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Lexical Tendencies of High and Low Barrier Personalities in Narratives of Everyday and Dream Memories

Abstract

The use of computerised content analysis has encouraged great interest in the assessment of personality. Given the psychological importance of body boundaries in the maintenance and regulation of the self, this study aimed to assess the lexical tendencies of High and Low Barrier personalities (Fisher & Cleveland, 1956, 1958), as measured using the BTD (Wilson, 2006), with regard to lexical frequencies, as classified by the Linguistic Inquiry and Word Count (LIWC) (Pennebaker, Booth, & Francis, 2007). Consistent with previous research that has identified an association between body boundary imagery and regressive cognitive functioning in everyday autobiographical memories, the results of this study showed that High Barrier personalities used higher frequencies of semantic content associated with primordial mental activity, such as group references, somatosensory processes, and spatial references. In contrast, Low Barrier personalities showed increased use of semantic content related to conceptual thought, such as self-reference, as well as affective and cognitive processes. The discussion conceptualizes the identified lexical tendencies in High and Low Barrier personalities by drawing on various cognitive and social psychological theories.

Introduction

Empirical research has consistently demonstrated that individuals differ in their body boundary awareness and thus distinguish influences and precepts that are situated outside of the self, or "the non-me", from internal processes and impressions that are on the inside of the self, or "the me". Fisher and Cleveland (1956, 1958) also identified that individuals would project their own body boundary awareness upon their environments and influence their perception of the protective and permeable features of objects. The Body Type Dictionary (BTD) (Wilson, 2006) represents a computerised content analysis measurement that can be used to explore lexical content associated with body boundaries and their penetrability. In particular, the BTD represents a computerised version of Fisher and Cleveland's (1956, 1958) manual body image scoring system that assesses the protectiveness and vulnerability of individuals' body boundaries.

Given that personality research has consistently identified personality differences that influence the way that people communicate (Pennebaker, 2011), this study aimed to assess the lexical tendencies in High and Low Barrier personalities in the narratives of everyday memories and dream memories relative to semantic content, as classified by the Linguistic Inquiry and Word Count (LIWC) (Pennebaker, Booth, & Francis, 2007). Such a semantic disambiguation might further the understanding of the relationship between language use and body boundary awareness, as well as the cognitive processes that underpin the linguistic construction of autobiographical memories.

Body Boundary Imagery

The theoretical concept of Fisher and Cleveland's (1956, 1958) body image boundary originated from their qualitative observation that individuals varied in the appraisals of their own body images. A series of exploratory studies provided empirical evidence that a distinction could be made between individuals who would perceive their body boundaries as clearly bounded and differentiated from the environment and individuals whose bodies lack such firm body boundaries. Based on these preliminary results, Fisher and Cleveland developed a reliable and valid body boundary scoring system that measures the frequency of lexical items that are assumed

to relate to the definiteness and permeability of an individual's body. Barrier imagery measures the definiteness of body boundaries by emphasising the protective, enclosing, decorative, or concealing features of the boundaries of a definite structure, substance, and surface; for example, barrier responses include *'a striped zebra'*, *'a woman wearing a high-necked dress'* and *'a tower with stone walls'*. Penetration imagery, in contrast, relates to the fragility, permeability, openness, and destruction of definite boundaries; for example, penetration responses include *'a man climbing through a window'*, *'an amputated arm'* and *'a bleeding leg'*. Based on this scoring system, high frequencies of boundary imagery indicate a High Barrier personality, whereas low frequencies of barrier imagery relate to a Low Barrier personality. In particular, barrier and penetration imagery represent independent personality dimensions, compared to opposite poles on a personality continuum. Given that the function of penetration imagery might be related to various variables associated with the testing situation, the majority of research has focussed on the exploration of barrier imagery (Fisher, 1970).

Psychological research has extensively explored the body boundary concept (Fisher & Cleveland 1958; see also Fisher, 1970, 1986). In particular, it has been identified that High Barrier personalities were more independent, goal-oriented, persistence- and achievement-oriented, emotionally expressive and spontaneous, less suggestible and less likely to be disturbed in stressful and frustrating situations. High Barrier personalities were also more likely to support group goals and to strive to achieve group cohesion, as well as to indicate greater interest in socialising and communicating with others. It has also been shown that High Barrier personalities reflected increased skin sensitivity and reduced heart rate associated with greater openness and receptivity to externally derived stimuli, compared to individuals with Low Barrier personalities, who indicated the reverse pattern. In contrast, Low Barrier personalities express heightened concern for the safety and security of places as a means of reinforcing their weak boundaries. Low Barrier personalities further reflected a greater need to engage in solitary activities that reduced social contact.

Body Boundaries and Primordial Mental Activity

Based on a series of experiments that identified familial patterns of body boundary definiteness, Fisher and Cleveland (1958) reasoned that the early experiences between the child and parent figures would be central in the development

of body boundaries. For example, mothers with High Barrier scores were less maladjusted and less rigid, as well as providing higher aspiration striving and family closeness compared to Low Barrier mothers who provide higher degrees of uncertainty to their children. Such a view is consistent with contemporary relational psychoanalytic theories, which perceive early infant socialisation experiences as representing one of the strongest influences on the formation of a coherent self and bodily schema (Ogden, 1989; Bick, 1968, 1986; Winnicott, 1971). An individual with such a coherent self and bodily schema is assumed to communicate mood states, sensations and thoughts linguistically to the environment, whereas the inability to express internal experiences indicates dissociation from one's emotions and thoughts (Bollas, 1987).

The relationships among body boundaries, cognitive functioning and language, however, represent a salient concept within psychoanalytic theory. Based on Freud's (1923) theory that perceives a unity between a body and a psyche, externally derived bodily sensations and feelings are assumed to be conscious perceptions, whereas internal perceptions are unconscious processes that are transformed into conscious perceptions and take the form of word presentations. Verbal expressions are then assumed to reflect residues of unconscious sensory perceptions that interact with meaning constructions, interpretative functions, and encoding and retrieval processes. Empirical research has also identified a relationship between body boundary awareness and primordial thought by measuring body boundary imagery and regressive language in personal memories, thus providing some supporting evidence for the Freudian theory that assumes that the body, unconscious thought and language represent interrelated concepts (Cariola, 2014).

In specific, primordial thought relates to the Freudian (1900) theory, which differentiates between two types of mental functioning: primary process (primordial thought); and secondary process (conceptual thought). According to Freudian psychodynamic theory (1900), the primary process is concrete, irrational, free-associative, autistic, unrelated to logic and spatio-temporal constraints, and free from social and moral conventions. Primary process thought is the principal awareness that young children have, and it has also been associated with the cognitive functioning of ASC, including dream, meditative, mystical and drug-induced hallucinatory states. The primary process is assumed to function in relation to the Freudian principles of displacement and condensation. In contrast, secondary process relates to abstract

principles of grammar and logic, time and space, social conventions and general knowledge of typical everyday situations in older children and adults.

Similarly, Robbins (2011, pp. 53-54) stated that primordial mental activity represents a distinctive form of mental activity that interacts with thought processes. In this view, primordial mental activity is assumed to be psychosomatic to the extent that it is motivated by bodily sensations and sensory perceptions, as well as the presence of unprocessed raw emotions and an inability to accept reality. Experiences are holistic, fragments are combined into isomorphic entities, and personal narratives are fragmented and only relate vaguely to time, logic and causality. Communication is concrete and lacks self-reflective functioning in relation to a self that is perceived as undifferentiated relative to others and the environment. In contrast, conceptual thought is reflective and is motivated to identify emotions and to adapt to reality. Experiences are self-referential, and personal narratives are coherent, as well as reflective of integrated thought and emotions that obey time and causality. Communication is self-reflective and symbolic, and the self is perceived as separated and individuated relative to others.

Importantly, psychological research has provided consistent evidence of the existence of the Freudian primary and secondary process in human cognitive functioning. For example, experimental studies employing non-verbal tasks to measure primary and secondary processes have shown that primary process thinking predominates in pre-schoolers and that at the age of seven years old, a shift occurs to secondary process thinking (Brakel & Shevrin, 2005; Brakel, Shevrin, & Villa, 2002). Neurological research has also established a biological basis for the primary and secondary process. Thus, Carhart-Harris and Friston (2010) suggested that Freud's descriptions of the primary and secondary process were consistent with the activation patterns of the default mode of hierarchical cortical systems and their reciprocal exchanges with the subordinate brain systems, which resemble the function of the ego.

Current Study

Although Fisher and Cleveland (1958) proposed that Barrier personality represents a stable personality trait, empirical linguistic research (Cariola, 2014) has shown that the frequency of barrier imagery increases with the level of regressive cognitive functioning in the production of everyday and dream memories, and thus

challenging the notion of Barrier personality to be a stable personality trait. Out of this view, the current study aimed to explore the stability of the semantic expressions used by individuals with Low and High Barrier personalities when reporting autobiographical memories that vary in their associated degrees of regressive cognitive functioning (Freud, 1900), i.e., everyday and dream memories. The presence of similar semantic content across both autobiographical memory types would suggest that Barrier personalities represent a dynamic personality trait that is moderated by the level of regressive cognitive functioning, which, however, does not affect the stability of individuals' semantic expressions.

Although this study primarily explores whether individuals with Low and High Barrier personalities verbalise their autobiographical memories differently, it may be possible to relate this study's findings to existing cognitive theories evident in dream research, which are however not explored and discussed within the framework of this study. In specific, and consistent with Freudian theory (1900), dream research has associated an increase of regressive cognitive functioning in dream states with neurological processes. Thus, Solms (1997) put forward that a deactivation of frontal regions would reduce cognitive inhibition resulting in the perception of unrelated and irrational sensory images, whereas an activation of the temporal regions relates to an increased processing of sensory perceptions and emotions. These neurological differences between waking and dream states have also been associated to an inhibition of self-reflective processes in dream states (Hobson, 1988; Hobson & McCarley, 1977; see also Kahan, LaBerge, Levitan, & Zimbaro, 1997; Kahan & LaBerge, 2011).

Despite such a cognitive discontinuity between waking and dream cognition, it has also been proposed that dreams would reflect individuals' aspect of everyday life, such as everyday concerns, life experiences and emotions (Domhoff, 2003; Schredl, 2003; see also Hobson & Schredl, 2011). Out of this view, in relation to the current study, evidence for semantic similarity in the narratives of everyday and dream memories between the Low and High Barrier personalities would confirm the continuity between waking and dream states.

Hypotheses

Given that body boundary awareness increases with increasing levels of primordial cognitive functioning, it can be posited that an inflation of barrier imagery

would result in an increase in the semantic content associated with primordial mental activity. Therefore, the first hypothesis (H1) predicted that the language use, as measured using the semantic categories of the LIWC (Pennebaker et al., 2007), would differ significantly between High and Low Barrier personality types. Based on the assumption that the self in primordial mental activity is not perceived as psychically differentiated from others and that High Barrier personalities meanwhile show an increased openness to others and the external environment, the second hypothesis (H2) was that High Barrier personalities would show higher frequencies of first-person plural pronouns, as well as inclusion words, than Low Barrier personality. Conversely, Low Barrier personalities reflect, consistent with conceptual thought, heightened self-differentiation, and thus the third hypothesis (H3) predicted that Low Barrier personalities would use higher frequencies of first-person singular pronouns than High Barrier personalities.

By relating Low Barrier personalities to conceptual thought, which is characterised by coordinated mental activity, emotional awareness, and integrated thought, the fourth hypothesis (H4) predicted that Low Barrier personalities would use higher frequencies of verb forms (such as common verbs, auxiliary verbs, present tense, past tense and future tense), as well as references related to cognitive processes (such as insight, causation, discrepancy, tentativeness, certainty, inhibition and exclusion words) and affective processes (such as positive emotions and negative emotions), compared to High Barrier personalities.

In contrast, High Barrier personalities are characterised by heightened skin sensitivity and receptivity to environmental sensory stimuli, and primordial thought makes an increased use of somatosensory sensations, so the fifth hypothesis (H5) predicted that High Barrier personalities would use more perceptual process (such as seeing, hearing and feeling) and references related to relativity (i.e., space and motion) and prepositions, as well as bodily processes (such as body, health, sexual and ingestion), compared to Low Barrier personality types. In particular, given the outgoing nature of High Barrier personalities, the sixth hypothesis (H6) predicted that High Barrier personalities would use higher frequencies related to personal concerns (such as work, achievement, leisure, home, money, religion and death) and social references (such as social, family, friends and humans).

Method

Participants

The data were based on responses of 330 female and 158 male participants with a mean age of 25.59 years old (*SD* = 10.65) with a range of 18-63 years. The data obtained for this study were based on a corpus of everyday memories (*N* = 488) and dream memories (*N*= 450). The narratives for everyday memories (*N* = 488) had a text length of 71,831 words with a mean of 147.19 words per response (*SD* = 97.27). The narratives of dream memories (*N* = 450) had a text length of 62,005 words with a mean of 137.79 words per response (*SD* = 125.16).

Procedure

An online survey was produced and distributed to undergraduate and graduate students. The study's online questionnaire included an initial briefing that outlined the purpose of the research project. Once the participants decided to participate in the experiment, they disclosed their demographic information, including gender, age, and native language. Then, the participants were asked to write a narrative about a recent everyday experience —*"Please think about a recent personal event. Write about this past event, in the box below, as you would describe it to a person or a good friend in a real-life situation"* — and a recent nocturnal dream — *"Please think about a recent nocturnal dream. Write about this dream, in the box below, as you would describe it to a person or a good friend in a real-life situation".* At the end of the experiment, the participants were thanked and were provided a debriefing that explained the purpose of the study. The study received full ethical approval from the Ethics Committee at Lancaster University in Lancashire, UK.

All the verbal responses were manually checked for correct spelling and were spell-checked used the Microsoft Word Spelling and Grammar tool, through which typing errors (e.g., *batallion* for *battalion*) and incorrect first-letter capitalisation (e.g., *i* for *I*) were changed within the original texts. Due to the technical restrictions of the PROTAN content analysis software (Hogenraad, Daubies, Bestgen, & Mahau, 2003), brackets, hyphens, and dashes were deleted from the corpus texts. Apostrophes used in contractions (i.e., negations and personal pronouns with auxiliary verbs) were substituted with the original grammatical forms, whereas apostrophes that marked the possessive case were deleted.

Computerized Content Analysis

The Body Type Dictionary (BTD) (Wilson, 2006) is a reliable and valid computerised dictionary that calculates the frequency of semantic items categorised as barrier imagery and penetration imagery, based on Fisher and Cleveland's (1956, 1958) scoring system of body boundary awareness (Cariola, 2014). In total, the BTD contains 551 words for barrier imagery, 231 words for penetration imagery, and 70 exception words that prevent the erroneous matching of ambiguous word stems that are assigned to 12 semantic categories (Wilson, 2008).

The Linguistic Word Count Inquiry text analysis program (LIWC) (Pennebaker, Booth, & Francis, 2007) calculates the frequencies of predefined types of semantic content. The LIWC is based on approximately 4,500 words and word stems that are assigned to 80 semantic categories. The LIWC dictionary is hierarchically organised such that one word can be ascribed to different main categories and sub-categories. For example, the word *"abandoned"* forms part of three psychological process categories — i.e., overall affect words, negative emotion words, and sadness words – as well as two syntactic categories — i.e., past tense verbs and common verbs.

For the computerised content analysis, the BTD and LIWC were applied to the texts using the PROTAN content analysis software program, which measures occurrences of category-based lexical content in texts (Hogenraad et al., 2003). A lemmatisation process was then applied to reduce inflected words to their base forms. For example, *"agrees, agreed, agreeing"* were all reduced to *"agree"*. Subsequently, the lexical content of the segmented and reduced texts was matched against the predefined categories of the BTD. The PROTAN computes two counts for lexical occurrences. The density count shows how many distinct lexical items (i.e., types) match each dictionary category, whereas the frequency count indicates how many lexical items in total (i.e., tokens) match the dictionary categories (Wilson, 2008). The frequency rate used in this study was based on the following formula:

$$Frequency\ rate = \sqrt{\frac{frequency\ count}{no.\ of\ tokens\ in\ segment}} x1000$$

Statistical Analysis

Initial descriptive statistics regarding the frequencies of barrier imagery revealed that the narratives for everyday memories had a mean of 2.20 and a median of 2.43 (SD = 2.18), whereas those for dream memories had a mean of 3.29 and a median of 3.75 (SD = 2.45). Consistent with the methodology discussed by Fisher and Cleveland (1958), the median range for the barrier imagery frequency for each memory type was used to divide the narratives of everyday and dream memories into two equivalent parts. Barrier scores less than the median values were categorised as 'Low Barrier personalities', whereas Barrier scores greater than the median values were categorised as 'High Barrier personalities'.

After the data were divided into two equal parts, it was revealed that the Low Barrier personalities (*N* = 244) had a mean of .34 (*SD* = .75) and that the High Barrier personalities (*N* = 244) had a mean of 4.10 (*SD* = 1.31) for the Barrier frequencies in the narratives of everyday memories, whereas the Low Barrier personalities (*N* = 225) had a mean of 1.30 (*SD* = 1.55) and the High Barrier personalities (*N* = 225) had a mean of 5.29 (*SD* = 1.24) for the Barrier frequencies in the narratives of dream memories (see Table 1).

To assess the semantic content that would differ between the Barrier personality types, a multivariate analysis of covariance (MANCOVA) was computed with all the LIWC categories as the dependent variables and Barrier personality type as the independent variable. Due to language use being influenced by gender and age (Newman, Groom, Handelman, & Pennebaker, 2008; Pennebaker & Stone, 2003), gender was used as an additional independent variable, and age was the covariate variable to identify whether differences in language use would be related with differences in age and gender.

Results

Main Effects of Barrier Personality on Semantic Content

Consistent with the first hypothesis (H1), the results showed that there was a significant multivariate effect difference in language use between Low and High Barrier personality types in narratives of everyday memories, $F(61, 423) = 24.061$, $p < .001$, *Pillai's Trace* $\lambda = .78$. The main effect for age, $p < .01$, was significant. The main effect for gender, $p = .171$, and the interaction between barrier personality and

gender, however, were not significant, $p = .267$, indicating that the use of semantic content was not due to gender in the narratives of everyday memories. Similarly, there was a main effect in narratives of dream memories, $F(61, 385) = 13.721$, $p < .001$, *Pillai's Trace* $\lambda = .69$. The main effects for gender, $p < .001$, and age, $p < .01$, were significant, thus indicating that lexical use in the narratives of dream memories was influenced by differences in age and gender. The interaction between Barrier personality and gender, however, was not significant, $p = .464$. The descriptive statistics and the univariate main effects in the narratives of everyday memories and narratives of dream memories can be seen in Table A1 and A2.

A series of individual univariate results indicated several instances of semantic content that could be attributed to primordial mental activity. Although High Barrier personalities used higher frequencies of inclusion words (e.g., and, with, include) that that contain first-person plural pronouns (e.g., we, us, our) among some other variables, in both memory types, High Barrier personalities used higher frequencies of first-person plural pronouns that emphasise group membership in narratives of everyday memories only, and thus the second hypothesis (H2) was partly maintained. The following everyday narrative reflects a shift from a self-focus to increased use of first person plural pronouns to establish group membership: "*I went to stay in a tower in the middle of the countryside recently. It was something I had been wanting to do for years, because you can see this tower from miles away. The views from the roof were amazing, especially at sunset and sunrise. It was lovely to pretend we lived there, just for a couple of days. In the early morning <u>we</u> saw a little fox cub outside, and I am sure there must have been lots of other wildlife <u>we</u> did not see. <u>We</u> will definitely do it again*".

Such collective group references might be related to a lack of self-other differentiation and over-inclusive thinking associated with primordial mental activity, compared with an increased self-focus associated with conceptual thought, in which the self exists as a differentiated entity relative to others (Robbins, 2011). In contrast, Low Barrier personalities showed increased frequency of first-person singular pronouns (e.g., I, me, mine) in both memory types, reflecting a greater emphasis on the self, compared to a heightened group focus, and therefore, the third hypothesis (H3) was maintained. An increased self-focus can be seen in the following dream memory: "<u>*I*</u> *am running a 10k race in a couple of months. Recently <u>I</u> had a dream about this event and the dream involved <u>me</u> struggling through the race. <u>I</u> ran the*

race previously, however I had been doing lots of training for it that time, and so it had not been a problem. In my dream I was worried about not being able to complete the race as I was running with other friends who were naturally fitter than me".

Partly consistent with the fourth hypothesis (H4), Low Barrier personalities also used higher frequencies of common verbs and auxiliary verbs (e.g., am, will, have) with a focus on present tense, and relative to narratives of everyday memories, there was a marked future-directed concern.

The narratives of High Barrier personalities also showed reduced frequencies of semantic content related to affective processes (e.g., happy, cried, abandoned) in both memory types and, with regard to narratives of everyday memories, an reduced frequency of cognitive processes (e.g., cause, know, ought), which might reflect that primordial mental activity is based on unprocessed raw emotions and fantasy-based thought, as well as low self-reflection and a reduced ability to communicate complex thought processes, compared with conceptual thought. An inflation of cognitive processes in narratives of everyday memories, including insight (e.g., think, know, consider), demonstrates heightened levels of self-reflection, as well as an increased ability to make causal inferences that are communicated in the narratives, e.g., *"Well I went to the interview and to be honest from the start I was not feeling (Insight) great, it did not last long and I did not seem (Insight) to be getting the kind of responses I wanted, I do not think (Insight) I was what they were looking for and to be honest after walking through their offices I am glad honestly, it was like watching drones I just cannot see me in that kind of environment ".*

Increases in certainty (e.g., always, never) and negations (e.g., no, not, never), as well as an increase in discrepancy (e.g., should, would, could), in Low Barrier personalities might indicate greater accuracy and thus factual truthfulness relative to the narratives' content, which can be seen in the following everyday memory: *"We took a girl we hardly knew round to friends for dinner. She turned out to be extremely (Certainty) strange and told some fantastic stories about her life and family. We had a funny and entertaining evening. Later my husband, who is a doctor, told me that she had a psychological condition and nothing (Negation) she had told us was true (Certainty). I felt bad that I had so enjoyed the evening and that it was somehow wrong to have found what she told me so entertaining, like I was judging her disability somehow. I could (Discrepancy) not (Negation) quite analyse how I felt*

about the whole situation and <u>wished</u> (Discrepancy) that he had <u>not</u> (Negation) told me in a way".

High Barrier personalities used higher frequencies of inclusion words (e.g., and, with, include) in both narrative types and thus might reflect a tendency to recall over-generalised memories that focus on continuous temporal movement, as well as emphasising the separateness of object boundaries, e.g., *"[...]<u>We</u> were taking water <u>out</u> of the sea bucketful by bucketful, <u>and</u> then at the other end of the production line <u>we</u> were putting it back <u>into</u> the sea further up the coast. Someone <u>came</u> to tell me off for missing a meeting, but I told them I could not <u>come</u>, I was part of the production line <u>and</u> an aeroplane had crashed so <u>we</u> had to help".* High Barrier personalities also used higher frequencies of inhibition words (e.g., block, constrain, stop) in narratives of everyday memories, e.g., *"...I tried to get them to <u>stop</u> kicking him as they had cornered and surrounded him. He had fallen to the ground and was curled into a ball to try and <u>protect</u> his face[...]".*

That Low Barrier personalities used higher frequencies of affect words (e.g., happy, cried, abandoned), including increased frequencies of positive emotions (e.g., love, nice, sweet) in both memory types, and negative emotion words (e.g., hurt, ugly, nasty) in narratives of everyday memories might indicate the ability to identify, tolerate, and communicate emotional states that are not acknowledged by individuals with High Barrier personalities.

The difference between memories using affective processes between Barrier personalities can be seen in the following personalities' everyday memory — *"I had an <u>argument</u> (Negative emotion) with my boyfriend the other night because I feel that he does not <u>support</u> (Positive emotion) me. I also feel that I cannot talk to him about some things without him thinking of me as <u>boring</u> (Negative emotion) <u>moody</u> (Negative emotion). I asked him to <u>support</u> (Positive emotion) me and 'bear with me' around this <u>stressful</u> (Negative emotion) time as it is exam period and he <u>agreed</u> (Positive emotion)"* in comparison to the less emotion-focused High Barrier everyday memory — *"I spent about an hour sat on an old tree-house platform talking to a <u>friend</u> (Positive emotion) I had not seen for God knows how long several years. It is <u>crazy</u> (Negative emotion) really, since we only live round the corner from each other, but he moved schools and then I went off to uni, and we have only recently got back in touch. He had been over-thinking some stuff that happened to him, and I was being a*

bit mixed up, so it was really <u>nice</u> (Positive emotion) to get things out into the open and catch up properly".

In line with Fisher and Cleveland's (1958) finding that neurotic individuals would show a slight inflation of barrier imagery compared to normal controls, psychodynamic-informed empirical research has associated the inability to activate emotion schemas with a neurotic personality organisation that reflects an inhibition in evaluating externally and internally sourced insights, thus resulting in turning away from symbolic reality and dissociation from emotional awareness (Bucci, 1997). Such a distancing from the self and symbolic reality might be further indicated in an inflation of first person plural pronouns reflecting emotional distancing (Pennebaker & Lay, 2012), as well as the use of articles (e.g., a, an, the) in High Barrier personalities, reflecting the objectification of the self and others as a characteristic of the concreteness in primordial mental activity (Bucci, 1997; Mergenthaler & Bucci, 1993; Loewald, 1978), e.g., *"I drove to Pateley Bridge to have <u>a</u> meeting with Charlie about <u>the</u> possibility of doing some workshops together. I left <u>a</u> lot of time for <u>the</u> drive because I was <u>a</u> bit concerned that <u>the</u> car might not make it because of <u>the</u> exhaust, but it was OK. We had <u>a</u> nice lunch and as usual talked (mostly me!) about interesting ideas in <u>the</u> area of our common interest, then we went for <u>a</u> walk and carried on talking [...]".* Conversely, an inflation of first-person singular pronouns and negative emotion words, as indicated in Low Barrier personalities' recall of everyday memories has been also associated with the personality trait neuroticism (Pennebaker, Mehl, & Niederhoffer, 2003).

As predicted by the fifth hypothesis (H5), High Barrier personalities also used more perceptual references (e.g., observed, heard feeling) and bodily references (e.g., hand, eat, spit) in narratives of everyday memories, as well as references to seeing (e.g., view, saw, seen) and ingestion (e.g., dish, eat, pizza) in both memory types. Relativity references (e.g., area, exit, stop), such as spatial words (e.g., down, in, thin) and motion words (e.g., arrive, car, go), were also inflated in both memory types, as well as prepositions (e.g., to, with, above) with regard to narratives of the everyday memories of High Barrier personalities, reflecting the psychosomatic characteristic of primordial functioning motivated by somatosensory impressions (Robbins, 2011), e.g., *"I had this crazy dream last night – <u>at</u> (Space) first I did not think I was dreaming. I <u>came</u> (Motion) downstairs to get a <u>drink</u> (Ingestion), because I had woken <u>up</u> (Space) <u>in</u> (Space) the <u>middle</u> (Space) of the night <u>thirsty</u> (Body/Ingestion), to find*

the kitchen (Ingestion) light (Perceptual process) was on (Space). My mum was stood there in (Space) the kitchen (Ingestion), stuffing her face (Body) with coffee (Ingestion) and walnut cake. I mean, it is just not the sort of thing she would do. She looked (Seeing) up (Space) at (Space) me with a really guilty expression, and then went (Motion) back to the cake. I just got my drink (Ingestion) and went (Motion) back to bed."

In addition, the semantic tendencies of Low Barrier personalities reflect similarities to Pennebaker and King's (1999) factor levels of *'immediacy'* and *'making distinctions'*. *'Immediacy'* is based on high frequencies of first-person singular pronouns and discrepancy words and low frequencies of articles and words of more than six letters. *'Immediacy'* is also correlated negatively with the need for achievement, which might be related to the tendency of High Barrier personalities to be more goal- and success-oriented, compared to Low Barrier personalities. *'Making distinctions'* is based on high frequencies of discrepancy words, exclusion words, tentativeness, and negations but low frequencies of inclusion. *'Making distinctions'* is also negatively correlated with the need for affiliation.

Taking into consideration that the semantic content of Low Barrier personalities reflects levels of *'immediacy'* and *'making distinctions'*, such as an inflation of first-person singular pronouns and negations but fewer inclusion words, the accuracy of the narratives in Low Barrier personalities might be perceived as more factually reliable than the narratives of High Barrier personalities. Consistent with this view, Low Barrier personalities' increased use of adverbs (e.g., about, constantly, generally) also infuses more specific details into a described autobiographical memory, which has been associated with truthfulness (Hancock et al., 2008; see also Porter & Yuille, 1996).

In contrast, High Barrier might be motivated to produce narratives that are socially engaging, in the narratives of everyday memories, reflecting an animated and creative narrative style, consistent with primordial mental activity (Martindale, 1990) and the communicative and outgoing characteristics of group-oriented High Barrier personalities. Such a creative expression in High Barrier individuals has been also associated with an increased interest in human interactions which is not related to creativity in scientific endeavours or creative receptivity (Loshak & Reznikoff, 1976).

High Barrier personalities also used higher frequencies related to personal concerns, such as home references (e.g., apartment, kitchen, house), which could indicate the shielding qualities of house-related features. With regard to narratives of everyday memories, High Barrier personalities also used higher frequencies of references related to leisure activities (e.g., cook, chat, movie), indicative of the out-going nature associated with High Barrier personalities, and money (e.g., audit, cash, owe), which might suggest a materialistic and concrete focus, and thus the sixth hypothesis (H6) was partly confirmed.

An increase in leisure activities in High Barrier personalities also refers to recreational activities, which include physical exercises, as well as creative expression, commonly associated with primordial processes, which can be seen in the following excerpt from an everyday memory: *"I went to a <u>concert</u> (Leisure) in London and my two friends from uni and we queued for 7 hours outside so we could get to the front. We turned up outside Brixton Academy in the morning and there was already a huge queue, which was very annoying! Loads of foreign people who had travelled and were following the <u>band</u> (Leisure) kept trying to push in so we complained and a really nice security guard let us straight in at the front of the queue [...]"*.

Low Barrier personalities used more social references (e.g., *talk*, *us*, *friend*) compared to High Barrier personalities in narratives of everyday memories, e.g., *"Yesterday, I met with my <u>friend</u> Laura for lunch and coffee. We only became <u>friends</u> about a month ago but already I feel closer to her than many of my long-term <u>friends</u>. I feel as though I can <u>speak</u> to her about anything and I believe that she can to me"*. Such an inflation of socially orientated references would be associated with the outgoing High Barrier personality rather than the typically perceived solitary Low Barrier personality. High Barrier personalities, on the other hand, used more family references (e.g., *mom*, *brother*, *cousin*) in narratives of dream memories, e.g., *"My <u>mum</u> was stood there in the kitchen, stuffing her face with coffee and walnut cake"*. Such a focus on family related semantic might indicate High Barrier personalities' heightened emotional attachment towards family members compared to other social groups and relationships.

Age as a Covariate of Semantic Content in both Memory Types

A multivariate main effect identified that age had a main effect on semantic content in both memory types. A significant multivariate effect was computed even when age was not controlled for in narratives of everyday memories, $F(61, 424) = 23.603$, $p < .001$, and narratives of dream memories, $F(61, 386) = 13.750$, $p < .001$. An exploration of the univariate analysis results demonstrated that not a single previously significant linguistic variable failed to meet significance or change direction between Barrier personality types, compared to the age-adjusted multivariate model in both memory types.

Differences between Gender in both Memory Types

A multivariate main effect for gender indicated that semantic content in narratives of dream memories differed significantly between male and female participants. A series of univariate analyses showed that narratives of female participants used significantly more personal pronouns, $p < .001$, first person singular pronouns, $p < .05$, common verbs, $p < .01$, auxiliary verbs, $p < .05$, positive emotions words, $p < .01$, and insight words, $p < .05$, compared to male participants, reflecting a gender-stereotypical female "involved" language style (Newman et al., 2008).

In contrast, men used higher frequencies of third person singular pronouns, $p < .05$, articles, $p < .05$, past tense verbs, $p < .05$, quantifiers, $p < .05$, and tentativeness, $p < .01$, demonstrating an increased external and past-oriented emphasis, as well as a focus on concrete objects. Male participants also used more spatial words, $p < .05$, and references to home, $p < .05$, thus reflecting heightened spatial awareness, which might be indicative of the sex-specific spatial lateralisation of the male brain (Linn & Petersen, 1985).

Although a multivatiave effect in narratives of everyday memories was overall not significant for gender, an exploration of the individual univariate results, however, showed that female participants used significantly more personal pronouns, $p < .01$, first person singular pronouns, $p < .05$, common verbs, $p < .001$, auxiliary verbs, $p < .05$, present tense verbs, $p < .001$, conjunctions, $p < .05$, and anxiety words, $p < .05$, whereas male participants used more articles, $p < .05$.

Discussion

In summary, the results of this study largely supported the research hypotheses. Autobiographical memories of High Barrier personalities contained a high degree of semantic content associated with primordial mental activity, such as group-related references, biological and somatosensory processes, and spatial references. Low Barrier personalities, however, showed an increase of semantic content related to conceptual thought, such as self-references and references related to affective and cognitive processes. Overall, the semantic content of Barrier personalities remained relatively similar across memory types. The semantic stability of Barrier personalities in both autobiographical memory types confirms the continuity hypothesis, which proposes that waking and dreaming experiences have similar semantic content given that dreaming reflects activities, concerns, thoughts and emotions that are related to waking states (Domhoff, 2003; Hobson & Schredl, 2011; Schredl, 2003).

Given the high degree of semantic content associated with primordial mental activity in High Barrier personalities, it appears that body boundary awareness may, to some extent, represent the embodiment of the Freudian modes of cognitive functioning in relation to the external bodily functions of barrier imagery (Fisher & Cleveland, 1956, 1958). Most importantly, the results of this study provide insight into the role of body definiteness in the context of language production and the function of body boundary awareness as a personality trait. The results of this study showed that the memories of High and Low Barrier personalities contain similar semantic content across memory types that vary in their levels of regressive cognitive functioning.

That the semantic content of Barrier personalities remains relatively stable across memory types might also be due to the comparable cognitive processes engaged in the linguistic construction of these memories. Under this assumption, episodic memory traces of both memory types are retrieved from the knowledge base, followed by analogous transformations of the meaning units into structural event sequences (Conway & Bekerian, 1987; Conway & Pleydall-Pearce, 2000; Conway, 2009; Johnson, 1992; Nielsen & Stenstrom, 2005; Tulving, 1985; 2002). In this sense, Barrier personality also influences the interpretation of the personal experience as well as moderating the encoding and retrieval of information. For example, a Low

Barrier personality emphasizes the self and one's emotions to gain an interpretative insight into the personal experience, but not necessarily mentioning other people, whereas a High Barrier personality would focus on other persons, motion processes and achievements to the exclusion of other features, such as emotional insight.

The semantic content of Low and High Barrier personalities' narratives of dream memories did not differ significantly in regards to lexical items measuring cognitive processes. Such a lack of differences in cognitive processes might be due to similar memory-specific phenomenological experiences caused by the heightened primordial mental activity of dream states, whereas in everyday experiences conceptual thought is more prevalent at the point of encoding. Given the neurological differences associated with regressive cognitive functioning that vary between waking and dream states (Solms, 1997), narratives of dream memories typically describe the development of non-causal event chains in which unrelated images and concepts freely interact on the internal dream screen, whereas event transactions in waking experiences are perceived as more logical (Kahan & LaBerge, 2011).

A dreamer's agency is also suspended when in a dreaming state, whereas narratives of everyday experiences provide implicit insights and plausible justifications that link event chains and position the narrator as an active and evaluative agent. This view is fairly consistent with dream research showing that higher-order cognitive processes, including reflective awareness, are suspended during dreaming due to neuropsychological differences in REM sleep compared to waking states (Hobson, 1988; Hobson & McCarley, 1977). However, Kahan (1994) showed that narratives of dreams often do not mention reflective awareness and other meta-cognitive processes; therefore, dream self-reports may provide better insight into dreamers' processes. Kahan and LaBerge (2011) also provided evidence that self-reflective functioning does not differ between waking and dream states.

Regarding the function of body boundary awareness as a personality trait, the increased presence of inclusion words, such as first person plural pronouns, reflects a group-orientated focus in High Barrier personalities. Because the body boundary defines the existence of the "other" by categorically differentiating the self from the non-self, the body boundary functions as a contact membrane that facilitates social contact and categorises the self and other individuals into social groups. Social categorisation and social comparison typically accentuate the perception of similarities and differences among group members (Tajfel, 1959; Tajfel & Wilkes,

1963). The accentuation of similarities and differences is associated with primordial mental activities in which the process of splitting involves gross exaggeration of difference (Rayner, 1995). Group categorization also emphasises a social identity characterised by a reduced subjective experience of the self due to the context-dependent external group focus that limits the expression of salient self-images (Hoggs & Abrams, 1988). This decreased expression of one's subjective experiences explains the reduced presence of affective content and cognitive evaluation in the narratives of High Barrier personalities.

Such a lower expression of subjective experiences might be explained in relation to High Barrier personalities who perceive others in early socialization experiences as approving, supportive and sources of love, thus resulting in a heightened externally focussed social identity. The communicative expression and interest in other group members in High Barrier personalities, compared to Low Barrier personalities, would then assume the function of gaining acceptance by other group members and to influence group values, as well as to reduce external threats, rather than the mere sharing of experiences of the inner self to another human being. Consistent with this reasoning, Fisher and Cleveland (1958, p. 212) stated that the increased group focus in High Barrier groups "…influenced them [the judges] in their preference for members of these groups a personal friends". Low Barrier personalities, in contrast, emphasise personal identity, focusing on subjective expressions that are more independent of social context. The emphasized personal identity that focuses on internal subjective expressions in Low Barrier personalities reflects a greater independency of social evaluation due to a lack of having received supporting responses and fewer internalisations of parental values (Fisher & Cleveland, 1958). Low Barrier personalities might be therefore more reliant on available psychological support from general social contacts, such as friends and coworkers, which might not necessarily be defined in relation to definite social boundaries that differentiate between in- and out-group membership.

A social-evaluation orientated expression of personal insights, such as emotion expression, as well as an increased use of inhibition words, indicates that the behaviour of High Barrier personalities is more easily conditioned in relation to rewarding or punishing responses in their social environment. The empirical exploration of punishment-reward activated or inhibited behaviour has been given much attention in health psychological research, which consistently identified

inhibited emotional responses and the development of physical and mental disorders (Pennebaker, 1989; Pennebaker & Beall, 1986; Pennebaker & Chung, 2011; Traue & Pennebaker, 1993).

Moreover, these results are also consistent with autobiographical memories associated with inter-sociocultural differences. As pointed out by Conway and Jobson (2012), individuals with a conceptual self that is aligned with a collective culture would recall memories that focus on routine events and social interactions that are emotionally neutral, whereas individuals from individualistic cultures recall autobiographical memories with a focus on detailed and self-focused content that emphasises subjective experiences, such as emotions, preferences and internal states.

Consistent with the results of this study, penetration imagery has consistently been associated with internal organs (Fisher & Cleveland, 1958), and, therefore, may relate to involuntarily internal muscular movements that are active in both High and Low Barrier personalities.

This study had several limitations. The effect sizes of the univariate analyses used to explore the semantic differences between Barrier personalities were often only small to medium, irrespective of the high levels of statistical significance. Such low effect sizes are an inherent problem in quantitative content analysis. Thus, the body boundary lexis, as classified in the BTD (Wilson, 2006), represents only a small proportion of everyday usage-based vocabulary, which is primarily composed of function words (such as pronouns, prepositions, articles, etc.) that allow discourse to be cohesive and coherent (Argamon & Levitan, 2005; Chang & Pennebaker, 2007).

The semantic content of the recalled autobiographical memories are also partly governed by the topic of the selected narrative, by recent emotional experiences, and by other variables, such as the frequency of rehearsal of the recalled memory, its perceived pleasantness, the specificity and vividness of the memory, and its visuo-spatial perspective (Conway & Bekerian, 1987; Habermas & Diel, 2013; Nigro & Neisser, 1983; Nelson, Moskovitz, & Steiner, 2008).

Considering that body boundary awareness represents a dynamic personality construct, the methodological constraints of this study do also not rule out the possibility that the relationship between semantic content and Barrier personality might reflect "method factors" that inevitably affect language use. Thus, the results obtained in this study are limited because they cannot be generalised to other modes of language production, such as the embeddedness of language and spontaneous recall

of autobiographical memories within social situations (Conway & Jobson, 2012; Berntsen & Rubin, 2012).

In light of the limitations of this study, therefore, future research should establish how autobiographical memory topic selection and cognitive process associated to the memory retrieval relate to Barrier personality and language use.

Apart from this, future studies should also explore the function of High and Low Barrier personalities in connection with inter-group dynamics and group identification, as well as early socialization experiences, such as attachment style.

Taking into consideration that primordial thought has been associated with creativity, such as metaphors (Martindale, 1990), future studies should also assess the linear behaviour and non-linear longitudinal dynamicity of body boundary imagery and semantic content associated with Barrier personalities in relation to linguistic creativity, and semantic and syntactic alignment in conversational settings, such as psychotherapeutic dialogues.

Furthermore, future research should explore the dynamic neurological relationship between body boundary awareness and regressive cognitive functioning.

Moreover, future research should also explore to what extent the modification of body boundaries through guided imagery, as explored by Fisher (1970, 1986), would result in lexical changes in the recall of autobiographical memories and other modes of language production. Embodied simulation that focuses on external muscular movements and internal bodily sensation through the use of guided imagery might enable individuals to restore the awareness of internal and external bodily, affective and cognitive experiences (Freedberg & Gallese, 2007). By drawing on Roger's (1961) humanistic theory, individuals with a strong external locus might be unable to communication their inner experiences to others, and thus resulting in deep feelings of loneliness, whereas individuals with a strong internal focus might present difficulties to conform to social norms. The restoration of body boundaries might then enable to increase self and other acceptance, as well as feelings of empathy, and thus to reinforce a sense of self-agency and self-esteem. Such an application could be used to support hypno-psychotherapeutic interventions and in forensic and psychological settings to treat victims or perpetrators of severe emotional and physical body boundary violations.

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