.of,like or relative to stars
D.running parallel to
E.beautiful

F.DON'T KNOW

44. PUERPERAL ANSWER:.....

A.relating to childbirth
B.caterpillar's foot
C.a structure surrounding another
D.a shade of violet
E.pertaining to twilight

F.DON'T KNOW

45. TOPIARY ANSWER:.....

A.relative of the camel
B.eye disease
C.another term for dentistry
D.a branch of gardening
E.relating to topics

F.DON'T KNOW

46. DEMESNE ANSWER:.....

A.17th century term for insanity
B.land estate
C.coal shaft
D.branch of the French aristocracy
E.breed of dog

F.DON'T KNOW

47. CAMPANILE ANSWER:.....

A.relating to countryside
B.type of healing cream
C.childish
D.open air cooking area
E.church bell tower

F.DON'T KNOW

48. LABILE ANSWER:.....

A.marker on clothing
B.portion of grasshoppers head
C.apt to slip or change
D.produced by the liver
E.musical

F.DON'T KNOW

49. SYNCOPE ANSWER:.....

A.a cutting short
B.artist's work place
C.a family breech
D.person of international fame
E.measure of music

F.DON'T KNOW

50. PRELATE ANSWER:.....

A.meat eater
B.rare species of bird
C.identical twin
D.a clergyman
E.an introduction, beginning

F.DON'T KNOW

51. COMB ANSWER:.....

A.toothed instrument for arranging hair
B.little wooded valley
C.anything arched or vaulted
D.coal dust
E.wooden bridge support

F.DON'T KNOW

52. TOMB ANSWER:.....

A.alloy of copper
B.long handled weapon
C.a grave
D.to fall
E.large book

F.DON'T KNOW

53. ISLE ANSWER:.....

A.mass of land surrounded by water
B.short form of I will
C.future tense in French
D.distinctive doctrine
E.religious sect

F.DON'T KNOW

54. SEW ANSWER:.....

A.to ooze
B.to drown
C.threaten with court action
D.to join with needle and thread
E.exclamtion of surprise

F.DON'T KNOW

55. PLAID ANSWER:.....

A.type of flooring
B.hair braid
C.long piece of checked woolen cloth
D.Scottish meadow
E.form of dance

F.DON'T KNOW

56. QUAY ANSWER:.....

A.species of bird
B.landing place for boats
C.measure of weight
D.trill
E.four petalled flower

F.DON'T KNOW

57. PLAIT ANSWER:.....

A.braid in which strands passed one over another
B.object to eat off
C.stellar body
D.lamentation
E.carpenters tolt for smoothing surfaces

F.DON'T KNOW

58. EPOCH ANSWER:.....

A.moment of great happening from which dates are reckoned
B.childhood illness
C.synonym for igloo
D.monumental error
E.tribal ruler

F.DON'T KNOW

59. SUITE ANSWER:.....

A.action in law
B.jacket
C.pack of cards
D.continental men's clothing
E.a set of furniture or rooms

F.DON'T KNOW

60. CHAISE ANSWER:.....

A.to pursue
B.movable seat for one
C.travelling carriage
D.mineral composed of silica
E.old coal measure

F.DON'T KNOW

61. SCENE ANSWER:.....

A.marshy area
B.tax collector
C.snow sport
D.length of wool
E.episode - as in a play or film

F.DON'T KNOW

62. LICHEN ANSWER:.....

A.muskrat
B.compound plant consisting of fungus and algae
C.factory for manufacture of cloth
D.region of Northern Germany
E.famiiar term for sweetheart

F.DON'T KNOW

63. PHLEGM ANSWER:.....

A.cannon fodder
B.inflammation of a vein
C.fiery river of Hades
D.thick, sticky matter secreted in throat
E.portion of vascular bundle

F.DON'T KNOW

64. RECIPE ANSWER:.....

A.acting in return
B.one who receives
C.repeat from memory
D.begin over again
E.directions for making something

F.DON'T KNOW

65. INDICT ANSWER:.....

A.formally charge with crime
B.land tax
C.to point out
D.cycle of fifteen years
E.interior design

F.DON'T KNOW

66. CROQUET ANSWER:.....

A.gallic weapon like a mace
B.game played with wooden balls and mallets
C.alternative form of cricket
D.type of handcraft
E.lunar module

F.DON'T KNOW

67. VISCOUNT ANSWER:.....

A.icon found in temples
B.madonna
C.ancient seafarer
D.title of nobility
E.inaccurate assesment

F.DON'T KNOW

68. PARQUET ANSWER:.....

A.partition
B.warm overcoat
C.floor covering of wooden blocks
D.fit of passion
E.talking bird

F.DON'T KNOW

69. VICTUAL ANSWER:.....

A.food
B.winner in a contest
C.wild species of llama
D.minor noble
E.prey

F.DON'T KNOW

70. GUNWALE ANSWER:.....

A.type of butter fish
B.artisan who repairs firearms
C.species of large sea creature
D.upper edge of ships side
E.coarse muslin cloth

F.DON'T KNOW

71. LIEUTENANT ANSWER:.....

A.homeless child
B.musical pause especially in operetta
C.commisioned officer in the armed forces
D.bank robber
E.Hungarian peasant

F.DON'T KNOW

72. HICCOUGH ANSWER:.....

A.North American genus of walnut family
B.17th century beau
C.a rural labourer
D.narrow shield made of bark or wood
E.involuntary contraction of the diaphragm

F.DON'T KNOW

73. EPISTLE ANSWER:.....

A.small firearm
B.a letter
C.female flower
D.refrain in music
E.tombstone inscription

F.DON'T KNOW

74. GROTESQUE ANSWER:.....

A.rude
B.amusing comedy
C.cave dweller
D.bizarre
E.to grunt or growl

F.DON'T KNOW

APPENDIX D.

ITEM INTER - CORRELATION MATRIX

	PIQ	VIQ	FSIQ	NART	prop
	1	2	3	4	
PIQ	1.0000				
VIQ	0.6331	1.0000			
FSIQ	0.8673	0.9313	1.0000		
NART	-0.5089	-0.7720	-0.7234	1.0000	
chord	0.1399	0.2280	0.2048	-0.2437	0.9789
ache	0.0993	0.3288	0.2547	-0.3749	0.9579
depot	0.1678	0.4119	0.3371	-0.5691	0.7474
aisle	0.1355	0.3405	0.2771	-0.3842	0.8737
bouquet	0.1557	0.4415	0.3492	-0.5150	0.8632
psalm	0.2663	0.4086	0.3814	-0.4533	0.8947
capon	-0.0735	-0.0622	-0.0620	0.0977	0.0842
deny	0.2485	0.3989	0.3675	-0.3798	0.8632
nausea	0.2807	0.5089	0.4557	-0.6031	0.8421
debt	0.2648	0.4342	0.4004	-0.5458	0.7579
courteou	0.3595	0.3122	0.3548	-0.4236	0.5895
rarefy	0.2617	0.4796	0.4348	-0.5301	0.6632
equivoca	0.3521	0.4541	0.4526	-0.5772	0.3684
naive	0.0728	0.2171	0.1764	-0.3815	0.8842
catacomb	0.3869	0.4248	0.4475	-0.4366	0.3895
gaoled	0.3037	0.4961	0.4614	-0.6172	0.3789
thyme	0.3404	0.5642	0.5193	-0.6259	0.4632
heir	0.3469	0.5571	0.5126	-0.6074	0.6737
radix	0.0269	0.2632	0.1879	-0.1713	0.6316
assignat	0.1874	0.2997	0.2720	-0.4237	0.4947
hiatus	0.1831	0.3762	0.3264	-0.4973	0.5158
subtle	0.2064	0.4961	0.4081	-0.6323	0.7684
procreat	0.1981	0.2793	0.2709	-0.4485	0.7263
gist	0.2851	0.4266	0.3945	-0.4371	0.5895
gouge	0.2927	0.2905	0.3248	-0.4345	0.6105
superflu	0.3124	0.3633	0.3711	-0.6798	0.4316
simile	0.0954	0.1299	0.1262	-0.2096	0.9579
banal	-0.0418	-0.1441	-0.1197	0.1205	0.1263
quadrupe	0.1856	0.2974	0.2817	-0.4738	0.2421
cellist	0.4481	0.4621	0.4959	-0.6162	0.2526
facade	0.3247	0.5194	0.4789	-0.6707	0.3895
zealot	0.2699	0.3175	0.3249	-0.5327	0.3053
drachm	-0.0838	-0.1047	-0.1053	0.1171	0.0421
aeon	0.4345	0.3980	0.4568	-0.5386	0.2947

placebo	0.1860	0.3902	0.3305	-0.4631	0.5053
abstemio	0.0985	0.1698	0.1447	-0.3902	0.3158
detente	0.2049	0.2748	0.2681	-0.3778	0.2316
idyll	0.0466	0.1289	0.1025	-0.1816	0.0737
puerpera	0.3355	0.2603	0.3267	-0.3391	0.0737
aver	0.1900	0.2184	0.2230	-0.3123	0.1053
gauche	0.0274	0.2277	0.1505	-0.2725	0.0632
topiary	0.2434	0.3782	0.3563	-0.3524	0.2737
leviatha	0.2228	0.2742	0.2771	-0.3750	0.1263
beatify	-0.1293	0.0797	-0.0158	-0.2179	0.0632
prelate	0.0119	0.1208	0.0769	-0.2833	0.0211
sidereal	0.2360	0.1677	0.2006	-0.2771	0.1684
demesne	0.2599	0.2822	0.2971	-0.3517	0.0842
syncope	-0.0098	0.0385	0.0138	-0.1816	0.0211
labile	0.0664	0.0577	0.0560	-0.1411	0.3789
campanil	0.0769	0.1521	0.1303	-0.1446	0.0211
courteou	rarefy	equivoca	naive	catacomb	gaoled

		11	12	13	14	15	16	17	18	19	20
capon	11	1.0000									
deny	12	0.0104	1.0000								
nausea	13	-0.1805	0.3316	1.0000							
debt	14	-0.0056	0.1325	0.3618	1.0000						
courteou	15	-0.0552	0.2903	0.2841	0.3276	1.0000					
rarefy	16	-0.0245	0.2995	0.4854	0.3771	0.1296	1.0000				
equivoca	17	-0.0744	0.1136	0.2110	0.3298	0.2381	0.2673	1.0000			
naive	18	-0.0087	0.2388	0.2944	0.1027	0.1661	0.2989	0.2764	1.0000		
catacomb	19	-0.0867	0.0040	0.1683	0.1995	0.0083	0.1582	0.2850	0.1541	1.0000	
gaoled	20	-0.0025	0.1848	0.3382	0.3908	0.2549	0.3272	0.3030	0.2149	0.4440	1.0000
thyme	21	-0.0536	0.1856	0.4022	0.2786	0.1314	0.3493	0.2971	0.2042	0.1672	0.3623
heir	22	-0.1123	0.2455	0.4990	0.3404	0.3320	0.4065	0.3454	0.2393	0.2336	0.2660
radix	23	-0.0041	0.0769	0.0882	0.0778	-0.0607	0.1944	-0.0952	0.0646	0.1178	0.1468
assignat	24	-0.1484	0.2102	0.3707	0.2152	0.1410	0.3043	0.0735	0.2265	0.0732	0.0516
hiatus	25	-0.1613	0.0432	0.1581	0.1900	-0.1235	0.3345	0.4344	0.1760	0.3419	0.2792
subtle	26	0.0766	0.3623	0.4466	0.4470	0.3535	0.3479	0.2641	0.1913	0.2338	0.3774
procreat	27	-0.0689	0.0991	0.3169	0.2042	0.1596	0.2619	0.2241	0.2206	0.1998	0.1875
gist	28	-0.2093	0.1036	0.1081	0.3775	0.1735	0.2202	0.2381	0.0993	0.1838	0.2108
gouge	29	-0.0687	0.1845	0.3053	0.1029	0.1233	0.3442	0.3415	0.1832	0.1510	0.2234
superflu	30	-0.0346	0.2233	0.3773	0.3436	0.3383	0.3512	0.3919	0.2489	0.3065	0.5022
simile	31	0.0636	0.0690	0.1967	0.0039	-0.0684	0.0724	0.1601	0.2517	0.1675	-0.0523
banal	32	-0.0012	-0.2174	-0.0091	-0.0070	0.0597	-0.1313	-0.1590	-0.0605	-0.1088	-0.0358
quadrupe	33	-0.0829	0.1535	0.1773	0.1473	0.1220	0.1948	0.1796	0.0509	0.2037	0.4196
cellist	34	-0.0891	0.2315	0.1853	0.3286	0.4359	0.1581	0.3595	0.0590	0.2311	0.4447
facade	35	-0.0867	0.1296	0.2867	0.2498	0.1838	0.2495	0.3745	0.2216	0.2032	0.3550
zealot	36	-0.0364	0.1309	0.2243	0.2679	0.1815	0.1822	0.3940	0.2399	0.2674	0.3303
dracha	37	0.1252	-0.0690	-0.0530	-0.0039	-0.0381	-0.0724	-0.0515	0.0759	-0.0600	-0.0557
aeon	38	-0.0298	0.1230	0.2799	0.3115	0.1640	0.2653	0.3199	0.0175	0.2886	0.4469
placebo	39	0.0726	0.3411	0.2644	0.1780	0.2870	0.2302	0.1884	0.1683	0.0564	0.2522
abstemio	40	0.1202	-0.0590	0.1700	0.1725	0.1066	0.0050	0.1384	0.1043	0.1540	0.2162
detente	41	-0.0766	0.0734	0.2377	0.1355	0.0016	0.0217	0.2015	0.0427	0.1756	0.1370
idyll	42	-0.0855	0.1123	0.1221	-0.0287	0.1535	0.0305	0.1187	0.1021	0.0226	0.1950
puerpera	43	0.0596	0.1123	0.1221	0.1594	0.2354	0.0305	0.3693	0.1021	0.1052	0.1950
aver	44	-0.1040	0.0368	0.1485	0.1138	0.2165	0.2445	0.3069	0.1241	0.1481	0.1563
gauche	45	-0.0787	0.1034	0.1124	0.1468	0.1287	0.0019	0.0708	0.0940	0.1476	0.0648

topiary	46	0.0689	0.1757	0.2011	0.2367	0.3203	0.1378	0.3143	0.1483	-0.0061	0.2018
leviatha	47	-0.1153	0.1514	0.1646	0.1409	0.1885	-0.1313	0.1694	-0.0605	0.0862	0.2255
beatify	48	-0.0787	0.1034	-0.0062	0.1468	-0.0472	0.0935	0.1605	0.0940	0.1476	0.1540
prelate	49	-0.0445	0.0584	0.0635	0.0829	0.1224	0.1045	0.1920	0.0531	0.1836	0.1877
sidereal	50	-0.1365	0.1792	0.1949	0.1230	0.0897	0.0232	0.1228	0.1629	0.1020	0.0543
demesne	51	-0.0920	0.0104	0.1313	0.0829	0.1760	0.0557	0.3970	0.1097	0.2242	0.1538
syncope	52	-0.0445	0.0584	0.0635	0.0829	-0.0267	-0.0506	0.1920	0.0531	0.0332	0.0366
labile	53	-0.0806	0.0585	-0.0188	0.1376	-0.0539	0.0517	0.0331	0.0792	0.1771	0.1055

		thyme	heir	radix	assignat	hiatus	subtle	procreat	gist	gouge	superflu
		21	22	23	24	25	26	27	28	29	30
thyme	21	1.0000									
heir	22	0.4664	1.0000								
radix	23	0.0967	0.2131	1.0000							
assignat	24	0.2631	0.2845	0.0574	1.0000						
hiatus	25	0.3931	0.2691	0.0460	0.1583	1.0000					
subtle	26	0.4098	0.3098	-0.0054	0.1439	0.2670	1.0000				
procreat	27	0.2861	0.1770	-0.1262	0.2769	0.1611	0.2787	1.0000			
gist	28	0.3460	0.2407	0.2055	0.1838	0.1762	0.1506	0.1596	1.0000		
gouge	29	0.2657	0.2268	0.0612	0.1859	0.2196	0.1244	0.3812	0.1672	1.0000	
superflu	30	0.3414	0.3798	-0.0394	0.3280	0.2489	0.3776	0.2965	0.2519	0.2601	1.0000
simile	31	0.0896	-0.0341	-0.0515	0.1026	0.1115	0.2577	0.3415	-0.0684	0.1550	0.0769
banal	32	-0.0355	-0.0733	-0.2351	-0.1227	-0.0754	-0.0917	-0.1219	-0.0047	0.1088	-0.1394
quadrupe	33	0.2635	0.1313	0.0241	0.0797	0.3018	0.3103	0.1816	0.1220	0.0483	0.3510
cellist	34	0.3344	0.3013	0.0423	0.1999	0.1271	0.2617	0.2482	0.3375	0.2160	0.4716
facade	35	0.5569	0.3717	0.1178	0.2459	0.5147	0.3873	0.2966	0.2716	0.2838	0.4808
zealot	36	0.3469	0.3638	-0.0623	0.1213	0.3678	0.2555	0.2531	0.2744	0.2013	0.3915
drachm	37	-0.0896	0.0341	-0.1658	0.0022	-0.0066	-0.0092	-0.2240	-0.1447	-0.0475	-0.1827
aeon	38	0.3256	0.2037	-0.0327	0.0992	0.3030	0.3002	0.2415	0.3048	0.2796	0.4156
placebo	39	0.1169	0.2094	0.0299	0.1791	0.1787	0.3052	0.1953	0.2014	0.0300	0.2671
abstemio	40	0.3227	0.1347	0.1433	0.0524	0.1598	0.2119	0.2139	0.1066	0.1247	0.2310
detente	41	0.1907	0.1692	-0.0463	0.1555	0.1824	0.2422	0.2251	0.1538	0.1826	0.2270
idyll	42	0.1420	-0.0615	-0.1187	0.1238	0.0314	0.0593	0.0828	-0.0103	0.1426	0.0796
puerpera	43	0.2228	0.1963	-0.2022	-0.0373	0.0314	0.1548	0.1731	0.1535	0.2253	0.3237
aver	44	0.2317	0.1656	-0.0225	0.3466	0.0578	0.1070	0.1336	0.1468	0.0629	0.1859
gauche	45	0.2795	0.1807	0.0189	0.2624	0.1650	0.1425	0.1594	0.1287	0.0299	0.2106
topiary	46	0.1874	0.2762	0.0283	0.1009	0.1223	0.2810	-0.0468	-0.0157	0.0545	0.2278
leviatha	47	0.2823	0.0619	-0.0380	0.1941	0.1148	0.2087	0.0913	0.1885	0.1088	0.2444
beatify	48	0.1060	-0.0039	0.1086	0.1758	0.2516	0.0400	-0.0347	0.1287	0.0299	0.2106
prelate	49	0.1579	0.1021	0.1120	0.1482	0.1421	0.0805	0.0900	0.1224	-0.0332	0.1683
sidereal	50	0.0897	0.1932	-0.0061	0.1173	0.0421	0.1137	0.0870	0.0325	0.1287	0.1757
demesne	51	0.1744	0.2110	-0.1613	-0.0726	0.2180	0.1665	0.1861	0.1760	0.2422	0.3480
syncope	52	0.1579	0.1021	-0.0400	0.1482	0.1421	0.0805	0.0900	0.1224	0.1171	0.1683
labile	53	-0.1163	0.0809	0.3267	0.0950	0.0622	0.1716	-0.0558	0.0785	0.0009	0.0641

		simile	banal	quadrupe	cellist	facade	zealot	drachm	aeon	placebo	abstemio
		31	32	33	34	35	36	37	38	39	40
simile	31	1.0000									
banal	32	-0.0781	1.0000								
quadrupe	33	0.1185	-0.0670	1.0000							
cellist	34	0.1219	-0.1481	0.4066	1.0000						
facade	35	0.1675	-0.0438	0.4053	0.3802	1.0000					

zealot	36	0.1390	-0.1144	0.3190	0.2985	0.3612	1.0000			
dracha	37	0.0440	0.0781	-0.1185	-0.1219	-0.1675	-0.0252	1.0000		
aeon	38	0.0206	-0.0373	0.3892	0.4743	0.3359	0.1731	-0.0206	1.0000	
placebo	39	0.0022	-0.1308	0.2644	0.3330	0.2722	0.2902	-0.2119	0.1779	1.0000
abstemio	40	0.1424	0.0144	0.3033	0.2825	0.3862	0.1889	-0.1424	0.3555	0.0834
detente	41	0.1151	-0.1336	0.1558	0.2551	0.2779	0.2321	0.0092	0.2472	0.2438
idyll	42	0.0591	-0.1072	0.3109	0.2069	0.0226	0.2505	-0.0591	0.0828	-0.0433
puerpera	43	0.0591	0.0140	0.1228	0.3924	0.1879	0.1630	-0.0591	0.3479	0.1179
aver	44	0.0719	-0.0272	0.2065	0.2742	0.2184	0.0706	-0.0719	0.1544	0.1336
gauche	45	0.0544	0.0315	0.1563	0.1478	0.2363	0.0158	-0.0544	0.0220	-0.0027
topiary	46	0.1287	-0.0202	0.0940	0.2951	0.2360	0.1058	-0.0111	0.0174	0.2296
leviatha	47	0.0797	-0.0492	0.2289	0.3623	0.2811	0.2296	-0.0797	0.2407	0.3129
beatify	48	0.0544	-0.0987	0.2573	0.1478	0.1476	0.0158	-0.0544	0.2118	0.0838
prelate	49	0.0307	-0.0558	0.2595	0.2522	0.1836	0.0620	-0.0307	0.2268	0.1451
sidereal	50	0.0944	-0.0018	0.2053	0.1267	0.2174	0.1292	0.0457	0.1409	0.1640
demesne	51	0.0636	-0.0012	0.0941	0.3471	0.3019	0.2105	-0.0636	0.3028	0.1484
syncope	52	0.0307	-0.0558	0.0883	0.0835	0.1836	0.2212	-0.0307	0.0660	-0.0015
labile	53	-0.1604	-0.1011	-0.0869	-0.0047	-0.0009	0.0005	-0.0557	-0.0291	0.0786
campanil	54	0.0307	-0.0558	0.0883	0.0835	0.1836	0.0620	-0.0307	-0.0948	0.1451

		detente	idyll	puerpera	aver	gauche	topiary	leviatha	beatify	prelate	sidereal
		41	42	43	44	45	46	47	48	49	50
detente	41	1.0000									
idyll	42	0.0362	1.0000								
puerpera	43	0.2272	0.0747	1.0000							
aver	44	-0.1883	0.2971	0.0345	1.0000						
gauche	45	0.1652	0.0924	-0.0732	0.0520	1.0000					
topiary	46	-0.0012	0.0076	0.2787	0.0972	0.1318	1.0000				
leviatha	47	0.1668	0.2566	0.2566	0.1793	0.0315	0.0509	1.0000			
beatify	48	0.0626	0.0924	-0.0732	0.1930	0.1105	-0.0623	0.1618	1.0000		
prelate	49	-0.0805	0.2393	-0.0414	0.4275	0.2634	0.0744	0.1650	0.2634	1.0000	
sidereal	50	0.0197	-0.1269	0.0884	0.0289	0.1144	0.1654	0.0829	-0.0012	0.1299	1.0000
demesne	51	0.3727	-0.0855	0.6399	-0.1040	-0.0787	0.1539	0.2270	-0.0787	-0.0445	0.0661
syncope	52	0.0933	-0.0414	-0.0414	-0.0503	-0.0381	-0.0900	0.1650	0.2634	-0.0215	0.1299
labile	53	-0.0173	-0.1373	-0.1373	0.0856	0.0648	-0.0415	0.0296	-0.0244	0.0366	0.1123
campanil	54	0.2671	0.2393	-0.0414	-0.0503	0.2634	-0.0900	0.3857	-0.0381	-0.0215	-0.0660

		demesne	syncope	labile	campanil
		51	52	53	54
demesne	51	1.0000			
syncope	52	-0.0445	1.0000		
labile	53	-0.1587	0.1877	1.0000	
campanil	54	-0.0445	-0.0215	0.0366	1.0000

APPENDIX E.

RELIABILITY AND VALIDITY - ENGLISH NSAGT SS: SORTINGS

Proportion correct - each word

	PIQ	VIQ	FSIQ	NART	Q
PIQ	1.0000				
VIQ	0.7578	1.0000			
FSIQ	0.9168	0.9519	1.0000		
NART	-0.4346	-0.6826	-0.6114	1.0000	
gauche	0.0000	0.0000	0.0000	0.0000	0.0000
prelate	0.0000	0.0000	0.0000	0.0000	0.0000
campanil	0.0000	0.0000	0.0000	0.0000	0.0000
syncope	-0.1047	-0.0647	-0.0913	-0.1501	0.0182
beatify	-0.2268	-0.1215	-0.1813	0.0296	0.0364
demesne	0.1527	0.2636	0.2331	-0.3497	0.0364
drachm	-0.0632	0.0157	-0.0245	0.0142	0.0545
idyll	0.0700	0.0638	0.0701	-0.0751	0.0545
puerpera	0.2322	0.3476	0.3276	-0.3654	0.0545
aver	0.1453	0.1264	0.1437	-0.1979	0.0545
leviatha	0.0816	0.2418	0.1962	-0.2091	0.0545
sidereal	0.1340	-0.0658	0.0098	-0.0453	0.0727
capon	-0.0203	0.0404	0.0256	-0.0281	0.1091
cellist	0.4353	0.4434	0.4734	-0.3778	0.1091
banal	0.0146	-0.1712	-0.1041	0.0771	0.1455
detente	0.1190	0.2005	0.1768	-0.3471	0.1455
topiary	0.3951	0.4267	0.4510	-0.2177	0.1455
abstemio	-0.0763	-0.1957	-0.1460	-0.0269	0.1818
facade	0.2335	0.3987	0.3538	-0.5134	0.2000
quadrupe	0.1795	0.3546	0.3016	-0.4230	0.2182
aeon	0.3992	0.4366	0.4547	-0.4660	0.2182
equivoca	0.3294	0.3793	0.3861	-0.5222	0.2545
catacomb	0.3113	0.3467	0.3532	-0.3418	0.2545
thyme	0.2871	0.4420	0.4107	-0.5397	0.2545
zealot	0.2599	0.3918	0.3450	-0.6386	0.2545
gaoled	0.3882	0.5919	0.5378	-0.6640	0.2727
placebo	0.0688	0.1993	0.1553	-0.4396	0.3273
labile	-0.0433	-0.0893	-0.0837	-0.1425	0.3273
assignat	0.0910	0.1625	0.1401	-0.3107	0.3455
superflu	0.3455	0.4680	0.4287	-0.7372	0.3455
hiatus	0.0859	0.2898	0.2197	-0.4347	0.4000
gist	0.1878	0.2441	0.2242	-0.2990	0.4545
courteou	0.3284	0.2675	0.3034	-0.4237	0.4909
heir	0.3188	0.4928	0.4389	-0.6160	0.5091
gouge	0.2745	0.3350	0.3342	-0.4546	0.5455
radix	0.0644	0.2551	0.1906	-0.2105	0.5636
rarefy	0.4070	0.6021	0.5467	-0.8023	0.5818
subtle	0.0966	0.3166	0.2333	-0.6469	0.6000
depot	0.0375	0.2910	0.1894	-0.5314	0.6364
debt	0.2617	0.3365	0.3258	-0.5630	0.6364

procreat	0.1634	0.2900	0.2488	-0.4837	0.6545
nausea	0.2351	0.3837	0.3402	-0.6501	0.7091
bouquet	0.0752	0.3027	0.2111	-0.5371	0.7455
aisle	0.0593	0.1928	0.1433	-0.2891	0.7818
deny	0.1644	0.3488	0.2820	-0.3198	0.7818
psalm	0.2024	0.3769	0.3130	-0.5121	0.8182
naive	0.0183	0.1277	0.0934	-0.4464	0.8182
ache	0.0635	0.3139	0.2108	-0.3941	0.9273
simile	0.0737	0.0826	0.0821	-0.2769	0.9273
chord	0.1354	0.2148	0.1813	-0.2463	0.9636

Correlations with NART errors

	PIQ	VIQ	FSIQ	NART	Q
PIQ	1.0000				
VIQ	0.7578	1.0000			
FSIQ	0.9168	0.9519	1.0000		
NART	-0.4346	-0.6826	-0.6114	1.0000	
abstemio	-0.0763	-0.1957	-0.1460	-0.0269	0.1818
capon	-0.0203	0.0404	0.0256	-0.0281	0.1091
sidereal	0.1340	-0.0658	0.0098	-0.0453	0.0727
idyll	0.0700	0.0638	0.0701	-0.0751	0.0545
labile	-0.0433	-0.0893	-0.0837	-0.1425	0.3273
syncope	-0.1047	-0.0647	-0.0913	-0.1501	0.0182
aver	0.1453	0.1264	0.1437	-0.1979	0.0545
leviatha	0.0816	0.2418	0.1962	-0.2091	0.0545
radix	0.0644	0.2551	0.1906	-0.2105	0.5636
topiary	0.3951	0.4267	0.4510	-0.2177	0.1455
chord	0.1354	0.2148	0.1813	-0.2463	0.9636
simile	0.0737	0.0826	0.0821	-0.2769	0.9273
aisle	0.0593	0.1928	0.1433	-0.2891	0.7818
gist	0.1878	0.2441	0.2242	-0.2990	0.4545
assignat	0.0910	0.1625	0.1401	-0.3107	0.3455
deny	0.1644	0.3488	0.2820	-0.3198	0.7818
catacomb	0.3113	0.3467	0.3532	-0.3418	0.2545
detente	0.1190	0.2005	0.1768	-0.3471	0.1455
demesne	0.1527	0.2636	0.2331	-0.3497	0.0364
puerpera	0.2322	0.3476	0.3276	-0.3654	0.0545
cellist	0.4353	0.4434	0.4734	-0.3778	0.1091
ache	0.0635	0.3139	0.2108	-0.3941	0.9273
quadrupe	0.1795	0.3546	0.3016	-0.4230	0.2182
courteou	0.3284	0.2675	0.3034	-0.4237	0.4909
hiatus	0.0859	0.2898	0.2197	-0.4347	0.4000
placebo	0.0688	0.1993	0.1553	-0.4396	0.3273
naive	0.0183	0.1277	0.0934	-0.4464	0.8182
gouge	0.2745	0.3350	0.3342	-0.4546	0.5455
aeon	0.3992	0.4366	0.4547	-0.4660	0.2182
procreat	0.1634	0.2900	0.2488	-0.4837	0.6545
psalm	0.2024	0.3769	0.3130	-0.5121	0.8182
facade	0.2335	0.3987	0.3538	-0.5134	0.2000

equivoca	0.3294	0.3793	0.3861	-0.5222	0.2545
depot	0.0375	0.2910	0.1894	-0.5314	0.6364
bouquet	0.0752	0.3027	0.2111	-0.5371	0.7455
thyme	0.2871	0.4420	0.4107	-0.5397	0.2545
debt	0.2617	0.3365	0.3258	-0.5630	0.6364
heir	0.3188	0.4928	0.4389	-0.6160	0.5091
zealot	0.2599	0.3918	0.3450	-0.6386	0.2545
subtle	0.0966	0.3166	0.2333	-0.6469	0.6000
nausea	0.2351	0.3837	0.3402	-0.6501	0.7091
gaoled	0.3882	0.5919	0.5378	-0.6640	0.2727
superflu	0.3455	0.4680	0.4287	-0.7372	0.3455
rarefy	0.4070	0.6021	0.5467	-0.8023	0.5818
gauche	0.0000	0.0000	0.0000	0.0000	0.0000
prelate	0.0000	0.0000	0.0000	0.0000	0.0000
campanil	0.0000	0.0000	0.0000	0.0000	0.0000
drachm	-0.0632	0.0157	-0.0245	0.0142	0.0545
beatify	-0.2268	-0.1215	-0.1813	0.0296	0.0364
banal	0.0146	-0.1712	-0.1041	0.0771	0.1455

Note: Kuder Richardson formula 20 for internal reliability = 0.87.

Correlations with FSIQ

	PIQ	VIQ	FSIQ	NART	Q
PIQ	1.0000				
VIQ	0.7578	1.0000			
FSIQ	0.9168	0.9519	1.0000		
NART	-0.4346	-0.6826	-0.6114	1.0000	
drachm	-0.0632	0.0157	-0.0245	0.0142	0.0545
labile	-0.0433	-0.0893	-0.0837	-0.1425	0.3273
syncope	-0.1047	-0.0647	-0.0913	-0.1501	0.0182
banal	0.0146	-0.1712	-0.1041	0.0771	0.1455
abstemio	-0.0763	-0.1957	-0.1460	-0.0269	0.1818
beatify	-0.2268	-0.1215	-0.1813	0.0296	0.0364
campanil	0.0000	0.0000	0.0000	0.0000	0.0000
gauche	0.0000	0.0000	0.0000	0.0000	0.0000
prelate	0.0000	0.0000	0.0000	0.0000	0.0000
sidereal	0.1340	-0.0658	0.0098	-0.0453	0.0727
capon	-0.0203	0.0404	0.0256	-0.0281	0.1091
idyll	0.0700	0.0638	0.0701	-0.0751	0.0545
simile	0.0737	0.0826	0.0821	-0.2769	0.9273
naive	0.0183	0.1277	0.0934	-0.4464	0.8182
assignat	0.0910	0.1625	0.1401	-0.3107	0.3455
aisle	0.0593	0.1928	0.1433	-0.2891	0.7818
aver	0.1453	0.1264	0.1437	-0.1979	0.0545
placebo	0.0688	0.1993	0.1553	-0.4396	0.3273
detente	0.1190	0.2005	0.1768	-0.3471	0.1455
chord	0.1354	0.2148	0.1813	-0.2463	0.9636
depot	0.0375	0.2910	0.1894	-0.5314	0.6364
radix	0.0644	0.2551	0.1906	-0.2105	0.5636

leviatha	0.0816	0.2418	0.1962	-0.2091	0.0545
ache	0.0635	0.3139	0.2108	-0.3941	0.9273
bouquet	0.0752	0.3027	0.2111	-0.5371	0.7455
hiatus	0.0859	0.2898	0.2197	-0.4347	0.4000
gist	0.1878	0.2441	0.2242	-0.2990	0.4545
demesne	0.1527	0.2636	0.2331	-0.3497	0.0364
subtle	0.0966	0.3166	0.2333	-0.6469	0.6000
procreat	0.1634	0.2900	0.2488	-0.4837	0.6545
deny	0.1644	0.3488	0.2820	-0.3198	0.7818
quadrupe	0.1795	0.3546	0.3016	-0.4230	0.2182
courteou	0.3284	0.2675	0.3034	-0.4237	0.4909
psalm	0.2024	0.3769	0.3130	-0.5121	0.8182
debt	0.2617	0.3365	0.3258	-0.5630	0.6364
puerpera	0.2322	0.3476	0.3276	-0.3654	0.0545
gouge	0.2745	0.3350	0.3342	-0.4546	0.5455
nausea	0.2351	0.3837	0.3402	-0.6501	0.7091
zealot	0.2599	0.3918	0.3450	-0.6386	0.2545
catacomb	0.3113	0.3467	0.3532	-0.3418	0.2545
facade	0.2335	0.3987	0.3538	-0.5134	0.2000
equivoca	0.3294	0.3793	0.3861	-0.5222	0.2545
thyme	0.2871	0.4420	0.4107	-0.5397	0.2545
superflu	0.3455	0.4680	0.4287	-0.7372	0.3455
heir	0.3188	0.4928	0.4389	-0.6160	0.5091
topiary	0.3951	0.4267	0.4510	-0.2177	0.1455
aeon	0.3992	0.4366	0.4547	-0.4660	0.2182
cellist	0.4353	0.4434	0.4734	-0.3778	0.1091
gaoled	0.3882	0.5919	0.5378	-0.6640	0.2727
rarefy	0.4070	0.6021	0.5467	-0.8023	0.5818

RELIABILITY AND VALIDITY - SAWAIS SS - SORTINGS

Proportion correct

	PIQ	VIQ	FSIQ	NART	Q
PIQ	1.0000				
VIQ	0.2721	1.0000			
FSIQ	0.8453	0.7434	1.0000		
NART	-0.4305	-0.4679	-0.5521	1.0000	
chord	0.0000	0.0000	0.0000	0.0000	1.0000
ache	0.0000	0.0000	0.0000	0.0000	1.0000
depot	0.2264	0.3061	0.3276	-0.3355	0.9024
aisle	0.0000	0.0000	0.0000	0.0000	1.0000
bouquet	0.0000	0.0000	0.0000	0.0000	1.0000
psalm	0.2621	-0.0367	0.1575	-0.1949	0.9756
capon	-0.1023	-0.0854	-0.1165	0.1831	0.0488

deny	0.3166	-0.0367	0.1956	-0.0608	0.9756
nausea	0.0000	0.0000	0.0000	0.0000	1.0000
debt	0.0281	0.2424	0.1493	-0.3355	0.9024
courteou	0.2998	0.1415	0.2727	-0.3292	0.7073
rarefy	-0.1153	0.1827	0.0252	-0.0547	0.7561
equivoca	0.2685	0.4706	0.4431	-0.5822	0.5122
naive	0.0243	0.0101	0.0210	-0.1831	0.9512
catacomb	0.3615	0.2736	0.4076	-0.3486	0.5610
gaoled	0.0667	0.2490	0.1785	-0.5243	0.5122
thyme	0.1834	0.2679	0.2783	-0.4382	0.7317
heir	0.1491	0.1859	0.2006	-0.3076	0.8780
radix	-0.1481	0.1534	-0.0180	-0.0020	0.7073
assignat	0.1272	-0.0132	0.0789	-0.3243	0.6829
hiatus	0.1791	0.3000	0.2898	-0.4863	0.6585
subtle	0.1395	0.1735	0.1956	-0.1949	0.9756
procreat	0.1535	0.0492	0.1346	-0.4085	0.8049
gist	0.2761	0.5351	0.4906	-0.4592	0.7561
gouge	0.2536	0.1088	0.2304	-0.4487	0.6829
superflu	0.1712	0.0225	0.1243	-0.6726	0.5366
simile	0.0442	-0.0192	0.0242	-0.2217	0.9756
banal	-0.0919	-0.0147	-0.0800	0.0986	0.0976
quadrupe	0.1770	0.3847	0.3320	-0.7192	0.2683
cellist	0.3751	0.2002	0.3622	-0.7348	0.4390
facade	0.2428	0.2779	0.3235	-0.6699	0.6341
zealot	0.2370	0.2158	0.2866	-0.4806	0.3659
drachm	-0.0714	-0.4012	-0.2718	0.2485	0.0244
aeon	0.4268	0.3134	0.4621	-0.6503	0.3902
placebo	0.1123	0.1459	0.1589	-0.1302	0.7317
abstemio	0.1140	0.1619	0.1684	-0.5927	0.4878
detente	0.1975	0.1503	0.2246	-0.2899	0.3415
idyll	-0.0281	0.1948	0.0884	-0.2917	0.0976
puerpera	0.4604	0.2130	0.4351	-0.3614	0.0976
aver	0.1636	0.1773	0.2118	-0.3421	0.1707
gauche	-0.1038	0.0962	-0.0217	-0.2269	0.1463
topiary	-0.1038	-0.1363	-0.1538	-0.0655	0.4634
leviatha	0.2630	0.0971	0.2314	-0.4155	0.2195
beatify	-0.1344	0.1766	-0.0007	-0.4171	0.0976
prelate	-0.0633	0.0275	-0.0346	-0.3929	0.0488
sidereal	0.2220	-0.0109	0.1471	-0.2616	0.2927
demesne	0.3063	0.2262	0.3358	-0.2971	0.1463
syncope	0.1056	0.2470	0.2045	-0.2877	0.0244
labile	0.1592	0.1239	0.1787	-0.0598	0.4390
campanil	0.0538	0.1279	0.1155	-0.1049	0.0488

Correlations with NART errors

	PIQ	VIQ	FSIQ	NART Q
PIQ	1.0000			
VIQ	0.2721	1.0000		
FSIQ	0.8453	0.7434	1.0000	
NART	-0.4305	-0.4679	-0.5521	1.0000

radix	-0.1481	0.1534	-0.0180	-0.0020	0.7073
rarefy	-0.1153	0.1827	0.0252	-0.0547	0.7561
labile	0.1592	0.1239	0.1787	-0.0598	0.4390
deny	0.3166	-0.0367	0.1956	-0.0608	0.9756
topiary	-0.1038	-0.1363	-0.1538	-0.0655	0.4634
campanil	0.0538	0.1279	0.1155	-0.1049	0.0488
placebo	0.1123	0.1459	0.1589	-0.1302	0.7317
naive	0.0243	0.0101	0.0210	-0.1831	0.9512
psalm	0.2621	-0.0367	0.1575	-0.1949	0.9756
subtle	0.1395	0.1735	0.1956	-0.1949	0.9756
simile	0.0442	-0.0192	0.0242	-0.2217	0.9756
gauche	-0.1038	0.0962	-0.0217	-0.2269	0.1463
sidereal	0.2220	-0.0109	0.1471	-0.2616	0.2927
syncope	0.1056	0.2470	0.2045	-0.2877	0.0244
detente	0.1975	0.1503	0.2246	-0.2899	0.3415
idyll	-0.0281	0.1948	0.0884	-0.2917	0.0976
demesne	0.3063	0.2262	0.3358	-0.2971	0.1463
heir	0.1491	0.1859	0.2006	-0.3076	0.8780
assignat	0.1272	-0.0132	0.0789	-0.3243	0.6829
courteou	0.2998	0.1415	0.2727	-0.3292	0.7073
depot	0.2264	0.3061	0.3276	-0.3355	0.9024
debt	0.0281	0.2424	0.1493	-0.3355	0.9024
aver	0.1636	0.1773	0.2118	-0.3421	0.1707
catacomb	0.3615	0.2736	0.4076	-0.3486	0.5610
puerpera	0.4604	0.2130	0.4351	-0.3614	0.0976
prelate	-0.0633	0.0275	-0.0346	-0.3929	0.0488
procreat	0.1535	0.0492	0.1346	-0.4085	0.8049
leviatha	0.2630	0.0971	0.2314	-0.4155	0.2195
beatify	-0.1344	0.1766	-0.0007	-0.4171	0.0976
thyme	0.1834	0.2679	0.2783	-0.4382	0.7317
gouge	0.2536	0.1088	0.2304	-0.4487	0.6829
gist	0.2761	0.5351	0.4906	-0.4592	0.7561
zealot	0.2370	0.2158	0.2866	-0.4806	0.3659
hiatus	0.1791	0.3000	0.2898	-0.4863	0.6585
gaoled	0.0667	0.2490	0.1785	-0.5243	0.5122
equivoca	0.2685	0.4706	0.4431	-0.5822	0.5122
abstemio	0.1140	0.1619	0.1684	-0.5927	0.4878
aeon	0.4268	0.3134	0.4621	-0.6503	0.3902
facade	0.2428	0.2779	0.3235	-0.6699	0.6341
superflu	0.1712	0.0225	0.1243	-0.6726	0.5366
quadrupe	0.1770	0.3847	0.3320	-0.7192	0.2683
cellist	0.3751	0.2002	0.3622	-0.7348	0.4390
chord	0.0000	0.0000	0.0000	0.0000	1.0000
ache	0.0000	0.0000	0.0000	0.0000	1.0000
aisle	0.0000	0.0000	0.0000	0.0000	1.0000
bouquet	0.0000	0.0000	0.0000	0.0000	1.0000
nausea	0.0000	0.0000	0.0000	0.0000	1.0000
banal	-0.0919	-0.0147	-0.0800	0.0986	0.0976
capon	-0.1023	-0.0854	-0.1165	0.1831	0.0488
drachm	-0.0714	-0.4012	-0.2718	0.2485	0.0244

Note: Kuder Richardson formula 20 for internal reliability = 0.82.

Correlations with FSIQ

	PIQ	VIQ	FSIQ	NART	Q
PIQ	1.0000				
VIQ	0.2721	1.0000			
FSIQ	0.8453	0.7434	1.0000		
NART	-0.4305	-0.4679	-0.5521	1.0000	
beatify	-0.1344	0.1766	-0.0007	-0.4171	0.0976
radix	-0.1481	0.1534	-0.0180	-0.0020	0.7073
gauche	-0.1038	0.0962	-0.0217	-0.2269	0.1463
prelate	-0.0633	0.0275	-0.0346	-0.3929	0.0488
banal	-0.0919	-0.0147	-0.0800	0.0986	0.0976
capon	-0.1023	-0.0854	-0.1165	0.1831	0.0488
topiary	-0.1038	-0.1363	-0.1538	-0.0655	0.4634
drachm	-0.0714	-0.4012	-0.2718	0.2485	0.0244
chord	0.0000	0.0000	0.0000	0.0000	1.0000
ache	0.0000	0.0000	0.0000	0.0000	1.0000
aisle	0.0000	0.0000	0.0000	0.0000	1.0000
bouquet	0.0000	0.0000	0.0000	0.0000	1.0000
nausea	0.0000	0.0000	0.0000	0.0000	1.0000
naive	0.0243	0.0101	0.0210	-0.1831	0.9512
simile	0.0442	-0.0192	0.0242	-0.2217	0.9756
rarefy	-0.1153	0.1827	0.0252	-0.0547	0.7561
assignat	0.1272	-0.0132	0.0789	-0.3243	0.6829
idyll	-0.0281	0.1948	0.0884	-0.2917	0.0976
campanil	0.0538	0.1279	0.1155	-0.1049	0.0488
superflu	0.1712	0.0225	0.1243	-0.6726	0.5366
procreat	0.1535	0.0492	0.1346	-0.4085	0.8049
sidereal	0.2220	-0.0109	0.1471	-0.2616	0.2927
debt	0.0281	0.2424	0.1493	-0.3355	0.9024
psalm	0.2621	-0.0367	0.1575	-0.1949	0.9756
placebo	0.1123	0.1459	0.1589	-0.1302	0.7317
abstemio	0.1140	0.1619	0.1684	-0.5927	0.4878
gaoled	0.0667	0.2490	0.1785	-0.5243	0.5122
labile	0.1592	0.1239	0.1787	-0.0598	0.4390
deny	0.3166	-0.0367	0.1956	-0.0608	0.9756
subtle	0.1395	0.1735	0.1956	-0.1949	0.9756
heir	0.1491	0.1859	0.2006	-0.3076	0.8780
syncope	0.1056	0.2470	0.2045	-0.2877	0.0244
aver	0.1636	0.1773	0.2118	-0.3421	0.1707
detente	0.1975	0.1503	0.2246	-0.2899	0.3415
gouge	0.2536	0.1088	0.2304	-0.4487	0.6829
leviatha	0.2630	0.0971	0.2314	-0.4155	0.2195
courteou	0.2998	0.1415	0.2727	-0.3292	0.7073
thyme	0.1834	0.2679	0.2783	-0.4382	0.7317
zealot	0.2370	0.2158	0.2866	-0.4806	0.3659
hiatus	0.1791	0.3000	0.2898	-0.4863	0.6585
facade	0.2428	0.2779	0.3235	-0.6699	0.6341
depot	0.2264	0.3061	0.3276	-0.3355	0.9024
quadrupe	0.1770	0.3847	0.3320	-0.7192	0.2683

demesne	0.3063	0.2262	0.3358	-0.2971	0.1463
cellist	0.3751	0.2002	0.3622	-0.7348	0.4390
catacomb	0.3615	0.2736	0.4076	-0.3486	0.5610
puerpera	0.4604	0.2130	0.4351	-0.3614	0.0976
equivoca	0.2685	0.4706	0.4431	-0.5822	0.5122
aeon	0.4268	0.3134	0.4621	-0.6503	0.3902
gist	0.2761	0.5351	0.4906	-0.4592	0.7561

APPENDIX F.

ITEM INTER - CORRELATION MATRIX

	PIQ	VIQ	FSIQ	MART	prop
	1	2	3	4	
PIQ	1.0000				
VIQ	0.6331	1.0000			
FSIQ	0.8673	0.9313	1.0000		
MART	-0.5089	-0.7720	-0.7234	1.0000	
chord	0.1399	0.2280	0.2048	-0.2437	0.9789
ache	0.0993	0.3288	0.2547	-0.3749	0.9579
depot	0.1678	0.4119	0.3371	-0.5691	0.7474
aisle	0.1355	0.3405	0.2771	-0.3842	0.8737
bouquet	0.1557	0.4415	0.3492	-0.5150	0.8632
psalm	0.2663	0.4086	0.3814	-0.4533	0.8947
capon	-0.0735	-0.0622	-0.0620	0.0977	0.0842
deny	0.2485	0.3989	0.3675	-0.3798	0.8632
nausea	0.2807	0.5089	0.4557	-0.6031	0.8421
debt	0.2648	0.4342	0.4004	-0.5458	0.7579
courteou	0.3595	0.3122	0.3548	-0.4236	0.5895
rarefy	0.2617	0.4796	0.4348	-0.5301	0.6632
equivoca	0.3521	0.4541	0.4526	-0.5772	0.3684
naive	0.0728	0.2171	0.1764	-0.3815	0.8842
catacomb	0.3869	0.4248	0.4475	-0.4366	0.3895
gaoled	0.3037	0.4961	0.4614	-0.6172	0.3789
thyme	0.3404	0.5642	0.5193	-0.6259	0.4632
heir	0.3469	0.5571	0.5126	-0.6074	0.6737
radix	0.0269	0.2632	0.1879	-0.1713	0.6316
assignat	0.1874	0.2997	0.2720	-0.4237	0.4947
hiatus	0.1831	0.3762	0.3264	-0.4973	0.5158
subtle	0.2064	0.4961	0.4081	-0.6323	0.7684
procreat	0.1981	0.2793	0.2709	-0.4485	0.7263
gist	0.2851	0.4266	0.3945	-0.4371	0.5895
gouge	0.2927	0.2905	0.3248	-0.4345	0.6105
superflu	0.3124	0.3633	0.3711	-0.6798	0.4316
simile	0.0954	0.1299	0.1262	-0.2096	0.9579
banal	-0.0418	-0.1441	-0.1197	0.1205	0.1263
quadrupe	0.1856	0.2974	0.2817	-0.4738	0.2421
cellist	0.4481	0.4621	0.4959	-0.6162	0.2526
facade	0.3247	0.5194	0.4789	-0.6707	0.3895
zealot	0.2699	0.3175	0.3249	-0.5327	0.3053
drachm	-0.0838	-0.1047	-0.1053	0.1171	0.0421
aeon	0.4345	0.3980	0.4568	-0.5386	0.2947

placebo	0.1860	0.3902	0.3305	-0.4631	0.5053
abstemio	0.0985	0.1698	0.1447	-0.3902	0.3158
detente	0.2049	0.2748	0.2681	-0.3778	0.2316
idyll	0.0466	0.1289	0.1025	-0.1816	0.0737
puerpera	0.3355	0.2603	0.3267	-0.3391	0.0737
aver	0.1900	0.2184	0.2230	-0.3123	0.1053
gauche	0.0274	0.2277	0.1505	-0.2725	0.0632
topiary	0.2434	0.3782	0.3563	-0.3524	0.2737
leviatha	0.2228	0.2742	0.2771	-0.3750	0.1263
beatify	-0.1293	0.0797	-0.0158	-0.2179	0.0632
prelate	0.0119	0.1208	0.0769	-0.2833	0.0211
sidereal	0.2360	0.1677	0.2006	-0.2771	0.1684
demesne	0.2599	0.2822	0.2971	-0.3517	0.0842
syncope	-0.0098	0.0385	0.0138	-0.1816	0.0211
labile	0.0664	0.0577	0.0560	-0.1411	0.3789
campanil	0.0769	0.1521	0.1303	-0.1446	0.0211
courteou	rarefy	equivoca	naive	catacomb	gaoled

		capon	deny	nausea	debt

		11	12	13	14	15	16	17	18	19	20
capon	11	1.0000									
deny	12	0.0104	1.0000								
nausea	13	-0.1805	0.3316	1.0000							
debt	14	-0.0056	0.1325	0.3618	1.0000						
courteou	15	-0.0552	0.2903	0.2841	0.3276	1.0000					
rarefy	16	-0.0245	0.2995	0.4854	0.3771	0.1296	1.0000				
equivoca	17	-0.0744	0.1136	0.2110	0.3298	0.2381	0.2673	1.0000			
naive	18	-0.0087	0.2388	0.2944	0.1027	0.1661	0.2989	0.2764	1.0000		
catacomb	19	-0.0867	0.0040	0.1683	0.1995	0.0083	0.1582	0.2850	0.1541	1.0000	
gaoled	20	-0.0025	0.1848	0.3382	0.3908	0.2549	0.3272	0.3030	0.2149	0.4440	1.0000
thyme	21	-0.0536	0.1856	0.4022	0.2786	0.1314	0.3493	0.2971	0.2042	0.1672	0.3623
heir	22	-0.1123	0.2455	0.4990	0.3404	0.3320	0.4065	0.3454	0.2393	0.2336	0.2660
radix	23	-0.0041	0.0769	0.0882	0.0778	-0.0607	0.1944	-0.0952	0.0646	0.1178	0.1468
assignat	24	-0.1484	0.2102	0.3707	0.2152	0.1410	0.3043	0.0735	0.2265	0.0732	0.0516
hiatus	25	-0.1613	0.0432	0.1581	0.1900	-0.1235	0.3345	0.4344	0.1760	0.3419	0.2792
subtle	26	0.0766	0.3623	0.4466	0.4470	0.3535	0.3479	0.2641	0.1913	0.2338	0.3774
procreat	27	-0.0689	0.0991	0.3169	0.2042	0.1596	0.2619	0.2241	0.2206	0.1998	0.1875
gist	28	-0.2093	0.1036	0.1081	0.3775	0.1735	0.2202	0.2381	0.0993	0.1838	0.2108
gouge	29	-0.0687	0.1845	0.3053	0.1029	0.1233	0.3442	0.3415	0.1832	0.1510	0.2234
superflu	30	-0.0346	0.2233	0.3773	0.3436	0.3383	0.3512	0.3919	0.2489	0.3065	0.5022
simile	31	0.0636	0.0690	0.1967	0.0039	-0.0684	0.0724	0.1601	0.2517	0.1675	-0.0523
banal	32	-0.0012	-0.2174	-0.0091	-0.0070	0.0597	-0.1313	-0.1590	-0.0605	-0.1088	-0.0358
quadrupe	33	-0.0829	0.1535	0.1773	0.1473	0.1220	0.1948	0.1796	0.0509	0.2037	0.4196
cellist	34	-0.0891	0.2315	0.1853	0.3286	0.4359	0.1581	0.3595	0.0590	0.2311	0.4447
facade	35	-0.0867	0.1296	0.2867	0.2498	0.1838	0.2495	0.3745	0.2216	0.2032	0.3550
zealot	36	-0.0364	0.1309	0.2243	0.2679	0.1815	0.1822	0.3940	0.2399	0.2674	0.3303
dracha	37	0.1252	-0.0690	-0.0530	-0.0039	-0.0381	-0.0724	-0.0515	0.0759	-0.0600	-0.0557
aeon	38	-0.0298	0.1230	0.2799	0.3115	0.1640	0.2653	0.3199	0.0175	0.2886	0.4469
placebo	39	0.0726	0.3411	0.2644	0.1780	0.2870	0.2302	0.1884	0.1683	0.0564	0.2522
abstemio	40	0.1202	-0.0590	0.1700	0.1725	0.1066	0.0050	0.1384	0.1043	0.1540	0.2162
detente	41	-0.0766	0.0734	0.2377	0.1355	0.0016	0.0217	0.2015	0.0427	0.1756	0.1370
idyll	42	-0.0855	0.1123	0.1221	-0.0287	0.1535	0.0305	0.1187	0.1021	0.0226	0.1950
puerpera	43	0.0596	0.1123	0.1221	0.1594	0.2354	0.0305	0.3693	0.1021	0.1052	0.1950
aver	44	-0.1040	0.0368	0.1485	0.1138	0.2165	0.2445	0.3069	0.1241	0.1481	0.1563
gauche	45	-0.0787	0.1034	0.1124	0.1468	0.1287	0.0019	0.0708	0.0940	0.1476	0.0648

Key to appendices G and H:

Appendix G:

Column. head	Explanation
NUM	S number (names removed for purposes of confidentiality)
GRP	group from which S drawn
AGE	age of S
RA	race of S
SEX	sex of S
MA	Mental Age score
CF	Culture Fair Test score
GTP	P.I.Q.
GTV	V.I.Q.
GTT	F.S.I.Q.
LH	'home' language of S
LF	language spoken to friends
LW	language spoken at work
LP	language in parental home
LSC	language spoken at school
LHE	language of higher education
LS	medium of instruction at school
LMN	average language usage
LTB	indicator of whether S's average language usage fell in top 27%, bottom 27%, or middle 46% of group
NTC	Total words pronounced correctly - NART plus new words
NOC	NART words correct
NNC	New words correct
NTE	Total words pronounced incorrectly - NART plus new words
NOE	NART words incorrect
NNE	New words incorrect
CHOP - CAMP	Individual NART words - correct/incorrect pronunciation
COMP - GROP	Individual new words - correct/incorrect pronunciation

Appendix H: - as above where column headings correspond except as follows:

ACHM - PREM	Individual NART words - correct/incorrect meanings as per multiple choice questionnaire
COMM - GROM	Individual new words - correct/incorrect meanings as per multiple choice questionnaire

APPENDIX G. - ALL S's ALL DATA EXCL MEANINGS

NUM	GRP	AGE	RA	SEX	MA	CF	GTP	GTV	GTT	LH	LF	LW	LP	LSC	LHE	LS	LNN	LTB	NTC	NOC	NNC
547	5	24	0	0	-1	-1	-1	-1	-1	-1	7	2	7	7	-1	-1	5.8	4	-1	1	-1
528	5	28	0	0	-1	-1	-1	-1	-1	-1	6	5	7	5	-1	-1	5.8	4	-1	6	-1
536	5	29	0	0	-1	-1	-1	-1	-1	-1	7	7	7	7	-1	-1	7.0	7	-1	15	-1
555	5	27	0	0	-1	-1	-1	-1	-1	-1	7	1	7	7	-1	-1	5.6	4	-1	13	-1
561	5	22	0	0	-1	-1	-1	-1	-1	-1	7	7	7	7	-1	-1	7.0	7	-1	10	-1
519	5	32	0	0	-1	-1	-1	-1	-1	-1	7	1	7	7	-1	-1	5.6	4	-1	4	-1
522	5	26	0	0	-1	-1	-1	-1	-1	-1	7	6	7	7	-1	-1	6.8	7	-1	3	-1
521	5	22	0	0	-1	-1	-1	-1	-1	-1	7	3	6	7	-1	-1	5.6	4	-1	5	-1
533	5	28	0	0	-1	-1	-1	-1	-1	-1	7	6	7	7	-1	-1	6.8	7	-1	17	-1
558	5	33	0	0	-1	-1	-1	-1	-1	-1	7	2	6	7	-1	-1	5.6	4	-1	21	-1
508	5	30	0	0	-1	-1	-1	-1	-1	-1	7	6	7	7	-1	-1	6.7	7	-1	3	-1
504	5	21	0	0	-1	-1	-1	-1	-1	-1	7	4	4	7	-1	-1	5.3	4	-1	12	-1
515	5	21	0	0	-1	-1	-1	-1	-1	-1	7	6	7	7	-1	-1	6.7	7	-1	0	-1
525	5	30	0	0	-1	-1	-1	-1	-1	-1	7	4	7	4	-1	-1	5.3	4	-1	2	-1
568	5	29	0	0	-1	-1	-1	-1	-1	-1	7	5	7	7	-1	-1	6.5	7	-1	8	-1
562	5	26	0	0	-1	-1	-1	-1	-1	-1	7	2	4	7	-1	-1	4.9	4	-1	5	-1
527	5	25	0	0	-1	-1	-1	-1	-1	-1	7	5	7	7	-1	-1	6.5	7	-1	2	-1
553	5	28	0	0	-1	-1	-1	-1	-1	-1	7	6	2	5	-1	-1	4.9	4	-1	1	-1
543	5	25	0	0	-1	-1	-1	-1	-1	-1	7	5	7	7	-1	-1	6.5	7	-1	13	-1
539	5	23	0	0	-1	-1	-1	-1	-1	-1	7	1	4	7	-1	-1	4.7	4	-1	14	-1
507	5	23	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.3	7	-1	2	-1
502	5	33	0	0	-1	-1	-1	-1	-1	-1	7	6	1	4	-1	-1	4.4	4	-1	4	-1
540	5	21	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.3	4	-1	8	-1
541	5	28	0	0	-1	-1	-1	-1	-1	-1	5	2	7	4	-1	-1	4.4	4	-1	17	-1
552	5	27	0	0	-1	-1	-1	-1	-1	-1	7	6	7	5	-1	-1	6.3	4	-1	10	-1
517	5	26	0	0	-1	-1	-1	-1	-1	-1	1	6	4	7	-1	-1	4.4	4	-1	8	-1
565	5	24	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.1	4	-1	2	-1
514	5	27	0	0	-1	-1	-1	-1	-1	-1	7	4	1	5	-1	-1	4.2	4	-1	22	-1
557	5	30	0	0	-1	-1	-1	-1	-1	-1	6	4	7	7	-1	-1	6.1	4	-1	13	-1
520	5	28	0	0	-1	-1	-1	-1	-1	-1	2	4	4	7	-1	-1	4.0	4	-1	23	-1
566	5	26	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.1	4	-1	11	-1
526	5	25	0	0	-1	-1	-1	-1	-1	-1	7	6	1	2	-1	-1	4.0	4	-1	27	-1
516	5	24	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.1	4	-1	1	-1
549	5	25	0	0	-1	-1	-1	-1	-1	-1	6	3	6	1	-1	-1	4.0	1	-1	22	-1
569	5	23	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.1	4	-1	8	-1
510	5	31	0	0	-1	-1	-1	-1	-1	-1	1	1	7	7	-1	-1	3.9	1	-1	6	-1
563	5	22	0	0	-1	-1	-1	-1	-1	-1	7	2	7	7	-1	-1	5.8	4	-1	11	-1
545	5	31	0	0	-1	-1	-1	-1	-1	-1	1	6	7	1	-1	-1	3.7	1	-1	14	-1
571	5	32	0	0	-1	-1	-1	-1	-1	-1	7	7	7	7	-1	-1	7.0	7	-1	4	-1
511	5	25	0	0	-1	-1	-1	-1	-1	-1	4	5	1	4	-1	-1	3.3	1	-1	11	-1
548	5	23	0	0	-1	-1	-1	-1	-1	-1	7	6	7	7	-1	-1	6.8	7	-1	10	-1
501	5	25	0	0	-1	-1	-1	-1	-1	-1	1	6	1	3	-1	-1	2.6	1	-1	19	-1
509	5	32	0	0	-1	-1	-1	-1	-1	-1	7	6	7	7	-1	-1	6.7	7	-1	21	-1
556	5	27	0	0	-1	-1	-1	-1	-1	-1	1	2	7	1	-1	-1	2.6	1	-1	32	-1
567	5	28	0	0	-1	-1	-1	-1	-1	-1	7	5	7	7	-1	-1	6.5	7	-1	14	-1
529	5	27	0	0	-1	-1	-1	-1	-1	-1	1	2	7	1	-1	-1	2.6	1	-1	19	-1
518	5	31	0	0	-1	-1	-1	-1	-1	-1	7	5	7	7	-1	-1	6.5	7	-1	6	-1
570	5	27	0	0	-1	-1	-1	-1	-1	-1	1	5	1	1	-1	-1	1.8	1	-1	23	-1
572	5	30	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.3	4	-1	15	-1
551	5	25	0	0	-1	-1	-1	-1	-1	-1	1	5	1	1	-1	-1	1.8	1	-1	9	-1
534	5	29	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.1	4	-1	11	-1
559	5	21	0	0	-1	-1	-1	-1	-1	-1	1	4	1	1	-1	-1	1.4	1	-1	21	-1
523	5	29	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.1	4	-1	10	-1
530	5	27	0	0	-1	-1	-1	-1	-1	-1	1	4	1	1	-1	-1	1.4	1	-1	33	-1
544	5	32	0	0	-1	-1	-1	-1	-1	-1	7	3	7	7	-1	-1	6.0	4	-1	27	-1
535	5	26	0	0	-1	-1	-1	-1	-1	-1	1	1	1	4	-1	-1	1.4	1	-1	14	-1

APPENDIX G. - ALL S's ALL DATA EXCL MEANINGS

573	5	26	0	0	-1	-1	-1	-1	-1	-1	7	7	7	7	-1	-1	7.0	7	-1	1	-1
513	5	30	0	0	-1	-1	-1	-1	-1	-1	1	3	1	1	-1	-1	1.2	1	-1	30	-1
546	5	27	0	0	-1	-1	-1	-1	-1	-1	7	7	5	7	-1	-1	6.5	7	-1	17	-1
550	5	26	0	0	-1	-1	-1	-1	-1	-1	1	1	1	1	-1	-1	0.9	1	-1	24	-1
564	5	31	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.3	7	-1	7	-1
512	5	25	0	0	-1	-1	-1	-1	-1	-1	1	1	1	1	-1	-1	0.9	1	-1	10	-1
524	5	24	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.1	4	-1	7	-1
506	5	30	0	0	-1	-1	-1	-1	-1	-1	1	1	1	1	-1	-1	0.9	1	-1	24	-1
505	5	29	0	0	-1	-1	-1	-1	-1	-1	1	1	0	1	-1	-1	0.5	1	-1	38	-1
542	5	30	0	0	-1	-1	-1	-1	-1	-1	1	1	1	1	-1	-1	0.7	1	-1	30	-1
560	5	24	0	0	-1	-1	-1	-1	-1	-1	7	5	7	7	-1	-1	6.5	7	-1	1	-1
537	5	25	0	0	-1	-1	-1	-1	-1	-1	1	1	1	1	-1	-1	0.7	1	-1	26	-1
531	5	28	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.1	4	-1	3	-1
503	5	27	0	0	-1	-1	-1	-1	-1	-1	7	4	7	7	-1	-1	6.3	4	-1	10	-1
532	5	25	0	0	-1	-1	-1	-1	-1	-1	7	6	7	7	-1	-1	6.7	7	-1	8	-1
538	5	29	0	0	-1	-1	-1	-1	-1	-1	1	1	1	1	-1	-1	0.7	1	-1	16	-1
8	0	18	1	0	1	-1	81	70	70	7	7	-1	7	-1	-1	7	7.0	7	17	9	8
101	1	22	1	0	1	83	70	70	70	7	-1	-1	-1	-1	-1	7	7	7	18	10	8
109	1	20	1	0	1	84	81	70	70	7	7	7	7	-1	-1	7	7	7	13	6	7
36	0	22	1	0	1	-1	70	70	70	7	7	-1	7	-1	-1	7	7.0	7	18	11	7
115	1	23	1	0	1	89	75	70	70	7	7	7	7	-1	-1	7	7	7	14	7	7
117	1	23	1	0	1	76	70	70	70	7	7	7	7	-1	-1	7	7	7	10	6	4
102	1	19	1	0	1	83	77	76	75	-1	5	6	6	-1	-1	7	6	4	13	8	5
48	0	19	1	0	1	-1	86	70	75	7	-1	-1	-1	-1	-1	-1	7.0	7	11	5	6
28	0	19	1	0	2	-1	87	70	78	7	7	-1	7	-1	7	7	7.0	7	10	5	5
47	0	18	1	0	2	-1	84	75	78	1	-1	-1	-1	-1	-1	-1	1.0	1	24	13	11
2	0	20	1	0	1	-1	70	88	79	7	7	-1	7	-1	-1	7	7.0	7	5	2	3
114	1	22	1	0	2	66	83	76	79	7	5	5	5	-1	-1	7	5.8	4	13	9	4
106	1	19	1	0	1	91	83	76	79	7	-1	-1	-1	-1	-1	7	7	7	11	6	5
31	0	19	1	0	1	-1	92	70	80	7	6	4	7	-1	7	7	6.3	7	13	5	8
9	0	20	1	0	1	-1	92	70	80	7	6	4	6	-1	-1	7	6.0	4	23	12	11
3	0	19	1	0	2	-1	84	79	81	7	3	3	5	-1	-1	7	5.0	4	17	11	6
336	3	17	0	0	2	-1	87	76	81	1	1	-1	1	3	-1	1	1.4	1	28	14	14
30	0	16	1	0	1	-1	92	70	82	1	1	-1	1	-1	-1	1	1.0	1	21	12	9
37	0	21	1	0	1	-1	87	81	84	1	3	-1	3	-1	-1	1	2.0	4	37	23	14
7	0	21	1	0	2	-1	97	70	84	1	2	-1	1	-1	-1	1	1.3	1	13	5	8
108	1	23	1	0	1	86	80	88	84	7	7	6	5	-1	-1	7	6.4	7	17	9	8
119	1	18	1	0	2	97	84	84	84	7	7	2	7	-1	-1	7	6	4	9	4	5
29	0	20	1	0	3	-1	89	81	84	7	6	2	7	-1	-1	7	5.8	4	13	8	5
111	1	17	1	0	2	89	95	76	85	7	6	-1	6	-1	-1	1	5	4	13	7	6
116	1	18	1	0	2	102	102	70	86	7	6	2	6	-1	-1	7	5.6	4	24	13	11
118	1	19	1	0	1	86	95	81	86	7	4	2	6	-1	-1	7	5.2	4	10	6	4
123	1	19	1	0	1	79	87	87	87	7	3	4	7	-1	-1	7	5.6	4	9	3	6
127	1	19	1	0	4	92	89	85	87	7	5	6	7	-1	-1	4	5.8	4	23	14	9
21	0	28	1	0	2	-1	93	82	88	7	6	3	4	-1	6	7	5.5	4	22	14	8
34	0	17	1	0	4	-1	92	84	88	1	3	-1	1	-1	2	1	1.6	1	32	19	13
122	1	19	1	0	1	96	95	84	88	7	6	5	6	-1	-1	7	6.2	7	12	6	6
126	1	19	1	0	1	97	101	76	88	7	4	6	7	-1	-1	7	6.2	7	7	3	4
308	3	17	0	0	1	-1	87	88	88	1	1	-1	1	3	-1	1	1.4	1	22	10	12
113	1	19	1	0	1	84	86	90	88	7	5	6	7	-1	-1	7	6.4	7	9	4	5
32	0	19	1	0	2	-1	99	78	88	1	2	-1	3	-1	-1	4	2.5	4	10	5	5
335	3	18	0	0	2	-1	95	84	89	1	1	-1	1	4	-1	1	1.6	1	31	19	12
105	1	17	1	0	2	96	89	93	90	7	4	6	6	-1	-1	7	6	4	15	9	6
337	3	19	0	0	1	-1	102	78	90	1	1	-1	2	3	-1	1	1.6	1	21	10	11
38	0	18	1	0	3	-1	81	102	91	7	2	-1	6	-1	-1	7	5.5	4	23	13	10
312	3	17	0	0	2	-1	95	88	91	7	5	-1	7	7	-1	7	6.6	7	15	7	8
107	1	20	1	0	1	99	95	88	91	7	5	7	7	-1	-1	7	6.6	7	22	12	10
327	3	17	0	0	3	-1	90	94	92	1	3	-1	1	2	-1	1	1.6	1	25	14	11
201	2	19	0	0	1	-1	67	98	92	7	5	-1	6	5	-1	7	6.0	4	10	5	5
315	3	17	0	0	4	-1	89	98	93	7	5	-1	6	6	-1	7	6.2	7	23	14	9

APPENDIX G - ALL S's ALL DATA EXCL MEANINGS

329	3	17	0	0	2	-1	97	91	93	7	5	-1	5	5	-1	7	5.8	4	5	3	2
125	1	18	1	0	4	105	93	94	93	1	4	2	1	-1	-1	1	1.8	1	20	11	9
110	1	19	1	0	4	113	105	81	93	7	5	-1	5	-1	-1	7	6	4	13	8	5
300	3	18	0	0	1	-1	101	85	93	7	4	4	4	1	-1	1	3.5	4	20	11	9
128	1	17	1	0	3	97	101	87	93	1	2	3	2	-1	-1	1	1.8	1	27	15	12
27	0	21	1	0	2	-1	98	91	94	1	1	3	1	-1	4	1	1.8	4	44	26	18
1	0	18	1	0	1	-1	105	84	94	1	4	-1	1	-1	-1	1	1.8	1	22	10	12
33	0	18	1	0	4	-1	108	85	96	1	4	-1	3	-1	-1	1	2.3	4	16	7	9
325	3	18	0	0	3	-1	101	91	96	1	1	-1	1	1	-1	1	1.0	1	27	13	14
323	3	18	0	0	2	-1	97	96	96	7	4	-1	6	3	-1	7	5.4	4	23	15	8
39	0	17	1	0	3	-1	95	98	96	1	3	-1	1	-1	-1	4	2.3	4	33	20	13
124	1	19	1	0	1	97	98	96	96	1	3	1	4	-1	-1	1	2	4	16	11	5
334	3	17	0	0	3	-1	99	96	97	1	1	-1	1	3	-1	1	1.4	1	31	18	13
5	0	19	1	0	5	-1	102	94	98	7	6	6	6	-1	-1	7	6.4	7	22	12	10
112	1	18	1	0	5	96	118	79	98	1	2	5	1	-1	-1	1	2	4	18	9	9
313	3	18	0	0	1	-1	89	108	98	7	4	-1	7	6	-1	7	6.2	7	27	14	13
314	3	18	0	0	1	-1	93	98	98	7	4	-1	7	4	-1	7	5.8	4	16	9	7
326	3	18	0	0	3	-1	107	90	98	1	1	-1	1	1	-1	1	1.0	1	25	12	13
44	0	19	1	0	3	-1	101	98	99	1	3	6	3	-1	-1	1	2.8	4	27	16	11
215	2	23	0	0	3	-1	101	96	99	1	3	4	2	2	1	1	2.0	4	37	21	16
307	3	18	0	0	2	-1	104	96	100	1	1	-1	3	3	-1	1	1.8	1	19	12	7
209	2	19	0	0	3	-1	99	96	100	1	1	1	1	2	-1	1	1.2	1	36	20	16
302	3	17	0	0	3	-1	101	99	100	7	5	-1	6	4	-1	7	5.8	4	10	7	3
331	3	18	0	0	4	-1	102	98	100	7	6	-1	7	7	-1	7	6.8	7	5	2	3
35	0	18	1	0	3	-1	98	103	101	7	4	-1	6	-1	-1	7	6.0	4	10	4	6
406	4	21	0	0	4	115	105	102	102	7	5	5	7	6	-1	7	6.2	7	14	9	5
104	1	19	1	0	4	102	102	101	102	7	6	3	5	-1	-1	7	5.6	4	20	12	8
4	0	20	1	0	4	-1	116	88	102	7	4	4	7	-1	-1	4	5.2	4	8	2	6
121	1	20	1	0	1	86	108	94	102	7	6	-1	6	-1	-1	7	6.5	7	30	18	12
317	3	18	0	0	3	-1	110	93	102	1	3	-1	3	3	-1	1	2.2	4	20	12	8
321	3	18	0	0	6	-1	105	101	103	7	3	-1	7	7	-1	7	6.2	7	8	4	4
318	3	19	0	0	4	-1	118	88	103	1	3	1	1	2	1	1	1.4	1	28	15	13
324	3	17	0	0	6	-1	111	94	103	1	1	-1	1	1	-1	1	1.0	1	39	25	14
103	1	17	1	0	4	92	108	98	103	1	4	-1	2	-1	2	1	2	4	38	20	18
311	3	18	0	0	4	-1	110	96	103	7	6	-1	6	6	-1	7	6.4	7	20	9	11
301	3	17	0	0	5	-1	111	98	104	1	1	-1	1	1	-1	1	1.0	1	36	22	14
309	3	17	0	0	2	-1	121	88	104	1	3	-1	1	4	-1	1	2.0	4	20	12	8
6	0	21	1	0	2	-1	113	94	104	7	7	-1	4	-1	-1	7	6.3	7	27	12	15
202	2	18	0	0	4	-1	114	96	105	7	4	-1	7	6	-1	7	6.2	7	23	10	13
213	2	18	1	0	6	-1	113	102	106	1	6	2	1	2	1	1	2.0	4	38	21	17
647	6	19	0	1	-1	-1	111	101	106	1	-1	-1	-1	-1	-1	-1	1	-1	-1	18	-1
322	3	17	0	0	4	-1	114	98	106	7	5	-1	4	7	-1	7	6.0	4	22	12	10
207	2	19	0	0	6	-1	111	102	107	1	2	4	1	6	1	7	3.1	4	28	14	14
400	4	19	0	0	5	122	105	108	107	1	3	3	3	3	-1	1	2.3	4	48	29	19
212	2	17	0	0	5	-1	113	102	108	1	1	-1	1	2	-1	1	1.2	1	40	25	15
305	3	17	0	0	4	-1	110	105	108	7	5	-1	7	5	-1	7	6.2	7	6	2	4
120	1	19	1	0	4	102	113	109	109	7	-1	-1	-1	-1	-1	7	7	7	15	8	7
402	4	18	0	0	6	115	114	103	109	1	2	3	1	1	-1	1	1.5	1	35	19	16
637	6	18	0	1	-1	-1	93	126	109.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	25	-1
624	6	23	0	0	-1	-1	108	112	110	1	-1	-1	-1	-1	-1	-1	1	-1	-1	27	-1
610	6	18	0	1	-1	-1	106	114	110	1	-1	-1	-1	-1	-1	-1	1	-1	-1	20	-1
306	3	22	0	0	5	-1	110	109	110	7	4	5	6	2	3	1	4.0	4	14	6	8
606	6	19	0	1	-1	-1	105	115	110	1	-1	-1	-1	-1	-1	-1	1	-1	-1	23	-1
612	6	20	0	1	-1	-1	100	121	110.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	25	-1
621	6	20	0	1	-1	-1	112	110	111	1	-1	-1	-1	-1	-1	-1	1	-1	-1	28	-1
205	2	20	0	0	5	-1	113	108	111	7	5	6	6	5	-1	7	6.0	4	27	18	9
203	2	17	0	0	6	-1	111	108	111	7	5	-1	7	5	-1	7	6.2	7	38	26	12
626	6	21	1	0	-1	-1	97	126	111.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	20	-1
413	4	18	0	0	7	119	111	111	112	7	3	3	7	7	3	7	5.3	4	37	21	16
328	3	17	0	0	7	-1	107	117	112	1	2	-1	1	3	-1	1	1.6	1	41	24	17

411	4	18	0	0	4	117	122	101	112	1	2	2	1	1	-1	1	1.3	1	44	27	17
210	2	17	0	0	5	-1	119	105	112	1	1	-1	1	1	-1	1	1.0	1	38	23	15
639	6	18	0	1	-1	-1	104	122	113	1	-1	-1	-1	-1	-1	-1	1	-1	-1	20	-1
319	3	18	0	0	6	-1	114	111	113	1	1	4	1	1	1	1	1.4	1	43	27	16
601	6	18	0	1	-1	-1	115	113	114	1	-1	-1	-1	-1	-1	-1	1	-1	-1	22	-1
611	6	18	0	1	-1	-1	112	116	114	1	-1	-1	-1	-1	-1	-1	1	-1	-1	24	-1
629	6	19	1	1	-1	-1	115	115	115	1	-1	-1	-1	-1	-1	-1	1	-1	-1	18	-1
609	6	19	0	1	-1	-1	106	124	115	1	-1	-1	-1	-1	-1	-1	1	-1	-1	38	-1
608	6	19	0	1	-1	-1	112	120	116	1	-1	-1	-1	-1	-1	-1	1	-1	-1	28	-1
303	3	17	0	0	7	-1	118	111	116	7	6	-1	7	6	-1	7	6.6	7	19	9	10
615	6	18	0	1	-1	-1	99	133	116	1	-1	-1	-1	-1	-1	-1	1	-1	-1	35	-1
625	6	18	1	1	-1	-1	115	118	116.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	28	-1
304	3	17	0	0	6	-1	111	118	117	7	6	-1	7	5	-1	7	6.4	7	18	10	8
214	2	17	0	0	6	-1	111	120	117	1	1	-1	-1	1	-1	1	1.0	1	42	25	17
320	3	18	0	0	4	-1	113	118	117	7	5	-1	7	4	-1	7	6.0	4	20	13	7
613	6	19	0	1	-1	-1	104	131	117.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	23	-1
208	2	17	0	0	7	-1	114	118	118	1	2	-1	1	2	-1	1	1.4	1	52	31	21
632	6	18	1	1	-1	-1	120	116	118	1	-1	-1	-1	-1	-1	-1	1	-1	-1	29	-1
616	6	19	0	1	-1	-1	117	120	118.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	28	-1
614	6	19	0	1	-1	-1	105	132	118.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	21	-1
619	6	19	0	0	-1	-1	113	125	119	1	-1	-1	-1	-1	-1	-1	1	-1	-1	19	-1
330	3	17	0	0	7	-1	126	109	119	7	5	-1	6	5	-1	7	6.0	4	19	13	6
645	6	18	0	1	-1	-1	117	122	119.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	26	-1
638	6	18	0	1	-1	-1	113	127	120	1	-1	-1	-1	-1	-1	-1	1	-1	-1	25	-1
607	6	19	0	1	-1	-1	125	115	120	1	-1	-1	-1	-1	-1	-1	1	-1	-1	25	-1
603	6	21	0	1	-1	-1	128	113	120.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	17	-1
333	3	18	0	0	6	-1	122	116	121	7	4	-1	3	5	-1	7	5.2	4	38	24	14
617	6	18	0	1	-1	-1	121	122	121.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	29	-1
640	6	18	0	1	-1	-1	110	133	121.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	29	-1
620	6	19	0	0	-1	-1	117	126	121.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	27	-1
407	4	23	0	0	7	124	134	114	122	1	2	3	1	4	7	1	2.7	4	44	26	18
211	2	21	0	0	6	-1	127	111	122	-1	1	-1	3	3	-1	1	2.0	4	38	20	18
204	2	19	0	0	-1	-1	136	108	122	7	6	-1	6	6	-1	7	6.4	7	13	8	5
643	6	19	0	1	-1	-1	115	131	123	1	-1	-1	-1	-1	-1	-1	1	-1	-1	24	-1
644	6	19	0	1	-1	-1	120	126	123	1	-1	-1	-1	-1	-1	-1	1	-1	-1	37	-1
338	3	17	0	0	7	-1	118	124	123	1	2	-1	1	1	-1	1	1.2	1	40	23	17
622	6	18	1	1	-1	-1	117	131	124	1	-1	-1	-1	-1	-1	-1	1	-1	-1	31	-1
332	3	20	0	0	7	-1	118	126	124	7	4	6	6	5	7	7	6.0	4	30	17	13
404	4	18	0	0	7	126	119	124	124	1	3	3	1	2	-1	1	1.8	1	53	30	23
410	4	20	0	0	5	113	136	111	124	1	2	3	1	2	-1	1	1.7	1	24	12	12
401	4	24	0	0	4	123	121	124	125	7	5	3	7	5	2	7	5.1	4	32	15	17
618	6	21	0	0	-1	-1	126	128	127	1	-1	-1	-1	-1	-1	-1	1	-1	-1	29	-1
403	4	19	0	0	9	126	130	121	128	1	3	3	1	2	-1	1	1.8	1	38	23	15
630	6	21	0	0	-1	-1	121	136	128.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	34	-1
628	6	18	0	0	-1	-1	127	132	129.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	35	-1
633	6	18	0	1	-1	-1	130	130	130	1	-1	-1	-1	-1	-1	-1	1	-1	-1	34	-1
316	3	22	0	0	8	-1	126	127	130	1	1	1	1	1	1	1	1.0	1	42	27	15
635	6	18	0	1	-1	-1	129	132	130.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	25	-1
641	6	18	0	1	-1	-1	141	121	131	1	-1	-1	-1	-1	-1	-1	1	-1	-1	37	-1
627	6	20	0	1	-1	-1	124	138	131	1	-1	-1	-1	-1	-1	-1	1	-1	-1	38	-1
642	6	20	0	1	-1	-1	139	125	132	1	-1	-1	-1	-1	-1	-1	1	-1	-1	37	-1
648	6	20	0	0	-1	-1	134	132	133	1	-1	-1	-1	-1	-1	-1	1	-1	-1	29	-1
405	4	19	0	0	8	124	136	124	135	7	6	5	6	6	4	7	5.9	4	23	13	10
206	2	17	0	0	7	-1	145	124	138	7	6	-1	6	5	-1	7	6.2	7	36	21	15
310	3	17	0	0	7	-1	134	135	138	1	2	-1	2	2	-1	1	1.6	1	50	33	17
412	4	18	0	0	8	129	136	139	141	1	4	4	2	2	-1	1	2.3	4	38	20	18
409	4	19	0	0	5	144	142	137	144	1	4	4	1	3	-1	1	2.3	4	48	28	20
636	6	18	0	1	-1	-1	143	150	146.	1	-1	-1	-1	-1	-1	-1	1	-1	-1	31	-1

APPENDIX G - ALL S's ALL DATA EXCL MEANINGS

NUM	NTE	NOE	NNE	CHOP	ACHP	DEPP	AISP	BOUP	PSAP	CAPP	DENP	NAUP	DEBP	COUP	RARP	EOUP	NAIP	CATP	GAOP	THYP	HEIP
547	-1	49	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
528	-1	44	-1	0	0	1	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0
536	-1	35	-1	1	1	0	1	1	1	0	1	1	1	0	1	0	1	0	0	0	0
555	-1	37	-1	1	1	1	0	1	0	1	1	0	0	0	1	0	1	0	0	0	0
561	-1	40	-1	1	1	1	1	0	0	0	1	0	0	0	1	0	1	0	0	0	0
519	-1	46	-1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
522	-1	47	-1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
521	-1	45	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
533	-1	33	-1	1	1	1	1	1	1	0	1	1	0	0	1	0	1	0	0	0	0
558	-1	29	-1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
508	-1	47	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
504	-1	38	-1	1	1	1	1	0	1	0	0	1	1	0	0	0	1	0	0	0	0
515	-1	50	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
525	-1	48	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
568	-1	42	-1	0	1	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	0
562	-1	45	-1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
527	-1	48	-1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
553	-1	49	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
543	-1	37	-1	1	1	1	0	0	1	1	1	0	0	0	1	1	1	0	0	0	0
539	-1	36	-1	0	0	1	1	0	0	1	1	1	1	0	0	0	1	0	0	0	0
507	-1	48	-1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
502	-1	46	-1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
540	-1	42	-1	1	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
541	-1	33	-1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	0	1	0
552	-1	40	-1	1	1	1	1	0	0	0	0	0	0	0	1	0	1	0	0	1	0
517	-1	42	-1	1	1	1	1	0	0	0	0	1	0	0	1	0	1	0	0	0	0
565	-1	48	-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
514	-1	28	-1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	0	0	0
557	-1	37	-1	1	1	1	0	1	0	0	1	1	1	0	0	0	1	0	0	0	0
520	-1	27	-1	1	1	1	0	1	0	0	1	1	1	1	1	0	1	1	0	1	0
566	-1	39	-1	1	1	1	1	1	1	0	0	0	0	0	0	0	1	0	0	0	0
526	-1	23	-1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	0
516	-1	49	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
549	-1	28	-1	1	1	1	0	1	1	1	1	1	1	0	0	1	1	0	0	1	1
569	-1	42	-1	1	0	0	1	1	0	0	1	0	0	0	1	0	1	0	0	0	0
510	-1	44	-1	0	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0
563	-1	39	-1	1	1	0	0	1	1	0	1	0	1	0	0	0	1	0	0	0	0
545	-1	36	-1	1	1	1	1	1	1	0	0	1	1	0	0	0	1	0	0	1	0
571	-1	46	-1	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
511	-1	39	-1	1	1	1	0	1	0	0	1	1	0	1	1	0	1	0	0	0	0
548	-1	40	-1	1	1	1	0	0	0	1	1	1	1	0	0	1	1	0	0	0	0
501	-1	31	-1	1	1	1	1	1	1	0	1	1	1	0	0	0	1	0	0	1	1
509	-1	29	-1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	0	0	1
556	-1	18	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1
567	-1	36	-1	1	1	1	1	1	1	0	1	0	0	0	1	0	1	0	0	0	0
529	-1	31	-1	1	1	1	1	1	1	0	1	1	1	0	0	0	1	1	0	1	0
518	-1	44	-1	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
570	-1	27	-1	1	1	0	1	1	1	0	1	1	1	1	1	0	1	1	0	1	0
572	-1	35	-1	1	1	1	1	1	1	0	1	1	1	0	1	0	0	0	0	0	0
551	-1	41	-1	1	1	1	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0
534	-1	39	-1	1	1	1	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0
559	-1	29	-1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	0	0	1	0
523	-1	40	-1	1	1	1	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0
530	-1	17	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
544	-1	23	-1	1	1	1	1	1	0	0	1	1	1	1	1	1	1	0	1	1	0
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573	-1	49	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
513	-1	20	-1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	0	1	1
546	-1	33	-1	1	1	1	1	1	0	0	1	1	0	0	1	0	1	1	1	0	1
550	-1	26	-1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	0	1	0
564	-1	43	-1	0	1	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0
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506	-1	26	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0
505	-1	12	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
542	-1	20	-1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	0	1	0	1
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537	-1	24	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	0	1
531	-1	47	-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
503	-1	40	-1	1	1	1	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0
532	-1	42	-1	0	1	0	1	1	1	0	1	0	0	0	0	0	1	0	0	0	0
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8	57	41	16	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1	0
101	56	40	16	1	1	0	1	0	1	1	1	0	0	0	0	1	1	0	0	0	0
109	61	44	17	0	0	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0
36	56	39	17	1	1	0	1	0	0	0	1	0	0	1	1	0	1	0	0	0	0
115	60	43	17	1	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0
117	64	44	20	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
102	61	42	19	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
48	63	45	18	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0
28	64	45	19	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	50	37	13	1	1	1	1	1	1	0	0	1	1	1	0	0	1	0	0	0	0
2	69	48	21	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
114	61	41	20	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
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9	51	38	13	1	1	1	1	1	1	0	1	0	0	0	0	0	1	0	0	1	0
3	57	39	18	1	1	0	1	0	1	0	1	1	0	0	0	0	1	0	0	0	0
336	46	36	10	1	1	1	1	1	1	0	1	1	0	0	0	0	1	0	0	0	0
30	53	38	15	1	1	0	0	0	0	1	1	0	1	1	0	0	1	0	0	0	0
37	37	27	10	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	1	0	0
7	61	45	16	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0
108	57	41	16	1	1	0	1	1	0	0	1	0	1	0	0	0	1	0	0	0	0
119	65	46	19	0	1	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0
29	61	42	19	1	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
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116	50	37	13	1	1	1	1	1	1	0	1	1	0	1	1	0	1	0	0	0	0
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123	65	47	18	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
127	51	36	15	1	1	0	0	1	1	0	1	1	0	0	0	0	1	0	0	0	0
21	52	36	16	1	1	1	1	1	0	0	0	1	0	1	1	0	1	0	0	0	1
34	42	31	11	1	1	1	1	1	1	0	1	1	1	1	0	0	1	0	0	0	1
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126	67	47	20	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0
308	52	40	12	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0
113	65	46	19	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
32	64	45	19	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0
335	43	31	12	1	1	1	1	1	1	0	1	0	1	1	1	1	1	0	0	0	0
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337	53	40	13	1	1	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	1
38	51	37	14	1	1	0	1	0	1	0	0	0	1	0	1	0	1	0	0	1	1
312	59	43	16	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
107	52	38	14	1	1	1	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0
327	49	36	13	1	1	0	1	1	1	0	1	1	0	0	0	0	0	0	0	1	1
201	64	45	19	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
315	51	36	15	1	1	1	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0

329	69	47	22	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
125	54	39	15	1	1	0	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0
110	61	42	19	1	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
300	54	39	15	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	0	0	1
128	47	35	12	1	1	1	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0
27	30	24	6	1	1	1	1	1	1	0	1	1	1	0	1	1	1	0	0	1	1
1	52	40	12	1	1	0	1	0	1	0	0	0	0	0	0	1	1	0	0	0	0
33	58	43	15	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
325	47	37	10	0	1	1	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0
323	51	35	16	1	1	1	1	1	1	0	1	1	0	0	1	0	1	0	0	1	0
39	41	30	11	1	1	1	1	1	1	0	1	1	0	1	1	0	1	0	0	0	1
124	58	39	19	1	1	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0
334	43	32	11	1	1	1	0	0	1	1	1	1	1	1	1	0	1	0	0	0	1
5	52	38	14	1	1	1	1	1	1	0	1	1	0	0	0	0	1	0	0	0	0
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313	47	36	11	1	1	0	1	1	1	1	1	0	0	0	1	0	1	0	0	0	0
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326	49	38	11	1	1	0	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0
44	47	34	13	1	1	0	1	0	1	0	1	1	0	1	0	0	1	0	0	0	0
215	37	29	8	1	1	1	1	1	1	0	1	1	1	1	1	0	1	0	1	1	1
307	55	38	17	1	1	1	1	0	1	0	1	0	0	0	0	0	0	1	0	0	0
209	38	30	8	1	1	1	1	1	1	0	0	1	1	0	1	1	1	0	0	0	0
302	64	43	21	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	1	0
331	69	48	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	64	46	18	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
406	60	41	19	1	1	1	0	0	0	1	0	0	0	1	0	1	1	0	0	0	0
104	54	38	16	1	1	0	1	1	0	0	1	0	0	0	1	1	1	0	0	0	0
4	66	48	18	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
121	44	32	12	1	1	1	0	1	1	0	1	0	0	1	0	0	1	0	1	0	0
317	54	38	16	1	1	0	0	1	1	0	1	0	0	1	0	0	1	0	0	0	1
321	66	46	20	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
318	46	35	11	1	0	0	1	1	1	0	1	1	0	1	1	0	1	0	0	0	0
324	35	25	10	1	1	1	1	1	1	0	0	1	1	0	1	0	1	0	0	1	1
103	36	30	6	1	1	1	1	1	1	0	1	1	1	0	1	0	1	0	0	0	0
311	54	41	13	1	1	1	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0
301	38	28	10	1	1	1	1	1	1	0	1	1	1	1	1	0	1	0	1	0	0
309	54	38	16	1	1	0	0	0	0	0	0	1	1	1	0	0	0	1	0	0	0
6	47	38	9	1	1	1	1	1	1	0	1	1	0	0	0	0	0	0	0	0	0
202	51	40	11	1	1	1	0	1	0	0	1	0	0	0	1	0	1	0	0	0	0
213	36	29	7	1	1	1	0	1	1	0	1	1	0	1	1	0	1	0	0	0	1
647	-1	32	-1	1	1	0	1	1	1	0	1	1	1	1	0	0	1	0	0	0	1
322	52	38	14	1	1	1	1	1	0	0	1	1	0	0	1	0	1	0	0	0	0
207	46	36	10	1	1	0	1	1	1	0	1	1	0	0	1	0	1	0	0	0	1
400	26	21	5	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	1
212	34	25	9	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1
305	68	48	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	59	42	17	0	1	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	1
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637	-1	25	-1	1	1	1	1	1	1	0	0	1	0	0	1	1	1	1	1	1	1
624	-1	23	-1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	0	1	1	1
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306	60	44	16	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
606	-1	27	-1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	0	1	0	1
612	-1	25	-1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	0	0	1	1
621	-1	22	-1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	0	1	1	0
205	47	32	15	1	1	1	1	1	0	0	1	1	1	0	1	0	1	0	0	0	0
203	36	24	12	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	1
626	-1	30	-1	1	1	1	1	1	0	1	1	1	1	0	1	0	1	0	1	1	0
413	37	29	8	1	1	1	1	1	1	0	1	1	1	0	0	1	1	0	0	1	1
328	33	26	7	1	1	0	1	1	1	0	1	1	1	0	1	0	1	0	1	1	1

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639	-1	30	-1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	0	0	0	0
319	31	23	8	1	1	1	1	1	1	0	0	1	1	1	1	0	1	1	1	1	1
601	-1	28	-1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	1	1	1
611	-1	26	-1	1	1	0	1	1	1	0	1	1	1	1	0	1	1	1	0	1	1
629	-1	32	-1	1	1	1	1	1	1	0	1	1	0	1	1	0	1	0	0	1	1
609	-1	12	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
608	-1	22	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	1
303	55	41	14	1	1	1	1	1	0	1	1	0	0	0	0	0	1	0	0	0	0
615	-1	15	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1
625	-1	22	-1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	0	1	1
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214	32	25	7	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	1	1	1
320	54	37	17	1	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0
613	-1	27	-1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	0	0	1	1
208	22	19	3	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1
632	-1	21	-1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	0	1
616	-1	22	-1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	0	1	1
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619	-1	31	-1	1	1	1	1	1	1	0	1	1	1	1	1	0	0	0	1	0	1
330	55	37	18	1	1	1	1	1	0	0	1	1	0	0	1	0	1	0	0	0	0
645	-1	24	-1	1	1	1	1	1	1	0	1	1	1	0	1	0	0	0	0	1	1
638	-1	25	-1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	0	0	1	1
607	-1	25	-1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	0	1	1
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617	-1	21	-1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	0	0	1	1
640	-1	21	-1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	0	1
620	-1	23	-1	1	1	1	1	1	1	0	1	1	1	0	1	1	1	1	1	1	0
407	30	24	6	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	1
211	36	30	6	1	1	0	0	1	1	0	1	1	0	0	1	0	1	0	0	1	0
204	61	42	19	1	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
643	-1	26	-1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	0	1	1
644	-1	13	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
338	34	27	7	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	0	0
622	-1	19	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1
332	44	33	11	0	1	1	0	1	0	0	1	1	0	0	1	1	1	1	0	0	0
404	21	20	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1
410	50	38	12	1	1	0	1	1	1	0	1	0	1	1	0	0	0	0	0	0	0
401	42	35	7	1	1	1	1	1	0	0	1	0	0	0	1	0	1	0	0	0	0
618	-1	21	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0	1
403	36	27	9	1	1	1	0	1	1	0	1	1	1	1	1	0	1	1	1	0	1
630	-1	16	-1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	1	1	1	1
628	-1	15	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
633	-1	16	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
316	32	23	9	1	1	1	1	1	1	0	1	1	1	1	1	0	1	0	1	1	1
635	-1	25	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	0	1	1
641	-1	13	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
627	-1	12	-1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1
642	-1	13	-1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1
648	-1	21	-1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	0	0	1	1
405	51	37	14	1	1	1	1	1	0	1	0	0	0	0	1	1	1	0	0	0	0
206	38	29	9	1	1	1	0	1	0	1	1	1	0	0	1	0	1	1	0	0	0
310	24	17	7	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1
412	36	30	6	1	1	1	1	1	1	0	1	1	1	0	1	1	1	0	0	0	1
409	26	22	4	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
636	-1	19	-1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1

APPENDIX G. - ALL S's ALL DATA EXCL MEANINGS

NUM	RADP	ASSP	HIAP	SUBP	PROP	GISP	GOUP	SUPP	SIMP	BANP	QUAP	CELP	FACP	ZEAP	DRAP	AEOP	PLAP	ABSP	DETP	IDYP	PUEP	AVEP
547	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
528	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
536	1	0	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
555	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
561	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
519	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
522	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
521	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
533	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0
558	0	0	0	1	0	0	0	0	1	0	0	1	0	1	1	0	0	0	1	0	0	0
508	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
504	0	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
515	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
525	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
568	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
562	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
527	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
553	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
543	1	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
539	0	1	0	1	1	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0
507	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
502	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
540	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
541	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0
552	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
517	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
565	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
514	1	1	0	0	1	0	0	0	1	0	1	1	0	0	0	1	0	0	1	0	0	0
557	1	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
520	1	0	0	1	1	0	0	1	0	0	1	0	1	1	0	1	0	0	1	0	0	0
566	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
526	0	1	0	1	1	0	1	1	1	0	0	1	1	0	0	1	0	0	1	0	0	0
516	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
549	0	1	1	1	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0
569	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
510	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
563	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
545	1	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
571	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
511	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
548	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
501	1	0	0	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
509	1	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	1	1	0	0	0
556	0	1	0	1	1	1	1	1	1	0	0	1	1	1	0	1	1	0	1	0	0	1
567	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
529	1	1	0	1	1	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0
518	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
570	1	0	1	1	1	0	1	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0
572	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
551	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
534	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
559	1	1	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
523	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
530	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0	1	1	1	0	0	0
544	1	0	0	1	1	0	1	1	1	0	0	1	0	0	0	1	0	1	1	0	0	0
535	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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573	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
513	1	1	1	1	0	1	1	1	1	0	1	1	1	1	0	0	0	1	1	0	0	0
546	1	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0
550	1	0	0	1	1	1	0	1	1	0	0	0	1	1	0	0	0	0	1	1	0	0
564	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
512	1	0	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
524	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
506	1	0	0	1	0	1	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0
505	0	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	0	0	1	1	0	0
542	1	0	1	1	1	1	1	1	1	0	1	0	1	0	0	1	1	1	1	0	0	0
560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
537	1	1	1	1	0	1	1	1	1	0	0	0	0	1	0	0	0	0	1	0	0	0
531	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
503	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
532	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
538	0	1	0	0	1	0	0	0	1	0	0	0	1	0	0	1	0	1	1	0	0	1
8	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
101	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
109	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
36	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
115	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
117	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
102	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
48	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
47	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
114	1	0	1	0	1	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0
106	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
3	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
336	1	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0
37	1	1	1	1	0	0	0	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0
7	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
108	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
111	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
116	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
118	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
123	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
127	1	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
21	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	1	0	0	0	0
34	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0
122	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
126	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
308	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
113	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
335	1	0	0	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
105	1	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
337	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
38	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
312	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
107	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
327	1	0	0	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
201	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
315	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0

329	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
125	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0
110	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
300	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
128	0	0	1	1	1	1	1	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0
27	0	1	1	1	1	1	1	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0
1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
33	0	0	0	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
325	1	0	1	0	1	1	0	0	1	0	0	0	1	0	0	0	0	1	0	0	0	0
323	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	1	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
124	1	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
334	0	1	0	1	0	0	1	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0
5	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0
112	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
313	1	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0
314	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
326	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
44	1	0	0	1	1	0	1	0	1	0	1	0	0	0	0	0	0	1	0	1	0	0
215	1	0	0	0	0	1	1	1	0	1	0	0	0	0	0	0	1	0	0	0	0	0
307	1	0	1	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
209	1	1	1	0	1	1	1	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0
302	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
331	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
35	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
406	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104	1	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
121	1	1	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
317	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
321	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
318	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1
324	1	1	1	1	1	1	1	0	1	1	0	0	0	1	0	1	0	1	0	0	0	0
103	0	0	0	1	1	0	0	1	1	0	1	0	0	0	0	1	1	1	0	0	0	0
311	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
301	1	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
309	0	0	0	0	1	0	1	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0
6	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
202	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
213	1	1	0	0	1	1	1	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0
647	0	1	0	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
322	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
207	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
400	0	0	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	0	1	0	1	0
212	0	1	1	1	1	0	0	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0
305	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
402	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
637	1	0	1	1	1	0	1	1	1	0	0	0	1	0	0	0	0	1	1	0	0	0
624	1	1	0	1	1	0	0	1	1	0	0	1	1	1	0	0	1	1	1	0	0	0
610	1	1	1	0	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
306	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
606	0	0	1	1	0	0	1	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0
612	1	1	1	1	1	1	0	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0
621	0	1	1	1	1	1	1	1	1	0	0	1	1	0	0	1	1	0	0	0	0	0
205	1	0	0	1	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1
203	0	1	1	1	1	1	1	0	1	0	1	0	0	1	0	0	1	0	0	0	0	0
626	1	0	0	1	1	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0
413	1	0	0	1	1	0	1	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0
328	1	1	1	1	1	1	0	1	1	0	1	0	1	0	0	1	0	0	0	0	0	0

411	1	0	1	1	0	0	1	1	1	0	0	0	1	1	0	0	0	1	0	0	0	0
210	0	1	0	1	1	1	0	1	1	0	1	1	0	0	0	1	1	0	1	0	0	0
639	1	0	0	1	0	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0
319	0	1	1	1	1	1	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0	1
601	1	0	0	1	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
611	0	1	1	1	1	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0
629	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
609	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	0	1	0	1
608	1	1	0	1	1	1	1	1	1	0	0	1	1	0	0	0	1	0	0	0	0	1
303	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
615	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	1	1	1	1	0	0	0
625	1	1	1	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0
304	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
214	1	0	1	1	0	1	1	0	1	0	0	0	0	1	1	1	0	0	1	0	0	0
320	1	0	1	1	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
613	1	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	1
208	1	0	1	1	1	0	1	1	1	0	1	0	1	1	0	1	1	1	1	0	0	0
632	1	1	0	1	1	1	1	1	1	0	0	1	0	0	0	1	1	1	0	0	0	0
616	0	1	1	1	1	1	1	1	1	0	0	0	1	0	0	1	0	1	0	0	0	1
614	1	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
619	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
330	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
645	1	1	1	1	1	1	1	0	1	0	0	0	1	0	0	0	1	1	1	0	0	0
638	1	1	0	1	1	1	1	0	1	1	0	0	1	0	0	0	0	1	0	0	0	0
607	1	1	1	1	0	0	1	1	1	0	0	0	1	0	0	0	1	1	0	0	0	0
603	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0
333	1	0	0	1	1	1	1	1	0	0	1	1	0	0	0	0	1	1	0	1	0	0
617	1	1	0	1	1	1	1	0	1	0	1	1	1	1	0	0	1	1	1	0	0	0
640	1	0	1	1	1	1	1	0	1	0	1	0	1	1	0	0	1	0	0	0	0	0
620	0	1	1	1	1	1	1	0	1	0	0	0	0	1	0	1	0	1	1	1	0	0
407	0	0	0	1	1	1	1	1	1	0	0	0	0	1	0	0	1	0	1	0	0	0
211	0	1	1	1	1	0	1	0	1	0	1	0	1	0	0	1	1	0	1	0	0	0
204	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
643	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
644	1	1	1	1	1	1	0	1	1	0	1	1	1	0	0	1	1	1	0	0	0	1
338	1	1	0	1	1	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0
622	1	0	1	1	0	1	1	1	1	0	1	1	1	1	0	1	0	1	0	1	0	0
332	0	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
404	0	1	0	1	1	0	1	1	1	0	1	1	0	1	0	0	1	0	0	1	1	1
410	1	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0
401	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0
618	0	1	1	1	1	1	1	1	1	0	0	1	0	1	0	0	1	0	1	0	0	0
403	1	0	0	1	1	1	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0
630	0	1	1	1	1	1	0	1	1	0	1	1	1	1	0	0	1	1	1	1	0	0
628	0	0	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	0	0	1	0
633	0	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	1	0	1	0
316	1	0	1	1	1	1	1	0	1	0	1	0	1	1	0	0	1	0	0	0	0	0
635	1	0	1	1	1	1	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0
641	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	0	0	0	1
627	1	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	0	0	0
642	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0	1	1	1	1	0	1	0
648	0	1	0	1	1	1	1	1	1	0	0	0	1	0	0	1	1	0	1	0	1	0
405	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
206	1	0	0	1	1	1	0	0	0	0	1	0	0	1	0	1	1	1	0	1	0	0
310	1	0	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	0	0	0	0	0
412	1	1	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
409	1	0	0	1	1	1	1	1	1	0	0	1	0	0	0	1	0	0	0	0	1	0
636	1	1	1	1	1	1	1	0	1	0	0	1	1	0	0	1	1	0	0	0	0	1

APPENDIX G. - ALL S's ALL DATA EXCL MEANINGS

NUM	GAUP	TOPP	LEVP	BEAP	PREP	SIDP	DEMP	SYNP	LABP	CAMP	CONP	TOMP	ISLP	SEWP	PLDP	QUYP	PLTP	EPOP	SUIP	CHAP	SCEP
547	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
528	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
536	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
555	0	0	0	0	0	0	1	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
561	0	0	0	0	0	0	1	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
519	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
522	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
521	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
533	0	1	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
558	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
508	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
504	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
515	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
525	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
568	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
562	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
527	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
553	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
543	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
539	0	1	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
507	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
502	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
540	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
541	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
552	0	1	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
517	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
565	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
514	0	0	1	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
557	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
520	0	0	0	0	0	1	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
566	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
526	0	0	0	0	0	1	1	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
516	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
549	0	1	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
569	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
510	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
563	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
545	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
571	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
511	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
548	0	0	1	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
501	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
509	0	0	0	0	0	1	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
556	0	0	1	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
567	0	1	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
529	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
518	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
570	0	0	0	0	0	1	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
572	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
551	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
534	0	0	0	0	0	0	0	0	0	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
559	0	1	1	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
523	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
530	0	0	0	0	0	1	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
544	0	1	0	0	0	0	0	1	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
535	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

APPENDIX G - ALL S's ALL DATA EXCL MEANINGS

573	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
513	0	1	0	0	0	1	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
546	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
550	0	0	0	1	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
564	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
512	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
524	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
506	0	1	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
505	1	1	1	1	0	1	1	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
542	0	0	0	0	0	1	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
560	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
537	0	1	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
531	0	0	0	1	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
503	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
532	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
538	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
8	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	0	1	0	0	0	1
101	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	1
109	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0	1
36	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	1
115	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0	1
117	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1
102	0	0	0	0	0	0	0	1	1	0	1	0	1	0	1	0	1	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1
28	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	1	1	0	0	0
47	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
114	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1
106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1
31	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	0	0	0
9	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	0	0	1
3	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0	1
336	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	1
30	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	1
37	0	0	0	1	0	0	0	0	1	0	1	1	1	1	1	0	1	1	1	0	1
7	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	1
108	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	1	0	0	1
119	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1
29	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	1	0	0	1
111	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	1
116	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	1	1	0	0	1
118	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1
123	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0
127	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	0	0	1
21	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0	0	0	1
34	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	1	0	1	0	1
122	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0	1
126	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1
308	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	1
113	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0
32	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	1
335	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	0	0	0	0	1
105	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1
337	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0	1	0	1
38	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	0	0	1
312	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	1	0	0	1
107	0	1	0	0	0	0	0	0	1	0	1	0	1	0	1	0	1	1	1	0	1
327	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0	1
201	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1
315	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	1	0	0	1

APPENDIX G - ALL S's ALL DATA EXCL MEANINGS

329	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
125	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	1	0	0	1
110	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0
300	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	0	1
128	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	0	1	1	1	0	1
27	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	1	1	1	0	0	1
1	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	1	1	0	0	1
33	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	1
325	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	1
323	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	0	1	1	0	0	1
39	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	0	0	1
124	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	1
334	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1
5	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	1	0	0	1
112	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	0	1	0	0	0	1
313	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	1
314	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0	1
326	0	1	0	0	0	0	0	0	1	0	1	1	1	1	1	0	1	0	0	0	1
44	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	0	1
215	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1	0	1
307	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	1
209	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0	1
302	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0
331	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1
406	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1
104	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	0	1
4	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0	1	0	0	0	0
121	0	0	0	0	0	1	0	1	0	0	0	0	1	0	1	1	1	1	1	0	1
317	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	1	0	0	1
321	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	0
318	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	1	0	1
324	0	0	0	0	0	0	0	0	1	0	0	1	1	0	1	1	1	1	0	0	1
103	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1
311	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	1	1	0	1
301	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	1	0	0	0	1
309	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	1
6	0	0	0	0	0	1	0	0	0	0	1	1	1	0	1	0	1	1	1	0	1
202	0	1	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	1
213	0	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1
647	0	1	0	0	0	1	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
322	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	1	0	0	0	1
207	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	0	0	1
400	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	0	1	1	0	1	1
212	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	1	0	1	1
305	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	1
120	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	0	0	1
402	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	1
637	0	0	0	0	0	0	1	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
624	0	1	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
610	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
306	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	1
606	0	1	0	0	0	1	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
612	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
621	0	1	1	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
205	0	1	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	0	0	0	1
203	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	0	1	1	1	0	1
626	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
413	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	1	1	0	0	1
328	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	1	0	1

411	0	1	0	0	0	1	0	0	1	0	1	1	1	1	1	0	1	1	0	1	1
210	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	1
639	0	1	1	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
319	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	1
601	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
611	1	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
629	0	1	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
609	0	0	1	1	1	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
608	0	1	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
303	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	1	1	0	1
615	1	1	0	1	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
625	1	1	0	0	0	1	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
304	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	1	0	0	1
214	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	1	0	1
320	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0	1
613	0	1	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
208	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	0	1	0	1
632	0	0	0	0	0	1	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
616	0	0	0	1	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
614	0	1	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
619	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
330	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1
645	0	0	1	0	0	0	0	0	0	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
638	1	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
607	0	1	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
603	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
333	0	1	0	0	0	1	0	1	0	0	1	1	1	1	1	0	1	0	1	0	1
617	0	0	0	0	0	1	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
640	0	1	0	0	0	1	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
620	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
407	0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	0	1
211	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1
643	0	0	0	0	0	1	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
644	1	1	0	0	1	1	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
338	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	1	1
622	0	1	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
332	0	1	0	0	0	0	0	1	1	0	0	1	1	0	1	1	1	1	1	0	1
404	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1
410	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	1
401	0	1	1	0	0	1	0	0	0	0	1	0	1	1	1	1	1	1	1	0	1
618	0	1	0	0	0	0	1	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
403	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	0	1	0	0	0	1
630	1	0	1	0	0	0	0	0	1	1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
628	0	1	0	0	0	1	1	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
633	0	1	0	0	0	0	1	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
316	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	1
635	0	0	0	0	0	0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
641	0	0	1	0	0	1	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
627	0	0	1	1	0	1	0	1	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
642	0	1	1	0	0	0	1	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
648	0	0	1	0	0	1	1	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
405	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	1	0	0	1
206	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	1	1	1	1	0	1
310	0	0	1	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	0	1
412	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	1
409	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	0	1
636	0	0	0	0	0	0	0	0	1	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

NUM	LICP	PHLP	RECP	INDP	CROP	VISP	PARP	VICP	GUNP	LIEP	HICP	EPIP	GROP
547	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
528	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
536	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
555	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
561	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
519	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
522	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
521	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
533	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
558	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
508	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
504	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
515	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
525	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
568	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
562	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
527	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
553	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
543	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
539	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
507	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
502	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
540	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
541	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
552	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
517	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
565	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
514	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
557	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
520	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
566	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
526	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
516	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
549	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
569	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
510	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
563	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
545	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
571	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
511	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
548	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
501	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
509	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
556	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
567	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
529	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
518	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
570	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
572	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
551	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
534	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
559	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
523	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
530	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
544	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
535	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

573	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
513	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
546	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
550	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
564	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
512	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
524	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
506	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
505	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
542	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
560	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
537	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
531	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
503	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
532	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
538	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
8	0	0	0	0	1	0	0	0	0	1	0	0	0
101	1	0	0	0	0	0	0	0	0	1	0	0	0
109	1	0	0	0	0	0	0	0	0	1	0	0	0
36	1	0	0	0	0	0	0	0	0	1	0	0	0
115	1	0	0	0	0	0	0	0	0	1	0	0	0
117	0	0	0	0	0	0	0	0	0	1	0	0	0
102	0	0	0	0	0	0	0	0	0	1	0	0	0
48	1	0	0	0	0	0	0	0	0	1	0	0	0
28	0	0	0	0	0	0	0	0	0	1	0	0	0
47	0	0	1	1	0	0	1	0	0	1	0	0	0
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114	0	0	0	0	0	0	0	0	0	1	0	0	0
106	1	0	0	0	0	0	0	0	0	1	0	0	0
31	1	0	1	0	0	0	0	0	0	1	0	0	0
9	1	0	0	0	1	0	1	0	0	1	0	0	0
3	0	0	0	0	0	0	0	0	0	1	0	0	0
336	1	1	1	0	0	0	0	0	0	1	1	1	1
30	1	1	0	0	0	0	0	0	0	1	0	0	0
37	1	1	0	0	1	0	0	0	0	1	0	0	1
7	0	1	0	0	0	0	0	0	0	1	0	0	0
108	1	0	0	0	0	0	0	0	0	1	0	0	0
119	1	0	0	0	0	0	0	0	0	1	0	0	0
29	0	0	0	0	0	0	0	0	0	1	0	0	0
111	1	0	0	0	0	0	0	0	0	1	0	0	0
116	1	0	0	0	1	0	1	0	0	1	0	0	1
118	0	0	0	0	0	0	0	0	0	1	0	0	0
123	1	0	1	0	0	0	0	0	0	1	0	0	0
127	0	1	0	0	1	0	1	0	0	1	0	0	0
21	0	1	1	0	0	0	0	0	0	1	0	0	0
34	0	1	1	0	0	0	0	0	0	1	0	1	1
122	1	0	0	0	0	0	0	0	0	0	0	0	0
126	0	0	0	0	0	0	0	0	0	1	0	0	0
308	1	0	1	0	0	0	0	0	0	1	0	1	1
113	0	0	0	0	0	0	0	0	0	1	0	0	0
32	0	0	0	0	0	0	0	0	0	1	0	0	0
335	1	1	1	0	0	0	1	0	0	1	0	0	1
105	1	0	0	0	0	0	0	0	0	1	0	0	0
337	1	1	0	0	0	0	0	0	0	1	0	0	1
38	1	0	0	0	0	0	1	0	0	1	0	0	0
312	0	0	1	0	0	0	0	0	0	1	0	0	1
107	1	0	0	0	0	0	0	0	0	1	0	0	1
327	1	0	1	0	1	1	0	0	0	1	0	0	0
201	0	0	0	0	0	0	0	0	0	1	0	0	0
315	1	1	1	0	0	0	0	0	0	0	0	0	0

APPENDIX G - ALL S's ALL DATA EXCL MEANINGS

329	0	0	0	0	0	0	0	0	0	0	0	0	0
125	1	0	0	0	0	0	1	0	0	1	0	0	0
110	1	1	0	0	0	0	0	0	0	1	0	0	0
300	0	0	1	0	0	0	0	0	0	1	0	0	0
128	0	0	1	0	1	0	1	0	0	0	0	0	1
27	1	1	1	0	1	1	1	0	0	1	0	1	1
1	1	1	0	0	0	0	0	0	0	1	1	0	0
33	1	0	1	0	0	0	0	0	0	1	0	0	0
325	1	0	1	0	1	0	1	0	0	1	0	0	1
323	0	0	0	0	1	0	0	0	0	1	0	0	0
39	0	0	1	0	0	1	0	0	0	1	0	0	1
124	0	0	0	0	0	0	0	0	0	1	0	0	0
334	1	0	0	0	0	0	0	0	1	1	1	0	0
5	0	0	1	0	0	0	1	0	0	1	0	0	0
112	1	0	0	0	0	0	0	0	0	1	0	0	0
313	1	0	1	0	1	0	1	0	0	1	0	0	0
314	0	0	0	0	0	0	0	0	0	1	1	0	0
326	1	1	1	0	1	0	0	0	0	1	1	0	0
44	1	1	0	0	0	0	0	0	0	1	0	0	0
215	1	1	1	0	1	0	0	0	0	1	1	0	1
307	0	0	1	0	0	0	1	0	0	1	0	0	0
209	0	1	1	0	1	0	1	0	0	1	0	1	1
302	0	0	0	0	0	0	0	0	0	1	0	0	0
331	1	0	0	0	0	0	0	0	0	0	0	0	0
35	1	0	0	0	0	0	0	0	0	1	0	0	0
406	0	0	0	0	0	0	0	0	0	1	0	0	0
104	0	0	1	0	0	0	0	0	0	1	0	0	0
4	1	0	0	0	0	0	0	0	0	1	0	0	0
121	0	0	1	1	0	0	1	0	0	1	0	0	1
317	1	0	0	0	1	0	0	0	0	1	0	0	0
321	0	0	0	0	0	0	0	0	0	1	0	0	0
318	1	0	1	0	1	0	0	0	0	1	0	0	0
324	1	1	1	0	1	0	0	0	0	1	1	0	1
103	1	1	1	1	1	0	1	0	0	1	0	0	1
311	0	0	1	0	1	0	1	0	0	1	0	0	0
301	1	1	1	0	0	0	0	0	0	1	1	1	1
309	1	1	0	0	0	0	0	0	0	1	0	0	0
6	1	1	1	1	0	1	1	0	0	1	0	0	0
202	1	0	1	0	0	0	1	0	0	1	0	0	1
213	1	1	1	1	1	0	1	0	0	1	0	0	1
647	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
322	0	0	1	0	1	0	0	0	0	1	1	0	0
207	0	0	1	0	1	0	1	0	0	1	0	0	1
400	1	1	1	1	0	1	1	1	0	1	0	1	1
212	1	1	1	0	1	0	0	0	0	1	0	0	1
305	0	0	0	0	0	0	0	0	0	1	0	0	0
120	1	1	0	0	0	0	0	0	0	1	0	0	0
402	1	0	0	0	1	0	1	0	1	1	0	1	1
637	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
624	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
610	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
306	0	0	1	0	0	0	0	0	0	1	0	1	0
606	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
612	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
621	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
205	0	0	0	0	0	0	0	0	0	1	1	0	1
203	0	0	1	0	1	0	0	0	0	1	0	0	0
626	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
413	0	1	1	0	1	1	1	0	1	1	1	0	1
328	1	1	1	0	1	1	0	0	0	1	1	1	1

411	1	1	1	0	1	0	0	0	0	1	1	1	1
210	1	1	1	0	0	0	0	0	1	1	0	1	1
639	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
319	1	1	1	1	1	0	0	0	0	1	0	1	1
601	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
611	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
629	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
609	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
608	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
303	0	0	1	0	0	0	0	0	0	1	0	0	0
615	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
625	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
304	0	0	1	0	0	0	0	0	0	1	0	0	0
214	1	1	1	1	1	0	1	0	0	1	1	0	1
320	0	0	0	0	1	0	1	0	0	1	0	0	0
613	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
208	1	1	1	1	1	1	1	0	1	1	1	1	1
632	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
616	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
614	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
619	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
330	0	0	1	0	0	0	0	0	0	1	0	0	0
645	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
638	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
607	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
603	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
333	0	0	1	0	1	1	0	0	0	1	0	1	1
617	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
640	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
620	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
407	0	1	1	0	0	1	0	1	1	1	1	1	1
211	0	1	1	0	0	1	1	0	1	1	0	0	1
204	0	0	0	0	0	0	0	0	0	1	0	0	0
643	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
644	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
338	1	0	1	0	1	0	1	0	0	1	0	0	1
622	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
332	0	0	1	0	1	0	1	0	0	1	0	0	1
404	1	1	1	1	1	1	1	0	1	1	1	1	1
410	0	0	1	0	0	1	0	0	0	1	1	0	0
401	1	0	1	0	0	1	0	0	1	1	1	1	1
618	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
403	1	1	1	0	0	1	1	0	0	1	0	1	1
630	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
628	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
633	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
316	1	1	1	0	0	1	0	0	0	1	0	1	1
635	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
641	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
627	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
642	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
648	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
405	0	1	0	0	0	0	1	0	0	1	0	0	0
206	1	1	1	0	1	0	1	0	0	1	0	0	1
310	1	1	1	0	0	0	1	0	0	1	0	1	1
412	0	1	1	0	1	0	1	0	1	1	1	1	0
409	1	1	1	0	1	1	1	0	1	1	1	1	1
636	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1

APPENDIX G. - ALL DATA FOR S's WITH MEANINGS

NUM	GRP	AGE	RA	SEX	MA	CF	GTP	GTV	GTT	M2C	MOC	MMC	MTC	M2E	MOE	MME	MTE	LH	LF	LW	LP
302	3	17	0	0	3	-1	101	99	100	4	7	4	11	21	43	20	63	7	5	-1	6
338	3	17	0	0	7	-1	118	124	123	16	24	17	41	9	26	7	33	1	2	-1	1
321	3	18	0	0	6	-1	105	101	103	5	5	2	7	20	45	22	67	7	3	-1	7
401	4	24	0	0	4	123	121	124	125	14	15	9	24	11	35	15	50	7	5	3	7
405	4	19	0	0	8	124	136	124	135	12	14	11	25	13	36	13	49	7	6	5	6
202	2	18	0	0	4	-1	114	96	105	17	20	14	34	8	30	10	40	7	4	-1	7
331	3	18	0	0	4	-1	102	98	100	5	8	7	15	20	42	17	59	7	6	-1	7
333	3	18	0	0	6	-1	122	116	121	17	23	17	40	8	27	7	34	7	4	-1	3
314	3	18	0	0	1	-1	93	98	98	14	18	9	27	11	32	15	47	7	4	-1	7
330	3	17	0	0	7	-1	126	109	119	13	16	12	28	12	34	12	46	7	5	-1	6
406	4	21	0	0	4	115	105	102	102	8	11	8	19	17	39	16	55	7	5	5	7
306	3	22	0	0	5	-1	110	109	110	7	7	9	16	18	43	15	58	7	4	5	6
201	2	19	0	0	1	-1	67	98	92	10	11	4	15	15	39	20	59	7	5	-1	6
320	3	18	0	0	4	-1	113	118	117	8	8	8	16	17	42	16	58	7	5	-1	7
309	3	17	0	0	2	-1	121	88	104	9	11	11	22	16	39	13	52	1	3	-1	1
204	2	19	0	0	-1	-1	136	108	122	13	17	7	24	12	33	17	50	7	6	-1	6
317	3	18	0	0	3	-1	110	93	102	6	6	4	10	19	44	20	64	1	3	-1	3
311	3	18	0	0	4	-1	110	96	103	8	14	14	28	17	36	10	46	7	6	-1	6
305	3	17	0	0	4	-1	110	105	108	8	8	4	12	17	42	20	62	7	5	-1	7
315	3	17	0	0	4	-1	89	98	93	13	19	14	33	12	31	10	41	7	5	-1	6
332	3	20	0	0	7	-1	118	126	124	14	16	12	28	11	34	12	46	7	4	6	6
329	3	17	0	0	2	-1	97	91	93	7	14	6	20	18	36	18	54	7	5	-1	5
308	3	17	0	0	1	-1	87	88	88	17	25	16	41	8	25	8	33	1	1	-1	1
303	3	17	0	0	7	-1	118	111	116	16	18	11	29	9	32	13	45	7	6	-1	7
203	2	17	0	0	6	-1	111	108	111	20	29	18	47	5	21	6	27	7	5	-1	7
409	4	19	0	0	5	144	142	137	144	20	27	18	45	5	23	6	29	1	4	4	1
404	4	18	0	0	7	126	119	124	124	22	29	22	51	3	21	2	23	1	3	3	1
318	3	19	0	0	4	-1	118	88	103	17	24	17	41	8	26	7	33	1	3	1	1
413	4	18	0	0	7	119	111	111	112	17	24	19	43	8	26	5	31	7	3	3	7
403	4	19	0	0	9	126	130	121	128	17	23	15	38	8	27	9	36	1	3	3	1
326	3	18	0	0	3	-1	107	90	98	10	12	10	22	15	38	14	52	1	1	-1	1
324	3	17	0	0	6	-1	111	94	103	16	18	15	33	9	32	9	41	1	1	-1	1
212	2	17	0	0	5	-1	113	102	108	16	21	14	35	9	29	10	39	1	1	-1	1
207	2	19	0	0	6	-1	111	102	107	11	14	11	25	14	36	13	49	1	2	4	1
334	3	17	0	0	3	-1	99	96	97	14	19	14	33	11	31	10	41	1	1	-1	1
301	3	17	0	0	5	-1	111	98	104	18	25	17	42	7	25	7	32	1	1	-1	1
316	3	22	0	0	8	-1	126	127	130	20	32	23	55	5	18	1	19	1	1	1	1
213	2	18	1	0	6	-1	113	102	106	18	22	18	40	7	28	6	34	1	6	2	1
337	3	19	0	0	1	-1	102	78	90	11	13	10	23	14	37	14	51	1	1	-1	2
205	2	20	0	0	5	-1	113	108	111	17	23	14	37	8	27	10	37	7	5	6	6
304	3	17	0	0	6	-1	111	118	117	19	27	16	43	6	23	8	31	7	6	-1	7
327	3	17	0	0	3	-1	90	94	92	15	18	12	30	10	32	12	44	1	3	-1	1
208	2	17	0	0	7	-1	114	118	118	21	32	20	52	4	18	4	22	1	2	-1	1
300	3	18	0	0	1	-1	101	85	93	15	18	9	27	10	32	15	47	7	4	4	4
400	4	19	0	0	5	122	105	108	107	21	29	23	52	4	21	1	22	1	3	3	3
412	4	18	0	0	8	129	136	139	141	20	27	23	50	5	23	1	24	1	4	4	2
214	2	17	0	0	6	-1	111	120	117	20	32	19	51	5	18	5	23	1	1	-1	-1
215	2	23	0	0	3	-1	101	96	99	17	23	17	40	8	27	7	34	1	3	4	2
310	3	17	0	0	7	-1	134	135	138	21	31	19	50	4	19	5	24	1	2	-1	2
312	3	17	0	0	2	-1	95	88	91	13	18	12	30	12	32	12	44	7	5	-1	7
323	3	18	0	0	2	-1	97	96	96	14	20	12	32	11	30	12	42	7	4	-1	6
209	2	19	0	0	3	-1	99	96	100	18	26	13	39	7	24	11	35	1	1	1	1
336	3	17	0	0	2	-1	87	76	81	18	23	18	41	7	27	6	33	1	1	-1	1

APPENDIX G - ALL DATA FOR S's WITH MEANINGS

210	2	17	0	0	5	-1	119	105	112	18	25	19	44	7	25	5	30	1	1	-1	1
411	4	16	0	0	4	117	122	101	112	16	20	15	35	9	30	9	39	1	2	2	1
328	3	17	0	0	7	-1	107	117	112	20	28	19	47	5	22	5	27	1	2	-1	1
206	2	17	0	0	7	-1	145	124	138	17	22	14	36	8	28	10	38	7	6	-1	6
211	2	21	0	0	6	-1	127	111	122	19	31	18	49	6	19	6	25	-1	1	-1	3
335	3	18	0	0	2	-1	95	84	89	13	15	13	28	12	35	11	46	1	1	-1	1
402	4	18	0	0	6	115	114	103	109	17	20	12	32	8	30	12	42	1	2	3	1
322	3	17	0	0	4	-1	114	98	106	14	18	12	30	11	32	12	44	7	5	-1	4
410	4	20	0	0	5	113	136	111	124	13	16	13	29	12	34	11	45	1	2	3	1
325	3	18	0	0	3	-1	101	91	96	12	15	17	32	13	35	7	42	1	1	-1	1
307	3	18	0	0	2	-1	104	96	100	15	19	8	27	10	31	16	47	1	1	-1	3
313	3	18	0	0	1	-1	89	108	98	19	24	13	37	6	26	11	37	7	4	-1	7
407	4	23	0	0	7	124	134	114	122	21	32	19	51	4	18	5	23	1	2	3	1
319	3	18	0	0	6	-1	114	111	113	18	22	17	39	7	28	7	35	1	1	4	1

APPENDIX H. - ALL DATA FOR S's WITH MEANINGS

NUM	LSC	LHE	LS	LMN	LTB	NTC	NOC	NNC	NTE	NOE	NNE	CHOP	ACHP	DEPP	AISP	BOUP	PSAP	CAPP	DENP	NAUP	DEBP
302	4	-1	7	5.8	4	10	7	3	64	43	21	0	0	0	0	0	0	0	0	1	0
338	1	-1	1	1.2	1	40	23	17	34	27	7	1	1	1	1	1	1	0	1	1	1
321	7	-1	7	6.2	7	8	4	4	66	46	20	1	0	0	0	0	0	0	1	0	0
401	5	2	7	5.1	4	32	15	17	42	35	7	1	1	1	1	1	0	0	1	0	0
405	6	4	7	5.9	4	23	13	10	51	37	14	1	1	1	1	1	0	1	0	0	0
202	6	-1	7	6.2	7	23	10	13	51	40	11	1	1	1	0	1	0	0	1	0	0
331	7	-1	7	6.8	7	5	2	3	69	48	21	0	0	0	0	0	0	0	0	0	0
333	5	-1	7	5.2	4	38	24	14	36	26	10	1	1	1	1	1	1	0	0	0	1
314	4	-1	7	5.8	4	16	9	7	58	41	17	0	1	1	1	0	0	0	0	0	1
330	5	-1	7	6.0	4	19	13	6	55	37	18	1	1	1	1	1	0	0	1	1	0
406	6	-1	7	6.2	7	14	9	5	60	41	19	1	1	1	0	0	0	1	0	0	0
306	2	3	1	4.0	4	14	6	8	60	44	16	1	1	1	1	0	0	0	1	0	0
201	5	-1	7	6.0	4	10	5	5	64	45	19	1	1	1	0	0	0	0	1	0	0
320	4	-1	7	6.0	4	20	13	7	54	37	17	1	1	1	1	0	0	0	1	0	0
309	4	-1	1	2.0	4	20	12	8	54	38	16	1	1	0	0	0	0	0	0	1	1
204	6	-1	7	6.4	7	13	8	5	61	42	19	1	1	1	0	1	0	0	0	0	0
317	3	-1	1	2.2	4	20	12	8	54	38	16	1	1	0	0	1	1	0	1	0	0
311	6	-1	7	6.4	7	20	9	11	54	41	13	1	1	1	0	1	0	1	0	0	0
305	5	-1	7	6.2	7	6	2	4	68	48	20	0	0	0	0	0	0	0	0	0	0
315	6	-1	7	6.2	7	23	14	9	51	36	15	1	1	1	1	1	1	1	1	0	0
332	5	7	7	6.0	4	30	17	13	44	33	11	0	1	1	0	1	0	0	1	1	0
329	5	-1	7	5.8	4	5	3	2	69	47	22	0	1	0	0	0	0	0	0	0	0
308	3	-1	1	1.4	1	22	10	12	52	40	12	1	1	1	1	1	0	0	1	1	0
303	6	-1	7	6.6	7	19	9	10	55	41	14	1	1	1	1	1	0	1	1	0	0
203	5	-1	7	6.2	7	38	26	12	36	24	12	1	1	1	1	1	1	1	1	1	1
409	3	-1	1	2.3	4	48	28	20	26	22	4	1	1	1	1	0	1	1	1	1	1
404	2	-1	1	1.8	1	53	30	23	21	20	1	1	1	0	1	1	1	0	1	1	1
318	2	1	1	1.4	1	28	15	13	46	35	11	1	0	0	1	1	1	0	1	1	0
413	7	3	7	5.3	4	37	21	16	37	29	8	1	1	1	1	1	1	0	1	1	1
403	2	-1	1	1.8	1	38	23	15	36	27	9	1	1	1	0	1	1	0	1	1	1
326	1	-1	1	1.0	1	25	12	13	49	38	11	1	1	0	1	1	1	1	0	0	1
324	1	-1	1	1.0	1	39	25	14	35	25	10	1	1	1	1	1	1	0	0	1	1
212	2	-1	1	1.2	1	40	25	15	34	25	9	1	1	1	1	1	1	0	1	1	1
207	6	1	7	3.1	4	28	14	14	46	36	10	1	1	0	1	1	1	0	1	1	0
334	3	-1	1	1.4	1	31	18	13	43	32	11	1	1	1	0	0	1	1	1	1	1
301	1	-1	1	1.0	1	36	22	14	38	28	10	1	1	1	1	1	1	0	1	1	1
316	1	1	1	1.0	1	42	27	15	32	23	9	1	1	1	1	1	1	0	1	1	1
213	2	1	1	2.0	4	38	21	17	36	29	7	1	1	1	0	1	1	0	1	1	0
337	3	-1	1	1.6	1	21	10	11	53	40	13	1	1	0	0	0	0	0	0	1	1
205	5	-1	7	6.0	4	27	18	9	47	32	15	1	1	1	1	1	0	0	1	1	1
304	5	-1	7	6.4	7	18	10	8	56	40	16	1	1	1	0	1	0	0	1	1	0
327	2	-1	1	1.6	1	25	14	11	49	36	13	1	1	0	1	1	1	0	1	1	0
208	2	-1	1	1.4	1	52	31	21	22	19	3	1	1	1	1	1	1	1	1	1	1
300	1	-1	1	3.5	4	20	11	9	54	39	15	1	1	1	1	1	1	0	0	0	0
400	3	-1	1	2.3	4	48	29	19	26	21	5	1	1	1	1	1	1	0	1	1	1
412	2	-1	1	2.3	4	38	20	18	36	30	6	1	1	1	1	1	1	0	1	1	1
214	1	-1	1	1.0	1	42	25	17	32	25	7	1	1	1	1	1	1	0	1	1	1
215	2	1	1	2.0	4	37	21	16	37	29	8	1	1	1	1	1	1	0	1	1	1
310	2	-1	1	1.6	1	50	33	17	24	17	7	1	1	1	1	1	1	0	1	1	1
312	7	-1	7	6.6	7	15	7	8	59	43	16	1	0	0	0	0	0	0	1	0	0
323	3	-1	7	5.4	4	23	15	8	51	35	16	1	1	1	1	1	1	0	1	1	0
209	2	-1	1	1.2	1	36	20	16	38	30	8	1	1	1	1	1	1	0	0	1	1
336	3	-1	1	1.4	1	28	14	14	46	36	10	1	1	1	1	1	1	0	1	1	0

APPENDIX H. - ALL DATA FOR S's WITH MEANINGS

210	1	-1	1	1.0	1	38	23	15	36	27	9	1	1	1	1	1	1	0	1	1	1
411	1	-1	1	1.3	1	44	27	17	30	23	7	1	1	1	1	1	1	0	1	1	1
328	3	-1	1	1.6	1	41	24	17	33	26	7	1	1	0	1	1	1	0	1	1	1
206	5	-1	7	6.2	7	36	21	15	38	29	9	1	1	1	0	1	0	1	1	1	0
211	3	-1	1	2.0	4	38	20	18	36	30	6	1	1	0	0	1	1	0	1	1	0
335	4	-1	1	1.6	1	31	19	12	43	31	12	1	1	1	1	1	1	0	1	0	1
402	1	-1	1	1.5	1	35	19	16	39	31	8	1	1	1	1	1	1	0	1	1	1
322	7	-1	7	6.0	4	22	12	10	52	38	14	1	1	1	1	1	0	0	1	1	0
410	2	-1	1	1.7	1	24	12	12	50	38	12	1	1	0	1	1	1	0	1	0	1
325	1	-1	1	1.0	1	27	13	14	47	37	10	0	1	1	1	1	0	0	0	0	0
307	3	-1	1	1.8	1	19	12	7	55	38	17	1	1	1	1	0	1	0	1	0	0
313	6	-1	7	6.2	7	27	14	13	47	36	11	1	1	0	1	1	1	1	1	0	0
407	4	7	1	2.7	4	44	26	18	30	24	6	1	1	1	1	1	1	0	1	1	1
319	1	1	1	1.4	1	43	27	16	31	23	8	1	1	1	1	1	1	0	0	1	1

APPENDIX 11 - ALL DATA FOR S's WITH MEANINGS

NUM	COUP	RARP	EQUP	NAIP	CATP	GAOP	THYP	HEIP	RADP	ASSP	HIAP	SUBP	PROP	GISP	GOUP	SUPP	SIMP	BANP	GUAP	CELP	FACP
302	0	0	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0
338	1	1	0	1	1	1	0	0	1	1	0	1	1	0	1	1	1	0	0	0	1
321	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
401	0	1	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
405	0	1	1	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0
202	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
331	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
333	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	0	0	1	1	0
314	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0
330	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
406	1	0	1	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
306	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
201	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
320	0	0	0	1	0	0	0	0	1	0	1	1	0	1	1	0	0	0	0	0	0
309	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0	0
204	0	0	0	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0
317	1	0	0	1	0	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0
311	0	0	0	1	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0	0
305	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
315	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0
332	0	1	1	1	1	0	0	0	0	1	1	0	1	1	0	0	1	0	0	0	0
329	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
308	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0
303	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
203	0	1	1	1	0	0	0	1	0	1	1	1	1	1	1	0	1	0	1	0	0
409	1	1	1	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	0	1	0
404	1	1	1	1	0	1	1	1	0	1	0	1	1	0	1	1	1	0	1	1	0
318	1	1	0	1	0	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0
413	0	0	1	1	0	0	1	1	1	0	0	1	1	0	1	0	1	0	0	1	0
403	1	1	0	1	1	1	0	1	1	0	0	1	1	1	1	1	1	0	0	0	0
326	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0
324	0	1	0	1	0	0	1	1	1	1	1	1	1	1	1	0	1	1	0	0	0
212	1	1	1	1	1	1	0	1	0	1	1	1	1	0	0	1	1	0	0	0	0
207	0	1	0	1	0	0	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0
334	1	1	0	1	0	0	0	1	0	1	0	1	0	0	1	0	1	1	0	0	0
301	1	1	0	1	0	1	0	0	1	1	0	1	1	1	1	1	1	0	0	0	0
316	1	1	0	1	0	1	1	1	1	0	1	1	1	1	1	0	1	0	1	0	1
213	1	1	0	1	0	0	0	1	1	1	0	0	1	1	1	1	1	0	0	0	0
337	0	0	0	1	0	0	0	1	1	0	0	0	0	1	0	0	1	0	0	0	0
205	0	1	0	1	0	0	0	0	1	0	0	1	1	0	0	0	0	1	0	0	1
304	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0
327	0	0	0	0	0	0	1	1	1	0	0	0	1	1	1	0	1	0	0	0	0
208	0	1	1	1	1	1	0	1	1	0	1	1	1	0	1	1	1	0	1	0	1
300	0	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
400	1	1	1	1	0	0	0	1	0	0	1	1	1	1	1	1	1	0	0	1	1
412	0	1	1	1	0	0	0	1	1	1	1	0	1	0	1	0	1	0	0	0	0
214	0	1	0	1	1	1	1	1	1	0	1	1	0	1	1	0	1	0	0	0	0
215	1	1	0	1	0	1	1	1	1	0	0	0	0	1	1	1	0	1	0	0	0
310	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1
312	0	0	0	1	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0
323	0	1	0	1	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0
209	0	1	1	1	0	0	0	0	1	1	1	0	1	1	1	0	1	0	0	0	0
336	0	0	0	1	0	0	0	0	1	1	0	0	1	0	1	0	1	0	0	0	0

APPENDIX H. - ALL DATA FOR S's WITH MEANINGS

210	1	1	0	0	0	0	0	1	0	1	0	1	1	1	0	1	1	0	1	1	0
411	1	1	1	1	0	0	1	1	1	0	1	1	0	0	1	1	1	0	0	0	1
328	0	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1
206	0	1	0	1	1	0	0	0	1	0	0	1	1	1	0	0	0	0	1	0	0
211	0	1	0	1	0	0	1	0	0	1	1	1	1	0	1	0	1	0	1	0	1
335	1	1	1	1	0	0	0	0	1	0	0	1	1	1	1	0	1	0	0	0	0
402	1	1	1	1	0	0	1	1	0	0	1	1	1	0	0	0	1	0	0	0	0
322	0	1	0	1	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0
410	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	1	0
325	0	0	0	1	1	0	0	0	1	0	1	0	1	1	0	0	1	0	0	0	1
307	0	0	0	0	1	0	0	0	1	0	1	1	0	0	0	0	1	0	1	0	0
313	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0
407	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	1	1	0	0	0	0
319	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	0	1

APPENDIX 4 - ALL DATA FOR S's WITH MEANINGS

NUM	ZEAP	DRAP	AEOP	PLAP	ABSP	DETP	IOYP	PUEP	AVEP	GAUP	TOPP	LEVP	BEAP	PREP	SIOP	DEMP	SYNP	LABP	CAMP	COMP	TOMP
302	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
338	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
321	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
401	0	0	0	0	1	0	0	1	0	0	1	1	0	0	1	0	0	0	0	1	0
405	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
202	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0
331	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
333	0	0	0	1	1	0	1	0	0	0	1	0	0	0	1	0	1	0	0	1	1
314	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
330	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
406	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
306	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
320	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
309	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
204	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
317	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
311	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
305	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
315	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0
332	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	0	0	1
329	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
308	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
303	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
203	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1
409	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1	1
404	1	0	0	1	0	0	1	1	1	0	1	1	0	0	0	0	0	0	0	1	1
318	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1
413	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
403	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
326	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	1
324	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
212	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
207	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
334	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
301	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
316	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
213	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
337	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
205	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	1
304	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
327	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
208	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
400	1	0	1	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	1	1
412	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1
214	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
215	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
310	1	0	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	1
312	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
323	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
209	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
336	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1

APPENDIX 14 - ALL DATA FOR S's WITH MEANINGS

210	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
411	1	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	1	0	1	1
328	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
206	1	0	1	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0
211	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
335	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
402	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
322	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
410	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
325	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
307	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
313	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
407	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	1
319	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1

NUM	ISLP	SEWP	PLDP	GUYP	PLTP	EPOP	SUIP	CHAP	SCEP	LICP	PHLP	RECP	INDP	CROP	VISP	PARP	VICP	GUNP	LIEP
302	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
338	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0	1	0	0	1
321	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
401	1	1	1	1	1	1	1	0	1	1	0	1	0	0	1	0	0	1	1
405	1	0	1	1	1	1	0	0	1	0	1	0	0	0	0	1	0	0	1
202	1	1	1	1	1	1	0	0	1	1	0	1	0	0	0	1	0	0	1
331	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
333	1	1	1	0	1	0	1	0	1	0	0	1	0	1	1	0	0	0	1
314	1	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1
330	1	0	1	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1
406	0	0	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1
306	1	0	1	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1
201	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1
320	1	0	1	0	1	0	0	0	1	0	0	0	0	1	0	1	0	0	1
309	1	0	1	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	1
204	0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	1
317	0	0	0	0	1	1	0	0	1	1	0	0	0	1	0	0	0	0	1
311	1	0	1	0	1	1	1	0	1	0	0	1	0	1	0	1	0	0	1
305	0	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1
315	1	0	1	0	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0
332	1	0	1	1	1	1	1	0	1	0	0	1	0	1	0	1	0	0	1
329	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
308	1	1	1	0	1	0	0	0	1	1	0	1	0	0	0	0	0	0	1
303	1	0	1	1	1	1	1	0	1	0	0	1	0	0	0	0	0	0	1
203	1	1	1	0	1	1	1	0	1	0	0	1	0	1	0	0	0	0	1
409	1	1	1	1	1	0	1	0	1	1	1	1	0	1	1	1	0	1	1
404	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1
318	1	1	1	0	1	1	1	0	1	1	0	1	0	1	0	0	0	0	1
413	1	0	1	0	1	1	0	0	1	0	1	1	0	1	1	1	0	1	1
403	1	1	1	0	1	0	0	0	1	1	1	1	0	0	1	1	0	0	1
326	1	1	1	0	1	0	0	0	1	1	1	1	0	1	0	0	0	0	1
324	1	0	1	1	1	1	0	0	1	1	1	1	0	1	0	0	0	0	1
212	1	1	1	0	1	1	0	1	1	1	1	1	0	1	0	0	0	0	1
207	1	1	1	1	1	1	0	0	1	0	0	1	0	1	0	1	0	0	1
334	1	1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	1	1
301	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	0	0	0	1
316	1	1	1	1	1	0	0	0	1	1	1	1	0	0	1	0	0	0	1
213	1	1	1	1	1	1	0	0	1	1	1	1	1	1	0	1	0	0	1
337	0	1	1	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0	1
205	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1
304	1	0	1	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0	1
327	1	0	0	1	1	0	0	0	1	1	0	1	0	1	1	0	0	0	1
208	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	0	1	1
300	1	1	1	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0	1
400	1	1	1	0	1	1	0	1	1	1	1	1	1	0	1	1	1	0	1
412	1	1	1	1	1	1	1	0	1	0	1	1	0	1	0	1	0	1	1
214	1	1	1	0	1	0	1	0	1	1	1	1	1	1	0	1	0	0	1
215	1	1	1	0	1	1	1	0	1	1	1	1	0	1	0	0	0	0	1
310	1	1	1	1	1	1	1	0	1	1	1	1	0	0	0	1	0	0	1
312	0	0	1	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0	1
323	1	0	1	0	1	1	0	0	1	0	0	0	0	1	0	0	0	0	1
209	1	1	1	1	1	0	1	0	1	0	1	1	0	1	0	1	0	0	1
336	1	1	1	0	1	0	0	0	1	1	1	1	0	0	0	0	0	0	1

210	1	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	1	1
411	1	1	1	0	1	1	0	1	1	1	1	1	0	1	0	0	0	0	1
328	1	1	0	1	1	0	1	0	1	1	1	1	0	1	1	0	0	0	1
206	1	0	1	1	1	1	1	0	1	1	1	1	0	1	0	1	0	0	1
211	1	1	1	1	1	1	1	1	1	0	1	1	0	0	1	1	0	1	1
335	1	1	1	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0	1
402	1	1	1	1	1	1	0	0	1	1	0	0	0	1	0	1	0	1	1
322	1	1	1	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	1
410	1	1	1	1	1	0	0	0	1	0	0	1	0	0	1	0	0	0	1
325	1	1	1	1	1	1	0	0	1	1	0	1	0	1	0	1	0	0	1
307	1	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	0	1
313	1	1	1	0	1	1	0	0	1	1	0	1	0	1	0	1	0	0	1
407	1	1	1	1	1	1	1	0	1	0	1	1	0	0	1	0	1	1	1
319	1	1	1	1	1	0	0	0	1	1	1	1	1	1	0	0	0	0	1

NUM	HICP	EPIP	GROP	ACHM	DEBM	PSAM	DEPM	CHOM	BOUM	DENM	CAPM	HEIM	AISM	SUBM	NAUM	EQUM	NAIM	THYM	COUM	GADM	PROM
302	0	0	0	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0
338	0	0	1	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	1	1	0
321	0	0	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
401	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1	1	0	0
405	0	0	0	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	0	0
202	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	0	1
331	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
333	0	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	0	0
314	1	0	0	1	1	1	1	0	1	1	0	1	1	0	0	0	0	1	1	0	0
330	0	0	0	1	1	1	1	0	1	1	0	1	1	0	1	0	1	0	1	0	0
406	0	0	0	1	1	1	1	1	0	0	0	0	0	1	0	0	0	0	1	0	1
306	0	1	0	0	0	1	1	1	0	1	0	0	1	0	0	0	0	0	0	0	0
201	0	0	0	1	0	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0
320	0	0	0	1	0	1	1	0	0	1	0	0	0	0	1	1	0	1	0	0	0
309	0	0	0	0	1	1	1	1	1	0	0	1	1	0	1	0	0	0	1	0	0
204	0	0	0	1	1	1	1	1	1	1	0	1	0	1	1	0	1	1	0	0	0
317	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0	0	0	1	1	0	0
311	0	0	0	1	0	1	1	1	1	1	0	0	1	0	0	0	0	0	0	0	0
305	0	0	0	0	1	1	1	1	1	1	0	0	0	1	0	0	0	0	1	0	0
315	0	0	0	1	1	1	1	1	1	1	0	0	1	0	1	1	0	1	1	0	0
332	0	0	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	0	1	0	0
329	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
308	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0
303	0	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	1	0	1	1	0
203	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	1	1	0
409	1	1	1	1	1	1	0	1	1	1	0	1	1	0	1	1	1	1	1	1	1
404	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1
318	0	0	0	1	1	1	1	1	1	1	0	1	1	0	1	0	0	1	1	1	0
413	1	0	1	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	1
403	0	1	1	1	1	1	1	1	1	1	1	1	0	0	1	0	1	0	1	1	0
326	1	0	0	1	1	1	0	1	1	0	0	1	1	0	0	0	0	0	1	0	0
324	1	0	1	0	1	1	1	1	1	1	0	1	1	1	1	1	0	1	1	0	1
212	0	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	0	1	1	1	0
207	0	0	1	1	1	0	1	1	1	1	0	1	1	0	1	0	0	1	1	0	0
334	1	0	0	1	1	1	1	1	1	1	0	1	0	1	1	0	1	0	1	0	0
301	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1	1	1	0
316	0	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1	1	1	1
213	0	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	0	1
337	0	0	1	1	1	1	0	1	1	1	0	1	0	0	1	1	0	0	1	0	0
205	1	0	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	0	1	1	1
304	0	0	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1
327	0	0	0	1	1	1	1	1	1	1	0	1	1	0	1	1	0	1	1	0	1
208	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1
300	0	0	0	1	1	1	1	1	1	1	0	1	0	1	0	1	0	1	1	1	0
400	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
412	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	0	0
214	1	0	1	1	1	1	1	1	0	1	0	1	1	0	1	1	1	1	1	1	1
215	1	0	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	1	1	0
310	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1
312	0	0	1	1	1	1	1	1	0	1	0	1	0	1	0	1	1	0	0	0	0
323	0	0	0	1	1	1	1	1	1	1	0	1	0	1	1	0	1	0	1	0	0
209	0	1	1	1	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	0	1
336	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0

210	0	1	1	1	1	1	1	1	1	1	0	1	1	0	1	1	0	1	1	0	1
411	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1	1	1	0
328	1	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1	1	1	1
206	0	0	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1	1	1	0
211	0	0	1	1	1	1	1	1	1	1	0	1	1	0	1	1	1	1	1	1	1
335	0	0	1	1	1	1	1	1	1	1	0	1	1	0	1	0	1	0	1	0	0
402	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0	0
322	1	0	0	1	1	1	1	1	1	1	0	1	1	1	1	0	0	1	1	0	0
410	1	0	0	1	1	1	1	1	1	1	1	1	1	0	1	0	1	0	1	0	0
325	0	0	1	1	1	1	1	0	1	1	0	1	1	0	1	0	1	0	1	0	0
307	0	0	0	1	1	1	1	1	1	1	0	1	1	0	1	0	1	1	1	0	0
313	0	0	0	1	1	1	1	1	1	1	0	1	0	1	1	1	1	0	1	1	1
407	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
319	0	1	1	1	1	1	1	1	1	0	0	1	1	1	1	0	0	1	1	1	1

H11.

NUM	QUAM	CATM	SUPM	RADM	ASSM	GISM	HIAM	SIMM	RAMM	CELM	ZEAM	ABSM	GOUM	PLAM	FACM	AVEM	LEVM	AEOM	DETM	GAUM	DRAM
302	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
338	0	1	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	1	1	0	0
321	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
401	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
405	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
202	1	0	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
331	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
333	0	1	1	0	1	0	0	0	1	1	0	0	0	0	1	0	0	1	0	0	0
314	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0
330	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
406	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
306	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
201	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
320	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
309	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
204	0	1	0	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0	0	0	0
317	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
311	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	0	0
305	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
315	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	1	0	0	1	0	0
332	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
329	0	0	0	1	1	1	1	1	0	0	0	0	1	0	0	0	0	1	1	1	0
308	0	1	1	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0
303	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0
203	1	1	1	0	0	1	1	1	1	1	0	0	0	0	0	0	1	0	1	1	1
409	1	1	1	0	1	1	0	1	0	1	1	0	1	0	1	0	0	1	0	0	0
404	1	1	1	0	1	1	0	1	0	1	1	0	1	0	0	0	1	1	0	0	0
318	0	1	0	1	1	1	0	1	0	0	0	0	1	0	1	1	0	1	0	0	1
413	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0
403	1	1	0	0	1	1	0	1	1	1	0	0	0	0	1	0	0	1	0	0	0
326	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
324	0	1	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
212	0	1	1	0	0	0	0	1	0	1	0	0	1	0	1	0	0	1	0	0	0
207	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0
334	0	1	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	1	0	0	0
301	0	1	1	0	1	1	0	1	0	0	1	0	1	0	1	0	0	0	1	0	0
316	1	1	1	0	1	1	0	1	1	1	1	0	1	0	1	0	0	1	1	0	1
213	0	1	1	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0	0	1	0
337	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
205	1	1	0	0	0	1	0	1	1	1	0	0	0	0	1	0	0	1	0	0	0
304	0	1	1	0	0	0	0	1	1	0	1	0	1	0	1	0	1	1	0	0	0
327	0	0	0	0	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0
208	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	0	0	1	1	0	1
300	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
400	1	1	0	0	0	1	0	1	0	1	1	1	1	0	0	0	1	0	1	0	0
412	0	1	1	0	1	1	1	1	0	1	1	0	1	0	1	0	1	1	0	0	0
214	0	1	1	1	1	1	0	1	0	1	1	0	1	0	0	0	1	1	1	1	1
215	1	1	0	0	0	0	0	1	0	0	1	0	1	0	1	0	1	1	0	0	0
310	1	1	0	0	1	1	0	1	0	1	1	0	1	0	1	0	1	1	0	0	1
312	0	1	0	1	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0
323	0	1	0	0	1	0	0	1	1	1	0	0	1	0	0	0	0	1	0	0	0
209	0	1	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0
336	0	1	0	0	1	0	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0

210	1	1	1	0	0	1	0	1	1	1	0	0	0	0	1	0	1	0	0	0	0
411	0	1	1	0	0	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0	0
328	1	1	1	0	1	1	0	1	0	0	1	1	1	0	1	0	0	1	0	1	0
206	1	1	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0
211	1	1	0	0	0	1	0	1	1	1	1	0	1	0	1	0	1	1	1	1	0
335	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
402	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0
322	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0
410	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0
325	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0
307	0	0	0	1	0	0	1	1	0	0	0	0	0	0	1	0	0	1	0	0	0
313	0	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	1	0	1	0
407	1	1	1	0	1	0	0	1	0	1	1	0	1	0	1	0	0	0	1	1	1
319	1	1	1	0	0	1	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0

NUM	IDYM	BEAM	BANM	SIDM	PUEM	TOPM	DEMM	CAMM	LABM	SYNM	PREM	COMM	TOMM	ISLM	SEWM	PLOM	QUYM	PLTM	EPOM	SUIM	CHAM
302	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0
338	1	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
321	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
401	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0
405	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0
202	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	0	1
331	1	0	0	0	0	0	0	0	0	1	1	1	0	0	1	1	0	0	0	0	0
333	0	0	1	0	0	0	0	0	0	1	0	1	1	1	1	1	1	1	1	1	0
314	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	1	0	0	0	0
339	1	0	0	0	0	1	0	0	0	0	0	1	0	1	1	0	1	0	1	0	0
406	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1
306	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0
201	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
320	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0	0	0
309	1	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0
204	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
317	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
311	0	1	0	1	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	1	0
305	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
315	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	1	0
332	1	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	1	0	1	1	0
329	0	1	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0
308	1	0	1	0	0	1	0	1	0	0	0	1	1	1	1	0	1	1	1	0	0
303	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0
203	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	0
409	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	0	0
404	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
318	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	0	1	1	1	1	0
413	1	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
403	0	0	1	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	1	0	0
326	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	0	0	0	0	1	0
324	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0
212	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	1	0
207	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	1	0
334	0	0	0	0	0	0	1	0	0	0	0	1	1	1	1	0	1	0	0	1	0
301	0	0	0	1	0	1	0	0	0	0	0	1	1	1	1	0	1	1	0	0	0
316	0	1	1	0	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	0
213	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0
337	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	0	1	1
205	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0
304	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	1	1	1	1	0
327	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0
208	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	1	1	0
300	0	0	0	0	0	0	1	0	1	0	0	1	0	0	1	0	1	0	0	0	0
400	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
412	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
214	0	0	1	0	0	1	1	0	0	0	0	1	1	1	1	0	1	1	1	1	0
215	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	1	0
310	0	0	1	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1	0
312	0	1	0	0	0	1	0	0	0	0	0	1	1	0	0	1	1	0	0	1	0
323	0	1	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	1	0	1
209	0	1	1	0	0	1	0	1	0	1	0	1	1	1	1	0	1	0	0	1	0
336	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	1

HHL.

210	0	0	0	0	0	0	0	1	1	0	0	1	1	1	1	0	1	1	0	1	0
411	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	1
328	0	1	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	1	0
206	1	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	0	1	0	0	1	0
211	0	0	0	0	0	1	0	1	0	0	0	1	1	1	1	1	0	1	1	1	0	0
335	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1	0	0	0	0	0
402	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1	1	0	1	0	0	0	0
322	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	0	0	1	0
410	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	1	0
325	0	0	0	0	0	1	0	0	0	0	0	1	1	1	1	1	0	1	1	1	0	0
307	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0
313	0	1	0	0	0	1	0	0	0	0	0	1	1	1	1	1	1	1	0	1	1	0
407	0	1	1	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	1	0	0
319	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0

NUM	SCEA	LICA	PHLA	RECA	INDA	CROA	VISA	PARA	VICA	GUNA	LIEA	HICA	EPIA	GROA
302	1	0	0	0	0	0	0	0	0	0	0	0	0	0
338	1	1	0	1	0	1	0	0	0	1	1	0	0	1
321	0	0	0	0	0	0	0	0	0	0	1	0	0	0
401	0	0	0	0	0	1	0	0	1	1	1	0	0	0
405	1	0	1	0	0	1	1	0	0	1	1	0	0	0
202	1	1	1	1	0	1	0	0	0	0	1	1	0	0
331	1	0	0	0	1	0	0	0	1	0	1	0	0	0
333	1	0	0	1	1	1	1	0	0	1	1	1	0	0
314	1	0	0	1	1	0	0	0	0	0	1	0	0	1
330	1	1	0	1	0	0	1	0	0	0	1	1	0	1
406	1	0	0	1	0	0	0	0	0	1	1	0	0	0
306	1	0	0	1	0	1	0	0	0	0	1	1	0	1
201	1	0	0	0	0	0	0	0	0	0	1	0	0	0
320	1	1	0	0	0	1	0	0	0	0	1	0	0	0
309	1	1	1	0	1	1	0	0	0	1	1	1	0	0
204	1	0	0	1	0	1	1	0	0	0	1	0	0	0
317	0	1	0	0	0	1	0	0	0	0	1	0	0	0
311	1	1	0	1	1	0	0	1	0	0	1	1	0	0
305	1	0	0	1	0	0	0	0	0	1	1	0	0	0
315	1	1	0	1	0	1	0	0	0	1	1	0	1	0
332	1	0	0	1	0	0	1	0	0	0	1	1	0	1
329	0	0	0	0	0	0	1	0	1	0	0	1	0	0
308	1	1	1	1	0	1	0	0	0	1	1	1	0	1
303	0	0	0	1	0	0	0	0	0	1	1	1	0	0
203	1	1	1	1	1	1	1	0	0	1	1	1	0	1
409	1	1	1	1	1	1	1	0	1	1	1	1	0	0
404	1	1	1	1	1	1	1	1	1	1	1	1	0	1
318	0	1	1	1	1	1	0	1	0	1	1	1	0	0
413	1	0	1	1	0	1	1	0	1	1	1	1	0	1
403	1	0	1	1	0	1	1	0	0	1	1	1	1	1
326	1	0	1	1	0	0	0	0	0	0	1	1	0	0
324	1	1	1	1	1	1	0	0	0	1	1	1	0	0
212	1	1	0	1	1	1	1	0	0	1	1	0	0	1
207	1	0	0	1	0	1	0	0	0	1	1	1	0	0
334	1	0	1	0	1	1	0	1	0	1	1	1	0	0
301	1	1	1	1	0	1	0	0	1	1	1	1	1	1
316	1	1	1	1	1	1	1	1	1	1	1	1	1	1
213	1	1	1	1	1	1	1	0	0	1	1	1	1	1
337	1	0	1	0	0	0	0	0	0	1	1	0	0	0
205	1	0	1	1	1	1	1	0	0	1	1	1	0	1
304	1	1	0	1	0	1	0	0	0	1	1	1	0	1
327	1	1	0	1	0	1	0	0	0	1	1	1	0	0
208	1	1	1	1	1	1	1	0	1	1	1	1	0	1
300	1	0	0	1	1	0	1	0	0	1	1	0	0	0
400	1	1	1	1	1	1	1	1	1	1	1	1	1	1
412	1	1	1	1	1	1	1	1	1	1	1	1	1	1
214	1	1	1	1	1	1	1	0	0	1	1	1	0	1
215	1	0	1	1	1	1	1	0	0	1	1	1	1	1
310	1	1	1	1	1	1	0	0	0	1	1	1	0	1
312	1	1	1	1	0	0	0	0	0	0	1	1	0	1
323	1	0	0	1	0	0	0	0	0	0	1	1	0	1
209	1	0	1	1	1	1	0	0	0	1	1	0	0	0
336	1	1	1	1	0	1	1	0	0	0	1	1	0	1

210	1	1	1	1	1	1	1	0	1	1	1	0	1	1
411	1	0	1	1	1	1	0	0	1	1	1	1	0	0
328	1	1	1	1	1	1	1	0	1	1	1	1	0	1
206	1	0	1	1	1	1	0	0	0	1	1	0	0	1
211	1	1	1	1	1	1	1	1	1	1	1	0	0	0
335	1	1	0	1	0	1	1	0	0	1	1	1	0	1
402	1	0	0	1	0	1	0	1	0	1	1	0	0	1
322	1	0	0	1	0	1	0	0	0	1	1	1	0	0
410	1	0	0	1	0	1	0	0	0	1	1	1	0	0
325	1	1	1	1	0	1	0	1	0	1	1	1	0	1
307	1	0	0	1	0	1	0	0	0	0	1	1	0	0
313	1	0	0	1	0	1	0	0	0	0	1	1	0	0
407	1	1	1	1	1	1	1	0	1	1	1	1	0	1
319	1	0	1	1	1	1	0	0	0	1	1	1	0	1