

**Culture, Self, and Cognition:
Adding Africa to the Mix**

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COMPULSORY DECLARATION

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Abstract

Cross-cultural differences in cognition have been well established across the world, and differences in Individualism (IND) and Collectivism (COL) are believed to underlie the majority of these cultural variations. IND-COL measures are frequently used to categorise nations as either IND or COL and these nations are subsequently used to draw IND or COL samples for comparison on various cognitive tasks. The multicultural nature of South Africa and inconsistent findings on IND-COL in SA makes such IND-COL categorisation problematic. African nations have also been conspicuously missing from international cross-cultural research on culture and cognition. This study set out to explore the utility of IND-COL measures in South Africa, with special regard to possible racial or linguistic differences. It also set out to remedy the absence of African nations in the international literature by replicating a previous study on culture and cognition within a South African sample.

The shortened HVIC scale by Triandis and Gelfand (1998) was used to explore racial and linguistic differences in terms of IND-COL within a South African university population (N = 1380). Psychometric analyses showed good reliability, internal consistency, and construct validity. Regression analysis revealed race and language as poor predictors of IND. COL prediction was marginally better, accounting for 8.2% of variance, and with African Language as a significant predictor (beta = -.432, $p < .01$). To address the absence of Africa in the literature, replication of the eye-tracking and memory study by Chua et al. (2005) was attempted in a South African university population (N = 52). Due to the multicultural nature of South Africa, participants were recruited and sorted according to scores on a shortened version of the HVIC into an IND group (n = 25) and a COL group (n = 27). After correcting for outliers, no significant differences were found between the two groups regarding eye-movement patterns or memory. The two SA groups did, however, differ significantly from the American group but not the Chinese group in the original study by Chua et al. (2005).

Discrepancies in IND-COL research in SA are likely due to a lack of comprehensiveness in terms of the cultural tasks included in the surveys. Increasing acculturation in post-Apartheid South Africa, especially among university students, may also play a large role. Further issues regarding IND-COL measurement in South Africa, as well as issues surrounding IND-COL measurement internationally were also discussed. Methodological issues in studying the links between IND-COL and cognition within a South African context were likely the reason behind the lack of differences found in this study in terms of eye-movement patterns and memory for the two SA groups.

Chapter 1: Defining Culture

Introduction

For most of its history the field of psychology has maintained the belief that in understanding the behaviour of the individual one can understand all human behaviour (Henrich, Heine, & Norenzayan, 2010). Research from the past few decades, however, has increasingly begun to show that the individual cannot really be understood in isolation; that humans are inherently social beings, and as such must be viewed within their unique social contexts in order to gain a truly comprehensive understanding of their behaviour and cognition (Henrich et al., 2010). Much of this research has involved comparing the behaviours and cognitive strategies of individuals from different parts of the world during various tasks. These tasks ranged from asking individuals to determine causative factors in an event, recounting memories from their past, or simply looking at and memorising pictures. While people from many nations or cultures across the world have been studied, Africa in general, and South Africa in particular, have been widely ignored or left out in studying the link between culture and cognitive processes. This study set out to begin filling this gap in the literature by testing one of the major assumptions on how culture influences cognition within a South African sample: the notion that an individual's sense of self or self-concept affects how they direct visual attention when viewing a visual scene. It will also further explore, within a South African sample, the measurement of arguably the most important set of variables in cultural psychology, that of Individualism (IND) and Collectivism (COL).

What is Culture?

Cultural psychology is the study of how the human social world fundamentally shapes our behaviour (Markus & Hamedani, 2010). It is the merging of our understanding of the basic building blocks of the mind with our understanding of the broader social context within which we exist.

Since its very conception the behaviour of the individual has mostly been the focus of study within the field of psychology. The inclusion of culture, on the other hand, has had a somewhat inconsistent history in building our understanding behaviour (Triandis, 2010). Definitions regarding the behaviour of the individual are therefore quite abundant, and often well-defined and validated within psychology. Definitions of culture, however, are not. Accurate and well defined operationalisation of constructs being studied is a well-known standard for any research endeavour. Without a proper definition of culture, however, how

can one start understanding individual behaviour through a cultural lens? Luckily, scholars in the field of anthropology have for centuries been dealing with this issue of defining what 'culture' actually is; how one can say "this is the culture of people X and this is the culture of people Y" (Baldwin, Faulkner, & Hecht, 2006; Cole & Scribner, 1974). Cultural psychologists have therefore naturally drawn on this source of information to create new interdisciplinary definitions of culture and how it applies to individual human behaviour.

One of the first, and very influential, anthropological conceptualisations of 'culture' comes from Edward Tylor (1920). He described culture as "that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society" (p. 1). The individual is not seen as functioning in isolation, but is heavily influenced by the society that he or she is a member of. Culture is also seen as something accumulated by collectives as a whole, and is comprised of abstract as well as material objects that are reflective of that society in general. Tylor's definition is, however, somewhat static, with no acknowledgement of the fluidity and ambiguity that cultures typically exhibit. Tylor also saw culture as evolving according to a certain step-wise progressive hierarchy, with cultures evolving from some primitive state to the "civilised" ideal as epitomised by European societies. This idea of progressive cultural evolution was thoroughly discredited by later generations of anthropologists (Durham, 1990).

Definitions of what 'culture' is have kept on growing and changing over the subsequent decades (Baldwin et al., 2006). Almost a century later, through a systematic review of the various definitions of culture in use at the time, Kroeber and Kluckhohn (1954; as cited in Baldwin et al. (2006)) created a more developed and elaborated definition. According to them culture consisted not only of specific identifiable objects, whether abstract or material, but also specific patterns of behaviour. These patterns of behaviour may be embodied or transmitted through the use of objects or symbols, but what is important is that they are derived and selected throughout a collective's social history by the values that people attached to them. A group's behaviour over time is heavily influenced by the values and norms they espouse. These values and norms are often embodied or exemplified by specific symbols, such as a flag or a religious icon. The pervasiveness of such symbols or objects helps maintain and spread the norms or values that they embody amongst the people and the younger generations. A very important distinction they also expressed was that culture should not only be seen as the product of behaviour, but also have a shaping force of future

behaviour. That is to say, culture is shaped and in turn shapes human behaviour through a dynamic and intricate interplay between the two.

While this new refinement of the concept of 'culture' was met with much wider agreement among scholars, it was still not wholly accepted by all. It did, however, express certain trends that would emerge more and more in future definitions, including those used by cultural psychologists (Baldwin et al., 2006; Triandis, 2010).

Firstly, most modern definitions usually accept that culture is a product of human interactions with their social environments. They also accept that culture in turn shapes future human interactions with this social environment; that there is a dynamic interplay and co-creation between humans and their social environment. Secondly, they also acknowledge that culture consists of various abstract or material objects, as well as practices or rituals, that are shared between people. Of special importance are the shared meanings or values that people attach to these practices or objects, i.e. the social norms shared between people. Lastly, culture essentially functions as a repository of collective knowledge, and if knowledge is not shared, it will eventually be lost. Consequently, it is also generally accepted that a key element of culture is that it is transmitted among people or collectives. More precisely, that culture is formed and evolves through the transmission of the "units of knowledge" regarding concepts, ideas, abstract artefacts, or practices between people or collectives.

Taken altogether, culture can therefore be defined as the behavioural and cognitive expressions of the social rituals, norms, values, and abstract symbols or concepts shared within and between groups of people. This definition no longer views culture as located within the individual as some sort of inherent concrete trait, but is rather seen as a dynamically constituted product created through the interactions between the person, other people, their social history, and their environment. It captures quite well the dynamic and fluid nature of culture and how it is expressed by individuals as well as collectives. For instance, as a group's social environment changes, be it through migration, war, or contact with other cultures, so do the adaptive behavioural patterns change which creates new norms or values and consequently a new cultural dynamic (Newson, Richerson, & Boyd, 2010); or the broken-telephone nature of teaching and learning between generations may also subtly alter the various rituals or symbols, thus creating or introducing new abstract symbols or rituals and thus changing behavioural patterns (Newson et al., 2010). Individual behaviour can now be seen as inextricably linked with the individual's relationships with others, as well as with the vast accumulation of collective knowledge and practices embodied within their

families, communities, and greater social environment. The individual is no longer individual, but one small piece of a much larger whole.

The idea that social context influences human behaviour is not actually such a new concept, as from the early 1900's anthropological researchers such as Franz Boas and Edward Sapir had already begun looking into culturally situated psychologies (LeVine, 2010). Behavioural models incorporating cultural dynamics began falling out of favour, however, as the rise of behaviourism and cognitive psychology started taking hold throughout Western Europe and especially in the US (Nisbett, 2010). Behaviour was seen as a function of input-output computations, with the "organism" playing a very small part in these computations. Furthermore, various methodological issues also plagued cultural research during this time, further lowering its scientific "status" among psychological researchers of the time, especially when compared to the then more rigorous methods employed by the behaviourists (Nisbett, 2010).

A small group of researchers, however, continued doing cultural research, both within the US and in other parts of the world such as Soviet Russia and Japan (Nisbett, 2010). Over time these researchers honed the various methods and experimental techniques used in cultural research and started producing results with undeniable scientific and empirical merit (Nisbett, 2010). Due to the efforts of these researchers a new wave of interest in cultural psychology started building. Beginning in the late 80's the importance of culture started gaining more and more recognition once again, culminating in the flood of new research in cultural psychology seen in recent years (Nisbett, 2010). Studying the role of culture was no longer simply the realm of anthropologists or social psychologists, but an integral part of any holistic study of human behaviour and cognition.

Approaches to studying culture and behaviour

The new wave of cultural research brought about a number of methodologies and research techniques uniquely suited to studying this link between culture and the mind. Building upon these modern definitions of culture and improved research techniques, a number of approaches have arisen that attempt to incorporate the relationship between culture and the individual in studying behaviour (Markus & Hamedani, 2010). Although these approaches are not mutually exclusive, different cultural psychologists tend to use qualitatively different frameworks within which to study the interactions between culture and psychology. Naturally, the type of approach used is usually dependent on the type of question

each researcher is seeking to answer. These approaches can be broadly categorized into five different types (See Table 1).

Table 1. Five main approaches to studying cultural impact on human psychological characteristics.

APPROACH	EMPIRICAL GOAL	MECHANISM OF CONSTITUTION	EXAMPLE
Dimensional	Specify the dimensions of culture that explain differences in attitudes, beliefs, and behaviours	Worldviews, beliefs, values, attitudes translate the sociocultural in the psychological	Horizontal-vertical relationships dimensions.
Models	Specify models that organise the links between the sociocultural and self-systems.	Psychological tendencies, meanings, practices, and products reflect, foster, and sustain one another.	Influencing-adjusting models of agency
Cognitive Toolkit	Specify how cultural meanings and practices can influence basic cognitive tendencies.	Attention and perception are guided by cognitive tools or sets of interpretive tools.	Holistic-analytic cognition
Ecocultural	Specify how ecological and socio-political factors influence psychological adaptation to a context.	Cultural adaptation and transmission shape the development and display of basic human characteristics.	Variations in cognitive competence
Dynamic Constructivist	Specify the situational factors and boundary conditions that govern cultural influence	Particular knowledge structures/implicit theories are activated by situational cues in a given situation.	Bicultural frame switching.

Note: (adapted from Markus & Hamedani (2010, figure 1.1)

The purpose of this study is to attempt to draw connections between culture and how the mind works at a fundamental level, for which the Cognitive Toolkit approach would be useful. According to this approach, human cognition can essentially be seen as a set of cognitive capabilities utilized to interact with and adapt to the different environments that individuals and collectives encounter over time (Markus & Hamedani, 2010; Norenzayan, Choi, & Peng, 2010). These cognitive capabilities are therefore ‘tools’ used in daily interactions between people or collectives and their environment. They are cultural ways of thinking, mental heuristics for problem solving passed on through generations. Just as specific occupational demands require specific tools (e.g., a carpenter requires a saw and a

surgeon requires a scalpel), specific ecological demands require specific cognitive heuristics or tools. Because the ecological niches that the various human groups came to occupy throughout history differed greatly, these groups required different tools in order to successfully interact with and adapt to their unique environments. As a consequence, the cognitive ‘toolkit’ each group developed over time became more and more specialised to better deal with their unique environmental demands. The Cognitive Toolkit approach is primarily focused on *how* “tools” differ across populations and cultures, e.g. which cognitive styles or ways of thinking are more prevalent in use amongst which groups or cultures? It does not, however, delve far into how the cultural contexts within which people exist came about or *why* certain cultures created certain variations in toolkits. For this the Sociocultural Models approach and Ecocultural approach are most useful (Markus & Hamedani, 2010).

The Sociocultural Models approach maintains that culture, as the embodiment of the shared meanings, norms, rituals, and abstract symbols that a group of people possess and express, provides a kind of blueprint for social behaviour. It informs the individual of what is true, beautiful, right, and good in the world, and also what is not. It provides form and direction for the individual in his or her daily social interactions. People share these blueprints or schemas on how to understand and experience the world, and it is the variations in these schemas that the Sociocultural Models approach studies (Markus & Hamedani, 2010). Through understanding how different groups construct their blueprints of reality, the effects of cultural variations on behaviour can be teased apart far more accurately. Does a specific group, for instance, place great value on healing and medicine, or do they value crafting wooden sculptures or constructing buildings? Those groups that value crafting more would focus more on creating those tools suited to their goals and values (saws), whilst eschewing those that do not (scalpels).

Both the Cognitive Toolkit and Sociocultural Models approaches tend to focus a large part on individual functioning, or cultural variations at the micro-level. Culture, however, operates on a number of different levels, from the micro to the macro, and teasing apart the influences of these various levels is where the Ecocultural approach is most useful (Markus & Hamedani, 2010). The Ecocultural approach is focused on understanding the various macro level factors that can influence and shape the micro level factors of culture. It pays special attention to the socio-political and ecological factors that drove cultural change within and between groups. It draws strongly on evolutionary theories of population level changes in response to or in conjunction with environmental changes in trying to understand *how* and *why* certain cultural variations came about at the societal level. It then attempts to link these

with the individual or small scale group level behavioural and cognitive dynamics. How did this group come to value crafting more than surgery? What ecological or socio-political factors in their past and their present pushed them to value this more? Perhaps the economic climate and expansion of industry created a greater need for carpenters, or perhaps an oversupply of surgeons from another group decreased the need for such specialisation. These various macro-level factors change and shape the way in which the value of carpentry and subsequently saws are viewed or emphasised within a group.

The Sociocultural approach essentially looks at how culture shapes the psychological foundation from which people interact with their world. The Cognitive Toolkit approach looks at the various cognitive tools which people employ to interact and engage with their world. The Ecocultural approach looks at how the various sociocultural factors came about that actually shapes this psychological foundation and subsequently the tools employed by individuals. So, by combining these various approaches a holistic understanding of behaviour, viewed through a cultural lens, can be obtained. One that understands the variety of social factors that underlie, shapes, and emphasises the different cognitive processes, not just within the individual, but within the group, and possibly even society at large.

Becoming Cultured

One of the key defining features of culture, as previously mentioned, is that it is something shared amongst and between people. If units of knowledge or cultural variants are not shared, discussed, passed on between generations then these will die out, cease to exist. So the transmission of culture is an absolutely crucial part of its functioning. Similar to the Language Acquisition Devices (LAD) once proposed by Noam Chomsky, Konner (2010) proposed a type of Cultural Acquisition Device (CAD) possessed by all humans. Different to the LAD the CAD is not a distinct cognitive mechanism, but rather a collection of various social or habitual learning processes. Konner (2010) identified 17 processes altogether, loosely arranged into 4 categories (See Table 2).

Table 2. Processes of the Cultural Acquisition Device

Reactive processes (cultural habitus)

Habituation

Classical conditioning

Associative conditioning

Instrumental conditioning

Social facilitation

Facilitative processes (social learning)

Local enhancement (ad hoc scaffolding)

Imitation

Instruction

Collaboration

Psychodynamic processes (emotional enculturation)

Attachment

Positive identification (role modeling)

Fear of strangers (in-group preferencing)

Negative identification (us-them polarization)

Emotion management

Symbolic processes (cognitive enculturation)

Cultural construction of perception

Cultural schematization

Narrative construction

Cultural coherence

Note: Adapted from Konner (2010), Table 4.4.

The first set of processes refer to the ways in which individuals learn about their environment through the simple fact of being present in that milieu. Through encountering certain stimuli or observing the same social rituals frequently over an extended period of time, a young child learns a number of social norms by simply being present. For instance, welcoming rituals for guests may not need to be taught to a child, they learn it through seeing their parents perform the same sequence of actions whenever a guest arrives.

The second set of processes refer to the ways in which individuals are purposefully taught about or actively study their social environment. Through purposefully imitating or by receiving purposeful instruction, a young apprentice learns the crafts of their parents or

elders. The crux here is the term “purposeful”. It is not passive learning as the previous set, but active and participatory learning, where the teacher and the student must understand the mindsets of each other in order for coherent and meaningful schooling to occur.

The third set of processes refer to the role of emotions in guiding learning and social enculturation. People do not blindly copy or internalise everything they encounter, but are inherently biased towards certain stimuli or sources of information. Biases in social learning are quite well documented (Konner, 2010; Moya & Henrich, 2016), and a large part of these are due to the psychodynamic processes involved in cultural acquisition. For instance, individuals are biologically predisposed towards an inherent fear of strangers, starting at around 6-9 months of age. This fear of strangers creates an inherent in-group preference and also sets the basis for the negative identification of out-group members, an us-them polarisation. Children also from as early as 3 years old also use social cues from others to guide actions such as food or beverage selection, and adults have a strong tendency to use prestige cues in choosing who to imitate (Moya & Henrich, 2016).

Lastly, the fourth set of processes refers to how the social realm that groups construct around themselves and around new generations intimately structures enculturation and social learning. Individuals have an inherent need to construct a coherent and meaningful narrative of their lives. These narratives provide a foundation from which the present and past can be interpreted and understood, and from which future actions can be planned. Social groups share this need for a coherent socio-historical narrative within which to understand its place in history and the present. These group level narratives, in turn, help structure the personal narratives of those members that form part of the group. These narratives also help create cultural coherence as well, through forming bonds between members of the group based on shared social histories. These symbolic processes essentially form the cultural atmosphere within which individuals are raised and from which they derive the morals, social habits, and cognitive schemas.

The acquisition of culture is, as shown by emotional enculturation processes in the CAD, greatly biased towards the individual’s in-group (those people perceived as being similar to oneself). Newson et al. (2010) also outline a number of other biases that constrain the transmission of specific cultural variants. If a specific cultural variant is not deemed to be beneficial to the individual, then the likelihood of it being adopted becomes less. For instance, if binding your feet does not seem like a useful strategy of obtaining a potential mate, then you are very unlikely to adopt such a cultural practice. Individuals also tend to

only adopt cultural variants from those people they hold in high esteem and tend to disregard those from people they dislike. The more frequently an individual is exposed to particular variants, the more likely they are to adopt those variants as well. The actual expression of some cultural variants are very often largely dependent on situational or contextual factors as well. For instance, certain activities are only deemed appropriate within certain locations or times (e.g. drinking alcohol in a church versus a bar); or amongst certain people (e.g. drinking alcohol with peers versus elders). Individuals therefore do not blindly adopt all cultural variants or practices they are exposed to. They also do not readily and unreservedly express cultural variants. The transmission of cultural variants is intimately dependent on the actors of culture and contexts within which interactions between people occur.

Another important set of factors that has significantly influenced cultural transmission between populations of people was that the spread or acquisition of different cultural ideas, concepts, or variants throughout human history greatly depended on space, time, and language (Triandis, 2010). Groups needed to be within a close enough geographical distance with each other and be present at the same time in order to transmit information between them. They also needed to be able to understand one another (e.g. speak the same language) in order for meaningful communication to occur. Language also has a strong influence on the transmission of cultural variants in that humans across the world tend to draw abstract or symbolic boundaries between different groups based on linguistic differences (Moya & Henrich, 2016). Consequently, the in-group biases that affect cultural transmission also cause transmission to often occur along linguistic divides.

As anatomically modern humans began spreading out of Africa around 70-60 thousand years ago the various groups started settling in more and more disparate and removed locations from one another (National Geographic Society, 2016). Over time these now geographically and ecologically varied groups developed their own unique norms and behaviours specifically suited to solving the evolutionary adaptive problems that they faced in these unique environments (Konner, 2010; Newson et al., 2010). Different linguistic styles also developed as a result of the spatial restrictions in communication between the various human groups (Moya & Henrich, 2016). This varied cultural evolution between the different human groups resulted in a number of different cultural regions emerging across the globe, mainly separated by geographical difference, e.g. Europe and North America, Sub-Saharan Africa, and East Asia (Triandis, 2010). The exact number of cultural regions remains a matter of contention, but the general consensus seems to indicate the existence of between 6 and 10

separate regions. The advent and proliferation of writing and more modern advances in technology such as the internet have removed the first two limits on cultural transmission, and greatly reduced the last. These advances of modernisation and the increasingly globalised world of today have provided the individual with access to an unprecedented amount of cultural variants (Newson et al., 2010). These advances, however, are relatively recent in comparison to the time-scale within which cultural groups evolved and diversified into the societies we see today. Furthermore, the various biases that constrain cultural acquisition are also still in place. So while individuals may have access to an unprecedented amount of differing cultural variants, what they choose to adopt and internalise still has numerous constraints placed upon them. Instead of seeing a kind of cultural homogenisation as some people believed would happen, we are instead still seeing a great diversity of cultures, with new amalgamations and varieties forming out of this great explosion of cultural transmission between disparate groups of people (Newson et al., 2010). In this increasingly globalised world, the fluid and constantly changing nature of culture has become far more prominent in our attempts to understand its effects of psychology. Readily identifiable and bounded cultures are fast becoming obsolete (if such things ever existed) and a polycultural perspective on cultures and individuals is becoming more important in trying to study culture and the behaviour (Chiu & Kwan, 2016).

Psychological Universals

It is important to note at this point that because cultural transmission via social learning is a much faster process than genetic transmission, cultural evolution has progressed at a much faster rate than biological evolution (Norenzayan et al., 2010). Although the relatively fast pace of cultural evolution has ultimately resulted in the seemingly vast differences between human cultures seen today, due to the slow nature of biological evolution it is still widely agreed upon that some basic or “universal” cognitive toolkit should, in principle, still be available to all humans regardless of culture (Konner, 2010; Markus & Hamedani, 2010). Culture does not evolve within a biological vacuum, and any cultural trend will necessarily have to be supported by the underlying biology. If the biology cannot support a certain cognitive tool or process, it cannot evolve or be created. What culture therefore does is create new and adapted cognitive tools from this biological or “universal” toolkit. The shape, function, or accessibility of these new tools, however, will vary from culture to culture

in accordance with their unique histories and the demands it placed on societies, but each will still be constrained by the underlying human biology (Markus & Hamedani, 2010).

It is also important to point out that humans, regardless of culture, are actually far more similar than dissimilar. Besides the obvious similarities such as the fact that we are all bipedal, have linguistic capabilities, and use tools extensively in daily life, humans share numerous other cultural practices (Konner, 2010). For instance, the institution of marriage, although found in a variety of forms, is present in all human societies. All societies also share taboos against homicide and incest, and also have techniques for healing and caring for the ill. One of the better known psychological universals is the recognition and interpretation of emotions (Ekman, 2016). All people are able to effectively and efficiently recognise and interpret at least 5 basic emotions: anger, happiness, sadness, fear, and disgust (Ekman, 2016). So while variations in human behaviour as a function of culture do exist, the core of human behaviour is still mostly the same across the world.

From Society to the Individual

Inclusion or at least acknowledgement of macro-level factors in studying individual behaviour has become increasingly important in current psychological research. The focus, however, is still mainly on understanding *individual* behaviour, behaviour located at the micro-level. Utilising the approaches described above cultural psychologists have found that a specific foundational component of an individual's psyche is key in mediating the effects of culture on cognition, i.e. the conceptualisation or construction of the self.

Chapter 2: Culture and the Self

The self is comprised of all the various thoughts, schemas, abstract artefacts, habits, and modes of being that represents the individual as a person (Markus & Hamedani, 2010). According to Vygotsky (1981) all higher mental functions that humans exhibit or acquire in life are inherently social in nature. It is through learning of and experiencing the social world that individuals come to create the various cognitive schemas and cultural blueprints that guide behaviour (Mkhize, 2004; Vygotsky, 1981). The self, seen as the accumulation of psychological experiences and units of knowledge, is therefore an inherently social construct, created through the dynamic interactions with the individual's social environment across his or her lifetime (Kitayama, Duffy, & Uchida, 2010; Mwamwenda, 2004).

Due to the various factors influencing cultural transmission and adoption the exact nature of this dynamic between the self and the social environment, however, can differ from person to person. Each individual chooses their own unique set of cultural variants to incorporate into their self, and the variants chosen are greatly dependent on personal experience and the various social environments the individual finds themselves in over time. If you are never exposed to certain contexts (e.g. visiting a student bar), then you will never incorporate certain behaviours or norms into your self-identity (e.g. downing shots on a Friday night). A foundational problem in psychology, though, is that the abstract "mind" cannot be studied objectively, and so instead we study overt behaviour. It is, however, a well substantiated fact that people tend to adjust their behaviour according to their context, a fact that has vexed personality researchers for decades (Mendoza-Denton & Mischel, 2010).

Behaviour in context

Understanding the self as a set of cultural blueprints that guides behaviour, also allows for an understanding of varied behaviour depending on context. Viewed through a cultural lens personality and the self cannot be seen as a stable and concrete system, expressed consistently no matter the context. Individuals instead adjust their behaviours through *if...then...* type calculations, that when in situation A, do behaviour X, but when in situation B, do behaviour Y (e.g. when in a student bar, down shots, but when at church, sing hymns) (Shoda, Mischel, & Wright, 1994). These *if...then...* profiles, however, have been found to be relatively stable across contexts, in comparison to specific types of behaviour. For instance, Shoda et al. (1994) found that in a summer camp context, one child reliably

became aggressive when warned or rebuked by adults, whereas in contrast another child reliably became aggressive when confronted by peers and not adults. Consequently, it was concluded that both children reliably displayed aggression, but only within certain contexts. Aggression itself, though, was not consistent across contexts.

Specific types of behaviour are therefore seen as activated through the context of the individual, or rather, through the activation of knowledge *of* the context. The individual needs to understand the context, their behaviour, and the appropriateness of that behaviour within that context in order to behave in a certain manner. Mischel and Shoda (1995) proposed a framework within which these profiles of *if..then...* scenarios and their associated patterns of knowledge activation can be organised to provide a coherent, holistic, and culturally sensitive understanding of personality and behaviour. The Cognitive-Affective Personality System (CAPS) framework maintains that behaviour is dependent on various cognitive-affective units (CAUs), each activated by different contextual features. The culturally derived blueprints for behaviour that make up the self, therefore, consists of an accumulation of CAUs. These units of knowledge can also be divided into five separate categories: encodings or constructs for the self, other people, situations or events; expectations and beliefs regarding behavioural outcomes, how the world works, or self-efficacy; emotional or affective responses; goals or outcomes for specific situations or life in general; and behavioural schemas or scripts for organising behaviour and shaping outcomes (Mischel & Shoda, 1995). Situational features activate a pattern of various CAUs which in turn activates specific types of behaviours. Similar to activation patterns in neural networks CAUs are either inhibited or excited by the situational features as well as other CAUs. Specific types of behaviour are subsequently produced depending on the pattern of CAUs activated (Mendoza-Denton & Mischel, 2010).

Culture, however, works on various levels beyond the individual, and so any framework that wishes to incorporate holistic cultural sensitivity would also need to look past the features of just the immediate situation. The Cultural Cognitive-Affective System (C-CAPS) is a framework which expands on the CAPS framework to include macro-level factors in understanding the context dependent behaviour of individuals (Mendoza-Denton & Mischel, 2010). Figure 1 provides a graphical illustration of the C-CAPS framework. In brief, the framework maintains that a person's subjective and physical culture shapes and constrains the CAUs incorporated into or constituting the self (1). Furthermore, the subjective culture (especially when shared by collectives) also shapes the physical culture or lived context of the individual (2) which in turn deeply shapes the nominal situations experienced by

individuals (3). These nominal situations merge with the personal appraisal of that situation to create the subjectively experienced features of the situation (4, 5). This then activates specific CAUs within the self and consequently the *if...then...* scenarios which ultimately produces context dependent behaviours (6a, 6b, 7). Lastly, behavioural outcomes can then alter the person's immediate environment (8), or even possibly result in a cultural shift or change at the macro level (9).

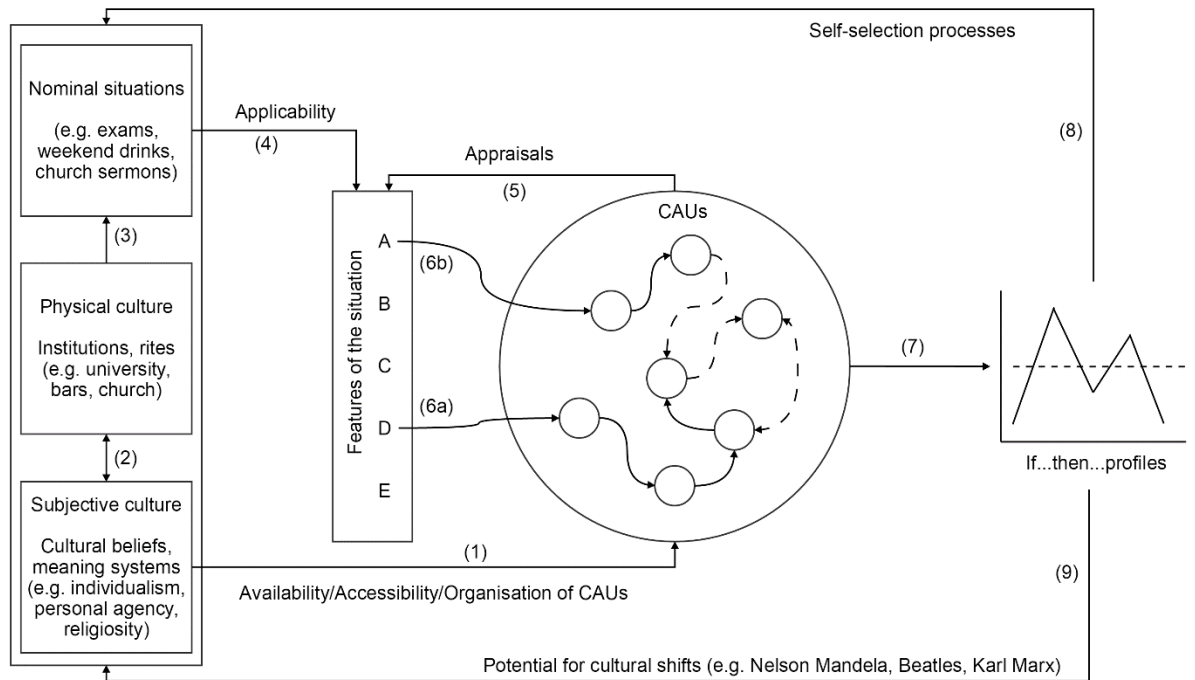


Figure 1. Illustration of the Cultural Cognitive-Affective Processing System (C-CAPS). Solid lines indicate excitatory links between CAUs while dotted lines indicate inhibitory links CAUs. Adapted from Mendoza-Denton and Mischel (2010), Figure 7.3.

To illustrate with an example, through being raised in a religious family and community an individual has internalised a number of religious beliefs, rituals, and norms into his self-identity that guides his behaviour. This community has also created institutions which symbolises their beliefs and provides physical spaces within which to practice and share these values and norms. Every Sunday the individual goes to his religious institutions where he takes part in a religious sermon. This situation activates the various units of knowledge or CAUs related to his religious identity which informs which behaviour is appropriate in that context. Thus, when the pastor indicates the time, he picks up his book of hymns and joins in with the rest of the congregation in song. This situation, based on the physical culture and the subjective culture it symbolises, would not easily activate the behavioural response to, for instance, consume an alcoholic beverage (other than on Sunday

mass), since those CAUs are intimately linked with a wholly other nominal situation and physical culture (e.g. a student bar).

Multiculturalism in a diverse world

In an increasingly globalised world the transmission of cultural variants have gained unprecedented reach and pervasiveness (Hong, Zhan, Morris, & Benet-Martinez, 2016; Newson et al., 2010). Human migration has increased to such an extent that according to a United Nations report from 2002 as many as 185 million people were living outside of the country of their birth (Hong, Wan, No, & Chiu, 2010). In 2014 over 1133 million international tourists travelled the world, and internet usage had increased from 25 million people in 1993 to 2.93 billion in 2014 (Hong et al., 2016). With this rise in culturally diverse nations and exposure to different cultures has come increased attention on multicultural identities as more and more people are raised and live within far more culturally complex environments than in previous eras.

Due to the various biases and factors influencing transmission and adoption of cultural variants, as individuals come into contact with different cultural environments a number of different outcomes may occur (Hong et al., 2016). Firstly, the person may assimilate into the new more pervasive cultural context wherein they alter their self-identity to better fit the greater social context; they can also maintain their original cultural heritage while simultaneously developing or integrating with the mainstream culture; they may choose to completely reject the mainstream culture and instead maintain a separation between their original cultural identity and that of the mainstream; they may also choose to reject both the mainstream as well as their original identity leading to cultural marginalisation; and lastly individuals may combine aspects of both or numerous cultures into a new hybrid polycultural identity

Integration or polyculturalism is believed to be the most psychologically healthy outcomes for the individual, but this results in the individual having to navigate bicultural or multicultural identities (Berry, 1997; Hong et al., 2016). The process of assimilation would also result in a transitioning multicultural period for the individual as they learn and adopt the various units of knowledge from their new cultural milieu. Consequently, these multicultural or polycultural individuals will have incorporated a large variety of cultural variants within their personal identity, each attuned to differing social and situational features or contexts. Appraisal of the features of nominal situations are now affected by CAUs shaped from not

only their original cultural heritage, but also those of other bodies of cultural knowledge. Interpreting and understanding social situations can now be viewed through more than one “cultural lens” and the individual can dynamically alter the way in which such appraisals occur. This “cultural frame switching” (Hong et al., 2010, p. 326) is typically pushed by specific features of an environment and allows the individual to dynamically navigate the more complex social worlds they live in. As will be discussed later on this ability to switch between different cultural lenses may have profound effects on various cognitive and behavioural processes.

Our social environment, as previously shown, is intimately informed and shaped by the various socio-ecological niches that different groups have found themselves in throughout their histories. Consequently, the manner in which the self is created is just as nuanced and intricate as culture itself, since the two are so intimately linked. Adding in the existence of multicultural identities within a diverse and multicultural environment, covering all the various nuances and subtle differences in how the self can be created or expressed across the world is well beyond the scope of this paper. One specific factor, however, has grabbed the attention of cross-cultural researchers, and is believed to be at the root of most of the cross-cultural variations in cognition found across the world: the social orientation of the self (Kitayama et al., 2010; Markus & Kitayama, 1991; Oyserman, Coon, & Kemmelmeier, 2002; Taras et al., 2014; Varnum, Grossmann, Kitayama, & Nisbett, 2010).

Cultural differences in social orientation

An individual’s social orientation refers to the manner in which the individual views themselves in relation to those around them (e.g. relatives or friends), their broader community, and even the cosmos at large (Varnum et al., 2010). It fundamentally structures how they see their place in the social world around them, what roles they are expected to fulfil, and what behaviour is socially accepted according to this position. The self and the social orientation of the self are inseparable as the latter is naturally a fundamental component of the individual’s self-identity. The impact of social orientation on behaviour is therefore of significant importance as it incorporates a variety of CAUs (encodings, expectations and beliefs, self-regulatory scripts etc.) and deeply structures appraisals of nominal situations. As the C-CAPS framework shows, the social norms and practices espoused by a particular culture intimately shapes or structures an individual’s social orientation by proscribing the above mentioned functions of social orientation through its

influence on available cultural variants (Varnum et al., 2010). It is thus clear to see why this specific aspect of the relationship between the self and culture has garnered so much attention from cross-cultural researchers. Different types of self-identities or self-concepts are created through the various norms that govern social relations that are incorporated into the self as a result of being raised within any given sociocultural context (Kitayama et al., 2010). Decades of research on the norms and values espoused by various cultural groups that affects social relations has identified two fundamental distinctions: Individualistic and Collectivistic social orientations (Hofstede, 1980; Kitayama et al., 2010; Yamagishi & Hashimoto, 2016).

Individualistic cultures tend to promote social relations based on instrumental relationships of separate individuals, connected through loose ties typically centred around specific goals or functions (Kitayama et al., 2010; Yamagishi & Hashimoto, 2016). Social interactions are usually centred on individual participants seeking to attain specific self-centred goals (Kitayama et al., 2010). Relationships are based on cost-benefit evaluations, where the individual must weigh up the benefits in pursuing social interactions versus the costs of doing so (Kitayama et al., 2010). Although a cultural norm such as this may seem to promote selfishness and reckless self-enhancement, social rejection is still a major threat and potential cost to such behaviours. Furthermore, in societies composed of large groups of loosely connected individuals, social order is also often maintained through external institutions such as national legal systems, which helps maintain and structure a system of loose networks (Yamagishi & Hashimoto, 2016).

Collectivistic cultures on the other hand tend to promote social relations based on mutual reciprocity between individuals with strong ties to each other, often familial based (Kitayama et al., 2010; Yamagishi & Hashimoto, 2016). Social interactions are usually centered around communal needs or responsiveness to contextual features (Kitayama et al., 2010). Mutual help and sharing of resources is an implied assurance for members of these close networks, and exclusion is used as punishment for those that do not cooperate in this reciprocity (Yamagishi & Hashimoto, 2016). This inward communal outlook creates a strong preference for in-group members and a conversely strong avoidance or exclusion of out-group members, but can also increase distrust and friction between in-group members as well (Kitayama et al., 2010; Yamagishi & Hashimoto, 2016).

The general consensus in the literature is that “Western” cultures (e.g., Germans, Canadians, British, etc.) tend to promote more individualistic values or norms regarding social interactions, and consequently tend to promote independent self-concepts. Cultures

from, essentially, the rest of the world (e.g., Chinese, Russians, Latin Americans, etc.) have been found to typically promote more collectivistic values or norms and so tend to promote interdependent self-concepts (Kitayama et al., 2010; Norenzayan et al., 2010; Oyserman et al., 2002; Varnum et al., 2010).

Independent self-concepts typically refer to a sense of self wherein the individual perceives their selfhood as being quite distinct from those around them. They see themselves as autonomous beings, separate from those around them and their environment or context. The self is essentially a 'given', something concrete and stable at the core of who they are and what their role in the world is, unaffected by context (Oyserman et al., 2002; Valchev, 2012). Their personal agency is of utmost importance in determining this role or place in the world and personal achievement and self-sufficiency are usually greatly valued (Mkhize, 2004; Oyserman et al., 2002).

An interdependent self-concept refers to a sense of self wherein the individual's context or social environment plays a key role in determining their selfhood (Mkhize, 2004; Oyserman et al., 2002). The self is not a fixed construct but is inextricably linked to the social environment and those around them. The individual sees themselves as a creation of their relations with their context and social environment. Selfhood is therefore intimately dependent on this context and its interactions with it, changing as needed. Personal agency is often suppressed in lieu of the collective will with greater value placed on social harmony and balance (Mkhize, 2004; Oyserman et al., 2002; Varnum et al., 2010).

So if, for instance, you are raised within a community that promotes personal agency and individual self-promotion, you are more likely to incorporate these values within your self-identity and thus create an independent self-concept. In contrast if your community espouses self-effacing and communal responsibility, these values are more likely to form part of your self-identity and thus create an interdependent self-concept.

The antecedents of self-concept differences

So how did these often contrasting differences in norms regarding social relations come about across the world? Why do certain societies or groups promote an interdependent self over an independent self (or vice versa)? While the exact and comprehensive list of factors responsible is still under debate, a number of potential antecedents have been identified (Mkhize, 2004; Norenzayan et al., 2010; Oyserman et al., 2002; Varnum et al., 2010).

The philosophical or religious traditions of a group of people is believed to play a key role in structuring the role of the individual in relation to other people, society, and even the cosmos at large (Kitayama et al., 2010; Mkhize, 2004). Religion intimately proscribes appropriate and acceptable behaviours, and it shapes understandings of social relations on various levels (Kiernan, 1995). It's immense role in shaping social norms and values throughout history is undeniable, and functions as the bedrock of understanding reality for the majority of people in the world (Hackett, Grim, Stonawski, & Abel, 2012; Kiernan, 1995; Norenzayan et al., 2016).

The philosophical traditions of most Western nations have strong Greek Aristotelian roots, but with Protestantism and the numerous writings of the European Reformation and Renaissance periods also having a strong shaping influence as well (Kitayama et al., 2010; Kitayama, Park, Sevincer, Karasawa, & Uskul, 2009). These philosophical traditions placed personal agency and control of one's fate firmly within the hands of the individual. They endorsed the idea that the nature of the cosmos could be fully understood through systematic categorisation by mapping the discreet boundaries between various objects. The individual is seen as a concrete object, separate from context, the agent of their own destinies.

Most East Asian nations or cultures are deeply embedded within Confucianist, Buddhist, Taoist or Bushido schools of thought (Kitayama et al., 2010). Within these traditions the individual is always placed in relation to others, the prevailing social structure or hierarchy, and the cosmos at large. The maintenance of harmony and balance is strongly emphasised, and it is the duty of the individual to preserve this through special care of the relationships they embody. The cosmos is understood as matrices of complex relationships, and can only be understood as such, i.e. in relation to other objects/forces.

African philosophical traditions follow a similar vein as East Asian traditions, in that the individual is also usually described in relational terms (Laher, 2013; Mkhize, 2004; Mwamwenda, 2004; Valchev, 2012). The self is not a bounded discrete construct but intimately connected with other people, their ancestors, God, and even the cosmos at large. (Meyer, Moore, & Viljoen, 2008; Mwamwenda, 2004). A person is only a person in relation to other people, and the self is always in a constant state of change throughout the lifetime. As the individual's context changes, so does the self since they are essentially one and the same. African traditional religions also emphasise social cohesion and harmony, self-effacement, and responsiveness to perceptions of others (Kiernan, 1995).

The type of economic or agricultural activity a community is built on is also believed to strongly influence how the self is constructed (Cohen & Varnum, 2016; Kitayama et al., 2010; Varnum et al., 2010). For instance, groups involved in more sedentary agricultural activities such as fishing or farming tend to be more interdependent than groups of a more nomadic nature such as herders or hunter-gatherers. Industrialised societies are also believed to promote a more independent sense of self than more agriculturally based societies. Industrialisation and formal schooling pushes commerce and reliance on individual abstract thinking versus the interdependent reasoning required by agricultural work (Greenfield, 2016). The larger urban environments that grow as a result of these changes in national industry also emphasise isolated living and more nuclear families as opposed to the intergenerational households typical of rural communities (Greenfield, 2016). These sociodemographic changes consequently alter the values and norms upheld by these societies, moving away from resource driven values towards more self-centred values since in poor communities there is a greater need for sharing resources than in wealthy communities or societies (Fischer & Boer, 2016; Greenfield, 2016). Consequently, self-expression and personal growth is valued more over communal responsibility and resource reciprocity in these economically developed societies.

Lastly, a very prominent factor believed to play a strong role in developing a society that promotes an independent sense of self is migration or voluntary settlement in foreign lands (Cohen & Varnum, 2016; Kitayama et al., 2010; Varnum et al., 2010). It is theorised that the types of groups more prone to uprooting and moving to new lands are more likely to value personal agency and place greater emphasis on personal achievement and success. These individuals are also less likely to place great value on broader communal ties and the collective will. Societies built on such groups are therefore much more likely to uphold or maintain this emphasis on independence as opposed to interdependence for future generations. Furthermore, these societies are probably more likely to be composed of separate groups loosely bound together by common goals (e.g. frontier settlement) rather than inherent communal ties (e.g. familial bonds). These factors, combined with the Western European philosophical traditions and the relative wealth of these countries may be the main reasons for the strong emphasis on individualism found within North American cultures, and why the USA is often seen as the 'gold standard' for individualism (Kitayama et al., 2010; Varnum et al., 2010).

Caveats in understanding the self and culture

Although a large and growing body of research has consistently found international differences in values and norms regarding social relations, a number of caveats must be mentioned in understanding the true relationship between culture and the self.

Once again, it is important to keep in mind the variability in how individuals choose specific cultural variants for incorporation. It is also important to keep in mind that observed behaviour is a function of the individual's *if...then...* profiles within their behavioural repertoire. Social context also still has a significant impact on the expression or activation of the different social orientations as well (Oyserman & Lee, 2008). Specific situational and contextual factors may predispose individuals towards exhibiting either an independent or an interdependent self-concept, regardless of the usual preference for one or the other (Oyserman & Lee, 2008). For example, it has consistently been found that an independent self-concept can be activated through asking people to think of and describe themselves as an individual, separate from their family or friends. Conversely, an interdependent self-concept can be activated by asking people to think and describe themselves as part of a group. The exact nature of the relationship between individualism and collectivism is also still under much debate, something that will be covered in more detail later on. For instance, an individual might be very independent when engaging in business transactions, but quite interdependent dealing with family or friends.

For now, it will suffice to say that the preference for one type of self-construal is not a simple either/or situation, but more likely a case of varying degrees, either within a single continuum or along multiple dimensions (Oyserman et al., 2002; Taras et al., 2014). In everyday life, however, the various nominal situations individuals would typically encounter should generally prime them towards a certain type of self-concept due to the overarching influence of the broader social norms espoused by their sociocultural milieu (Markus & Hamedani, 2010; Oyserman & Lee, 2008). Therefore, in order for a different self-concept to be primed, an extraordinary event or task will first have to be encountered, but due to the rather stable nature of most social or cultural contexts an individual's sense of self should remain reasonably constant, barring any sudden drastic changes in his or her life.

Individuals also do not act out every single behaviour proscribed by his or her culture or social context either. Instead, they tend to choose those most in-line with their personal

histories and experiences that still allows them to adhere to their culture’s generally sanctioned norms, e.g. independence or interdependence (Kitayama et al., 2009). Figure 2 shows the cultural task analysis framework proposed by Kitayama et al. (2009) in an attempt to explain the observed within-culture heterogeneity of how the self is created and expressed.

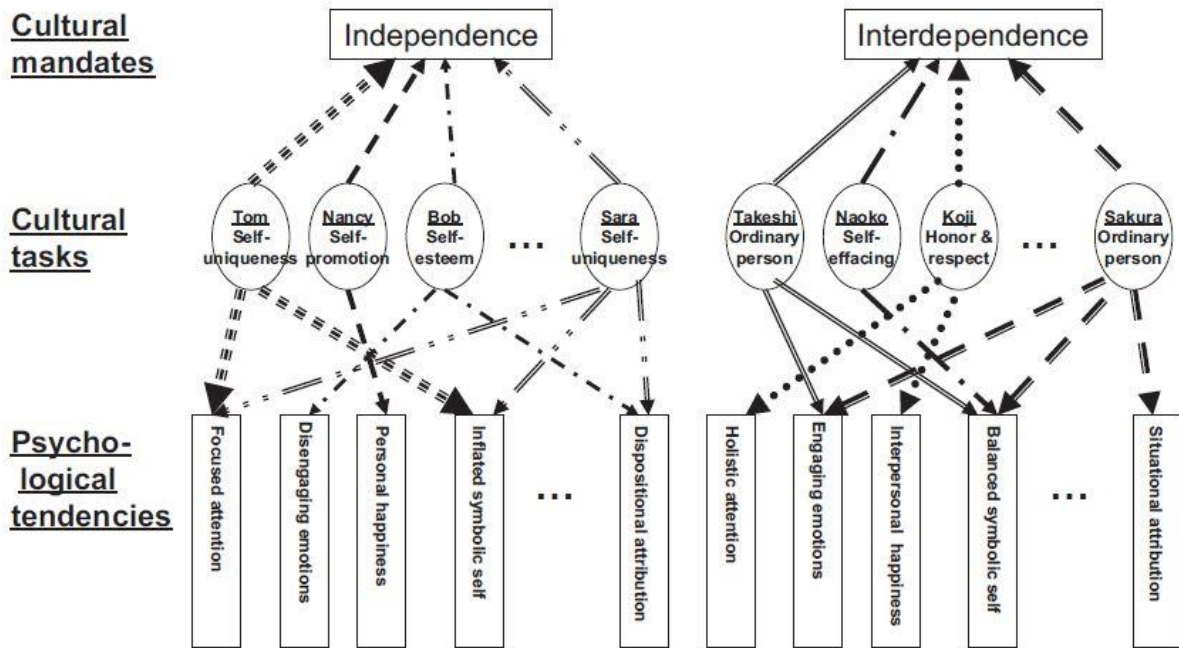


Figure 2. Task Analysis Framework (reproduced from Kitayama et al., 2009).

While the types of ‘traits’ available for incorporation into the self are structured by the individual’s socio-cultural context, they may not choose to incorporate the exact same repertoire of traits as their neighbour. Therefore, it is very likely that while two individuals both construct their sense of self in terms of personal needs (i.e. individualistic), one may place greater emphasis on them developing their individual uniqueness while the other may place greater value on intently pursuing their personal goals (Kitayama et al., 2009). So while aggregated differences might exist between two societies, there might at times be considerable variation between individuals believed to be from the same socio-cultural background. This is one of the reasons why it is important to keep in mind that what is often found at the cultural group level, may not always replicate perfectly on the individual level, even in supposedly “monocultural” countries.

Lastly, when speaking about culture at national levels it is also important to note the distinction between ‘society’ and ‘culture’, whereas the former refers to a group of people who happen to live within close geographical proximity to one another, the latter refers to a group of people who share a similar way of living or social worldview (Baldwin et al., 2006). While most studies in cultural psychology tend to equate certain cultural traits with a single nation state, e.g. Americans are individualistic and Japanese are collectivistic, this becomes quite problematic in our increasingly globalised world where most countries are inhabited by various groups with cultural heritages from at times vastly different parts of the world, e.g. the Nguni and Sotho-Tswana African heritages, and Germanic European heritages found within South Africa (Valchev, 2012). It becomes somewhat impossible to refer to a ‘South African culture’ in terms of its promotion of an interdependent or independent sense of self as the antecedents of these heritages often promote markedly different norms and values regarding social relations.

Measuring Individualism and Collectivism

Probably the most influential study in cross-cultural comparisons is that of Geert Hofstede (1980), in his seminal book *Culture’s Consequence*. Hofstede compared a large number of different societies from all across the world in terms of a number of variables, such as ‘power distance’, ‘masculinity’, ‘uncertainty avoidance’, and ‘individualism’. He attempted to provide a better understanding of exactly how cultures from various parts of the world differ from each other, but also to create a unified framework within which one can measure and compare such differences. This was done by administering a survey to large groups of individuals from the various countries and then creating an aggregate score meant to reflect the general level of, for instance, individualism within that society. By doing so Hofstede was able to conclude, for instance, that Americans were much more individualistic than say Japanese. Out of all the variables included in his initial study, none has had a greater impact than the distinction between individualism (IND) and collectivism (COL). A large recent meta-analysis of studies influenced or making use of Hofstede’s framework found that almost 88% of the effects of cultural values on organisational behaviour was due to differences in IND-COL (Taras et al., 2014).

Measuring IND-COL is clearly an incredibly useful dimension by which to start gaining a better understanding of human behaviour within its social context, but the measurement of IND-COL is still, after decades of research, quite a controversial topic

(Oyserman et al., 2002; Taras et al., 2014). In the case of Hofstede's work, the practice of assuming national culture is reflected at the individual level is, as previously explained, quite problematic. While there are still a number of studies that do make comparisons at the macro level, most studies on cross-cultural differences usually focus on differences at the individual level (Oyserman et al., 2002; Taras et al., 2014). The measurement of individual differences in terms of IND-COL, however, has not been standardised, with a lack of consensus on exactly how it should be measured (Oyserman et al., 2002; Taras et al., 2014). As of 2013, Vas Taras had identified a list of 157 different instruments that try to measure various aspects of culture, a large amount of which do so in terms of IND-COL dimensions. At the time the current study was conducted no clear favourite or generally accepted standard for measuring IND-COL could, however, be found.

In a meta-analysis of the various measures of IND-COL in use 20 years prior to their study Oyserman et al. (2002) did find a general consensus on how individualism and collectivism is conceptualised separately, generally following the descriptions regarding independent and interdependent self-concepts provided previously. Little consensus, however, was found as to whether IND-COL were bipolar opposites on a single continuum or orthogonal constructs altogether. A recent meta-analysis by Taras et al. (2014) also found a similar lack of consensus as to the dimensionality of the IND-COL relationship, and even found some evidence to suggest that dimensionality might change depending on geographical region or even demographics of the sample studied. Unidimensional conceptualisations view IND and COL as polar opposites of one another, and measures typically produce a single score that indicate a high or low level of either IND or COL. A high level indicates a strong preference for those values or social relational norms, e.g. a person who obtains a high score for IND displays a strong preference for personal agency, self-enhancement, or self-uniqueness. An individual that scores high on a unidimensional IND scale would also automatically be assumed to be low on COL, e.g. a meagre preference for self-effacement, communal responsibility, or conformity. Bidimensional conceptualisations on the other hand, view IND and COL as wholly separate constructs altogether. Individuals would typically obtain a score on IND as well as a score on COL, and may have whichever combination of scores across the two (e.g. high IND, low COL; high IND, high COL etc.). Certain measures go further and also draw distinctions within IND and COL as well, such as between Vertical and Horizontal dimensions, or between Family and Co-worker dimensions within both IND and COL (Oyserman et al., 2002; Taras et al., 2014).

One of the more commonly used measures is that of Singelis (1994) which conceptualises IND-COL as a bidimensional relationship, with IND and COL as orthogonal constructs (Kitayama et al., 2009; Oyserman et al., 2002; Taras et al., 2014). This conceptualisation of the IND-COL relationship was further refined by Singelis, Triandis, Bhawuk, and Gelfand (1995) to include the Horizontal and Vertical distinctions within both IND and COL. A Horizontal Collectivistic (HC) self-construal emphasises the interdependent nature of the self, but also the equal nature of the self in relation to those around it, the individual is located within a community of equals. A Vertical Collectivistic (VC) self-construal also emphasises the interdependent nature of the self, but recognises certain inequalities between individuals within a group or community. Similarly, a Horizontal Individualistic (HI) self-construal emphasises the independent nature of the self, but also the equal nature of the self in relation to those around it, the individual is located within a community of equals. A Vertical Individualistic (VI) self-construal emphasises the independent nature of the self, but recognises certain inequalities between individuals within a group or community.

With the situational or contextual variations in behaviour and self-concept, narrow conceptualisations of IND-COL seem ill-suited to accurately capturing the nature of such a crucial factor in our understanding of culture and behaviour. Most studies on IND-COL though seem to use a unidimensional conceptualisation, although at times only implicitly through use of polarising descriptions of the two constructs (Taras et al., 2014). The inclusion of further refined subscales such as the Horizontal and Vertical Individualism and Collectivism (HVIC) scales are also quite limited in the literature, which is unsurprising given the lack of consensus regarding the dimensionality of IND-COL itself. This general lack of consensus and confusion as to how to go about measuring such a crucial factor like IND-COL creates a problem when attempting to study IND and COL within new populations where little to no research has been conducted, especially in countries that lack emic IND-COL instruments.

The ability to link differences in behaviour, such as performance on perceptual tasks, with differences in culture become dubious if the cultural factors in question cannot be accurately measured. Most cross-cultural studies on the effect of IND-COL on behaviour make use of the implicit belief that the population of nation A generally exhibit self-concept X, while the population of nation B generally exhibit self-concept Y. Therefore, by comparing a sample from nation A to a sample from nation B on any given cognitive task, we

can reasonably assume the effects are due to differences in self-concept. However, this implicit belief is based on previous research that obtained aggregated scores for nation A and B on one or other IND-COL instrument. With the large variety of measures available and in use and no clear favourite either, plus the lack of consensus on something as crucial as dimensionality, how accurate or comparable are these cross-national results? The history of IND-COL assessment in South Africa provides a quite clear picture of this problem, where the ambiguity inherent in culture and how it relates to behaviour and the self can create numerous issues in attempting to quantitatively assess IND-COL preferences on a national or even individual level.

Selfhood in South Africa

To simply say South Africa is a multicultural nation might be somewhat of an understatement. With 11 official languages from various ethnic groups with ancestry from different continents, the cultural variety found within this country is quite large (Statistics South Africa, 2011; Valchev, 2012).

The Whorfian hypothesis posits the idea that language and cognition are inherently linked, and that the former fundamentally structures the latter (Chiu, Leung, & Kwan, 2010). While most cognitive and cultural psychologists have moved on from the strict Whorfian stance, the intricate relationship between language, culture, and cognition is still widely recognised as a significant moderator of behaviour (Chiu et al., 2010; Imai, Kanero, & Masuda, 2016). As previously discussed, language often acts as an abstract and subjective boundary marker between cultural groups for individuals, but also acts as a mediator for cultural transmission between groups, consequently reifying such abstract boundaries.

Following off of this understanding of the intimate link between culture and language as a starting point (Chiu et al., 2010), three broad cultural groups can be defined within South Africa: the Nguni; the Sotho-Tswana; and the Germanic (Valchev, 2012). The Nguni and the Sotho-Tswana are comprised of the various tribes which migrated down from more Northern parts of Africa and settled in South Africa starting from the north east and moving down and westward into what is now the Eastern Cape Province (Huffman, 2010). The Germanic groups came from the colonial expansion into South Africa which started in 1652 with the establishment of a Dutch colony in what is now Cape Town (Encyclopædia Britannica, 2015). Later influxes of German and French settlers mixed with the Dutch settlers to create

the Afrikaner nation and the Afrikaans language, whereas the British occupation in the 1800s introduced English and the British heritage to South Africa (Encyclopædia Britannica, 2015).

The philosophical traditions of these groups differed quite significantly, with the Germanic groups sharing Western Protestant based religious and philosophical beliefs, and the Nguni and Sotho-Tswana sharing traditional African religious and philosophical beliefs (de Gruchy, 1995; Kiernan, 1995). As previously noted, these traditions promoted markedly different norms and values regarding social relations and the place of the self in relation to the cosmos. The Germanic “Western” traditions typically promoted individualistic values, whereas the traditional African traditions typically promoted collectivistic values. Furthermore, the migrant nature of the Germanic groups most likely further reinforced the existing individualistic values as well.

The policies of racial segregation instituted during South Africa’s colonial history and reinforced during Apartheid meant little to no acculturation or assimilation occurred between the African and Germanic ethnic groups throughout South Africa’s history (Seekings, 2008). After the abolishment of Apartheid in the 1990’s and the birth of the “Rainbow Nation” in 1994, new policies of racial desegregation and institutional transformation were put in place in a national effort to create a new unified yet culturally diverse country (Hong et al., 2010; Seekings, 2008). Over two decades later, however, racial segregation is still quite prevalent across the country, although issues of class have started to play a stronger role in maintaining this racial segregation (Bhana, 2014; Binikos & Rugunanan, 2015). Research on the cultural melting pots of universities have provided interesting insights into how the previously institutionally segregated groups have started to interact and integrate (Bhana, 2014; Binikos & Rugunanan, 2015). While informal racial segregation is still present, attitudes towards racial integration tend to be very liberal and welcoming, although actual integrative behaviour still seem to be lagging behind. The most noticeable divisions are also believed to mainly be due to class or socioeconomic differences, rather than racial differences in itself, but as the middle class of the previously disadvantaged groups grow, this barrier to integration may start disappearing as well (Seekings, 2008).

Although integration and consequently cultural assimilation or acculturation may be increasing, research on self-concept in South Africa still seem to reflect the racially segregated past. Eaton and Louw (2000) found that Xhosa-speaking South Africans were more likely to describe themselves in reference to a social group that they identified with than

English-speaking South Africans were, indicating that Xhosa-speaking South Africans tended to have a more interdependent sense of self than English-speaking South Africans.

As part of a large scale project to create an emic personality measure, the South African Personality Inventory (SAPI), a number of studies were conducted to obtain personality descriptions from all linguistic groups in South Africa, create the SAPI scales, and obtain validation for the final inventory (Fetvadjev, Meiring, van de Vijver, Nel, & Hill; Valchev, 2012). To identify ethnic groups in South Africa linguistic categories were used, initially divided into Bantu languages (isiNdebele, isiXhosa, isiZulu, Sesotho sa Leboa, Sesotho, Setswana, siSwati, Tshivenda, and Xitsonga), and Germanic languages (English and Afrikaans). The Germanic language category was further refined due to Apartheid legacy of racial segregation into White, Coloured, and Indian. Bantu languages were also equated to Black as it was concluded that only native Africans would speak any of those as their home language. Self and personality-descriptions were obtained from individuals across all 11 languages and subjected to semantic cluster analysis and later quantitative hierarchical cluster analysis. Results revealed 9 broad clusters emerging from the free descriptions, namely Conscientiousness, Emotional Stability, Extraversion, Facilitating, Integrity, Intellect, Openness, Relationship Harmony, and Soft-Heartedness. According to Valchev (2012) Facilitating, Integrity, Relationship Harmony, and Soft-Heartedness represented distinctly social-relational aspects, i.e. relating to interpersonal relationships or social contexts. Using the SAPI qualitative database Adams, Vijver, and Bruin (2012) drew out data to analyse differences in descriptions between the different ethnic groups. Similar to Eaton and Louw (2000) they found that Black South Africans were more likely to describe themselves in terms of social relationships than White South Africans.

Quantitative exploration of the social-relational scales of the SAPI provided further evidence for cross-ethnic differences in social-relational aspects of personality (Valchev et al., 2014). Factor analysis of the social-relational scales revealed that the various facets distinctly loaded onto two factors, dividing the facets in Positive or Negative valence, e.g. Integrity and Relationship Harmony loaded onto one factor, while Arrogance and Harmony Breach loaded onto the other. Analyses were only conducted for Black and White groups as Coloured and Indian groups were deemed too small for inclusion. The scales had adequate internal consistency with Cronbach's alpha values ranging from .59 to .92 for Black South Africans and .74 to .89 for White South Africans. Multivariate analysis of covariance to test for interactions between ethnicity, age, and gender for significant effects for all facets with the exception of Empathy, with an overall substantial effect size ($\eta^2=.18$). Black South

Africans tended to score higher on the positive facets while White South Africans scored higher on the negative facets (Valchev et al., 2014).

Although the SAPI social-relational scales are closely linked with IND-COL, they do not directly measure these factors, and the two types of valence groupings cannot be equated to IND-COL (V. H. Fetvadjeiev, personal communication, June 24, 2016). It is most likely that the values espoused by IND or COL cultures have a significant impact on personality, but as mentioned previously, many other factors also play a part; too many to discuss in full here. Consequently, a natural overlap in social-relational scales in personality measurement and IND-COL dimensions should be expected, but the one is not fully equal to the other. For instance, facets such as Integrity (e.g. “I acknowledge my mistakes” (Valchev et al., 2014, p. 19) or Hostility (e.g. “I make people feel vulnerable” (Valchev et al., 2014, p. 19) do not necessarily equate IND or COL values, but IND or COL values may allow for such behaviours to be expressed more readily.

Qualitatively it would therefore seem that social-relational facets form part of the South African personality profile, and that significant differences in terms of IND-COL related facets do exist along racial or linguistic lines within the South African context. These facets, however, are not equal to IND-COL, and as of yet no emic instrument for measuring IND-COL in South Africa exists. Consequently, research directly studying IND-COL in South Africa has relied on internationally created instruments applied within the South African context.

The first major foray into studying IND-COL in South Africa was Hofstede’s (1980) study that really began all the fascination with IND-COL, as it also included a South African sample in its data. His study found that South Africa as a nation tended to be quite individualistic, but this was most likely a very poor representation of the South African population at large. The study was conducted only with IBM personnel, and took place over 2 decades prior to the end of Apartheid. Consequently, only White South Africans were sampled, which is not representative of the greater South African population at all. This lack of racial inclusion was mentioned in later works by Hofstede, but no new research was done to include a more diverse sample into the analyses (Hofstede & Hofstede, 2005). Furthermore, as mentioned previously the issue of reducing national culture to the individual level is problematic in most nations, but probably far more problematic in a multicultural nation such as South Africa.

Thomas and Bendixen (2000) made use of the VSM94, a survey created from the Hofstede (1980) study, to assess management styles of white and black South Africans. They found high levels of individualism, higher in fact than Hofstede's original study (average of 81 vs 65; unidimensional IND scale with a maximum of 100) for the SA managers. This high level of IND was found across race and gender groups (above 70 for all groups).

In another study on the management styles of black and white South Africans Booyesen (2001) made use of the Project-GLOBE leadership and culture questionnaire that included a unidimensional IND-COL scale. They found a significant difference between black and white South Africans with the former being more collectivistic and the latter more individualistic. These quantitative results were also supported by a qualitative exploration of management styles which found distinctly collectivistic themes for black South Africans and individualistic themes for white South Africans (e.g. belief in group decisions and incentives vs individual decisions and incentives).

van Dyk and de Kock (2004) looked into how differences in IND-COL could affect behaviour among military personnel in SA. They administered the Individualism-Collectivism Interpersonal Assessment Inventory (ICIAI) by Matsumoto, Weissman, Preston, Brown, and Kupperbusch (1997) to a sample of officer-students at the South African Military Academy. In contrast to Valchev et al. (2013) they did not find any significant differences between Black, Coloured, and White racial groups in IND-COL. Although the ICIAI did have a high internal consistency ($\alpha > .7$), it did not replicate the factor loadings as reported previously for the scale, pointing to possible validity issues within the South African context for that scale.

In another study Vogt and Laher (2009) attempted to see if there was a relationship between the Five-Factor Model (FFM) of personality and IND-COL within the South African context. They also wanted to know whether scores would differ according to race as well. They administered the IND-COL scale by Hui (1988) to a South African sample and, same as van Dyk and de Kock (2004), no significant differences were found as a function of race, nor was there a significant relationship between the FFM and IND-COL. The scale also had an internal consistency coefficient of .73 overall scale, but they did not report statistics for the subscales, nor any other correlational or validity data.

The studies by van Dyk and de Kock (2004) and Vogt and Laher (2009), however, suffered from significant limitations such as unsubstantiated IND-COL measurement validity within the African context, collapsing of potentially differing cultural groups into one, as well as arguably small sample sizes ($N = 88$ and $N = 176$ respectively). All of the measures used

in these studies also used a unidimensional conceptualisation of IND-COL, although situational variations in IND-COL were incorporated by the last two, e.g. IND-COL within the contexts of family, work, friends etc. (Hui, 1988; Matsumoto et al., 1997).

The only other study that administered an IND-COL scale to South Africans was that of Györkös et al. (2012), where they used the shortened version of the Singelis et al. (1995) HVIC scale developed by Triandis and Gelfand (1998). They found that all four of the subscales as well as the overall IND and COL scales had adequate reliability ($\alpha > .7$). A confirmatory factor analysis indicated that the four factor model replicated well within the South African context as well. Furthermore, a weak positive correlation ($r = .27$) between the general IND-COL scales also indicated support for the bidimensional conceptualisation of the IND-COL relationship. Unfortunately, though having the best psychometric results as well as a much larger sample ($N=818$), they did not do any cross racial comparisons, nor did they report the levels of IND-COL, since the sole purpose of the study was only to evaluate the psychometric properties of the HVIC scale.

There seems to be then a contradiction in the South Africa literature as to how self-concept differs between the various groups in South Africa. While open ended self-descriptions reveal a marked difference along racial or linguistic lines, psychometric measurements have thus far found conflicting results. Furthermore, emic personality scales with strong conceptual ties to IND-COL also revealed significant differences along racial or linguistic lines as well. In light of the previously discussed issues regarding the psychometric assessment of IND-COL this contradiction could quite likely be the result of the specific measures used failing to capture the way IND-COL is expressed within the South African context. It may also, however, be due to the methodological issues present in the studies they were used in. What the actual cause of this discrepancy is, is unclear. What is clear though, is that IND-COL assessment in South Africa requires a lot more attention.

Chapter 3: Culture, Self, and Cognition

The cognitive effects of cross-cultural differences in self-concept have been one of *the* most intensively studied topics in cultural psychology over the last few decades (Cole & Scribner, 1974; Norenzayan et al., 2010; Varnum et al., 2010). In understanding human behaviour, the self can be seen as a basis from which the individual organises behaviour and creates meaning from his or her experiences and interaction with the world (Kitayama et al., 2010; Mkhize, 2004). It can therefore also be seen as a large contributor or shaper of the cognitive toolkit an individual has access to. The way in which the self is shaped has a significant impact on how the individual creates his or her unique cognitive toolkit from the “universal” biological toolkit. Recent studies in cultural neuroscience have even found that differences in self-concept modulates brain activity as well, and creates a “cultural framework for the neural substrates of cognitive and affective processes” (Han & Humphreys, 2016, p. 10). The self, therefore, fundamentally structures the way in which the individual thinks, right down to the most basic processes of the mind and brain (Kitayama et al., 2010; Markus & Hamedani, 2010; Norenzayan et al., 2010).

Independent self-concepts are characterised by an emphasis on unique and stable characteristics of the self and the social context, while an interdependent self-concept places greater value on the relationships within the social context. This difference in emphasis on unique characteristics versus contextual characteristics is believed to create marked differences in cognitive styles (Ji & Yap, 2016; Markus & Kitayama, 1991; Miyamoto, 2013; Norenzayan et al., 2010). An independent self-concept is believed to foster analytic (ANA) thinking due to its emphasis on the discrete or bounded nature of the self and the world around it (Masuda & Nisbett, 2001; Norenzayan et al., 2010). Objects are perceived as solitary and context free, purposefully removed from its surrounds. The specific characteristics of the singular object are emphasised in understanding it while contextual features are minimised. Objects are also understood in reference to the specific categories that they are placed in through the use of formal logic and decontextualisation. An interdependent self-concept is believed to foster holistic (HOL) thinking due to its emphasis of relationship and contextual features in understanding the world and one’s place in it (Masuda & Nisbett, 2001; Norenzayan et al., 2010). The world is understood in terms of its context or the relationships between the various objects that the world is comprised of (Norenzayan et al., 2010). Objects in a person’s environment are not understood in isolation, but rather perceived as part of a greater whole, interconnected and inherently part of their surroundings.

While all people have access to both these tools (Analytic vs holistic thinking) in their kits, the choice to choose one over the other is dependent on a person's cultural background and context through the priming of specific self-concepts. An interdependent self-concept encourages the use of a more holistic tool with which to engage the environment, while an independent self-concept encourages a more analytic tool to be used.

Linking culture with cognition: IND-COL & ANA-HOL

According to the C-CAPS framework for understanding culturally situated behaviour, any given group of people's sociocultural history shapes their present cultural milieu. These distal factors within the cultural milieu in turn shape more proximal factors such as social institutions and social norms and values. These values are in turn internalised within the individual through incorporation of cultural variants into the self. The social institutions on the other hand, shape the nominal situations that the culturally shaped self interacts with, and consequently produce context dependent behaviour.

IND and COL can be seen as the distal level factors that ultimately produce the individual level behaviour or cognition of ANA or HOL thinking. The IND-COL milieus create different types of social structures, cultural products, communication styles, and social norms or values (Miyamoto, 2013). It is to these proximal level factors that individuals attune their cognitive processes for optimal functioning within their specific contexts. Continuous and prolonged exposure to these proximal contexts create habitual ways of thinking, developing specific cognitive patterns and specific neural patterns of activation (or vice versa), e.g. ANA-HOL patterns of thinking. Figure 3 provides a framework for the various levels and links between the broader cultural milieu and individual level cognition. This multilevel analysis of ANA-HOL cognition links well with the general understanding of culturally situated behaviour provided through the C-CAPS framework, where distal level factors have to be taken into account when attempting to understand individual level behaviour.

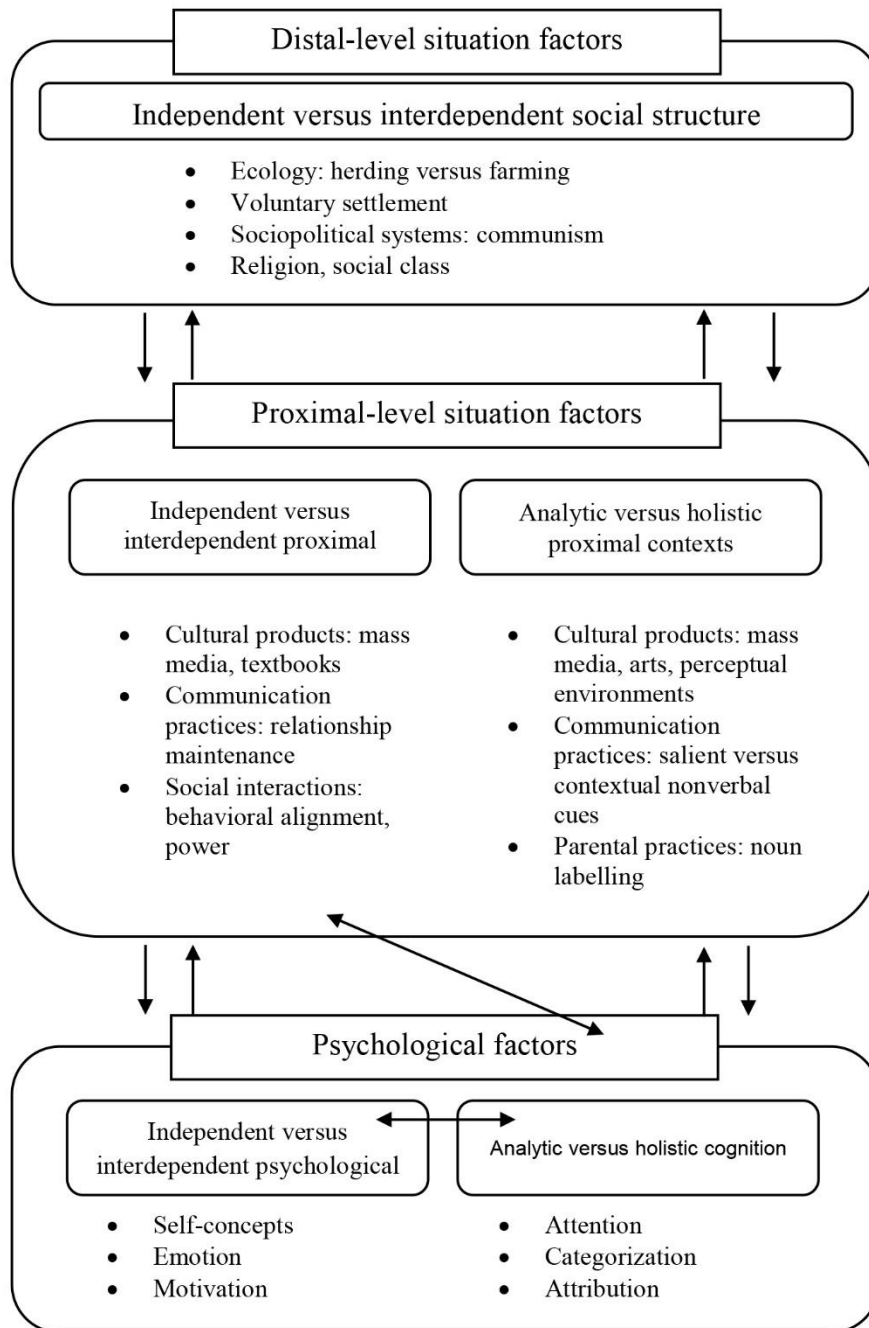


Figure 3. Framework for Individualism-Collectivism & Analytic-Holistic relationship (reproduced from Miyamoto, 2013)

The self and visual attention

These two different styles of thinking, and most likely the subsequent neural modulation, have been found to affect various cognitive processes, such as attention, memory, categorisation, or causal attribution (Ji & Yap, 2016; Norenzayan et al., 2010). Once again, detailing the effects of analytic versus holistic thinking for all these various

cognitive processes is beyond the scope of this paper. Instead, specific attention will be given to what is arguably one of the most fundamental cognitive processes, namely, attention.

Directing visual attention towards important environmental features or cues is an evolutionary adaptive function, available to all humans through our shared biologically based toolkit (Masuda, Ishii, & Kimura, 2016) (Norenzayan et al., 2010). The brain, however, is created through evolution to process information quickly and economically, meaning attention is only directed at the most important information in our environment in order to efficiently process the enormous volume of information our senses constantly take in (Krill, Platek, Goetz, & Shackelford, 2007). Attention is generally controlled through two broad mechanisms: bottom-up attentional selection and top-down attentional selection (Banich & Compton, 2011; Masuda et al., 2016). The former refers to when attention is automatically drawn to specific features of the environment, usually due to evolutionarily salient features, e.g. a dangerous animal, food sources, or potential mates. The latter, on the other hand, refers to when the individual directs his or her attention, usually based on specific goals or behaviourally relevant stimuli (Banich & Compton, 2011; Masuda et al., 2016).

In the absence of evolutionarily salient features, top-down processing typically plays a significant role in determining how attention is directed. Top-down processes, however, are shaped by the goals of the individual and his or her subjective appraisal of the situation, which according to the C-CAPS framework is intimately shaped by culture. Moreover, priming of independent or interdependent self-concepts modulates brain activity to be ready for either self-focusing or context-focusing attention, even when at rest (Han & Humphreys, 2016). So although directed attention is a tool from our universal toolkit, the way in which it gets used, consciously or subconsciously, is greatly influenced by cultural factors (Han & Humphreys, 2016; Masuda et al., 2016).

To illustrate how culture can affect attention Masuda and Nisbett (2001) tested the difference in holistic versus analytic perceptual styles by asking American and Japanese students to describe what they saw in various animated underwater scenes. They found that Americans were more likely to emphasize focal features of the scenes such as large or fast moving objects, while Japanese were 60% more likely to describe more background features than the Americans. Furthermore, changes in background information were more likely to impact Japanese students' ability to accurately judge whether or not an object had previously been seen than it did on American students' ability. In a later study, Masuda and Nisbett

(2006) tested change blindness between Americans and East Asians by showing a series of still pictures as well as animated scenes that included various focal objects upon a complex background. During the sequence of pictures or the animation some background and focal features were altered and participants were asked to identify any changes. In line with the previous study, Americans were more likely to identify more changes in focal features, while East Asians were more likely to identify more changes to background features.

These differences in perception are not only limited to passive visual attention and change blindness. Kitayama, Duffy, Kawamura, and Larsen (2003) made use of the framed-line test (FLT) to study differences in perceptual styles between North American and East Asian students. The FLT involves presenting participants with a square frame that has a single line extending downwards from the middle of top-bar. After viewing this frame, participants are moved to a different table with a new square frame that is either similar in size or slightly larger or smaller than the previous frame is displayed. Participants are then asked to draw the line seen in the first frame either in proportion to the new frame (relative task) or to exact length as seen in the first frame (absolute task). The researchers found that Americans were more likely to misjudge the length of the line they had to draw in the relative task than in the absolute task, where Asians were more likely to misjudge in the absolute than in the relative task. Hence, they concluded that Americans were better able to ignore contextual information than Asians, while Asians were better able to incorporate contextual information than Americans.

Thus, when simply perceiving a visual environment, a holistic perceptual style tends to direct attention more towards the contextual as opposed to the focal features of a visual environment, whereas an analytic perceptual style tends to bias attention towards the focal features alone (Chua, Boland, & Nisbett, 2005; Markus & Kitayama, 1991; Norenzayan et al., 2010).

Masuda and Nisbett (2001) showed a number of images with single focal objects placed on realistic background to American and Japanese university students. Afterwards, the students were shown a new set of pictures wherein some of the pictures were the same as before, some had their background altered, and some were completely new. The students were then asked to identify which focal objects had previously been seen and which had not. Results revealed that, in line with previous research, East Asian students are less likely to recognize previously seen focal objects if they have new backgrounds than Americans. These results indicated that biases in attention also have subsequent implications for memory as

well, in that what is not attended to is usually not very well encoded and as such not well remembered at a later stage.

Chua et al. (2005) attempted to better understand the precise perceptual components affected by cultural differences by using eye-tracking to see how individuals from different cultures direct their attention. Their reasoning was that if there are differences in how individuals from different cultures attend to a scene then this should be apparent in their patterns of fixations and saccades. Eye-movements do not occur in one continuous slide from one position to another, but instead in a number of short ‘jumps’ (known as saccades) until the eye reaches the next visual target (Banich & Compton, 2011). The areas of a visual field at which the eye finally pauses, or fixates on, are known as fixations. Therefore, recording saccades and fixations is a good method to determine differences in perceptual strategies because the areas most fixated on, as well as the routes used to get there, can now be measured objectively. Furthermore, areas or objects deemed more important should receive greater attention and consequently register greater or longer fixations. To test how eye-movement and culture interacts, Chua and colleagues used similar materials and procedure as those used by Masuda and Nisbett (2001) with a European-American student sample and a Chinese international student sample while monitoring their eye movements through an eye-movement tracker. The students were again asked to identify which focal objects had previously been seen and which had not. Again, results indicated that East Asian students are less likely to recognize previously seen focal objects if they have new backgrounds than Americans. Furthermore, the eye-movement tracking indicated that East Asians tended to look at the background more than Americans, while Americans tend to focus on the focal object sooner and for longer than East Asians.

The absence of Africa

Although these differences in perceptual styles due to differences in self-concept have mostly been studied between North-Americans and East Asians, some studies have branched out to other regions of the world, such as South America and Eastern Europe (Kühnen et al., 2001; Lechuga, Santos, Garza-Caballero, & Villarreal, 2011; Norenzayan et al., 2010; Varnum et al., 2010). These studies have also found support for the proposed link between perception and self-concept, e.g. that a culture that promotes an interdependent self-concept also promotes a holistic perceptual style. The African continent, however, has as of yet received no attention regarding the influence of self-concept on cognition (Miyamoto, 2013;

Norenzayan et al., 2010). The current drive for a culturally based or context cognisant understanding of human behaviour was built on the critique of psychological theories only being researched using WEIRD populations (Henrich et al., 2010). Overlooking an entire continent's worth of cultures, however, undermines these principles of building new context or culturally sensitive theories of human behaviour.

Rationale, Specific Aims, and Hypotheses.

Studying culture on its own is a very complex task, and then attempting to link this culture to differences in cognitions adds yet another level of complexity to such an undertaking. Consequently, the current study was broken into two separate yet related components, namely: an initial exploration and validation of IND-COL measurement in South Africa; and a subsequent experimental exploration of the effects of individual level IND-COL variations on visual attention and memory.

IND-COL Measurement

Due to the multicultural nature of South Africa, the heuristic method of equating nation-state aggregated preferences with individual level preferences regarding self-concepts would be flawed. In order to accurately assess the link between self-concept and cognition within a South African sample, IND/COL samples would first need to be identified within South Africa. Unfortunately, psychometric measurement of IND-COL that may be used to identify IND/COL individuals has a problematic history in South Africa, based on the inconsistent findings regarding self-concept preferences along racial or linguistic lines. These inconsistencies reflect issues with the broad categorisation of IND-COL along these ambiguous categories, especially within an increasingly integrated society. White and Black South Africans are geographically closely spaced, share numerous social institutions, and have large overlaps in media exposure to name but a few of the factors that underpin significant cultural exchange (Binikos & Rugunanan, 2015; Miyamoto, 2013; Triandis, 2010). Consequently, it may be assumed that these two groups are very likely not as culturally separated as Americans and Chinese. These issues therefore exclude the possibility of choosing IND or COL groups based on race or language as proxies for culture. Therefore, the first aim of this dissertation was to evaluate one of the existing measures of IND-COL in terms of its psychometric properties as well as its dimensionality and factor structure within South Africa. Due to the emphasis on race and language in previous South African studies,

however, the actual importance or influence of these two factors was also tested in terms of their relationship with quantitatively measured IND-COL.

The first phase of the study tested the following hypotheses:

1. Does the HVIC exhibit construct validity and reliability in measuring IND-COL in the South African context?
2. Do scores on the HVIC differ as a function of race?
3. Do scores on the HVIC differ as a function of language?
4. How well do race or language predict scores on the HVIC?

ANA-HOL Measurement

The current absence of African samples in the building of culturally sensitive theories on cognition is a serious problem in the literature. The second aim of this dissertation was to further knowledge by testing current assumptions on the influence of culture on cognition within the South African context. IND-COL is believed to be the foundation of a large portion of cultural differences in cognition and therefore would be the most obvious place to start adding Africa to the literature. The second study therefore set out to test the assumption that differences in self-concept strongly influence differences in perceptual style within a South African sample.

Although evidence regarding self-concepts in South Africa has shown mixed results, the general attitude is that there is a difference in self-concepts between different population groups within South Africa. Black South Africans are believed to generally possess more interdependent self-concepts, while White South Africans are believed to generally possess independent self-concepts. Coloured and Indian South Africans are believed to lie somewhere between these two groups on their preferences (Adams et al., 2012; Booysen, 2001; Hofstede, 1980; Hofstede & Hofstede, 2005). Language based differences are seen to follow these race based distinctions as well, with African language speaking South Africans preferring interdependent self-concepts, and English speaking South Africans independent self-concepts (Eaton & Louw, 2000; Valchev, 2012). If these differences do in fact exist in a real manner, then theoretically differences in perception or attention strategies should exist as well. The multicultural nature of South Africa should provide groups of independent and interdependent individuals, and these groups should theoretically employ markedly different

attentional strategies (ANA vs HOL) when engaging in perceptual tasks. Unfortunately, no evidence exists to substantiate such a claim.

The second phase of this study therefore tested the following hypotheses:

1. Will interdependent South Africans display a greater number of eye saccades and fixations to/on backgrounds than independent South Africans while watching images with a single focal object on a realistic background?
2. Will independent South Africans fixate on focal objects faster and for longer than interdependent South Africans, while watching images with a single focal object on a realistic background?
3. Will interdependent South Africans' accuracy be affected more than independent South Africans' accuracy by changes to backgrounds during an object recognition task?
4. Will performance differences on the tasks between independent and interdependent South Africans be similar to those between Americans and Chinese in the Chua et al. (2005) study?

Chapter 4: Methodology & Results

IND-COL Measurement

Materials and Procedure

The HVIC Scale by Triandis and Gelfand (1998) was selected for this study as it is based on one of the most widely used measures available, i.e. the Singelis (1994) Self Construal Scale (SCS). The HVIC has also been shown to have promising reliability and construct validity within South Africa (Györkös et al., 2012). The survey consisted of an online version of the HVIC, slightly adapted to be more relevant to a student population. The survey consisted of four subscales: The HI, VI, HC, and VC subscales. Each subscale consisted of four questions (See Table 3). Over the space of four months the survey was sent out twice to the entire database of students at the University of Cape Town (UCT), and once to UCT undergraduate Psychology students. The university wide survey was done via the Research Invitation Newsletter facility provided by the UCT Department of Student Affairs. The undergraduate Psychology student survey was done through the Student Research Participation Programme (SRPP) provided by the UCT Department of Psychology.

Table 3. Horizontal and Vertical Individualism and Collectivism Scale and scoring (Adapted from Triandis & Gelfand, 1998)

Rate on a 9 point scale (1 = Strongly Agree to 9 = Strongly Disagree).

Horizontal individualism

1. I'd rather depend on myself than others.
2. I rely on myself most of the time; I rarely rely on others.
3. I often do "my own thing."
4. My personal identity, independent of others, is very important to me.

Vertical individualism

1. It is important that I do my job better than others.
2. Winning is everything.
3. Competition is the law of nature.
4. When another person does better than I do, I get tense and aroused.

Horizontal collectivism

1. If a coworker/fellow student/peer gets a prize, I would feel proud.
2. The well-being of my coworker/fellow student/peers is important to me.
3. To me, pleasure is spending time with others.
4. I feel good when I cooperate with others.

Vertical collectivism

1. Parents and children must stay together as much as possible.
2. It is my duty to take care of my family, even when I have to sacrifice what I want.
3. Family members should stick together, no matter what sacrifices are required.
4. It is important to me that I respect the decisions made by my groups.

Note: slight alterations of scale refers to addition of "/fellow student/peer" to items 1 and 2 for the Horizontal collectivism subscale.

Participants

A total of 1380 valid¹ responses were collected. Of these respondents 33.5% were African (n=462), 13% were Coloured (n=179), and 42.2% were White (n=583). The majority (65.3%, n=901) indicated that they spoke English as their home language, while 7.3% (n=101) spoke Afrikaans, and 27.4% (n=378) spoke one of South Africa's national African languages². Of these respondents 40.7% were male (n=293), 59.3% female (n=427), and the average age was 21.9 years ($SD = 4.9$)³.

Table 4. Participant Demographics

Race	Language			Total
	English	Afrikaans	African	
African	88 (6.4%)	2 (0.1%)	372 (27%)	462 (33.5%)
Coloured	164 (11.9%)	14 (1%)	1 (0.1%)	179 (13%)
White	506 (36.7%)	77 (5.6%)	0 (0%)	583 (42.2%)
Asian	50 (3.6%)	0 (0%)	1 (0.1%)	51 (3.7%)
Indian	30 (2.2%)	0 (0%)	0 (0%)	30 (2.2%)
Other	21 (1.5%)	1 (0.1%)	0 (0%)	22 (1.6%)
Prefer not to answer	42 (3%)	7 (0.5%)	4 (0.3%)	53 (3.8%)
Total	901 (65.3%)	101 (7.3%)	378 (27.4%)	1380 (100%)

Results

Psychometric Evaluation

Analyses of internal consistency revealed overall satisfactory alphas ($\alpha > .7$; $N = 1380$) for the combined Individualism (IND) and the combined Collectivism (COL) scales as well as for all subscales (See Table 5). This remained mostly the same across racial or language groups with the exception of HI for 'White' and 'Afrikaans' groups with alphas of .690 and .660 respectively. While not above the .7 general standard, these are still reasonably

¹ In order to control for any foreign or exchange students, all respondents who indicated their language as 'Other', i.e. not an official SA language, were excluded. All responses that had missing data for the HVIC scale were also excluded.

² African languages included isiNdebele, isiXhosa, isiZulu, Sesotho sa Leboa, Sesotho, Setswana, siSwati, Tshivenda, and Xitsonga.

³ Age and sex was only obtained for just over half of the respondents (52.2%, n=720).

strong indicators of internal consistency given the small number of items in the subscale (4 items per subscale).

Table 5. Cronbach's Alphas for Horizontal and Vertical Individualism and Collectivism Scale

Scale	α	N of items
IND	.746	8
COL	.768	8
HI	.736	4
VI	.787	4
HC	.732	4
VC	.783	4

Due to the survey being sent out with at least one month interval between surveys, a small number of the respondents were identified as having completed the survey twice (N = 97). These responses were grouped together in order to complete a test-retest reliability analysis of the measure. Both the combined IND and COL scales had strong positive correlations of above .7. The VI and VC subscale also had strong positive correlations of above .7, and the HI and HC subscales had positive but moderate correlations (.461 and .527 respectively). All correlations were significant at $p \leq 0.01$ level. Consequently, the HVIC exhibited a good test-retest reliability.

Table 6. Test-retest correlations for Horizontal and Vertical Individualism and Collectivism scales

Scale	r .	CI
IND	.740**	.635 - .818
COL	.730**	.621 - .811
HI	.461**	.289 - .604
VI	.777**	.684 - .845
HC	.527**	.367 - .657
VC	.737**	.631 - .816

*Note: ** Correlation is significant at the 0.01 level (2-tailed)*

The combined IND and COL scales had a weak positive correlation ($r=.139$; $p<.01$) indicating an orthogonal relationship between the two based on the $r < .2$ cut-off advocated by Taras et al. (2014). HI and VI, as well as VI and VC had weak positive correlations ($r=.236$ and $r=.227$ respectively; $p<.01$ for both); HC and VC had a moderate positive correlation ($r=.315$; $p<.01$); and lastly, HI and VC also had a weak positive correlation ($r=.096$; $p<.01$). Although the correlations between HI and VI and VI and VC are above $.2$, they can still be seen as small enough to indicate independence (they only have a shared variance of just over 5%). Based on the Taras et al. (2014) standard of $r > .3$ to indicate non-independence, HC and VC are the only scales that are not independent. The correlations between scales tended to be quite similar across racial and language groups with the exception of VI and VC which had a strong positive correlation ($r=.394$; $p<.01$) for the ‘Afrikaans’ group, indicating non-independence of those two subscales.

Table 7. Horizontal and Vertical Individualism and Collectivism Scale correlations

	IND	COL	HI	VI	HC	VC
IND	1	.139**	.652**	.891**	-.033	.222**
COL	.139**	1	.052	.147**	.745**	.868**
HI	.652**	.052	1	.236**	-.030	.096**
VI	.891**	.147**	.236**	1	-.024	.227**
HC	-.033	.745**	-.030	-.024	1	.315**
VC	.222**	.868**	.096**	.227**	.315**	1

Note: ** $p < .001$

A factor analysis was conducted on the 16 items to assess construct validity. A Principal Component Analysis (PCA) was done with Varimax rotation. Four components with eigenvalues above one were identified accounting for a total of 59.949% of variance. Each of the subscales loaded quite prominently on separate components, further supporting the distinctness of the four constructs (HI, VI, HC, and VC). The following items had the highest loading on each of the components (See Table 8): “Winning is everything.” had a factor loading of .817 on component 1; “Family members should stick together, no matter what sacrifices are required.” had a factor loading of .842 on component 2; “I rely on myself most of the time; I rarely rely on others.” had a factor loading of .817 on component 3; and “I feel good when I cooperate with others.” had a factor loading of .784 on component 4.

The four component model was found across racial and language groups with the exception of the 'Afrikaans' group that had five components with Eigenvalues greater than one. Inspection of the factor loadings revealed only a single item with a loading above .3 on the 5th factor ("My personal identity, independent of others, is very important to me", $r = .893$). Forcing a 4 factor model, however, only slightly decreased total variance explained (70.846% vs 64.574%), and the item loaded adequately on the same component as the rest of the items in its subscale ($r = .330$).

Figure 4. Scree plot of eigenvalues for Horizontal and Vertical Individualism and Collectivism factor analysis

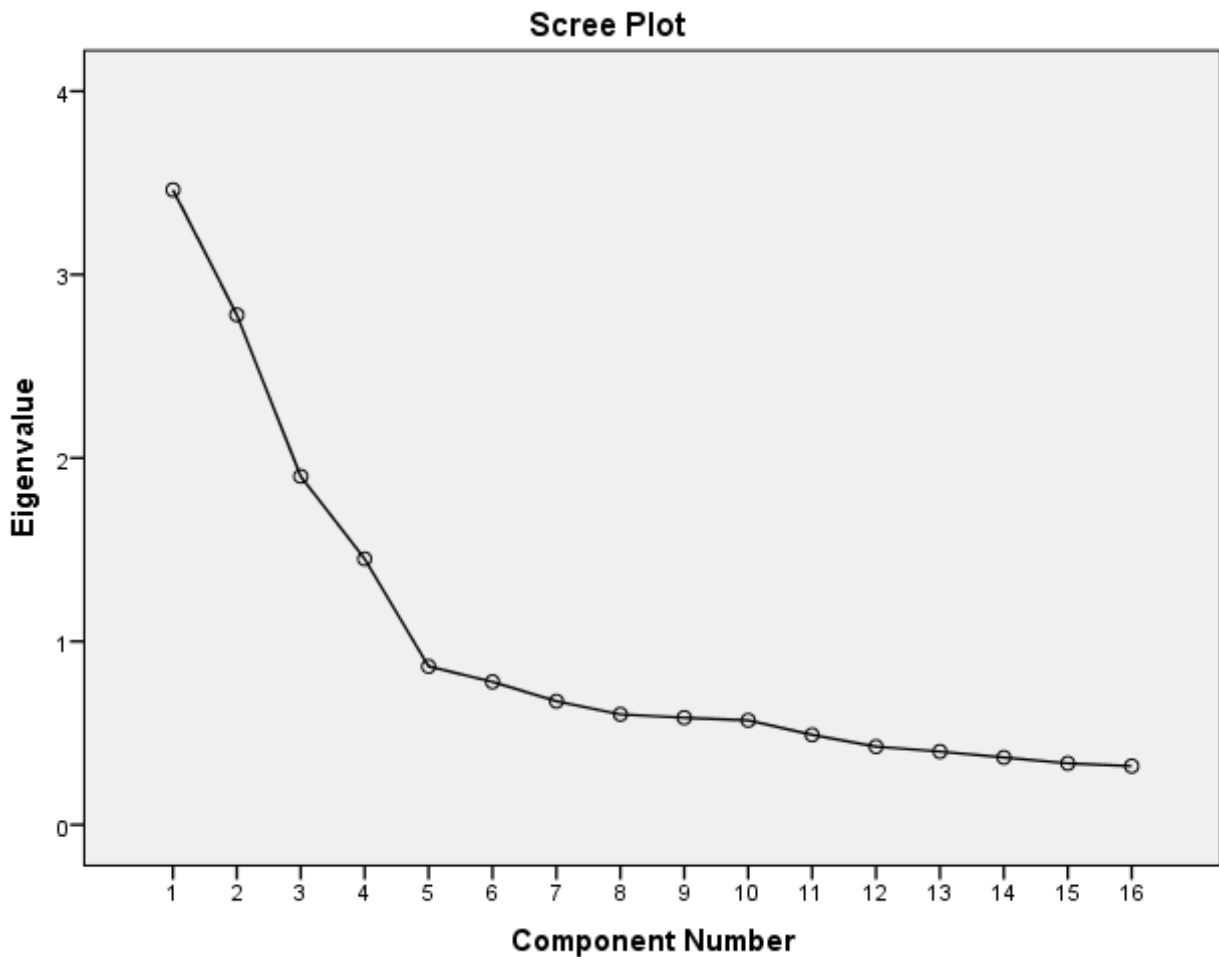


Table 8. Factor Loadings for the Horizontal and Vertical Individualism and Collectivism scale

Items	1	2	3	4
<u>Horizontal Individualism</u>				
1. I'd rather depend on myself than others.	.077	-.010	.784	.021
2. I rely on myself most of the time; I rarely rely on others.	.116	-.075	.817	.042
3. I often do "my own thing."	.108	.009	.765	.117
4. My personal identity, independent of others, is very important to me.	.059	-.044	.559	-.128
<u>Vertical Individualism</u>				
1. It is important that I do my job better than others.	.745	-.075	.230	-.041
2. Winning is everything.	.817	-.152	.126	.050
3. Competition is the law of nature.	.731	-.105	.110	.008
4. When another person does better than I do, I get tense and aroused.	.778	-.028	-.048	.049
<u>Horizontal Collectivism</u>				
1. If a coworker/fellow student/peer gets a prize, I would feel proud.	.151	.165	-.181	.684
2. The well-being of my coworkers/fellow students/peers is important to me.	.099	.079	-.058	.771
3. To me, pleasure is spending time with others.	-.155	.096	.174	.711
4. I feel good when I cooperate with others.	-.017	.141	.076	.784
<u>Vertical Collectivism</u>				
1. Parents and children must stay together as much as possible.	-.059	.746	-.010	.054
2. It is my duty to take care of my family, even when I have to sacrifice what I want.	-.106	.808	-.062	.077
3. Family members should stick together, no matter what sacrifices are required.	-.145	.842	-.039	.112
4. It is important to me that I respect the decisions made by my groups.	-.049	.637	-.023	.286
Eigenvalues	3.462	2.781	1.899	1.450

Note: Rotation Method: Varimax with Kaiser Normalization. Major loadings for each item are in bold

HVIC Descriptive Statistics & Means comparisons

Two mixed between-within subject ANOVAs revealed significant interactions between IND-COL scales for Race ($F_{6,1373} = 4.280, p < .001$) and Language ($F_{2,1377} = 8.564, p < .001$). Mean IND scores were significantly lower than mean COL scores for the African, Coloured, and White racial groups, and the Afrikaans language group was the only group whose mean IND score was not significantly lower than its mean COL score (it was near identical; 53.56 vs 53.46). See Table 9 for means, SDs, and Cohen's d effect sizes.

To further explore the interactions a between subjects Factorial MANOVA (2 x 3 x 7) was conducted on IND-COL scales for Race and Language. Significant main effects were found for Race and Language ($F_{12,2726} = 1.812, p = .041$; $F_{4,2726} = 2.666, p = .031$ respectively). There was no significant interaction. Univariate analyses, with a Bonferroni adjusted alpha of .025, revealed a significant effect for Race on COL ($F_{6,1364} = 2.753, p = .012$). After adjusting alpha, Language on COL only approached significance ($F_{2,1364} = 3.470, p = .031$). All significant effects accounted for only a small portion of variance, with $\eta^2 < .02$. A Factorial MANOVA (4 x 3 x 7) for the HVIC subscales revealed no significant main or interaction effects for either Race or Language.

Due to the relatively small sample sizes of the Asian, Indian, Other, and Prefer not to Answer racial categories (N = 51, 30, 22, and 53 respectively), further discussion of means comparisons will focus more on the African, Coloured, and White groups (N = 462, 179, and 583 respectively). All three of these groups scored significantly higher on COL than on IND ($p < .001, d = .48, .62, \text{ and } .2$ respectively). African race group had the highest mean for COL (M = 58.76, SD = 8.11), followed by Coloured (M = 57.29, SD = 8.02) and then White (M = 54.53, SD = 8.2). Both African and Coloured were significantly higher than White ($p < .01, d = 0.52$; $p < .01, d = 0.33$ respectively), but not from each other ($p = .152, d = 0.194$). Interestingly the African Language group had the highest mean for both of the combined scales as well as all subscales. Comparisons of the subscale means show a mostly similar score average across language or racial groups, with the exception of VC where the African language and racial group tended to score relatively high. It is also interesting to note how similar the patterns of subscale means are across the language or racial groups. All groups scored highest on HI and HC, and lowest on VI. The greatest variation in scores was for VC, where the African language group seemed to score much higher than both English and Afrikaans.

Lastly, Males and Females had a very similar pattern of scores, but with Males scoring slightly higher for IND in total and for VI in particular. However, including Sex within the Factorial MANOVA model (2 x 2 x 3 x 7) removed all significant main effects. This change should be interpreted with caution though, due to the markedly different samples sizes for Sex excluded vs Sex included (N = 1380 vs N = 720 respectively).

Table 9. Horizontal and Vertical Individualism and Collectivism combined Individualism-Collectivism scale descriptive statistics

Scale	IND		COL		Cohen's <i>d</i>
	Mean	N	Mean	N	
Language					
English	52.59 (8.91)	901	55.5 (8.17)	901	-0.34**
Afrikaans	53.56 (9.13)	101	53.46 (9.36)	101	0.01
African	54.98 (8.53)	378	59.37 (8.01)	378	-0.53**
Race					
African	54.76 (8.67)	462	58.76 (8.11)	462	-0.48**
Coloured	52.05 (8.62)	179	57.19 (8.02)	179	-0.62**
White	52.86 (8.62)	583	54.53 (8.2)	583	-0.20**
Asian	52.12 (9.77)	51	57.39 (7.39)	51	-0.61*
Indian	53.43 (9.56)	30	56.5 (9.66)	30	-0.32
Prefer not to answer	50.66 (9.61)	53	52.51 (9.59)	53	-0.19
Other	54.41 (9.16)	22	57.5 (7.79)	22	-0.36

Note: ** $p < .001$; * $p < .01$. SD in brackets.

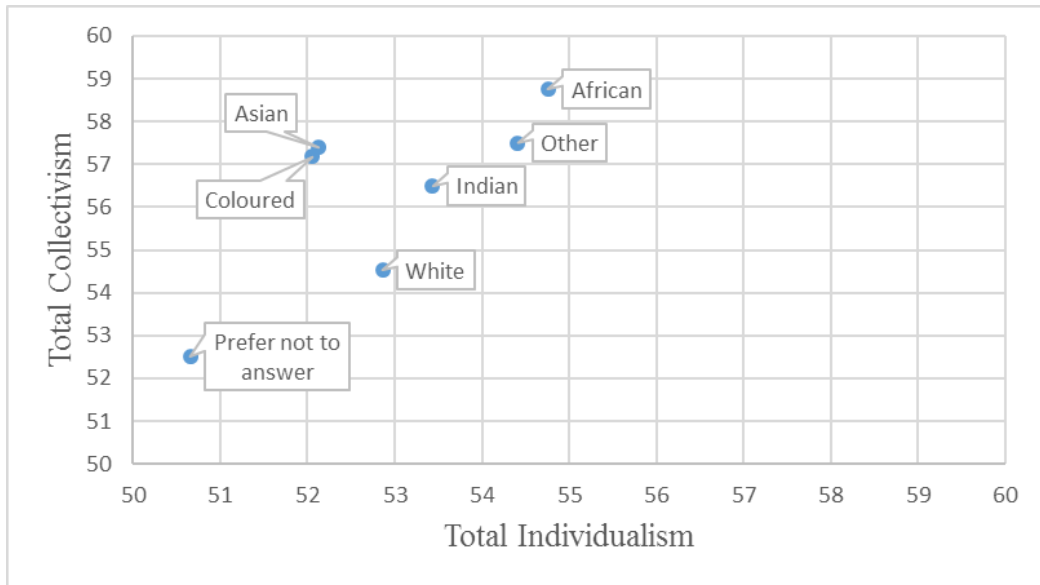


Figure 5. Individualism-Collectivism Scores By Race

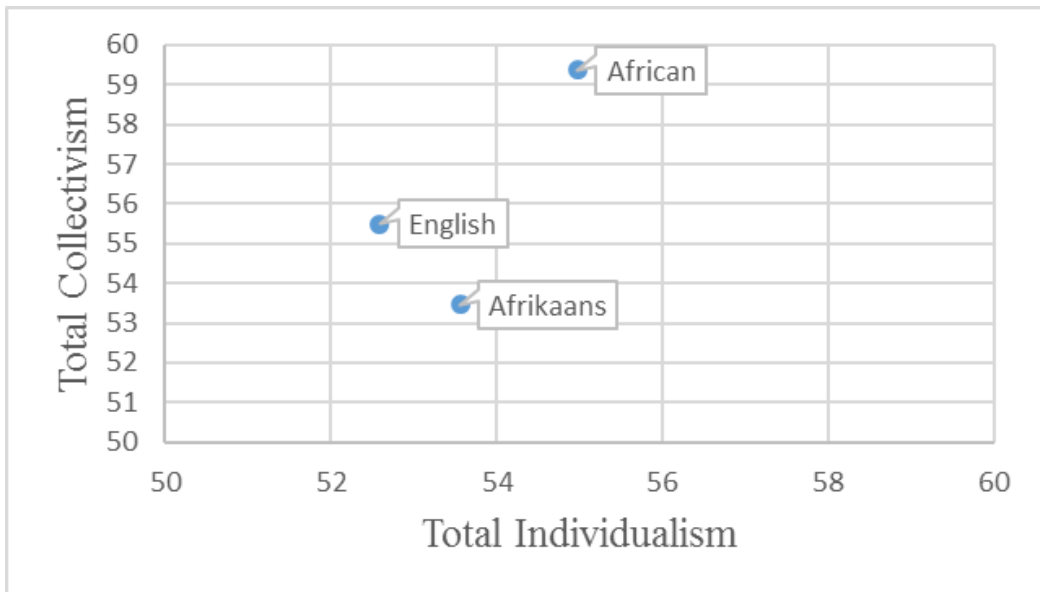


Figure 6. Individualism-Collectivism Scores By Language

Table 10. Horizontal and Vertical Individualism and Collectivism subscales descriptive statistics

Subscale	HI		VI		HC		VC	
	Mean	N	Mean	N	Mean	N	Mean	N
Language								
English	30.43 (4.19)	901	22.17 (6.86)	901	29.24 (4.21)	901	26.26 (5.88)	901
Afrikaans	31.15 (3.62)	101	22.42 (6.55)	101	28.77 (4.95)	101	24.68 (6.73)	101
African	31.81 (3.93)	378	23.17 (6.97)	378	29.96 (4.68)	378	29.42 (5.04)	378
Race								
African	31.55 (4.08)	462	23.22 (6.91)	462	29.74 (4.58)	462	29.02 (5.21)	462
Coloured	30.58 (4.02)	179	21.47 (6.89)	179	29.47 (4.25)	179	27.72 (5.66)	179
White	30.37 (4.03)	583	22.49 (6.62)	583	29.08 (4.22)	583	25.46 (5.95)	583
Asian	31.1 (4.31)	51	21.02 (7.56)	51	30.57 (4.34)	51	26.82 (5.47)	51
Indian	30.4 (4.66)	30	23.03 (7.48)	30	29.43 (5.48)	30	27.07 (5.71)	30
Prefer not to answer	30.85 (4.65)	53	19.81 (7.15)	53	28.15 (4.81)	53	24.36 (6.74)	53
Other	31.82 (4.05)	22	22.59 (7.2)	22	30.73 (3.57)	22	26.77 (7.08)	22

Regression

A number of regression models were tested to assess the predictive value of Race, Language, and Sex on the level of Individualism and Collectivism as determined by the HVIC. Initial regressions excluded Sex due to the reduced sample size. Separate regressions were run for the two combined IND and COL scales⁴. White, English, and Female were set as the reference groups for Race, Language, and Sex variables (respectively) in all regressions. See table 11 for R^2 and Beta values.

The full regression model for IND, excluding Sex, accounted for only 1.7% of variance in scores ($F_{4, 1379} = 6.030, p < .01$). There were no statistically significant predictors either. The full regression model that included Sex explained 4.1% of the variance in IND scores ($F_{5, 719} = 6.174, p < .01$), and the Male group significantly predicting IND ($B = -.287, p < .01$).

For COL, the full regression model, excluding Sex, accounted for 6.8% of variance in scores ($F_{4, 1379} = 25.171, p < .01$). Coloured ($B = -.358, p < .01$) and African Language groups ($B = -.432, p < .01$) were statistically significant predictors. The model including Sex accounted for 6.3% of variance in COL ($F_{5, 719} = 9.532, p < .01$), with the Coloured ($B = -.395, p < .01$) and African Language ($B = -.476, p < .01$) groups again as significant predictors.

It is important to note, though, that race and language had a significant and strong correlation ($\Phi_{Cramer} = .606, p < .001$), meaning the effects of one cannot easily be disentangled from the other. Any conclusions regarding such effects should therefore be done with caution.

The same regression models were run on each of the four subscales⁵. The full model, excluding Sex, was able to explain 2.8% of the variance in scores for HI, 0.8% for VI, 1.1% for HC, and 9% for VC. The model including Sex explained 4.3% for HI, 4.3% for VI, 2.2% for HC, and 7.1% for VC. All final models were significant ($p < .05$). The African Language group was a significant predictor ($p < .01$) in all subscales, with the exception of VI, regardless of whether Sex was included. The Coloured and African racial groups, as well as the Afrikaans language group were also significant predictors of VC ($p < .05$) when Sex was

⁴ Dependent variables were transformed due to presence of moderate negative skewness in both DVs. Scale direction was reversed and transformed scale scores ranged from 8.5-1 for the combined IND and combined COL scales.

⁵ Similar transformations of DVs were done for subscales. Scale direction was reversed and transformed scale scores ranged from 5.7-1 for all subscales.

excluded, but only the Coloured and African language groups remained significant ($p < .01$) when Sex was included. The Male group significantly predicted only VI ($B = -.352$, $p < .001$).

Table 11. R^2 and Beta coefficients for survey regression models

	R^2	Beta values			
		African Race	Coloured	African Language	Afrikaans
IND	.017	-.153	.068	-.142	-.106
COL	.068	-.180	-.315***	-.434***	.203
HI	.028	-.023	-.013	-.284**	-.143
VI	.008	-.170	.090	.019	-.028
HC	.011	.072	-.060	-.243**	.077
VC	.090	-.284**	-.348***	-.355***	.195*

*Note: *** $p < .001$; ** $p < .01$; * $p < .05$; White group used as reference for African & Coloured groups; English group used as reference for African Language and Afrikaans groups. Values are for Sex excluded. Inclusion did not significantly change values, with exception of VC for African Race and Afrikaans, $p > .05$ for both.*

ANA-HOL Measurement

Method

Design

The aim of this study was to assess whether cognitive strategies in perception and attention (ANA vs HOL) differed between South Africans with interdependent versus independent self-concepts. The experimental procedure and materials of Chua et al. (2005) were chosen due to their use of eye-tracking procedures in combination with a previously used memory task that showed significant differences in performance as a function of self-concept. The eye-tracking aspect was believed to add a more direct method of measuring attentional strategies, and therefore would provide more accurate information regarding the perceptual strategies employed by participants. The laboratory task was therefore split into two phases, the first being an eye-tracking phase, and the second the object recognition and memory task phase.

A single-factor between-groups design (Interdependent vs Independent self-concept) was used with participants grouped according to scores on the HVIC. The two groups were compared on 7 eye-tracking metrics, 9 recognition memory measures, and 4 recognition memory reaction time measures.

Participants

Due to the multicultural nature of South Africa and the poor predictive power of race or language for IND-COL, participants were selected on the basis of their scores on the HVIC. All respondents to the first survey who indicated interest in participating in future research (n = 473) were divided into two groups through the use of k-means cluster division, with a maximum of 2 clusters defined. The group with a higher mean for total Collectivism (totCOL) than total Individualism (totIND) was defined as the Collectivist group. The group with a higher mean for totIND than totCOL was defined as the Individualist group. Within the Collectivist group, the 60 lowest on totIND were selected from the final Collectivist sample group. Within the Individualist group, the 60 lowest on totCOL was selected to form the final Individualist sample group. It was believed that this procedure for recruitment would provide two distinctly different samples: A strongly interdependent group, and a strongly independent group. Theoretically these two groups, divided solely on IND-COL scores and presumably on the extremes of a dichotomous IND-COL spectrum, should reliably use either analytic or holistic attentional strategies.

These respondents (n = 120) were contacted and asked to come in for the laboratory based tasks. Due to an insufficient response rate and also to adjust for gender imbalances in responses, two additional recruitment surveys were sent out at later stages. These additional surveys were sorted by only selecting respondents if their totIND and totCOL scores fell within the minimum and maximum values of either groups as defined by the first set of groups created. Additional respondents were then selected at random from this newly sorted sample to be contacted and included in the laboratory based tasks.

A total of 60 individuals participated in the laboratory tasks (29 IND; 31 COL), with an average age of 21.9 (SD = 6.1). All participants who completed the laboratory tasks also completed a HVIC post-test. Based on the post-test scores, 5 participants were excluded from all analyses due to markedly different totIND and/or totCOL scores. Fisher’s Exact tests showed no significant differences in race or language between the two groups ($X^2_4 = 2.056$, $p = .841$; $X^2_2 = .982$, $p = .696$). 1 participant had incomplete eye-tracking data and 2 participants’ recognition data was lost due to power outages. 2 participants were excluded from eye-tracking analysis and 1 from recognition analysis as outliers⁶. This left a final sample of 52 (25 IND; 27 COL) for the eye-tracking task and 52 (25 IND; 27 COL)⁷ for the recognition task. Gender ratios were equal for both tasks (23 Male; 29 Female). All participants were compensated 50 ZAR for their participation, including those whose participation was cut short due to the power outages.

Table 12. Analytic vs Holistic study participant demographics

	IND	COL	Total
Eye-Tracking			
Male	11	12	23
Female	14	15	29
Total	25	27	52
Recognition			
Male	11	12	23
Female	14	15	29
Total	25	27	52

⁶ Eye-movements were significantly anomalous such as remaining fixated on a single spot; Recognition scores indicated guessing or response set (e.g. answering ‘yes’ for all images). Behavioural patterns were not theoretically plausible.

⁷ Not all participants were included in both datasets, the group Ns were only coincidentally equal.

Materials and Procedure

Eye-movements were recorded using a Tobii X120 eye-tracker (120Hz) which tracks eye-movement through a sensor positioned underneath the computer screen. Tobii Studio Software package was used to create and run the experiment, as well as record data for the first task, while E-Prime 2 was used to create and run the experiment and record the data for the second task.

The original images used by Chua et al. (2005) were obtained and were used as is in this study. These images are comprised of various realistic animals and inanimate objects placed on similarly realistic backgrounds. A total of 36 pictures with a single, focal object in the foreground were created (20 foregrounded animals, and 16 foregrounded inanimate objects). This set of 36 was used in the eye-movement tracking task of the Chua et. al. experiment and was used again as is in this study (See figures 6 & 7). For the object recognition task, Chua et. al. merged the previous 36 pictures with 36 new focal objects and backgrounds to create a new set of 72 pictures (See figures 8-11). In this new set half of the previous focal objects were present on their original backgrounds while the other half were presented on new background. Furthermore, half of the new objects were presented on backgrounds from the original pictures and the other half of the new objects were presented on new background. As a result, four different picture combinations were created: (1) 18 original objects on original backgrounds, (2) 18 original objects on new backgrounds, (3), 18 new objects on original backgrounds, and (4) 18 new objects on new backgrounds. This set of 72 pictures was also used as is in the object recognition task in this study. All participants saw the same pictures and the same trial sequences in the original study, and did so as well in this study. Procedure for this study replicated that of the original study as close as possible, with differences in the mathematical tasks completed during distraction phase as the main alterations.

Eye-movement tracking

Participants were seated in front of a computer screen with approximately 70cm between them and the screen. An adjustable chair was used in order to ensure that participants' eye level, relative to the screen, was as similar as possible. Tobii Studio also has a built-in calibration procedure that assists with ensuring recording quality, which was used for all participants. Focal objects and Backgrounds were identified as separate Areas of Interest (AOIs) in Tobii Studio (See Figures 14-17; Focal Object shaded purple; Background shaded blue).

A visit was counted when an individual's gaze moves into an area defined as either focal object or background from outside of the area. This is different from fixations as multiple fixations can occur within a single visit to an AOI. Another visit will only be counted if gaze moves out of this AOI and then moves back in again.

Participants were first shown a number of instruction screens as well as a brief sequence of sample pictures to familiarise participants with how the task would proceed and what they would need to do. Eye-tracking metrics only started recording after these introductory screens ended. The recorded section of the task consisted of the set of 36 pictures, with a blank screen with a cross (+) in the middle inserted before each image was presented. Participants were instructed to focus their eyes on the cross every time the cross screen appears to reset eye-fixation. They were also asked to verbally rate each picture on a scale from 1-7 for how much they like the picture (1 indicating 'don't like it at all'; 4 indicating 'neutral'; and 7 indicating 'like it a lot'). Each picture was shown for a period of 3 seconds. Once all 36 pictures had been presented participants were moved across the room to a different computer where they completed a number of arithmetic problems for 10 minutes.

Object-recognition task

After completing the distractor task, participants were asked to move back to the first computer to complete the next task in the study. For this task participants were once again shown a number of instruction screens as well as a brief sequence of sample pictures detailing how the task will proceed and what they will need to do. Eye-tracking data was not recorded for this task. Participants were shown the set of 72 pictures comprised of altered, original, and new pictures. Each picture was displayed for 3 seconds wherein participants needed to indicate whether they had previously seen the focal object in that picture by either pressing 'j' for 'yes' or 'f' for 'no'. Participants were told that if the picture disappears before a key was pressed, they can still do so before the next picture was displayed. If participants are unsure they were asked to guess. In the instruction screens, a sample picture was shown indicating what was meant by focal object and what was meant as background. A fixation screen was once again displayed in between each picture to reset eye-fixation.

Debriefing and Compensation

After completing the object recognition task participants were debriefed regarding the true aims and nature of the tasks and given their compensation for participation.



Figure 7. Phase 1 Sample image



Figure 8. Phase 1 Sample image



Figure 9. Phase 1 Original Image



Figure 11. Phase 2 Altered Background



Figure 10. Phase 1 Original Image



Figure 12. Phase 2 Altered Focal Object

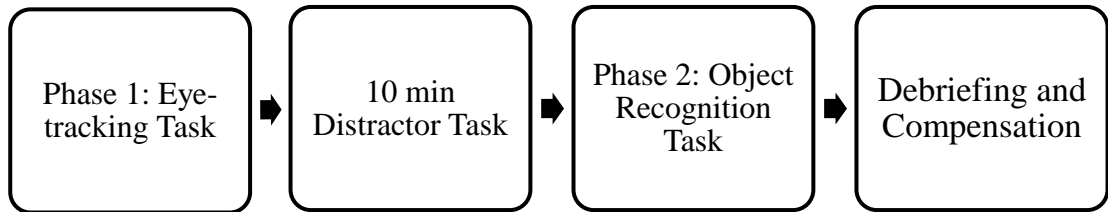


Figure 13. Experiment Procedure

The following data were recorded for each participant:

- Eye-tracking (7)
 - Number of fixations on focal objects or backgrounds;
 - Number of visits to focal objects or backgrounds;
 - Average time to first fixation on focal objects or backgrounds;
 - Average duration of individual fixations on focal objects or backgrounds;
 - Average duration of visits to focal objects or backgrounds;
 - Total duration of fixations on focal objects or backgrounds;
 - Total duration of visits to focal objects or backgrounds.
- Recognition Memory Accuracy (9)
 - Old Object on Old Background
 - New Object on New Background
 - Old Object on New Background
 - New Object on Old Background
 - Old Object
 - New Object
 - Old Background
 - New Background
 - Overall Total
- Recognition Memory Reaction Time (4)
 - Old Object - Old Background
 - New Object - New Background
 - Old Object - New Background
 - New Object - Old Background

Results

Tables 13 and 14 provide overviews of the IND-COL means comparisons with effect sizes for the eye-tracking and object recognition results. Table 15 provides an overview of the Background vs Focal Object means comparisons for important eye-tracking measures. Table 16 provides an overview of the accuracy means comparisons for different types of image combinations in the object recognition task.

A Mahalanobis distance analysis revealed three outliers in the eye-tracking data ($df = 12$, $X^2 > 32.91$, $p < .001$), all within the IND group, and one in the recognition data ($df = 13$, $X^2 > 34.53$, $p < .001$) within the COL group. Recognition scores and eye-tracking patterns did not seem theoretically implausible, therefore removal of outliers did not seem warranted. As a matter of precaution, however, two sets of all analyses were performed, one with the outliers included and one without. A number of paired t-tests were performed to test for differences between the different measures within each of the groups. MANOVAs were conducted to determine significant differences between the two groups on each of the measures.

The MANOVAs found no significant effects between the two groups on any of eye-tracking or object recognition accuracy measures ($F_{12,39} = 2.019$, $p = .05$; $F_{11,40} = 1.198$, $p = .32$ respectively). Excluding outliers only marginally altered these results ($F_{12,36} = 1.911$, $p = .06$; $F_{11,39} = 1.277$, $p = .27$ respectively).

A very similar pattern of eye-movements was found for both the IND and COL group. Both groups spent significantly more time looking at focal objects than background ($t(24) = -6.455$, $p < .001$ for IND; $t(26) = -3.839$, $p < .001$ for COL). Both were also worse at correctly recognising objects when only the background was altered in comparison to when only the object was altered ($t(24) = -2.577$, $p = .02$ for IND; $t(26) = -4.479$, $p < .001$ for COL). The only real difference between the two groups were the number of visits to focal objects versus backgrounds. The IND group did not have a significant difference between number of visits to backgrounds versus focal objects ($t(24) = 1.813$, $p = .082$). The COL group, however, made significantly more visits to the backgrounds than to the focal objects ($t(26) = 2.327$, $p = .028$). Removal of the outliers, however, caused the difference in the IND group to become significant as well ($t(21) = 2.218$, $p = .038$).



Figure 14. Fixation Duration Heat Map

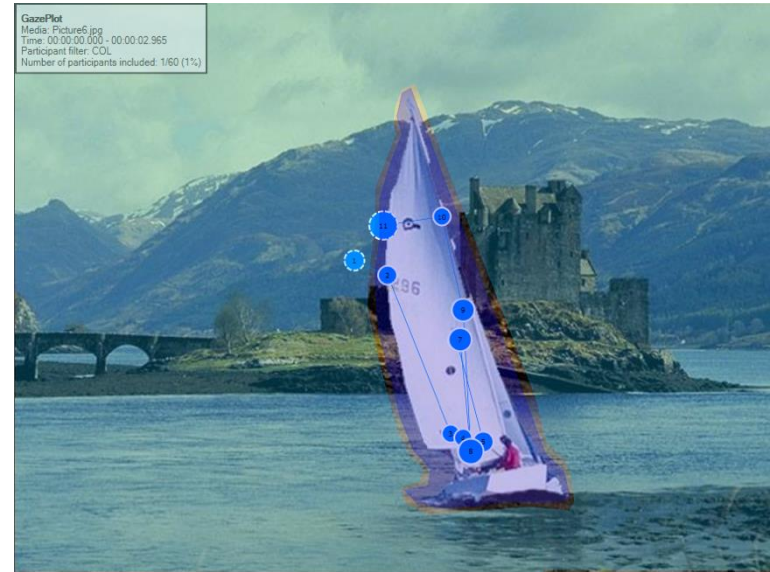


Figure 16. Fixations and Saccades Movement Pattern



Figure 15. Fixation Duration Heat Map - COL Group

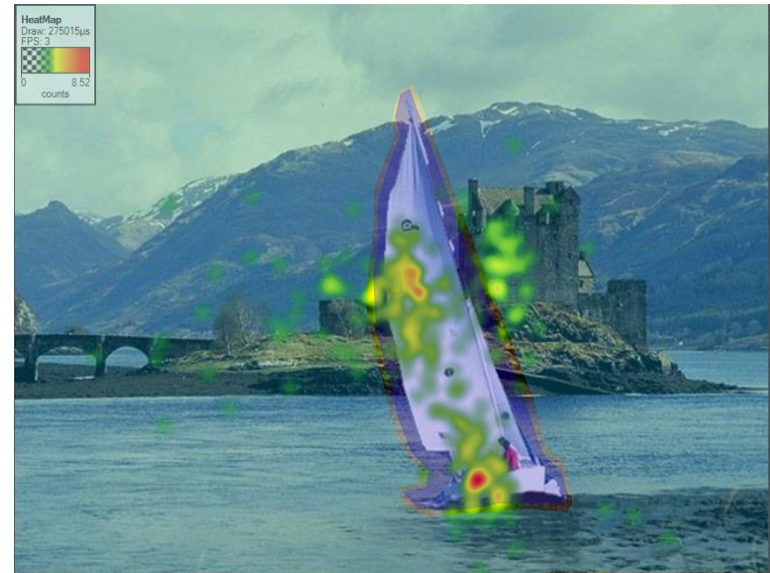


Figure 17. Fixation Duration Heat Map - IND Group

Table 13. Eye-tracking Measures Individualism-Collectivism Means Comparisons

Group	IND		COL		Cohen's <i>d</i>
	Mean	N	Mean	N	
Time to First Fixation on Background ^a	2.18 (1.05)	25	2.05 (1.11)	27	0.12
Time to First Fixation on Focal Object ^a	0.02 (0.04)	25	0.03 (0.07)	27	-0.14
Fixation Duration on Background ^a	0.22 (0.05)	25	0.23 (0.03)	27	-0.28
Fixation Duration on Focal Object ^a	0.25 (0.07)	25	0.26 (0.04)	27	-0.05
Total Fixation Duration on Background ^a	33.93 (7.85)	25	37.76 (8.47)	27	-0.47
Total Fixation Duration on Focal Object ^a	49.32 (8.18)	25	49.46 (8.02)	27	-0.02
Fixation Count on Background	157 (31.57)	25	163.44 (31.19)	27	-0.21
Fixation Count on Focal Object	204.24 (51.18)	25	194.70 (31.91)	27	0.22
Visit Duration on Background ^a	0.53 (0.10)	25	0.53 (.010)	27	0.06
Visit Duration on Focal Object ^a	0.81 (0.17)	25	0.73 (0.19)	27	0.42
Total Visit Duration on Background ^a	38.39 (7.75)	25	41.70 (9.03)	27	-0.39
Total Visit Duration on Focal Object ^a	56.17 (7.22)	25	54.98 (9.19)	27	0.14
Visit Count on Background	73.16 (11.84)	25	79.59 (10.81)	27	-0.57*
Visit Count on Focal Object	71.2 (11.48)	25	76.67 (10.02)	27	-0.51

Note: ^aTime in seconds. * $p = .046$, $p = .188$ excl. outliers. SD shown in brackets.

Table 14. Object Recognition Results

	IND			COL			Cohen's <i>d</i>
	Mean	% Correct ^a	N	Mean	% Correct ^a	N	
<i>Accuracy</i>							
Old Object on Old Background	13.16 (2.73)	73.11%	25	13.41 (3.08)	73.82%	27	-0.09
New Object on New Background	13.16 (2.34)	73.11%	25	12.30 (2.88)	70.62%	27	0.33
Old Object on New Background	9.36 (2.93)	52%	25	8.41 (2.45)	49.25%	27	0.37
New Object on Old Background	11.48 (2.66)	63.78%	25	11.67 (3.23)	64.32%	27	-0.06
Old Object	22.52 (4.81)	62.56%	25	21.81 (4.48)	60.60%	27	0.15
New Object	24.64 (4.19)	68.44%	25	23.96 (5.35)	66.56%	27	0.14
Old Background	24.48 (3.28)	68.44%	25	25.07 (3.16)	69.65%	27	-0.11
New Background	22.68 (2.10)	62.56%	25	20.70 (3.97)	57.51%	27	0.59
Overall Total	47.16 (4.57)	65.50%	25	45.78 (7.30)	64.50%	27	0.23
<i>Reaction Time^b</i>							
Old Object - Old Background	1415.87 (250.07)		25	1412.83 (265.05)		27	0.01
New Object - New Background	1444.66 (271.96)		25	1408.26 (284.28)		27	0.13
Old Object - New Background	1452.93 (274.19)		25	1450.70 (294.89)		27	0.01
New Object - Old Background	1469.29 (288.35)		25	1420.97 (280.74)		27	0.17

Note: ^aaverage % correct identification of objects for combination type. ^bRT shown in ms. SD shown in brackets.

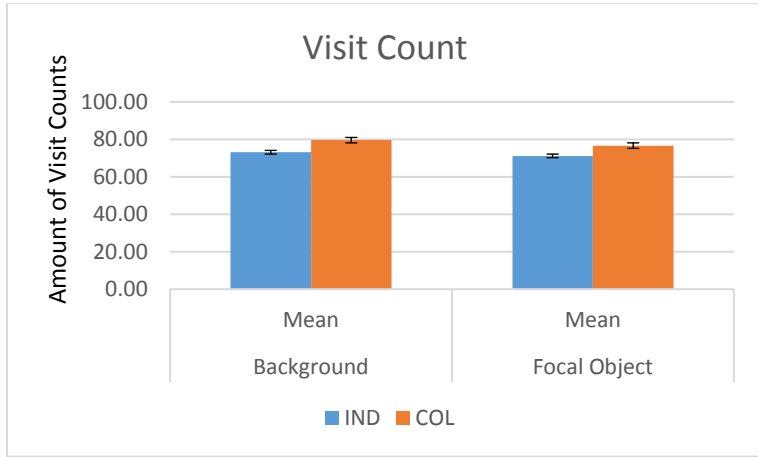


Figure 18. Average amount of visits to background and focal objects (Bars represent standard error).

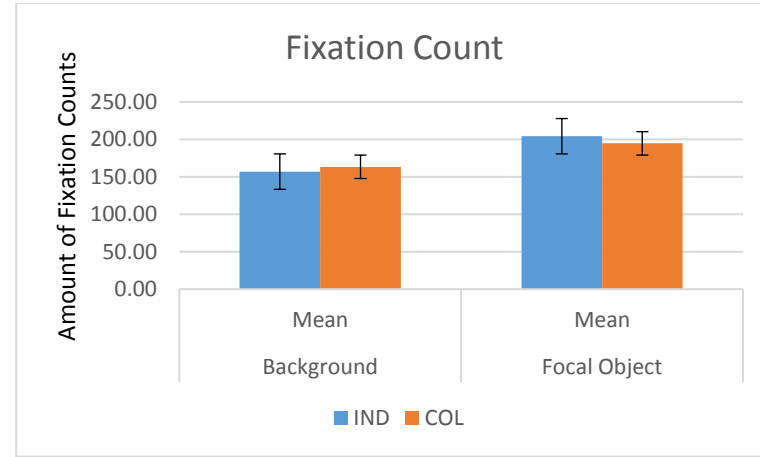


Figure 20. Average fixations on background and focal objects (Bars represent standard error).

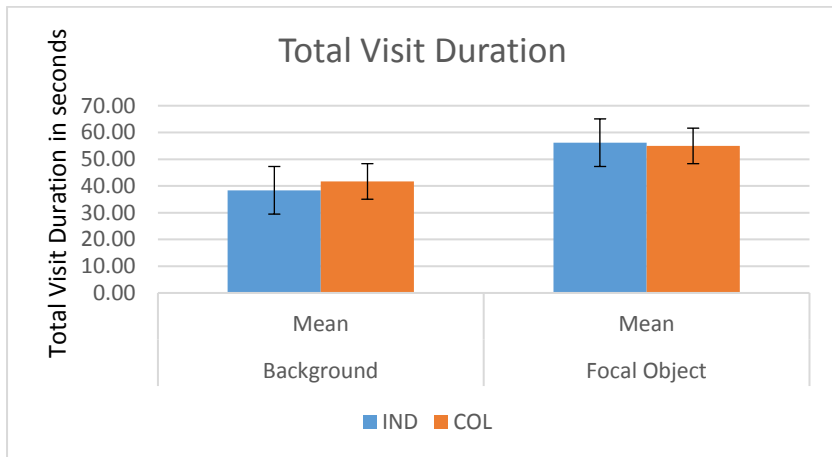


Figure 19. Average total amount of time spent looking at background and focal objects (Bars represent standard error).

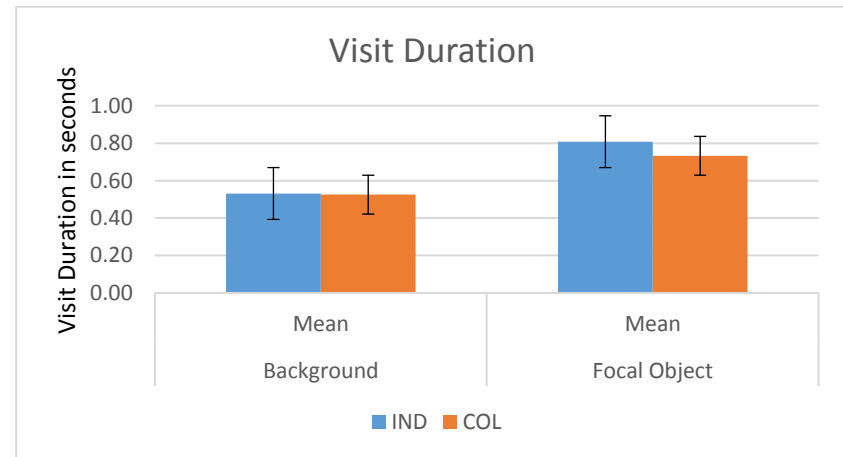


Figure 21. Average time spent looking at backgrounds or focal objects (Bars represent standard error).

Table 15. Eye-tracking Background vs Focal Object Comparisons

	IND				COL				IND - Excluding Outliers			
	Background	Focal Object	N	<i>Cohen's d</i>	Background	Focal Object	N	<i>Cohen's d</i>	Background	Focal Object	N	<i>Cohen's d</i>
Fixation Count	157 (31.57)	204.24 (51.18)	25	-1.11***	163.45 (31.19)	194.7 (31.91)	27	-0.99**	160.32 (30.22)	203.68 (45.89)	22	-1.12***
Visit Count	73.16 (11.84)	71.2 (11.48)	25	0.17	79.59 (10.81)	76.67 (10.02)	27	0.28*	75.55 (10.21)	73 (10.57)	22	0.24*
Visit Duration	0.53 (0.10)	0.81 (0.17)	25	-1.98***	0.53 (0.10)	0.73 (0.19)	27	-1.34***	0.53 (0.09)	0.79 (0.16)	22	-1.94***
Total Visit Duration	38.39 (7.75)	56.18 (7.22)	25	-2.37***	41.7 (9.03)	54.98 (9.19)	27	-1.46***	39.85 (6.58)	56.49 (7.51)	22	-2.36***

Note: *** $p < .001$; ** $p < .01$; * $p < .05$; A Visit refers to when the eyes move into an AOI, and duration is timed until it exits the AOI again. SD shown in brackets.

Table 16. Object Recognition Image Combinations Accuracy Comparisons

	OO	ON	N	<i>Cohen's d</i>	OO	NO	N	<i>Cohen's d</i>	ON	NO	N	<i>Cohen's d</i>
	IND	13.88 (2.85)	8.64 (2.74)	25	1.88**	13.88 (2.85)	10.6 (2.69)	25	1.18***	8.64 (2.74)	10.6 (2.69)	25
COL	14.15 (3.15)	7.67 (2.50)	27	2.28**	14.15 (3.15)	10.78 (3.32)	27	1.04***	7.67 (2.50)	10.78 (3.32)	27	-1.06***
COL Excl. Outliers	14 (3.11)	7.69 (2.54)	26	2.22**	14 (3.11)	11.08 (2.99)	26	0.96***	7.69 (2.54)	11.08 (2.99)	26	-1.22***

Note: *** $p < .001$; ** $p < .01$; * $p < .05$; OO = Original Focal Object on Original Background; ON = Original Focal Object on New Background; NO = New Focal Object on Original Background. SD shown in brackets.

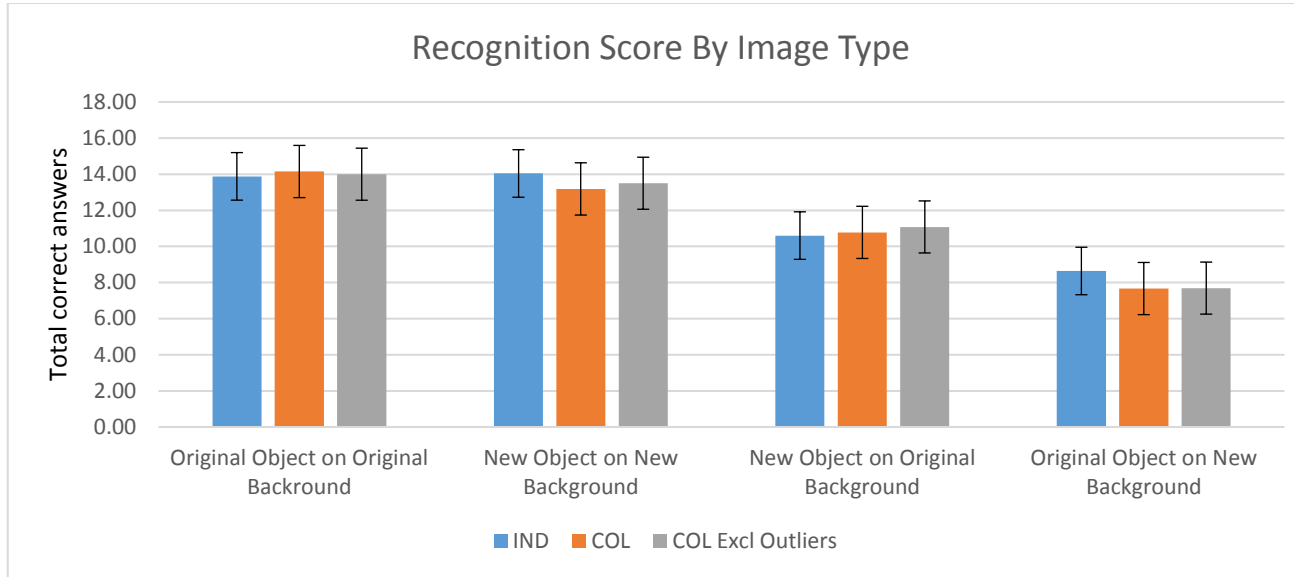


Figure 22. Mean scores for object recognition by image type (Bars represent standard error).

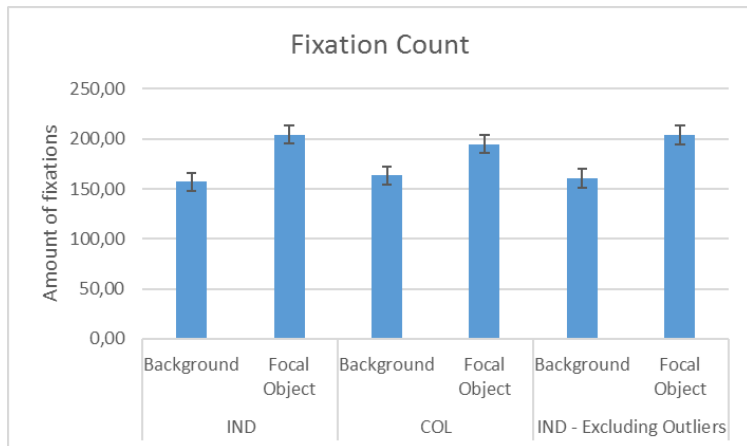


Figure 23. Mean Fixation Count within Focal Object and Background AOIs. (Bars represent standard error).

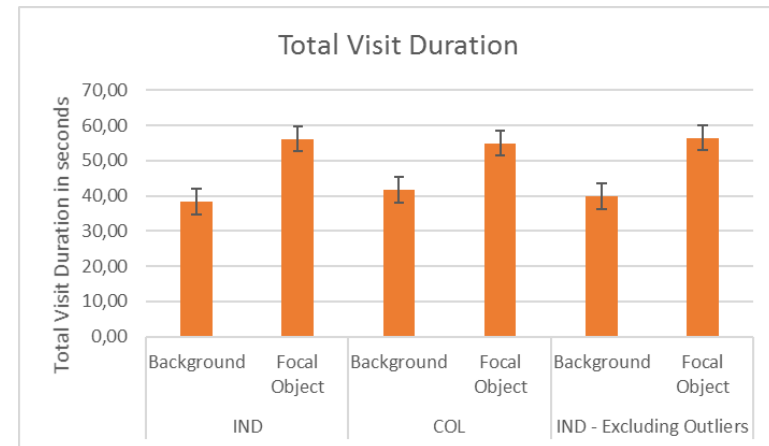


Figure 24. Mean Total Visit Duration within Focal Object and Background AOIs (Bars represent standard error).

Chua et al. Means Comparisons

Lastly, summary data for the analyses run in the study by Chua et al. (2005) was obtained as well. A number of one-way ANOVAs were conducted in order to directly compare the performance of the South African sample to that of the original sample from the Chua et al. (2005) study. The IV Culture had 4 levels: SA IND, SA COL, American, and Chinese. These ANOVAs focused on the outcomes that had shown significant differences in the original study. Significant main effects were found for three of these, namely Fixation Duration on Background ($F_{3,93}=4,323, p < .01$), Fixation Duration of Focal Object ($F_{3,93}=6,515, p < .001$), and Recognition Accuracy for Old Objects on New Backgrounds ($F_{3,93}= 13,708, p < .001$).

Tukey’s post-hoc analyses revealed significant differences between SA IND and Americans for all three of the outcomes ($p < .01$ for all), with the SA IND group’s fixations being shorter than the Americans, and also scoring worse than the Americans for the recognition outcome. SA COL differed significantly from Americans on Fixation Duration on Focal Objects and Recognition scores ($p < .01$), also with shorter fixation durations and lower scores. The SA COL group also scored significantly lower on the recognition outcome than the Chinese group ($p = .016$). Effect sizes for all significant differences were large. Table 17 provides an overview of significant effects and Cohen’s d ’s for these comparisons. Figures 23 and 24 provides graphical comparisons of means.

Table 17. Cohen’s d s for means comparisons between groups

	SA IND vs American	SA COL vs American	SA IND vs Chinese	SA COL vs Chinese	American vs Chinese
Fixation Duration - Background	-0.62***	-0.52	0.11	0.72	0.7**
Fixation Duration - Focal Object	-0.69**	-0.69**	0.42	0.83	0.88***
Recognition - Old object on New Background	-1.62***	-2.48***	-0.39	-0.78*	1.15*

Note: *** $p < .001$; ** $p < .01$; * $p < .05$

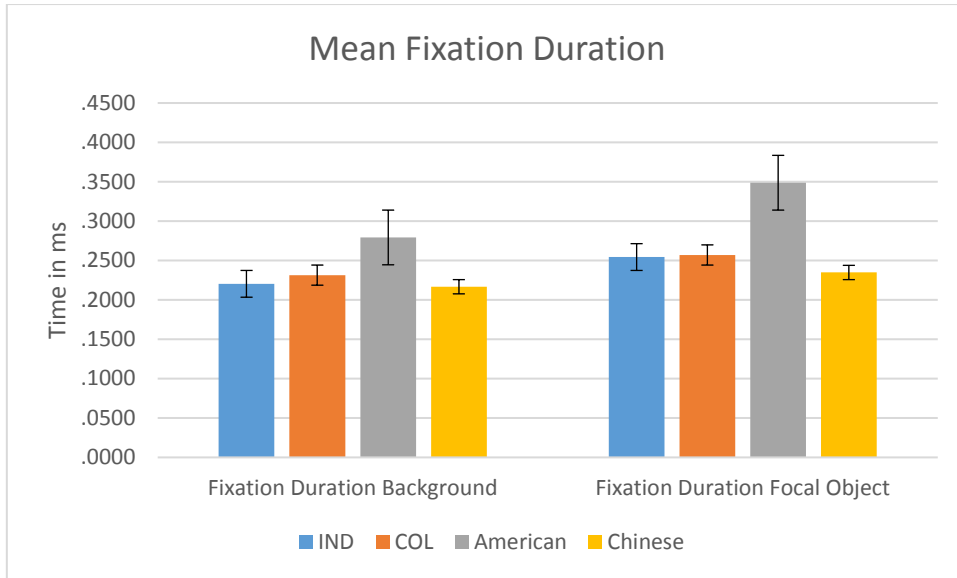


Figure 25. Mean fixation duration for Backgrounds and Focal Objects (Bars represent standard error)

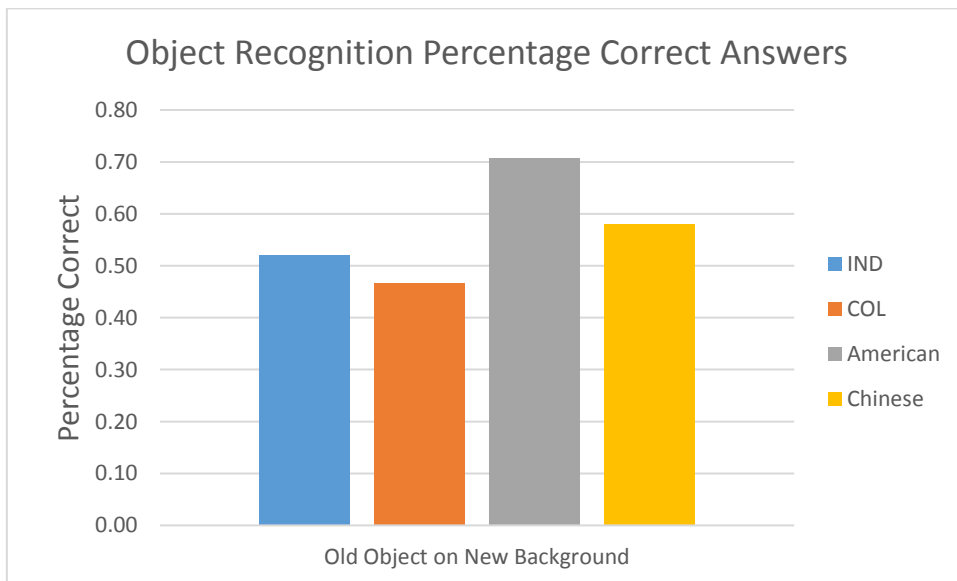


Figure 26. Mean correct answers (in %) during Object Recognition task for Old Objects on New Backgrounds⁸

⁸ Error bars not possible as means for American and Chinese samples were given and not calculated from raw data.

Ethical Considerations

Ethical clearance for the two phases of the study was obtained from the UCT Department of Student Affairs and the UCT Department of Psychology Ethics Committee. Consent was required from all participants prior to entering the study, starting with the online survey. Issues surrounding race and culture are of a sensitive nature in South Africa and so special attention was paid to explaining the nature and aims of the study to all participants as far as possible at the start of the initial survey. A more extensive debrief was also provided at the end of the laboratory phase as well as an opportunity for questions and in-depth discussion.

Apart from the potentially sensitive nature of the topic, due the non-invasive and voluntary nature of the study, no other significant ethical issues were expected nor encountered.

Summary of Results

The purpose of the first set of analyses was to assess the usefulness of the HVIC in South Africa, as well as to explore the relationship between IND-COL, as measured by the HVIC, and race and language.

Psychometrically the HVIC instrument was sound, with good internal consistency as well as test-retest reliability. A PCA also confirmed the 4 four factor model, consistent with the theory of four distinct constructs, i.e. Horizontal and Vertical Individualism and Collectivism. The orthogonal dimensionality between IND and COL for the HVIC was also confirmed.

Comparisons of the means for the combined IND and COL scales revealed statistically significant differences in Collectivism between racial groups, specifically between White and Coloured or African groups. These differences were also quite sizable as well. Although there are significant differences between racial groups regarding COL, the predictive models were not very accurate. At best only explaining 7.4% of variance in COL scores, relying on Race as a predictor of COL tendencies should be done with caution. IND scores could not be significantly predicted by either race or language, although sex was a significant predictor. While this does support the means comparisons in indicating some kind of relationship regarding COL, it shows poor predictive value for the variables included. Caution should also be taken in comparing results between the model including and excluding Sex due to the differences in sample sizes.

The second set of analyses set out to test for differences in eye-movement patterns as well as performance on an object recognition task between a group of South Africans identified as independent and another identified as interdependent. Ultimately, no extensive differences were found between the two groups in the eye-tracking measures as well as in object recognition performance. The only statistically significant difference in eye-movement patterns was due to the presence of 3 outliers in the independent group. Both groups spent more time looking at focal objects and also did worse in the object recognition task when the backgrounds were altered versus when the focal objects were altered.

Comparisons of means between the two SA groups and the American and Chinese groups from the original Chua et al. (2005) revealed very similar eye-movement patterns and recognition performance between the South Africans and the Chinese. The South Africans performed no different from the Chinese with the exception of the SA COL group who performed worse than the Chinese in the object recognition outcome. The Americans spent far more time looking at Focal objects than both the South Africans and the Chinese and also made fewer errors during object recognition when old objects were displayed on new backgrounds.

Chapter 5: Discussion

This study first and foremost attempted to contribute to the literature on the link between culture, the self, and cognition. It specifically sought to address the issue of the lack of African samples in the literature. It attempted to do so by replicating a study conducted between American and Chinese students that found clear differences in perceptual style, with Americans utilizing a more analytic perceptual style and Chinese using a more holistic perceptual style. It was believed that these differences in perceptual style were the result of differences in self-concept, primed by societal differences in cultural values, namely Individualism vs Collectivism. It is believed that differences in IND and COL underlie the vast number of cross-cultural differences in cognition, which are specifically believed to influence a preference for one self-concept over the other (Independent vs Interdependent), which in turn primes a preference for one perceptual style over the other (Analytic vs Holistic).

Most, if not all, studies on this link between IND-COL and perceptual style used the assumption of equating nation-state with societal culture (or rather with a general cultural tendency towards either IND or COL within the national population). These studies typically rely on previous research, such as that of Hofstede (1980), to label one country as IND and another as COL, and then draw a random sample population from the IND country to compare to a random sample population from the COL country in order to test for differences in cognition as a result of differences in self-concept. This commonly used sampling method, however, cannot be easily applied to a multicultural nation such as South Africa. Some previous research in South Africa has shown significant differences in self-concept across its population, usually along racial and linguistic lines. These differences are not surprising given the very recent systemic racially based cultural separation enforced during Apartheid, which was a continuation of the racial separation during South Africa's colonial history. Consequently, one cannot simply take a number of South Africans at random and compare them to a number of Americans taken at random and draw causal inferences regarding the link between IND-COL and cognition. Results will be far more sensitive to sampling biases than may be the case in other nations (although globalisation and the unprecedented cultural exchange brought on by social media may throw the whole notion of nation-state equating a distinct culture in doubt). How then can one go about studying this theorised link between culture and cognition within a multicultural nation such as South Africa?

For the purpose of this study it was believed it would suffice to draw on the widespread practice of psychometrically measuring IND-COL, the very practice that formed the basis for categorising one nation as IND and another as COL. It was theorised that one could identify groups of individuals who are either more Independent or more Interdependent in their self-construal based on their IND-COL scores on a measure specifically validated for the South African context. South African Individualistic and Collectivistic groups could then be identified for use in studying the link between IND-COL and ANA-HOL in the South African context. Unfortunately, the current state of psychometrically measuring IND-COL in South Africa is quite poor, with most studies reporting inconsistent or contradictory findings, as well as poor psychometric properties (when these were reported). Only one study had purposefully evaluated the psychometric reliability and validity of two IND-COL measures with a South African sample, but did not pay attention to any possible racial or linguistic differences.

A secondary aim of this current study, therefore, was to explore the psychometric reliability and validity of an IND-COL measure (the HVIC) within a South African sample, with a specific goal of comparing racial and linguistic differences. Due to the increased cross-racial or cross-cultural interactions since the end of Apartheid in 1994, this study also sought to ascertain the actual utility of race or language as predictors for levels of IND and COL. This also served as the starting point to identify potential participants for the subsequent self and cognition study phase.

Measuring and predicting IND and COL in a South African student population

Results from the psychometric evaluation of the HVIC indicated overall good reliability and validity for the measure, regardless of race or language, replicating and supporting the results obtained by Györkös et al. (2012). Factor analysis also supported the distinctness of the four underlying components of the HVIC, a result also found by Györkös et al. (2012). The measure, therefore, seems to be accurately and validly measuring what it is supposed to be measuring. The bidimensional conceptualisation of IND-COL found for the original HVIC created by Singelis et al. (1995) was also found in this study, and without any significant differences across race or language groups either. So conceptually in terms of IND-COL dimensionality, this measure also holds up well in the sample used. Based on these findings, it can be assumed that the shortened version of the HVIC used in this study is a good measure to use for studying IND-COL within a South African sample.

Previous research on self-concept in South Africa have always made use of race or language categories to study cultural differences in terms of IND-COL. The general consensus has been that due to their different socio-historical backgrounds South Africans of African descent tend to emphasise an interdependent self-concept, while South Africans of European descent tend to emphasise an independent self-concept. These different cultural backgrounds are believed to be intricately linked with race and language, specifically due to the racially segregated history of South Africa.

South African research on the matter has been quite inconsistent, with some studies finding significant differences between racial or linguistic groups and others finding no differences or even contradictory evidence to previous studies. It is interesting to note, though, that these inconsistencies and contradictions are solely found for the quantitative studies. The two studies that incorporated qualitative methods both found significant differences in IND-COL (or related concepts) as a function of race or language (Booyesen, 2001; Valchev, 2012). The inconsistencies with the quantitative research may be a result of the widespread inconsistency found in measuring IND-COL in general. With no clear standard with which to measure IND-COL, the variety of tests used may explain the variety of results obtained. Furthermore, many of the studies attempting to quantitatively study differences in IND-COL as a function of race or language did not pay much attention to the actual validity of the measures they used. This is a big problem since all currently readily available IND-COL measures were constructed internationally. This study, however, has shown that the HVIC is a valid and reliable measure to use in SA. If race or language were good predictors of IND-COL, the scores on HVIC should therefore have significant differences as a function of those two variables. This, however, was not entirely the case.

Significant differences between racial groups were found. Specifically, Africans tended to be more collectivistic than Whites, which supports the findings of Valchev (2012) and Booyesen (2001), and also supports the generally held notion that Africans are more collectivistic than Whites (Mwamwenda, 2004; Thomas & Bendixen, 2000). What is interesting to note, though, was that Whites were not especially high on individualism. In fact, there were no significant differences in IND as a function of race or language. Only Sex (or rather gender most likely) was found to vary significantly on IND. While this does seem to contradict previous research such as Hofstede (1980) or Thomas and Bendixen (2000), the discrepancy may be explained through differences in the measures and also the samples used. Both these two previous studies used the VMS that only measured IND expressly, with the

implication that a low score indicates high collectivism. They also both targeted managers or corporate employees, and were also done over a decade before Apartheid ended or very shortly after the new South Africa was created. This study, on the other hand, used a bidimensional IND-COL instrument with university students, and over two decades after the end of Apartheid. The cultural dynamics of the groups under investigation are not very comparable as a result. van Dyk and de Kock (2004) as well as Vogt and Laher (2009), however, did use student populations, but they did not find any significant differences between racial groups re IND-COL. Again, though, they used a unidimensional instrument, and were also conducted less than a decade after the end of Apartheid. Lastly, it could also be possible that intra-group variability in scores may have obscured any significant mean variations in scores due to the smaller samples sizes of those studies.

The predominant use of unidimensional measures of IND-COL in previous research makes the results of this study not quite directly comparable with the results of those studies and so caution should be taken when doing any comparisons. Nevertheless, the VSM based studies found high levels of IND, which this study did not. The two student population studies on the other hand found middling results for the expressly COL instruments, which may be somewhat more in line with the results of this study. Although most participants in this study scored higher on COL than on IND (with only the exception of the Afrikaans group), their IND scores could not really be considered low either. Mean scores for IND and COL were above 50 (out of a maximum of 72) for all groups. It may be possible that the existing IND characteristics within the participants of the other student based studies may simply have pushed the total COL scores slightly lower.

Ultimately, however, in recent years there has been an increasing shift towards understanding IND-COL as bidimensional or even multidimensional. The individual is never only IND or only COL, but a combination of the two, often depending on context. Hofstede also acknowledged the fact that the individual may possess both individualistic and collectivistic characteristics simultaneously. Therefore, it may not be surprising that the greater consistency has been with methods that do not try to force a unidimensional structure on the IND-COL relationship. The results of this study further supports this shift towards a bidimensional conceptualisation of IND-COL. A conceptualisation that is likely a more accurate reflection of social orientation than the unidimensional models used before, and so may provide more consistent results in the future.

Significant differences were found between racial groups in terms of their overall COL, but how well does race actually predict COL? How accurate would it be to use Race as an indicator of COL attitudes?

Only accounting for less than 2% of variance in IND scores, the predictive value of race is meagre at best for IND. Predictive value of COL, however, was somewhat better with just under 7% accounted for, indicating a non-negligible predictive value for race and language regarding COL. The strong correlation between language and race also indicates that these two variables are intricately linked with each other, even though neither may be strong indicators of preference for a certain type of self-concept. That being said, a few statistically significant predictors did exist between some of the racial or language groups, with the most notable being that of African Language speaking individuals when compared to English speaking individuals. In line with other qualitative research on self-concept in South Africa, African language speaking individuals tended to have significantly higher predicted scores for COL than English speaking individuals. Looking at the means a sizable difference could also be seen between these two groups in terms of mean COL scores (55.5 for English vs 59.4 for African). A relationship does therefore exist between race and language and COL, but predicting COL based on these two categories may not be very accurate. Over 90% of the variance in COL scores could not be attributed to racial background or linguistic differences. IND scores could not be significantly predicted at all by neither race nor language. The highly similar pattern for mean subscale scores across racial and linguistic groups also seem to indicate that South Africans in general really seem to be far more similar in terms of IND-COL characteristics than different. Too many other factors seem to be at play in determining IND-COL levels in order to confidently rely on race or language as proxies for IND or COL tendencies at the individual level.

The racially segregated past of South Africa may still be the reason that some significant differences do exist, especially at the group level. If this is the case, whether these differences will still exist in 5-10 years is debatable. As interactions amongst the different racial or linguist groups increase, so will the spread of ideas, norms, symbols and concepts become more diffuse between these groups. Recent South African student social movements like Rhodes Must Fall have even started altering physical institutions and symbols (Price, 2015). Thus over time a new more inclusive cultural context could be created and shared across racial or linguistic divisions. This would inevitably then lead to an increase in a specific type of self-concept being primed across racial or linguistic divides, since the range

of cultural tasks or behaviours accessible for inclusion in the self would be more homogenous for all South Africans. South African students in particular, living in the cultural melting pots of university life, likely already have access to a unique blend of cultural tasks, distinctly different to what may be available in other institutional contexts within South Africa. Differentiating students in terms of IND-COL according to race or language alone may therefore be particularly difficult.

So what is the state of IND-COL in SA? Previous qualitative research indicates that there seem to be distinct differences, but this has not been consistently found quantitatively. The known methodological issues surrounding cross-cultural psychometric measurement would lend credence to the possibility that the measures that have been used in the past were simply not capable of accurately capturing the nature of IND-COL in SA. This sentiment is further strongly highlighted by the vast variety of IND-COL measures out there, and the fact that researchers cannot even agree on the exact dimensionality of the construct(s) they are attempting to study. It would seem, though, that the four factor model, with IND-COL conceptualised as bidimensional fits the South African nature of IND-COL from a psychometric point of view. Would a measure that conceptualises IND-COL as unidimensional still have the same validity? This is unclear. The inconsistent findings of the past throws this in some doubt. What is clear, however, is that with inconsistent findings from previous research, and inadequate predictive power in this study, quantitatively predicting IND-COL preferences according to race or language should be done with caution.

Studying the link between IND-COL and ANA-HOL in a South African student population

Due to the problems associated with using race or language to predict IND and COL preferences a unique problem was encountered as to how to proceed in testing the theorised link between IND-COL and ANA-HOL. Using race or language as proxies for IND and COL became untenable, so a different method for finding IND and COL groups was needed.

Based on the sound psychometric properties of the survey, it was believed that categorising individuals according to their HVIC scores instead of race or language should provide two groups of South Africans distinct in their preference for either an independent or interdependent self-concept. These two purposefully selected groups should then, theoretically, perform significantly different on the two ANA-HOL tasks used in this study. This, however, was not the case. With the exception of the amount of visits to the

backgrounds of the images during the eye-tracking stage, the purposefully selected IND and COL groups did not statistically perform any different. Even that single case of statistical significance was biased due to three outliers within the IND group. It was also quite interesting to note that even though both groups spent more time looking at focal objects than they did at the backgrounds, both also did significantly worse at correctly recognising objects when the backgrounds were altered. This points to significant context sensitivity for the whole sample in general, regardless of the group they were in. In other words, being classified as high on IND and low on COL or vice versa, did not seem to make any difference to which perceptual style was used in the laboratory tasks. What is very strange was that the participants seemed to display a more analytic eye-movement pattern, but the memory task indicated a more holistic perceptual style. But what exactly does an analytic eye-movement pattern look like?

In the original study by Chua et al. (2005) the argument followed that the Americans would be more independent and thus use an analytic perceptual strategy in the tasks, while the Chinese would be more interdependent and thus use a more holistic perceptual strategy. The results seemed to bear this out with the Americans spending much more time looking at focal objects than the Chinese, and the Chinese also performing worse on the recognition task than the Americans when contexts were altered. Comparing the South African samples to the original study found that the South Africans (regardless of IND-COL classification) performed very similar to the Chinese, in both the eye-tracking and object recognition phase. This would imply that the South Africans used a more holistic perceptual strategy when compared to the Americans from the original study. This is somewhat in contradiction to what theoretically should have happened. The two South African groups were purposely chosen according to the IND vs COL preferences, and therefore should have been quite distinct in their self-concepts, and consequently distinct in their perceptual strategies. Not only did they perform the same as each other, their performance seemed to match the holistic performance of the Chinese interdependent group from the Chua et al. (2005) study. Does this mean South Africans prefer a holistic perceptual strategy regardless of self-concept? Perhaps not.

Other studies that also sought to use eye-tracking to study differences in perceptual styles could not replicate the findings by Chua et al. (2005) either; one of them also using the exact same stimuli used in the original study (Evans, Rotello, Li, & Rayner, 2009; Rayner, 2009; Rayner, Castelhana, & Yang, 2009; Rayner, Li, Williams, Cave, & Well, 2007). Evans

et al. (2009) also found that both groups tended to pay more attention to focal objects than backgrounds, and also that recognition accuracy for both groups (Americans and Chinese in their study) suffered when old objects were shown on new backgrounds. This again indicates that context sensitivity was not dependent on culture. Evans et al. (2009) also concluded through Receiver Operating Characteristic curve analyses that the differences in recognition scores in the Chua et al. (2005) study were most likely due to more liberal response biases in their American sample. The results of the current study also match the results of Evans et al. (2009) far better than that of Chua et al. (2005).

In a recent study Masuda et al. (2016) also looked for differences in eye-movement patterns between European Canadians and Japanese. They made use of a change detection paradigm, and found that when changes were present, eye-movement patterns tended to be very similar regardless of culture. When there was no change present, however, European Canadians were found to spend far more time looking at focal objects than backgrounds, whereas Japanese spent an equal amount of time looking at focal objects and backgrounds. They believed that when changes were present, universal bottom-up attentional processes took effect and automatically directed attention to the salient features within the pictures (i.e. the altered feature in the scene). When there was no such salient feature, however, top-down attentional processes were used to a greater extent. These top-down processes are far more influenced by goals, aims, and our learnt understanding of the world, and therefore, a greater cultural bias can come into effect skewing performance. This would also explain the lack of differences in the study by Rayner et al. (2009), where they used odd or strange looking scenes to test for differences in eye-movement patterns.

So what then can be concluded regarding eye-movement patterns, object recognition, and culture? While the authors of the contradictory studies by Rayner, Evans, and their colleagues did not believe the theory regarding self-concept and perceptual style was flawed, they felt that perceptual style may not actually be evident at as early a stage as oculomotor activity. The study by Masuda et al. (2016), however, supports the notion of eye-movement differences. The fact, though, that neither the eye-movement differences nor the recognition accuracy differences found by Chua et al. (2005) could be replicated by a number of different studies seems to point to problems with the specific materials or procedures used in these studies. Understanding scene perception from a cultural perspective still needs to take into account theories on general attentional processes. The findings by Masuda et al. (2016) demonstrates quite well the power of visual salience on grabbing attention, as do the results

by Rayner et al. (2009). The lack of differences found in this study and also in Evans et al. (2009) may simply be that the focal objects were in and of themselves highly salient objects, automatically drawing attention and ameliorating any possible cultural top-down biases. Why this did not occur in the original Chua et al. (2005) study is unclear.

As for the recognition performance results, Evans et al. (2009) believes liberal response biases may be the cause behind the significant differences found by Chua et al. (2005), but the fact still is, that the Americans in the original study *did* spend significantly more time looking at focal objects than backgrounds (349ms vs 279ms). In both this study and that of Evans et al. (2009) the independent groups spent just as much time looking at focal objects and backgrounds as did the interdependent groups (between 200-260ms on focal objects or backgrounds across all groups). Furthermore, this was similar to that of the Chinese group in Chua et al.'s (2005) study. So all groups in these studies spent an equal amount of time looking at either focal objects or backgrounds, with the exception of the Americans in the original study. All groups also performed poorly when contexts were altered with the exception of the Americans in the original study. What this seems to indicate is an anomalous American independent group in the Chua et al. (2005) study, but most likely anomalous in their eye-movement patterns, i.e. time spent looking at the focal objects. Why they did so is not clear, but that may still be the reason for their improved recognition accuracy when contexts were altered.

It is important to note at this point that certain methodological differences between the studies may have made accurate comparisons difficult. Not only did the various studies use completely different eye-tracking equipment and recording software, but they also recorded eye-movements at different frequencies (Evans et al., 2009; Rayner et al., 2009; Rayner et al., 2007). This study also suffered from this drawback. Recording eye-movements at different frequencies may have significant effects on the data recorded, especially in terms of amounts of fixations recorded (Hvelplund, 2014). Consequently, results may simply have varied between the studies not as a result of a flaw in theory, but as a result of methodological differences. While the actual impact of these differences in eye-tracking methodology is unclear, the lack of standardisation certainly calls for caution in making outcome comparisons.

Another possible factor that may be at work here, specifically regarding the results of this study, is the same as the explanation for the anomalous survey results: The measure used most likely did not accurately capture the full nature of IND-COL. Even purposefully

selecting the extremes, and essentially creating a unidimensional IND-COL contrast within the groups, did not create same contrasting effect in the ANA-HOL tasks. These findings mirror those of Kitayama et al. (2009). They compared the Singelis (1994) SCS to performance on the FLT, amongst other implicit culture sensitive tasks and found no significant correlations at all. Even amongst the implicit tasks themselves there was only one marginally significant correlation. It is interesting to note, however, that the SCS scores were quite inconsistent in terms of what would theoretically have been expected. For instance, it showed that the US sample was the most interdependent, while the Japanese sample the least interdependent, quite contradictory to previous studies. The implicit tasks, on the other hand, did reflect what would be expected from the different countries, e.g. Japanese made far more errors on the absolute than the relative task.

According to the cultural task analysis framework, specific cultural tasks are linked with specific types of behaviours, including ANA or HOL cognitive strategies. It might be possible that the cultural tasks that items in the HVIC tap into are not necessarily those that specifically prime ANA or HOL cognition. Furthermore, because individuals vary in terms of the culturally endorsed tasks or behaviours they choose to engage in, if the measure does not include all of these various tasks or behaviours an accurate assessment may be problematic. If you ask someone whether or not they like chocolate ice cream and they say no, it would be quite incorrect to conclude that they do not like ice cream in general. This might be exactly what is happening with the IND-COL surveys. Each item in the survey typically only captures a single cultural task associated with IND or COL. If an interdependent person, for instance, has not chosen to incorporate into their selfhood those exact COL tasks included in the measure, then they would not be accurately assessed. The shortened HVIC might especially be vulnerable to this problem due to its small number of items. Without knowing and incorporating a significant portion of the range of cultural tasks that embody IND or COL into a measure, obtaining an accurate assessment of an individual's preferred self-concept would be quite difficult. Then linking this self-concept with ANA-HOL behaviour is even more difficult as the exact tasks that prime ANA or HOL behaviour would not only have had to be included in the survey, but would also have had to be incorporated by the respondent into his or her self-identity as well!

This lack of comprehensiveness in the surveys may also explain the discrepancies between the qualitative and quantitative research on self-concept in South Africa. Due to its bottom-up approach in understanding behaviour, qualitative research is far more able to

incorporate the variety of cultural tasks associated with IND or COL when doing comparisons. The quantitative measures, on the other hand, make use of a selection of IND or COL tasks sourced from international samples. While these tasks may still occur within the South African context, their prevalence might differ considerably. There may also be a number of SA-specific tasks *not* captured by these international measures that are more strongly related to IND or COL in South Africa. Valchev (2012) found that a South African model of personality created from self-descriptions did not fit too well with Western models. In particular, self-descriptions regarding social-relational aspects of personality were not adequately covered in Western models such as the Five-Factor model, and needed more elaboration. If such a widely accepted model for personality needed adjustment for the South African context, it seems quite probable that current IND-COL models may be missing such context-specific nuances as well.

Another possibility may be that the manner in which the dimensionality of IND-COL is conceptualised in the measure could impact on how it correlates with ANA-HOL behaviour. Employing a specific perceptual style would inherently exclude the simultaneous use of the other. One cannot employ an analytic perceptual style at the same time as a holistic perceptual style, the two are opposing ways of directing attention. A bidimensional conceptualisation of IND-COL, however, means an individual can incorporate cultural tasks from both IND and COL into their selfhood. There is no inherent mutual exclusion. A unidimensional conceptualisation on the other hand is more similar to the way in which ANA-HOL has been conceptualised, opposites on a single continuum. A unidimensional measure of IND-COL may therefore correlate much better with ANA-HOL behaviour. The fact that both Kitayama et al. (2009) and this study found poor correlations between bidimensional IND-COL scales and ANA-HOL behaviour provides some support to this theory. Especially if most countries have been categorised in terms of IND-COL according to Hofstede's (1980) study, which used a unidimensional conceptualisation of the IND-COL relationship.

Both Kitayama et al. (2009) and this study also aimed to create a unidimensional contrast within our samples through manipulation of scale scores. The problem with this may be that the items or cultural tasks that the measure was created from were still framed in an inclusive rather than exclusive manner. Manipulation of subscale scores may not therefore be able to ameliorate this as the individual was not forced to make a choice between an IND or COL self-concept, and consequently between ANA or HOL perception.

This study was ultimately unable to replicate the findings by Chua et al. (2005). Self-concept did not appear to have any effect on perceptual style. Given the findings from other studies of eye-movement and culture, the reason for this may be due to specific features of the tasks involved, and is most likely not a result of flaws in the underlying theory. Issues with the psychometric measurement of IND-COL and its relation to ANA-HOL (amongst other methodological issues), may also have played a role. Whether the IND-COL/ANA-HOL relationship exists within the South African context is therefore unclear. What this study did manage to do is raise a number of methodological issues concerning the study of cross-cultural cognition within a multicultural nation.

Limitations and future directions

The first clear limitation was the need to use a survey to recruit participants for the laboratory tasks. The problematic history of IND-COL surveys in the South African context made reliance on such means troublesome. Using race or language, however, may not have been a better choice as proxies for culture either. The continued use of such ambiguous social constructs in future research may lose its validity more and more as previously segregated groups integrate to greater degrees in the future. Research in the near future, however, may still find them to be significant factors or as somewhat valid proxies for culture. It may still be of some use to include such distinctions in future research designs to account for this possibility.

Artificially attempting to create dichotomous groups out of surveys not created in terms of dichotomous constructs (such as in this study and in Kitayama et al. (2009)) may not actually provide two groups distinct in terms of the self-concepts they prefer. Therefore, attempting to correlate scores from these groups with ANA-HOL performance may very well be invalid or inaccurate. It may be better to use a survey that purposefully dichotomises IND-COL just as ANA-HOL is dichotomised. It may also possibly be better to use continuous regression analysis rather than means comparisons when trying to correlate IND-COL with ANA-HOL. IND-COL is a continuum, even when orthogonally conceptualised, and so should be studied as such.

The task used may not be the most accurate measurement of ANA-HOL behaviour. Other studies besides this one have found problems with the materials used by Chua et al. (2005). It may be useful to try other types of ANA-HOL tasks to study the link between self-concept and perception. For instance, the FLT is possibly the most widely used of ANA-HOL tasks and has been used in numerous countries besides just American and East-Asian

contexts. For eye-tracking, change blindness may be a better avenue of investigation based on the findings of Masuda et al. (2016), but also on the previous studies on change blindness by Masuda and Nisbett (2006). More top-down purposeful attentional processes are probably more influenced by cultural factors than passive bottom-up processes. The inclusion of more than one ANA-HOL task may help with gaining an accurate picture of the perceptual style employed by participant groups.

Similarly, the survey used here probably did not accurately capture IND-COL within the South African context. Using other surveys with a wider selection of cultural tasks may provide a better picture of IND-COL in the target groups. Especially measures that have a wider range of cultural tasks included in their item pools.

Lastly, correlating these other surveys with more than just one ANA-HOL task may then also provide a better understanding of which types of cultural tasks (as depicted in the surveys) correlate better with which types of ANA-HOL tasks (as depicted in the laboratory tasks).

Conclusion

This study supported construct validity as well as reliability for the shortened HVIC in assessing IND-COL in South Africa. However, it raised a number of issues regarding the validity of race and language as proxies for culture. Concerns regarding the psychometric measurement of IND-COL in SA were also highlighted which requires further investigation, as the fault may lie in the narrow selection of culturally mandated tasks present in the survey used. This study also did not find support for the theory that differences in self-concept underlie differences in visual perception. Again, though, this may simply be due to flaws in the survey used to recruit participants or in the materials used to test for differences.

This study did manage to identify various methodological issues that arise when attempting to study cultural differences in cognition in a multicultural nation such as South Africa. In fact, as the world becomes increasingly connected through social media and increased migration through porous national borders, equating nation-state with a single culture may become ever more difficult. This study clearly showcased the importance of obtaining accurate methods to assess self-concept, as well as the need to better understand the link between such assessments and ANA-HOL behaviour. If IND-COL, a cornerstone of cross-cultural research, cannot be accurately defined or measured then any inferences drawn regarding its influence on cognition are cast in doubt. Furthermore, if the values that prime ANA-HOL are not incorporated, then using these measures in future studies on culture and

cognition become unsound. To avoid this problem, more research is required to refine the measurement of IND-COL, and understand how such measures relate to or predict cognition. In order to maintain or enhance the validity of findings, these improvements are a must for any future research into culture and cognition within our increasingly multicultural global society.

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