The impact of interoceptive abilities on emotional intensity and susceptibility to distraction

by

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Abstract

Interoception, defined as the ability to sense change in visceral organs and internal states within the body, is thought to influence a wide range of psychological processes and behaviours. Evidence garnered from previous research suggests that individual differences in interoceptive ability influences emotional experience and cognitive processes such as memory, particularly when stimuli are emotional in nature. The present study aimed to extend these propositions by examining interoceptive abilities in relation to emotional intensity (defined as the strength of a response to emotional stimuli) and attention to auditory emotional stimuli. It was expected that interoceptive ability would be positively related to emotional intensity and vulnerability to distraction from emotional words during a serial recall task. This study also aimed to explore the reliability and validity of the most common task used to measure interoception (heartbeat tracking task; HTT), given that it has been criticised for its lack of test-retest reliability and the potential for participants to guess. Contrary to expectations, Experiment 1 (n = 70) found no relationship between interoceptive abilities and self-reported emotional intensity, and Experiment 2 (n = 32) found no effect of interoceptive abilities on distractibility. Furthermore, individuals who performed well on the HTT exhibited high variation during a temporal consistency task, suggesting that these individuals may have been guessing. Finally, the HTT was found to have low test-retest reliability. Together, both experiments failed to provide evidence to suggest a relationship between interoception and emotional intensity or susceptibility to emotional distractors. However, it is possible that this is reflective of methodological problems, rather than the absence of a relationship. Given the low test-retest reliability of the HTT, as well as evidence suggesting the task is vulnerable to guessing, future research examining interoceptive differences would benefit from the use of more robust and reliable methods.

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General Introduction

Interoception refers to the sense of change in visceral organs and internal states within the body (Seth, 2013). It has been proposed that internal physiological states (e.g., hunger or thirst) are represented cortically, allowing the brain to receive feedback about changes to maintain homoeostasis in the body (Craig, 2003). Research suggests individual differences in interoceptive accuracy (IAC) may have an effect across a broad range of research areas. For example, anxiety has been attributed to discrepancies between observed and predicted bodily signals (Domschke, Stevens, Pfleiderer, & Gerlach, 2010; Dunn, Stefanovitch, Evans, Oliver, Hawkins, & Dalgleish, 2010b; Paulus & Stein, 2006; Pollatos, Traut-Mattausc, & Schandry, 2009; Stern, 2014), and depression is thought to be related to a reduction in the connection between brain and body, which has been supported by studies that have found reduced autonomic responses in patients with depression (Carroll, Phillips, Hunt, & Der, 2007; Dawson, Schell, & Catania, 1977) and a relationship between individual differences in interoception and symptoms of depression (Dunn Dalgleish, Ogilvie, & Lawrence, 2007; Furman, Waugh, Bhattacharjee, Thompson, & Gotlib, 2013). Interoception has also been implicated in eating disorders (Herbert & Pollatos, 2014; Klabunde, Acheson, Boutelle, Matthews, & Kaye, 2013; Pollatos et al., 2008). It has been argued that the perception of body signals and an ability to discriminate between hunger and satiety are crucial for the regulation of food intake, and that altered interoceptive processing leads to a dysregulation in eating and drinking behaviour (Herbert, Blechert, Hautzinger, Matthias, & Herbert, 2013).

Other research has found that interoception may be related to addiction (Naqvi and Bechara, 2010; Verdejo-Garcia, Clark, & Dunn., 2012), empathy (Fukushima, Terasawa, & Umeda., 2011; Singer, Critchley, & Preuschoff., 2009), decision making (Clark et al., 2008; Dunn et al., 2010a; Dunn, Evans, Makarova, White, & Clark, 2012; Paulus, 2007; Werner, Jung, Duschek, & Schandry, 2009) and attention (Matthias, Schandry, Duschek, & Pollatos, 2009). Previous research has also found that IAC is related to emotion in that higher IAC leads to greater emotional regulation (Füstös, Gramann, Herbert, & Pollatos, 2012), emotional intensity (Pollatos, Herbert, Matthias, & Schandry, 2007; Wiens, Mezzacappa, & Katkin, 2000) as well as susceptibility to emotional stimuli (Pollatos & Schandry., 2008; Umeda, Tochizawa, Shibata, & Terasawa., 2016; Werner, Peres, Duschek, & Schandry, 2010). The focus of the present study was to further examine the effect of interoception on emotion, specifically looking at emotional intensity and susceptibility to distraction from emotional content.

Before discussing these individual differences, it is essential to define exactly what is meant by IAC and how this concept relates to other dimensions of interoception. Garfinkel, Seth, Barrett, Suzuki and Critchley (2015) introduced three separate dimensions of interoception: IAC, Interoceptive Sensibility (IS) and Interoceptive Awareness (IAW). IAC refers to the accuracy of an individual's performance during an interoceptive task, such as the heartbeat tracking task (HTT), in which an individual is instructed to count the heartbeats they feel within their body in a given time period. Their IAC is calculated by comparing the number of heartbeats they perceive with the actual number of heartbeats they had. Interoceptive sensibility (IS) refers to how an individual perceives their own interoceptive abilities/body awareness. This dimension is measured using self-report questionnaires, such as Porge's Body Perception Questionnaire (Garfinkel et al., 2015). The final dimension, IAW, refers to the extent to which an individual's confidence in their performance of an interoceptive task can predict their genuine performance. Garfinkel et al. (2015) stressed the importance of dissociating these terms, especially considering many researchers use the word IAC synonymously with IAW despite referring to separate concepts. Garfinkel et al. (2015), and more recently Forkmann et al. (2016), have found accuracy, sensibility and awareness were distinct and dissociable dimensions, and that scores in one dimension do not necessarily predict scores in another.

For example, Ma-Kellams (2014) found that participants from non-western cultures generally showed higher IS but lower levels of IAC. Khalsa et al. (2008) found IAW, but not accuracy, was increased in experienced meditators compared to controls. Additionally, individuals with autism spectrum conditions (ASC) showed a reduction in IAC but an increase in IS, possibly reflecting impairments in signal detection whilst simultaneously experiencing heightened subjective perception of body sensations (Garfinkel et al., 2016). The authors referred to this divergence as trait prediction error (TPE), which predicted emotion deficits and heightened anxiety experienced by the ASC individuals. Unfortunately, studies examining differences between these factors are limited. This lack of distinction has been criticised by Ceunen, Van Diest, and Vlaeyen, (2013), who argued if dimensions are not treated separately, researchers cannot make conclusions about interoceptive abilities during HTTs given that awareness, sensibility and accuracy of perception are not synonymous. For this reason, the present study will treat IAC, IS and IAW as separate constructs to determine their differential effects on the variables being tested.

Both the awareness and accuracy dimensions of interoception require a specific task to be conducted that tests the accuracy of an individual's perception of internal bodily processes. The HTT is the most common measure of IAC in which participants are instructed to count the number of heartbeats they feel over a set period of time (Garfinkel et al., 2015). Another task, commonly referred to as the heartbeat detection task (HDT), has also been used to examine individual sensitivity to heartbeats. In this task, individuals report if external stimuli are perceived as being in synchrony with their heartbeat (e.g., Whitehead, Drescher, Heiman, & Blackwell, 1977). Individuals more accurate at detecting their heartbeats as determined by either of these tasks are classed as having higher IAC. Limited studies have been undertaken examining interoceptive abilities across modalities given the invasive nature of alternate techniques (e.g., using a nasogastric tube to detect stomach contractions). However, a positive relationship has been found between cardiac IAC and sensitivity for gastric functions (Herbert, Muth, Pollatos, & Herbert, 2012). This suggests measurements of IAC using HTTs are likely to reflect general interoceptive abilities rather than solely heartbeat perception, providing a non-invasive but accurate measure of individual differences in overall interoception.

Both the HTT task and the HDT have received criticism regarding their validity and their ability to accurately measure IAC (e.g., Knapp, Ring, & Brener., 1997; Knapp-Kline, & Kline, 2005; Windmann, Schonecke, Fröhlig, & Maldener., 1999). For this study, HTT was chosen over HDT for several reasons. Firstly, the HDT is thought to rely on the monitoring of both external and internal information, whereas the HTT is thought to be mostly dependent on internal monitoring (Garfinkel et al., 2015). Secondly, the HDT task is considerably more difficult to perform, and because of this it is rare that the frequency of high IAC individuals is greater than 40% (Khalsa, Rudrauf, Sandesara, Olshansky, & Tranel, 2009). Secondly, Knapp-Kline and Kline (2005) found that several individual physiological differences have been found to influence the HDT. For example, slower heart rate predicted performance, and the authors argued that this was due to the participants having more time to process the sensations which were being generated by their heart. Decreased heart rate variability was also found to increase performance. This may be because participants were able to predict when a heartbeat would have occurred in the sequence they were hearing even if they missed a beat, and/or they could have used their own temporal pattern to accurately predict their own heartbeat without perceiving every one (Knapp-Kline, & Kline, 2005). Another issue, as noted by Knapp et al. (1997), is that the HDT is influenced by an individual's ability to judge how simultaneous stimuli are presented across different sensory modalities. An individual who is overall sensitive to their own heartbeat but poor at judging stimuli simultaneously (e.g., auditory tones, flashes of light) would be classified as a poor heartbeat detector, even if that was not necessarily the case. For these reasons, the HTT was chosen over the HDT as the method of measuring IAC in this study.

However, despite the HTT being referred to as the 'gold standard' for examining IAC (e.g., Krajnik, Kollndorfer, Notter, Mueller, & Schöpf, 2015), several caveats need to be taken into consideration. One criticism is that performance on HTTs are heavily influenced by individual beliefs about heart rate (Pennebaker & Epstein, 1983; Pennebaker & Hoover, 1984; Ring & Brener, 1996; Ring, Brener, Knapp, & Mailloux, 2015). For example, Windmann et al. (1999) manipulated the heart rate of individuals with pacemakers and found that as they increased the speed of the pacing rate, participant's accuracy on the HTT decreased. This suggests they were guided by their perception of how fast their heart was beating, and this did not change despite an artificial increase in their heart rate. This provides support for arguments claiming that HTTs test the beliefs a participant has about their heart rate, rather than genuine cardiac sensitivity (Windmann et al., 1999).

Additionally, there is still some debate as to whether interoception is a stable trait (Antony, Meadows, Brown & Barlow., 1994; Daubenmier, Sze, Kerr, Kemeny, & Mehling, 2013; Khalsa et al., 2008) or whether it can change over time (Ainley, Tajadura- Jiménez, Fotopoulou, & Tsakiris, 2012; Bornemann & Singer, 2016; Herbert et al., 2012). While the notion that IAC can be improved through deliberate manipulation (e.g., fasting, Herbert et al., 2012) or practice (e.g., Bornemann & Singer, 2016) is not problematic, variations in performance with no associated changes in other variables would reflect poor test-re-test reliability. Another confounding factor is percentage of body fat, which has been found to influence IAC (Rouse, Jones, & Jones, 1988). Evidence for the reason this occurs is limited. However, Cameron (2001b) argued higher body fat could lead to reduced sensitivity for visceral processes given the reduction of mechanoreceptors in body fat. Unfortunately, many studies have not provided a measure of body fat as part of their research (e.g. Chua & Bliss-Moreau, 2016; Durlik, & Tsakiris, 2015; Ferentzi et al., 2017; Ganos et al., 2015; Ricciardi et al., 2016; Suschinsky & Lalumière, 2014; Yoris et al., 2015). While the HTT may be viewed as the gold standard when examining differences in IAC, results could be misleading, as IAC may be overestimated/underestimated, if potential confounds are not considered.

Experiments 1 and 2 of this study aimed to examine interoception, giving the above issues consideration, as well as addressing additional research questions. Experiment 1 aimed to examine one of the factors which has been found to be related to interoception, namely, emotional intensity (EI). EI is defined as the strength of a response to emotional stimuli (Larsen, Diener, & Emmons, 1986). Previous research has suggested that EI is more pronounced in individuals with higher IAC (e.g., Barrett, Quigley, Bliss-Moreau, & Aronson., 2004; Furman et al., 2013; Herbert, Pollatos, & Schandry., 2007a; Herbert, Pollatos, Flor, Enck, & Schandry., 2010; Wiens et al., 2000). Experiment 2 extended previous research examining IAC and the processing of emotional stimuli to contribute to further understanding how individual differences in interoception may affect cognitive functioning. Specifically, Experiment 2 examined whether IAC had any relationship with attention to emotionally distracting stimuli. In addition to these factors, both experiments aimed to address the criticisms that have been made of the HTT (e.g., validity of measurement, test retest-reliability), and the methodological issues associated with it (e.g., body fat measurements). The results of both experiments will contribute to the current understanding of interoception and its relationship to emotion and cognitive functioning. In addition, the research will help to clarify the structure of interoception by addressing significant criticisms of commonly used methods, with a specific focus on the reliability of the HTT.

Experiment 1

Introduction

Interoception has become an area of interest for researchers who adhere to theories of emotion emphasising the role of physiological change in the production of emotional experience (Prinz, 2004). William James (1884) and Carl Lange (1885/1922), some of the first proponents of physiological based theories of emotion, suggested that changes within the body form the basis from which emotions are created, rather than being a result of emotional experiences themselves, and their ideas merged into what is now recognised as the James-Lange theory of emotions

(Cameron, 2001a). This contrasts with cognitive theories of emotion that tend to hold the belief that emotions are disembodied, in that they represent something outside changes in internal states, or the awareness of them (Prinz, 2004). Cognition often mediates emotion based on beliefs about a given event (Prinz, 2004). For example, anxiety felt before an exam may depend on beliefs about a variety of factors, including how much the exam content was studied, as well as how important the exam is thought to be (Prinz, 2004). However, James (1884) argued that while we may see an emotion eliciting stimulus, such as a threatening object, and run because of it, we would not feel the experience of fear without the accompanying physiological reaction. This view is supported by research that has highlighted the importance of bodily sensations in the expression of emotion. For example, Pistoia et al. (2015) examined recognition of facial expression and judgement of emotional scenes in both healthy controls and individuals with sensory deafferentation due to spinal cord injury (SCI). Sensory deafferentation refers to damage to or disconnection of sensory nerve fibres in the body, resulting in a loss of peripheral sensory input. Pistoia et al. (2015) hypothesised that there would be an impairment in individuals with SCI because of an inability to infer internal state due to the damage to the sensory pathways. The individuals with SCI had difficulty judging their own response to emotional scenes, particularly those eliciting fear and anger. Pistoia et al. (2015) also found that the greater the level of SCI, the greater the amount of dysfunction in emotion recognition. This suggests that a physical disconnect between the body and the brain may impair the experience of emotions, particularly primordial emotions such as fear and anger, and provides support for physiological theories of emotion (Pistoia et al., 2015). While physical damage to sensory pathways appears to impact emotional expression, theories of emotion emphasising the influence of interoception propose that individual differences in perception of body signals may also contribute to the way that emotions are felt, recognised and expressed (e.g., Damasio 1994; Dunn et al., 2010a; Seth, 2013; Wiens et al., 2000). A link between interoceptive abilities, particularly IAC, and emotional experience, has been demonstrated in several studies (e.g., Barrett et al., 2004; Critchley, Wiens, Rotshtein, & Dolan, 2004; Herbert et al., 2010; Kindermann & Werner, 2014; Terasawa, Moriguchi, Tochizawa, & Umeda, 2014; Wiens et al., 2000).

The results of previous studies have generally shown that for individuals with high IAC, emotional experiences are enhanced (e.g., Barrett et al., 2004; Critchley et al., 2004; Herbert et al., 2010; Kindermann & Werner, 2014; Wiens et al., 2000;). For example, Wiens et al. (2000) found that good heartbeat detectors reported their affective responses to emotional film clips as more intense compared to poor detectors. Barrett et al. (2004) found that IAC was related to the degree that participants reported arousal as part of their emotional experience. This was not the case for valence focus, as no relationship was found between IAC and the degree to which participants felt their experience was pleasant or not. This was also supported by Herbert et al. (2010), who found heartbeat perception was associated with greater subjective arousal when viewing emotional pictures, but not ratings of valence. This suggests feelings of emotion are related to visceral arousal, but valence may be defined by cognitive processes (Herbert et al., 2010). Kindermann and Werner (2014) found that participants with high IAC reported more negative emotions in response to a stress task than low IAC, suggesting that IAC may also mediate individual emotional responses to stressful experiences.

As well as self-reported emotional experiences, some studies have found IAC to be related to increases in physiological arousal (Herbert et al., 2010). Herbert et al. (2010) found that IAC was associated with greater sympathetic activity during mental stress. However, these results are not always consistent, and many of the studies mentioned above that found IAC associated with stronger emotional responses did not find corresponding associations between IAC and physiological responses (Kindermann & Werner., 2014; Wiens et al., 2000). Sloan and Sandt (2010) found that when showing participants neutral or emotional eliciting pictures, symptoms of depression did not affect heart rate or skin conductance response to the picture, despite previous findings suggesting low IAC and depression are related (Furman et al., 2013). Furman et al. (2013) suggested that low IAC disrupts ability to experience positive arousal states from the body, but this lack of observed physical reaction does not support this (Sloan & Sandt, 2010). However, Wiens et al. (2000) argued that perception of visceral sensations may be independent of sympathetic activity and arousal, which could explain the lack of relationship between the two. Despite discrepancies between findings that show increased arousal alongside self-reported emotional experiences and those that do not, these studies reveal a positive relationship between IAC and emotional experience (Barrett et al., 2004; Critchley et al., 2004; Furman et al., 2013; Herbert et al., 2007a; Herbert et al., 2010; Kindermann & Werner., 2014; Wiens et al., 2000)

However, despite studies which suggest that superior heartbeat detection is related to enhanced emotional experiences (e.g. Barrett et al., 2004; Wiens et al., 2000), other research has found no evidence for such a relationship (e.g., Calì, Ambrosini, Picconi, Mehling, & Committeri., 2015; Ferguson & Katkin., 1996). Ferguson and Katkin (1996) examined difference in IAC in individuals with anhedonia, a condition in which an individual is unable to feel pleasure in everyday activities, compared to control group with no anhedonic symptoms. They found no difference in IAC between anhedonia group and controls, as well as no differences between IAC group in verbal reports of emotional experience. In addition, Calì et al. (2015) examined the relationship between IAC, IS and emotional susceptibility (ES) as measured using the Emotional Susceptibility Scale, which is designed to measure an individual's tendency for negative emotional responses, such as inadequacy, discomfort or vulnerability. They found a relationship between ES and IS, but no relationship between ES and IAC. The lack of consistency within the literature suggests that it is still not yet clear what role interoception plays in the experience of emotions. There may also be methodological issues in the way studies are conducted. For example, Calì et al. (2015) used a scale that did not measure positive emotions alongside negative, which may have limited the results by not allowing for a wider range of emotional experiences. For example, an individual with high IAC may have more intense emotional experiences, but these may be of a positive nature. Another problem associated with interoception research is determination of IAC and whether techniques are accurate in their measurement (e.g., Windmann et al., 1999). Despite cardiac responses being of interest to researchers because there is a clear, discrete, relatively easily measured physiological response, all visceral awareness studies share the problem that few, if any, independent criteria can indicate whether awareness actually occurred (Cameron, 2001a).

Further research is needed, both to continue to determine the role that interoception plays in emotions, as well as to determine the validity and reliability of these methods. For this reason, the aim of this first experiment was to explore the relationship between emotional intensity and IAC, IS and IAW, based on the proposal that they are separate constructs (Garfinkel et al., 2015; Forkmann et al., 2016). EI is defined as the strength of a response to emotional stimuli (Larsen et al., 1986). The present study used a measure examining variations in emotional intensity rather than valence, given previous studies that have found this to be affected by IAC (Wiens et al., 2000) and arguments that have been made which suggest valence is more related to cognitive processes, rather than interoception (e.g., Barrett et al. 2004; Herbert et al., 2010).

A second aim was to examine the relationships between IAC, IAW and IS to provide support for previous findings suggesting that they are separate constructs (Garfinkel et al., 2015). A final aim of Experiment 1 was to examine whether discrepancies in previous findings can be attributed to methodological problems of the HTT, given concerns that such tasks may not indicate whether awareness actually occurred (Cameron, 2001a) as well as research suggesting that performance is more reflective of beliefs an individual has about their heart rate rather than genuine cardiac sensitivity (Windmann et al., 1999). It is possible that participants may be able to guess the amount of heartbeats in the absence of true perceptions based on prior knowledge of their heart rate. To counter this, Experiment 1 incorporated a tapping task designed to assess whether participant’s perception is temporally accurate.

Based on previous findings that have found a positive relationship between IAC and emotion (Barrett et al., 2004; Critchley et al., 2004; Furman et al., 2013; Herbert et al., 2007a; Herbert et al., 2010; Kindermann & Werner, 2014; Wiens et al., 2000), it was predicted that emotional intensity would have a positive relationship with IAC. It was also predicted that emotional intensity would be correlated with IS, given findings from Calì et al. (2015) that found this relationship. Given that IAW is a recent concept in interoceptive research, no specific hypotheses were made regarding this construct. Furthermore, the relationship between IAC, IS and IAW was examined to determine if findings from previous research (e.g., Calì et al., 2015; Garfinkel et al., 2015), which found no relationship, would be replicated. The final hypothesis was related to temporal accuracy during the HTT. If high heartbeat perceivers are genuinely counting their own heartbeats, it would be expected that there would be little variation in the time between each heartbeat and each key press. However, if there is a large degree of variation, this may suggest that participants are not reacting to actual heartbeats, but rather their own internal perception of when a heartbeat should occur. The results of this experiment may provide evidence for interoceptive theories of emotion, which state that emotional experience results from physiological changes occurring in the body, supporting the notion that individual differences in body-brain connections may have an impact on emotional experience.

Method

Design. This experiment employed a correlational design to assess the relationship between scores for each dimension of interoception (accuracy, sensibility and awareness) and emotional intensity as measured using self-report questionnaire. Temporal analysis of heartbeat tracking was conducted using correlation to examine the relationship between interoceptive accuracy (HTT score), and the temporal perception of each heartbeat (recorded by participants pressing a button when they felt each heartbeat) relative to the genuine heartbeat that preceded it (recorded using ECG). Confounding variables were controlled for, including symptoms of anxiety and depression, body fat, BMI, waist hip ratio and age. Ethical approval was obtained for the experiment from the School of Psychology Ethics Committee, University of Central Lancashire (UCLan) in accordance with the Declaration of Helsinki.

Participants. A total of 70 students and staff (44 female, 26 male) from the University of Central Lancashire participated in the study. Undergraduate psychology students could participate in exchange for course credits. Participant ages ranged from 18 to 67 years (M = 23.86, SD = 8.57) and all had English as their first language. They had no diagnosed cardiac, neurological and psychiatric conditions and did not use vasoactive and/or psychoactive medications.

Materials.

Interoceptive accuracy - HTT. The HTT employed has been used in previous studies (e.g., Garfinkel et al., 2015; Herbert et al., 2007a; Herbert et al., 2007b; Herbert et al., 2010; Pollatos & Schandry, 2004; Pollatos, Kirsch & Schandry, 2005a,b; Werner et al., 2009; Werner, Peres, Duschek & Schandry, 2010). Participants were encouraged to breathe normally and reassured that there are large variances in accuracy during the task and that accuracy is neither positive nor negative. Participants were encouraged only to count the heartbeats that they genuinely felt and not to guess. Prior to the task, participants were given the instruction “Without manually checking, can you silently count each heartbeat you feel in your body from the time you hear “start” to when you hear “stop””. This was repeated six times using six different time windows (25, 30, 35, 40, 45 and 50s) in a random order, which has been used in previous studies to discourage participants to guess the number of heartbeats based on their knowledge of their own heartbeats per minute (Garfinkel et al., 2015). No feedback on performance was given after any of the trials. After the task was complete, participants rated their confidence on a continuous visual analogue scale. Participants were then asked to sit in front of the computer and press the bottom arrow key on the keyboard every time they felt their heartbeat. This was for a duration of one minute, and their responses were recorded in E-Prime. A trigger was sent from the E-prime program every time this key was pressed, providing an accurate estimate of their perception of their heart rate in relation to their heartbeat cycle.

IAC was calculated using the following equation: 1-(Actual Heartbeats – Felt Heartbeats) / Actual Heartbeats (Schandry, 1981). This creates an accuracy score from 0 to 1, with 0 reflecting no perception and 1 reflecting complete perception. An average accuracy score for all trials was used as the individual IAC score for each participant.

Interoceptive sensibility. IS was measured using The Body Awareness Questionnaire (BAQ; Shields, Mallory, & Simon, 1989) which is an 18-item questionnaire designed to measure beliefs about sensitivity to non-pathological and non-emotive bodily processes (see Appendix A). Participants responded on a Likert scale from 1 (Not at all true of me) to 7 (Very true of me). Total scores on this questionnaire can therefore range from 18 to 126, and low and high scores reflect lower and higher sensitivity to body processes, respectively. Validity has been demonstrated as well as reliability, with coefficients of .69, .79, .87 and .84 for each of the four factors measured using the scale (Changes in Body Process, Predict Body Reaction, Sleep Wake Cycle and Onset of Illness respectively). The BAQ is considered a valid and reliable instrument to measure self-reported attention to internal bodily processes (Mehling et al. 2009).

In addition to the BAQ, The Multidimensional Assessment of Interoceptive Awareness (MAIA; Mehling, Price, Daubenmier, Acree, Bartmess, & Stewart, 2012) was used as an additional measure of IS. This was to examine the relationship between both measures to determine if there is any correlation between them, as well as to see if the results from Cali et al. (2015) can be replicated using a measure of emotional intensity. The MAIA contains 32 items with 8 subdimensions and measures awareness of bodily sensations using a Likert scale from 0 (Never) to 5 (Always). These subdimensions included Noticing (awareness of uncomfortable, comfortable, and neutral body sensations), Not-Distracting (tendency not to ignore or distract oneself from sensations of pain or discomfort), Not-Worrying (tendency not to worry or experience emotional distress with sensations of pain or discomfort), Attention

Regulation (ability to sustain and control attention to body sensations), Emotional Awareness (awareness of the connection between body sensations and emotional states), Self-Regulation (ability to regulate distress by attention to body sensations), Body Listening (active listening to the body for insight) and Trusting (experience of one's body as safe and trustworthy) (Mehling et al., 2012). Scores range from 0 to 90, with low and high scores indicating low and high awareness respectively (see Appendix B). Construct validity has been demonstrated with scales of related constructs, and has Cronbach alpha coefficients for each scale .79 or above (except for Noticing, Not-Distracting and Not-Worrying, which were .69, .66 and .67, respectively; Mehling et al., 2012)

Interoceptive awareness. To assess IAW, a confidence measure was taken after participants had completed the HTT. A visual analogue scale was used to assess confidence in their performance during the task using a pencil mark on a continuous visual analogue scale ("Total guess/No heartbeat awareness" to "Complete confidence/Full perception of heartbeat;" Garfinkel et al., 2015). For methodological reasons, calculations of IAW were not the same as those used by Garfinkel et al. (2015). In their study, they created individual correlation scores between accuracy and confidence by asking participants to give confidence estimates after each trial of the HTT. However, it was decided that it was important to limit of amount of distraction from the HTT and that asking participants about their confidence regularly would disrupt their focus during the task. Instead, a single estimate of their overall confidence was made at the end of the HTT. Whilst previous studies have used a computer to administer the HTT which would make regular confidence estimates easier, it was decided that the noise of the computer as well as the brightness of the screen could be distracting to the participants. Pennebaker (as cited in Cameron, 2001a) argues that the less information coming from external sources, the more likely an individual will be to attend to internal cues, such as a heartbeat. For this reason, it was important to ensure that participants were not distracted by external stimuli in their environment. Instead, the difference between confidence out of 100 and accuracy out of 100 were calculated, and this score was used as an estimate of IAW. This created a score of -100 to 100, with minus scores reflecting over-confidence, and positive scores representing under-confidence. As this was not the original measure used by Garfinkel et al. (2015), raw confidence scores were also examined as a supportive measure of IAW.

Emotional intensity. EI was measured using the Emotional Intensity Scale (EIS;

Bachorowski & Braaten, 1994), a 30-item questionnaire designed to assess participants' predicted intensity of an emotion in a given situation (e.g., I am late for work or school and I find myself in a traffic jam; see Appendix C). The EIS uses a 5-point Likert scale and is split into positive emotions (score range 14-70) and negative emotions (score range 16-80). Higher scores for both are indicative of higher intensity of emotions, with the reverse for low scores. The EIS has a high degree of internal consistency ($\alpha = .90$) and a test-retest reliability coefficient of .83 (Bachorowski & Braaten, 1994). The scale's validity has been demonstrated by a significant moderate correlation ($r = .48$) with the Affect Intensity Measure (AIM; Larsen & Diener, 1987), another measure of emotional intensity. (Bachorowski & Braaten, 1994). Bachorowski and Braaten (1994) argued that the AIM was not a pure measure of emotional intensity in that it also measured the frequency which the emotions occurred, and developed the EIS as a way of purely measuring intensity without frequency as a confound.

To assess whether there were differences in EIS score depending on the specific positive and negative emotion being expressed, key words from the most extreme response to the question were used to designate questions into either Anger, Fear, Sadness, Joy and Love. For example, responses which included words like "panic" "anxious" or "worried" would be classified as expressions of fear, whereas "grateful" "exuberant" or "thrilled" would be classified as joy. These categories were based on the framework outlined by Shaver, Schwartz, Kirson, and O'Connor (1987). An outline of this breakdown can be found in Appendix D.

Mood. Research has suggested that anxiety and depression may have a confounding effect on interoceptive abilities as they are thought to be related to dysfunctions in homeostatic regulation (Paulus & Stein, 2010; Pollatos et al, 2009). It has also suggested that mood may affect the interpretation of physiological symptomatology, particularly anxiety, and research has found that anxious individuals report greater physiological arousal in the absence of objective arousal compared to non-anxious controls. (Anderson & Hope, 2009). To control for these confounding factors, the Personal Health Questionnaire (PHQ-9) and Generalised Anxiety Disorder Assessment (GAD-7) were used (Kroenke & Spitzer, 2002; Spitzer, Kroenke, Williams, & Löwe, 2006).

The PHQ-9 includes 9 questions and measures depressive symptoms on a Likert scale from 0 (Not at all) to 3 (Nearly every day). Scores of 0-4 reflect no symptoms of depression, 5-9 reflect mild symptoms, 10-14 moderate, 15-19 moderately severe and

20-27 reflect severe depressive symptoms (see Appendix E). Internal reliability of the PHQ-9 has been found to be high, with a Cronbach's α of .89, and criterion, construct and external validity have also been demonstrated (Kroencke, Spitzer, & Williams, 2001).

The GAD-7 is a 7-item questionnaire which measures generalised anxiety symptoms on a Likert scale from 0 (Not at all) to 4 (Nearly every day). Scores from 0-5 reflect mild anxiety, 6-10 reflect moderate anxiety and 11-15 reflect severe anxiety (see Appendix F). Internal reliability of the GAD-7 is strong (α = .89) and has been validated as a suitable measure of anxiety in a general population, making it suitable for the present study (Löwe et al., 2008).

Body fat. BMI was calculated using the following formula: weight (kg) / [height (m)]^2(Centers for Disease Control and Prevention, n.d.). As BMI has been criticised for its inability to distinguish between other factors affecting weight, such as bone density and muscle mass (Burkhauser & Cawley, 2008), two other measures of body fat were used. Skinfold thickness was measured using callipers at four sites (triceps, abdomen, supra-iliac and sub-scapular) based on the methodology of Zin et al. (2015). Waist and hip measurements were also taken and used to calculate waist to hip ratio, following the recommendations of the World Health Organisation (2011).

ECG acquisition. For the HTT, non-polarisable Ag-AgCl electrodes were placed behind the right ear on the mastoid bone as a grounding electrode, and two on the top left-hand side of the chest to monitor heart rate. Heart rate data was collected using a Biopac MP150 system (Biopac System Inc., Goleta, CA).

Procedure. Participants were tested in a small, sound attenuated room to prevent noise disturbance during the HTT. After reading the information sheet, they were asked to sign a consent form to confirm their consent to take part in the study (see Appendices G and H). Body measurements were taken depending on participant consent (see Appendix I for Body Measurement Form). Participants either completed the five questionnaires before the HTT or after, which was done to prevent order effects. After completing the questionnaires and the HTT, participants were provided with a written and verbal debrief.

Data processing

Heartbeat detection. R-wave peaks were detected automatically using the software AcqKnowledge 3.5 system (Biopac System Inc., Goleta, CA), and then the data was visually examined to remove incorrectly detected or undetected peaks. Heartbeats were manually counted for each participant to compare to their estimates.

Temporal analysis of heartbeat tracking. Previous research has suggested that during a discrimination task, tones which are presented at 0ms and 500ms after the r-wave are not perceived by participants as simultaneous with their own heartbeat, however in-between these timeframes there may be differences between participants as to when their heartbeat would be perceived (Wiens & Palmer, 2001). Because of this, it is impossible to assign a specific timeframe from each heartbeat that could classify all individuals as being correct. Instead, consistency of response after the R-wave was used as a measure of temporal accuracy. The time of each response trigger was recorded, as well as the time of the preceding R-wave in the ECG recording. The difference between these was recorded and a standard deviation of all the scores was calculated to create an index of R-wave to trigger variability (RWT-SD). Another standard deviation was calculated for the difference between each trigger (TT-SD) to examine the consistency with which each trigger was pressed in relation to the one preceding it.

Statistical analysis.

Data screening. Statistical analyses were performed using IBM SPSS Statistics V22.0 for Windows. The data were screened for normality by examining Z scores for skewness and kurtosis (by dividing skew and kurtosis values by their standard errors), as well as through Kolmogorov-Smirnov tests (see Appendix J for output and Z score calculations). The data did not meet the assumptions of normality. Because of suggestions that transformation often fails to correct for lack of normality, cause a reduction in power and change the original data, Erceg-Hurn and Mirosevich (2008) recommend more robust methods, such as applying bootstrapping. Because of this, bootstrapping was used instead to estimate the distribution from the sample data, as recommended by Field (2013). Bootstrapping is a technique where samples from the observed data are taken and replaced, before selection of the next data point, creating a new sampling distribution. This method creates confidence intervals to be used as a test of significance, and confidence intervals which do not include zero are used as support that a result is statically significant in place of a p value. (Field, 2013).

IAC and confounding variables. Pearson's correlation analysis was conducted to assess the relationship between body measurements and IAC scores to determine whether body fat had confounding effects on the scores. In addition, correlation analysis was performed on age to determine whether this was a factor, as there is evidence that IAC is negatively correlated with age (Klabunde et al., 2013; Mendes, 2010). Pearson's correlations were conducted to examine the relationship between IAC, PHQ-9 and GAD-7 to determine whether symptoms of anxiety and depression were a confounding factor. Gender was not considered in the present study given interoception has not been found to differ in men and women (Pollatos et al., 2007a; Pollatos et al., 2009).

Dimensions of interoception and EIS. Correlations were conducted between IAC, BAQ, MAIA, IAW, confidence scores and EIS to determine if any dimensions of EIS were related with emotional intensity. Correlations were also used to assess any relationships between each of these separate interoceptive constructs.

Temporal analysis. Pearson's correlations were used to determine the relationship between RWT-SD and IAC, as well as the relationship between TT-SD and IAC.

Results

IAC and confounding variables. No significant correlations were found between WHR and IAC scores, BMI and IAC, body fat and IAC scores, or age and IAC (see Appendix K). There were also no significant correlations between IAC and scores on the PHQ-9 and the GAD-7.

Dimensions of interoception and EIS

IAC, IS and EIS. Correlation analysis was undertaken between IAC scores and questionnaire measures for IS and EIS (see Appendix L). No significant correlations were found between IAC scores and the BAQ, the MAIA or the EIS. There was also no significant correlation between the BAQ and the EIS (see Appendix M). When examining EIS with the scales of the MAIA, it was found that attentional regulation and self-regulation was significantly negatively correlated with anger, fear and overall EIS negative scores. Not worrying was significantly negatively correlated with fear, and emotional awareness was significantly positively correlated with fear, sadness, joy, and overall EIS positive and negative scores (see Table 1).

Table 1.

Significant correlations between EIS and MAIA.

			BCa 95% Confidence Interval	
	R	*p*	Upper	Lower
		Attentional Regulation		
Anger	-.27	.026	-.037	-.476
Fear	-.26	.033	-.027	-.468
EIS Negative	- .27	.026	-.025	-.478
		Self-Regulation		
Anger	-.42	<.001	-.257	-.572
Fear	-.29	.015	-.118	-.461
EIS Negative	-.34	.004	-.177	-.488
		Not Worrying		
Fear	-.29	.016	-.043	-.511
		Emotional Awareness		
Fear	.29	.016	.516	.047
Sadness	.41	< .001	.614	.167
Joy	.44	< .001	.641	.201
EIS positive	.42	< .001	.638	.177
EIS negative	.39	.001	.614	.124

BAQ AND MAIA. Correlations between the BAQ and MAIA can be found in Appendix M. BAQ was negatively correlated with Noticing and positively correlated with Attentional Regulation, Emotional Awareness, Self-Regulation, Body Listening and MAIA Total (see Table 2). There were no significant correlations between the BAQ and Not Distracting, Not Worrying, and Trusting.

Table 2.

Significant Correlations between BAQ and MAIA

	BAQ			
			BCa 95% Confidence Interval	
	r	*P*	Upper	Lower
Noticing	-.55	<.001	.705	.368
Attentional Regulation	.46	< .001	.615	.298
Emotional Awareness	.47	< .001	.659	.253
Self-Regulation	.43	< .001	.622	.206
Body Listening	.45	< .001	.610	.243
MAIA Total	.59	<.001	.715	.427

IAC, IAW, Confidence and EIS. Pearson's correlations were also conducted to assess the correlation between IAC, raw confidence scores and IAW on EIS (see appendix N). There was a significant positive correlation between IAC and IAW (r = .71, n = 70, p <.001; BCa 95% Confidence Interval [.610, .796] and IAC and confidence (r = .52, n = 70, p <.001; BCa 95% Confidence Interval [.305, .699] However, there were no significant correlations between confidence or IAW with any EIS scale. There were also no significant correlations between confidence, or IAW for either measure of IS.

Temporal Analysis. There was a significant positive correlation between IAC and RWT-SD; r = .32, n = 40, p = .042; BCa 95% Confidence Interval [.008, .633]. There was a significant negative correlation between TT-SD and IAC score; r = -.70, n = 40, p< .001; BCa 95% Confidence Interval [-.796, -.554] (see Appendix O). This suggested that a positive relationship between IAC and variability in time from each trigger, and the preceding heartbeat, as well as a negative relationship between IAC and variability between each trigger press.

Discussion

Experiment 1 in the present study aimed to replicate previous findings which have found a positive relationship between IAC and emotion (Barrett et al., 2004; Critchley et al., 2004; Furman et al., 2013; Herbert et al., 2007; Herbert et al., 2010; Kindermann & Werner., 2014; Wiens et al., 2000). It was predicted that emotional intensity would have a positive relationship with IAC. It was also predicted that emotional intensity would be correlated with IS, given findings from Calì et al. (2015). The relationship between EIS and IAW was also explored.

The findings of this study revealed no relationship between IAC and EIS, and well as IAW with the EIS. IS and EIS were found to be related, but only when using one measure of IS (MAIA) and not the other (BAQ). The relationship between IAC, IS and IAW was also explored to see if the results from previous research (Calì et al., 2015; Garfinkel et al.,2015), who found no such relationship, could be replicated. While there was no correlation between IAC and IS, nor between IS and IAW, there was a correlation between IAC and IAW.

The final aim of the study was to examine temporal accuracy during the HTT. There was a positive relationship between IAC and the size of the standard deviation from the timing of the R-wave to the trigger that followed it. This suggests that higher accuracy is correlated with more variation in the time from which a heartbeat occurred to the time is was felt. There was also a significant negative correlation between IAC score and the standard deviation from the time one trigger was pressed to the next one. This suggests that higher accuracy is correlated with more temporal consistency with each trigger press.

The lack of correlation with IAC and emotional intensity does not support the hypothesis that there would be a positive relationship between these two constructs. There were no correlations between any of the body measurements and IAC, which does not support findings of previous studies (Rouse et al., 1988), or age (Klabunde et al., 2013; Mendes, 2010), suggesting that these factors did not confound the results. There were also no correlations between HTT scores and PHQ-9 or GAD-7. This is surprising given previous research implicating interoception with depression (Dunn et al., 2007; Furman, et al., 2013) and anxiety (Domschke et al., 2010; Dunn et al., 2010b; Pollatos et al., 2009; Stern, 2014). However, it is possible that these effects only emerge in the context of psychiatric disorders, rather than trait or state anxiety and depression in the general population. It is possible that the response scale of the EIS questionnaire limited the way in which participants could respond. Previous research, such as the work by Barret et al. (2004) and Wiens et al. (2000), has suggested that IAC is related to arousal of emotion, rather than valence. Barret et al. (2004) argue that autonomic responses are ambiguous with regards to their patterns, and while certain states may promote energy and alertness, or sleepiness and lethargy, their associated emotions do not form a specific pattern. For example, it could be argued that heightened autonomic responses may lead to increases in energy, but this may translate into happiness or anger depending on the individual. The EIS, while allowing for participants to report intensity they would expect to feel regarding a given emotion, did not allow for the selection of a specific emotional state. As patterns of arousal may lead to different emotions for different individuals, it may be more appropriate for participants to choose the emotion a situation might cause, followed by an opportunity to rate how intensely the would expect to feel it. This was reflected in some of the comments made by participants in Experiment 1, who expressed a desire for valence alternatives for some of the EIS questions (e.g., choices for negative emotion in questions which only allowed for positive).

This study found no correlation between EIS and IS when using the BAQ, however there were several correlations with the MAIA, supporting the findings from Calì et al. (2015) who used an Italian version of the MAIA. The BAQ and MAIA were also correlated. Together, these findings suggest that while the correlation of the two IS suggests they are measuring similar processes, choice of IS measure is dependent on the concept being analysed (e.g., emotional intensity), and suggests caution when choosing a specific measure depending on the hypothesis. However, there were no correlations between IAC and either measure of IS in this study. This supports the results of previous studies (Cali et al., 2015; Garfinkel et al., 2015) suggesting that they are separate and dissociable constructs. In contrast, there was a positive association between IAC and IAW, which contradicts the findings of Garfinkel et al. (2015). It is possible that individuals higher in accuracy have high levels of awareness of their own performance. However, given that the method of calculating IAW in this study was different to that originally proposed by Garfinkel et al. (2015) this can only be speculated.

The positive correlation between RWT and HTT score, as well as the negative correlation between TT-SD, may also explain why the present hypothesis regarding emotional intensity was not supported. Firstly, higher variability from the R-wave associated with greater accuracy suggests that participants with high scores may not be reacting to heartbeats as they feel them, but are using their own expectations of how many they should feel to complete the task. This is supported by the second correlation, which shows that the greater the IAC, the more consistent the timing of the triggers are. This also suggests that though low perceivers may report a smaller number of heartbeats, their perception of individual beats may be more accurate and they may be less influenced by automated timing of finger pressing. These results tentatively suggest the possibility that some of the high IAC participants in this study were guessing.

One of the limitations of Experiment 1 is that reactions to emotive stimuli are not always brought to the level of conscious awareness, which limits the ability of participants to accurately reflect on how they feel in certain situations (Smith & Lane, 2016). Problems with self-reflection in this way are related to what Haybron (2007) termed "affective ignorance," arguing that past, present and future affective experiences are vulnerable to errors such as reflective blindness. This occurs when an individual is still unaware of an experience even when deliberately prompted to reflect upon it. For example, in a study of office noise, Evans and Johnson (2000) found that while behavioural and physiological measures of stress were higher for those in high noise intensity offices compared to low noise intensity offices, ratings of self-reported stress did not differ between groups. It appears the workers had adapted over time to the point where this was experienced as being 'normal'. The relevance to the current research is that if interoception increases emotional responses based on a stronger brain body connection, it is not clear whether this would be reflected in self-report accounts (e.g., high IAC individuals report feeling more stress compared to low IAC) physiological responses (e.g., high IAC individuals exhibited more stress based on physiological markers) or both. For example, while Herbert et al. (2010) found that high IAC was associated with self-report negative emotions alongside greater arousal during mental stress, Kindermann and Werner (2014) did not find corresponding associations between IAC and physiological responses.

The lack of relationship between IAC and EI in Experiment 1 could be related to problems with the EIS measure used. It is possible that other less subjective ways of measuring emotional susceptibility, such as measuring responses to emotional stimuli, may be a more objective way of measuring this. Experiment 2 aimed to address this issue using a cognitive task, whilst also continuing to examine the reliability and validity of the HTT by measuring its test-retest reliability.

Experiment 2

Introduction

The results from Experiment 1 found that, despite expectations, no relationships were found between heartbeat perception accuracy and emotional intensity. This contradicts the findings of several previous studies (Barrett et al., 2004; Critchley et al., 2004; Furman et al., 2013; Herbert et al., 2007a; Herbert et al., 2010; Kindermann & Werner, 2014; Wiens et al., 2000) but supports other (Calì et al., 2015; Ferguson & Katkin, 1996). The finding from Experiment 1 that temporal accuracy is negatively related to IAC suggests that scores in the HTT may not reflect genuine perception and may explain the discrepancies found in previous research regarding the relationship between IAC and emotion. Experiment 2 aimed to further question the reliability of the HTT as a measure of IAC by examining its test-retest reliability. However, the negative results may also be related to unreliability of the EIS. Because of these problems with self-report emotion, Experiment 2 examined IAC and the relationship to processing of emotional stimuli. By using a memory task to determine individual tendency to be distracted by emotional stimuli, this may provide a more objective way of examining IAC and its relationship to emotional processing compared to questionnaires.

Emotional content has been found to influence cognition in previous studies. Emotional stimuli are often better remembered than neutral. Research has found that emotional words (Kensinger & Corkin, 2003), taboo words (Buchanan, Etzel, Adolphs, & Tranel, 2006) and sexually explicit words (Bush & Geer, 2001) have been found to be remembered better than neutral words, and that these words are also related to greater autonomic arousal, such as heart rate and skin conductance (Buchanan et al., 2006). Bush and Geer (2001), as well as Kensinger and Corkin (2003) argued that this effect was due to increased saliency of the words, which lead to increased attention to them during encoding. This would suggest that attention was the main factor in the facilitation of memory. However, Kensinger and Corkin (2003) also proposed that the additional advantage for the recall of emotional words is that they stimulate a physical reaction in a way that neutral words do not. Several studies have found a link between physiological arousal in response to emotional stimuli which are associated with better subsequent recall, such as increased skin conductance (Bradley, Greenwald, Petry, & Lang, 1992), and heart rate (Jennings & Hall, 1980). Artificial increases in arousal have been found to have similar effects. Cahill and Alkire (2003) found that post memory task intravenous infusions of epinephrine, an endogenous stress hormone, facilitated memory during later recall compared to infusions of saline. Clark, Naritoku, Smith, Browning, and Jensen (1999) also found this through stimulation of the vagus nerve, the largest sensory nerve within the body, which transfers information from organs within the abdomen and chest to the brain (Zagon, 2001). During an experiment examining vagus nerve stimulation as a treatment for epilepsy, Clark et al. (1999) found that if stimulation was applied after verbal learning then this significantly enhanced later recall. This suggests vagus nerve activation can facilitate memory in a similar way to arousal. Based on these findings suggesting a relationship between recall and physiological arousal (Bradley et al., 1992; Clark et al., 1999; Jennings & Hall, 1980), it has been proposed that individuals with greater interoceptive access to internal signals could have increased memory performance. This has been found in several studies (Pollatos & Schandry, 2008; Umeda et al., 2016; Werner et al., 2010).

Pollatos and Schandry (2008) examined explicit memory and found that participants with high IAC had superior recall of pleasant and unpleasant pictures compared to low IAC. They also found that IAC was also positively related to increased cardiac arousal in response to the stimuli. Werner et al. (2010) examined whether IAC was related to implicit memory by using a word stem completion task. They found that high IAC participants completed more word stems of previously presented emotional words compared to low, a difference which was not found for neutral word stems. Pollatos & Schandry (2008) and Werner et al. (2010) explained their findings with the somatic marker hypothesis (Damasio, 1994), which proposes that specific signals from the body (somatic markers) arise when an individual is confronted with salient stimuli. Werner et al. (2010) argued that somatic markers also occur when reading emotional words, which can then be reactivated during a recall task facilitating memory. For individuals with better cardiac perception, this enhanced facilitation is thought to be due to more precise access to internal bodily signals (Werner et al., 2010). However, research has also suggested that greater IAC can have a detrimental effect if salient stimuli are used as distractors (Werner et al., 2014). For example, Werner et al. (2014) found individuals with higher IAC were more vulnerable to interference from negative words during an emotional Stroop task, suggesting higher IAC can lead to greater vulnerability to distraction by emotional stimuli. This is supported by previous research which has suggested that higher IAC leads to stronger emotional responses, measured both using self-report and physiological responses (Herbert et al., 2010). There is limited research regarding the impact of IAC on distraction by emotional content. While Werner et al. (2014) examined the effects IAC during an implicit memory task, however, there is a lack research examining the effect of IAC on distraction during an explicit memory task.

Based on this, the aim of Experiment 2 of this study was to examine distraction by emotional stimuli using an auditory distraction paradigm with a serial recall task. Buchner, Rothermund, Wentura, and Mehl (2004) have previously found a greater detrimental effect on performance for valent distractor words than neutral distractors, and attributed this to the role of attention capture from salient stimuli. However, based on research suggesting that emotional words also generate a stronger physical reaction which is associated with better recall (e.g., Bradley et al., 1992; Jennings & Hall, 1980) and research suggesting that this emotional reaction is increased in individuals with greater IAC (e.g., Herbert et al., 2007), this study aimed to extend the work of Buchner et al. (2004), as well as that of Werner and colleagues (2010; 2014), by examining the effects of emotional distractors compared to neutral distractors in low and high IAC individuals. Based on previous research suggesting superior heartbeat perceivers perform better in memory tasks for emotional word stems (Werner et al., 2010), this experiment aimed to test if the reverse was true: whether higher IAC creates a disadvantage when to-be-ignored stimuli are emotional in nature.

The findings in Experiment 1 were not consistent with previous research, and it is possible that this is due to problems with limitations of the EIS. However, given the temporal results from Experiment 1, it is possible that methodological issues associated with the HTT do not accurately measure individual IAC. If this is the case, the results from Experiment 2 would be confounded. Therefore, Experiment 2 aimed to examine another methodological issue with HTTs; whether scores on the task are consistent from one time to another. Several studies have examined whether HTT performance can be improved through either practice or interventions. Studies which have examined IAC in meditators have failed to find any sort of enhancement in accuracy because of regular attention to internal stimuli (Daubenmier et al., 2013; Khalsa et al., 2008). Similarly, the emphasis on mindfulness, yoga and meditation in non-western cultures does not lead to an increased accuracy for body signals (Ma-Kellams, 2014), manipulations of stress and relaxation (Fairclough & Goodwin, 2007), or cognitive behavioural therapy (Antony et al., 1994). However, it has been reported that IAC can be improved by exercise (Antony, 1995), following mirror-self-observation (Ainley et al, 2012), after a 24 hour fast (Herbert, Muth et al., 2012), and after mental training (Bornemann & Singer, 2016). These results suggest that through manipulation or training, IAC can change, suggesting that this is not a stable trait.

However, a variety of studies have contributed to the debate about whether practice of the HTT and feedback given about heartbeat can influence genuine heartbeat perception ability, or merely reflects updated knowledge. Ring et al. (2015) found that feedback, rather than repeated exposure to the task, led to improvements in the HTT, suggesting that practise alone does not cause improvements. Ring et al. (2015) also found that feedback improved performance regardless of whether the feedback was delayed or immediate. This would suggest that the feedback updated participant's beliefs about their heart rate which improved accuracy, rather than training the participants to more accurately detect heartbeat sensations. Because of mixed findings relating to the stability of IAC, it is unclear whether manipulation or training has any effect. The task's test-retest reliability has also been questioned by Pennebaker and Hoover (1984) found to produce low test-retest consistency over a two-week period. Since this study (Pennebaker & Hoover, 1984), research has not examined the consistency of IAC in the absence of manipulation or training. A second aim of Experiment 2 was to further examine this consistency by recruiting a sub-set of participants from Experiment 1 and compare their IAC scores from the first experiment to the second.

Experiment 2 aimed to extend the results of Experiment 1 by examining IAC and its relationship to distraction by emotional stimuli. Using a serial recall task with emotional auditory distractors, the tendency to be distracted by emotional stimuli was compared to IAC to provide a more objective way of examining IAC and its relationship to emotion compared to questionnaires. According to the somatic marker hypothesis (Damasio, 1994), emotive words used as auditory distractors should create a somatic state, compared to neural words which would not be associated with a physiological change. High IAC individuals with greater access to somatic states should be more distracted by emotional words than individuals with low IAC. If this is the case, the results will not only provide support for models of memory, which specify a role of attention in serial recall maintenance (e.g., Cowan 1995), but will also suggest that individual differences in interoceptive accuracy play a role retention of serial order and susceptibility to distraction. The first hypothesis was that the findings of Buchner et al. (2004) would be replicated and a general detrimental effect of emotional distractor words would be found. The hypothesis in this experiment was that distraction for emotional stimuli would be greater in high IAC individuals compared to low IAC, based on the somatic marker hypothesis (Damasio, 1994), and would lead to a reduction in memory for words presented at the same time as these distractors. The final aim was to determine whether IAC as measured using the HTT was stable in the absence of training or manipulation. If scores from the first experiment compared to the second are comparable, this would suggest that IAC is a stable trait. If it is not, it would suggest that either the HTT is not a reliable method, or that IAC changes over time regardless of a deliberate effort to change it.

Method

Design. This experiment used a within-subjects design. The independent variables were sound distractor condition (positive words, negative words, neutral words or silent) and interoceptive accuracy (high or low). The dependent variable was performance during the memory task (number of items remembered). This experiment also used correlation to assess the relationship between each dimension of interoception (accuracy, sensibility and awareness) and performance during the memory task (number of items remembered). Finally, this experiment examined test re-test reliability of the HTT. The independent variable was time (T1 vs T2) and the dependent was HTT accuracy. Confounding variables were controlled for, including body fat, BMI and waist hip ratio. Ethical approval was obtained for the experiment from the School of Psychology Ethics Committee, University of Central Lancashire (UCLan) in accordance with the Declaration of Helsinki.

Participants. A total of 33 (18 female, 15 male) students and staff from the University of Central Lancashire participated in the study. Undergraduate psychology students could participate in exchange for course credits. Participant ages ranged from 18 to 37 years (M = 22.67, SD = 4.74). Participants all had corrected, or corrected-to-normal vision and hearing due to visual and auditory presentation of stimuli, and English was their first language. Participants also had no diagnosed cardiac, neurological and psychiatric conditions and did not use vasoactive and/or psychoactive medications. One participant was excluded from the analysis of the memory task due to data recording error, leaving 32 participants.

Test-retest reliability. Some of the participants in Experiment 2 (*n* = 29) were a sub-set of the participants from Experiment 1. This allowed for the comparison of heartbeat tracking scores from the first experiment (Time 1) and the second (Time 2).

Materials.

Selection of to-be-remembered and distractor stimuli. The memory task was adapted from previous research (Buchner et al., 2004) in which sequences of six nouns (minibus, analyst, episode, monitor, vacancy, cabinet, leotard) were presented consecutively and participants were instructed to recall them in serial order. Auditory distractors were neutral, positive and negative adjectives matched on frequency, valence, familiarity, length, leading to four sound conditions: silent, neutral words, positive words and negative words.

To be remembered items consisted of three syllable nouns consisting of seven letters. Valence, arousal and dominance of nouns and distractor adjectives were taken from a list of 13,915 English lemmas (Warriner, Kuperman, & Brysbaert, 2013) compiled from the SUBTLEX-US corpus (Brysbaert & New, 2009), category norms from Van Overschelde, Rawson, and Dunlosky (2004) and the Affective Norms for English Words (ANEW) from Bradley and Lang (1999). Ratings ranged from 1-9 for valence (unhappy to happy), arousal (calm to excited) and dominance (controlled to in control). Concreteness of nouns and distractor adjectives were taken from Brysbaert, Warriner, and Kuperman (2014). In the study by Brysbaert et al (2014), word frequency values were taken from the SUBTLEX-US frequency count (Brysbaert & New, 2009). Because the present experience recruited British participants, frequency values from SUBTLEX-UK (Van Heuven, Mandera, Keuleers, & Brysbaert, 2014), a word frequency database for British-English, were used instead. Values in the database are expressed on a Zipf scale, ranging from slightly below 1 to slightly above 7. Values 3 and below are thought of as lower frequency words, whereas 4 and above are high frequency. Valency, arousal, dominance, concreteness and arousal ratings for to be remembered nouns and distractor adjectives can be found in Appendix P and Q, respectively.

Buchner et al. (2004) included positive and negative trait adjectives that were either possessor relevant or other relevant based on research by Wentura, Rothermund, and Bak (2000) who argued that the evaluation of traits depends on whether one must interact with a person with a trait (other relevant), or whether one possesses the trait themselves (possessor relevant). Given that IAC has been found to be an indicator of self-focused attention (Matthias et al., 2009), and research that has found linking insula activity (thought to be involved in interoception) with judgements of pictures as being self-related (Grimm et al., 2009), it was decided that these manipulations would also be used to see if there may be a distinction between trait evaluation for “self” and “other” in distraction depending on IAC. As in Buchner et al. (2004), the distractor words chosen were three syllable trait adjectives. However, because of translation differences leading to variation in syllable number, the current study adapted the original adjectives used in the study by Wentura et al. (2000). 15 out of the 28 possessor/other relevant adjectives had a direct, three syllable English translation from the original German words. The remaining 13 were given an English translation thought to be closely related to the German definition. The full list of translations can be found in Appendix R. Neutral distractor adjectives were chosen from the list in Warriner et al. (2013) by selecting three syllable trait adjectives close to 5 (neutral on the valence scale).

Memory task parameters. Trait adjectives were spoken by a female voice and digitally recorded using 16-bit encoding at 44.1kHz. Each noun was displayed on the screen for 700ms with a 500ms inter stimulus interval in-between. The irrelevant sounds were presented simultaneously with the nouns. The sounds were spoken by a female voice and edited using software (Audacity 2.1.2.) to ensure each word had a 700ms duration to match the visually presented stimuli, and each word was normalised to prevent differences in amplitude between the words. There was an inter-stimulus interval of 500ms between each sound, and the sounds were played binaurally at a level of approximately 65dBCA.

The materials for HTT and IAW were identical to Experiment 1. Scores from the MAIA (Mehling et al, 2012) in Experiment 1 were also used to explore associations between mindfulness and cognitive abilities, given research suggesting its relationship with increased working memory capacity (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010; Mrazek, Franklin, Phillips, Baird, & Schooler, 2013), and sustained attention (Chambers, Lo, & Allen, 2008; MacLean et al., 2010).

Procedure. Participants were given an information sheet and signed a consent form as in Experiment 1 (see Appendix S and T respectively). Body measurement and HTT procedures were identical to Experiment 1. The order of the memory tasks and the HTT were counterbalanced to prevent order effects. During the memory task, participants were instructed to remember the order of the six words that were presented on the screen and to type their responses into the box provided. They were also instructed to ignore any sounds that they heard through the headphones and focus on remembering the order of the visually presented stimuli.

There were 48 experimental sequences separated into six blocks, with each block containing eight sequences. Participants were encouraged to have a break between each block if so required. Each sequence contained six to be remembered stimuli which were randomly selected without replacement from the seven nouns. For each sequence, visual stimuli were accompanied by one of the following sets of adjectives: positive possessor relevant (eight sequences), negative possessor relevant (eight sequences), positive other-relevant (eight sequences), negative other-relevant (eight sequences) or neutral trait adjectives (eight sequences). The remaining eight sequences were accompanied by silence. After completing the HTT and the memory task, participants were provided with a written and verbal debrief (see Appendix U).

Statistical analysis

IAC groups. Heartbeat tracking scores were split at the median (0.44) to create a high and low performance groups (see Ainley et al., 2013; Durlik, Cardini, & Tsakiris, 2014; Garfinkel et al., 2015; Lenggenhager, Azevedo, Mancini, & Aglioti, 2013).

Memory performance and IAC. Data was screened using the same procedure as Experiment 1 (see Appendix V for output and Z score calculations). Statistical analyses were performed using IBM SPSS Statistics V22.0 for Windows. ANOVA models were used to determine if there was a difference between IAC group and performance during the memory task. First, a 6 (sound condition: Silent, Neutral Words, Positive Self, Positive Other, Negative Self and Negative Other Words) x 2 (group: Low heartbeat perceivers and High heartbeat perceivers) mixed ANOVA was conducted. A second 4 (sound condition: Silent, Neutral Words, Positive Words and Negative Words) x 2 (group: Low heartbeat perceivers and High heartbeat perceivers) x 2 (group: HTT before and HTT after) mixed ANOVA was conducted to test for differences in the absence of a self-other distinction, as well as to ensure there were no confounding effects of order on the results. Previous research (e.g., Chambers et al., 2008) suggested that attention to internal sensations may affect sustained attention, so comparisons of performance depending on whether the HTT came before or after the task was necessary.

Performance, IAC, IAW, body measurements and MAIA, BAQ. Pearson's correlation analyses were conducted to examine if there was a correlation between IAC and performance in case the median split analysis did not adequately separate low and high IAC individuals. Correlations were also used to assess the relationship between

IAW, raw confidence scores and IS on performance. Final correlations were conducted to examine the effect of mindfulness using all scales of the MAIA, given research suggesting they all correlate with other measures of mindfulness (Mehling et al, 2012).

Time 1 vs time 2 analysis. To assess these differences between IAC scores from time 1 to time 2, a paired samples t-test was conducted to determine if there is a significant difference in overall performance for time 1 and 2. A second test was performed to determine if there is a difference between groups based on whether their performance improved or became worse over time. The difference between the scores were calculated and then ranked. A median split was then used to split the data into two groups at the median (0) to create an improved performance group and a reduced performance group. Paired samples t-test were then used to determine if there was a significant change in IAC in these two groups from the first time they completed the HTT to the second.

Results

Performance – IAC. A repeated measure ANOVA was conducted to assess differences by group (Low or High IAC) for percent correct in each sound condition. Output can be found in Appendix W. Means and standard deviations of these scores can be found in Table 3.

Table 3.

Means (and Standard Deviations) for Scores in each sound condition by IAC Group.

	IAC Mean		
Sound Condition (Percent Correct)	Low	High	Total
Negative Other	50.00 (16.86)	52.73 (15.77)	51.37 (16.12)
Negative Self	50.26 (18.35)	56.25(15.74)	53.26 (17.09)
Neutral	49.22 (14.67)	49.87 (18.70)	49.54 (16.54)
Positive Other	50.00 (16.37)	53.91 (14.67)	51.95 (15.42)
Positive Self	53.78 (13.16)	55.08 (16.23)	54.43 (14.55)
Silent	55.60 (19.07)	57.81 (17.09)	56.71 (17.85)

There was a significant main effect of sound condition; $F(5, 150) = 2.69$, $p = .023$, $\eta p^2 = .08$. There was no main effect of group; $F(1, 30) = .30$, $p = .588$, $\eta p^2 = .01$. There was no significant interaction between sound condition and IAC group; $F(5, 150) =$

.40, p =.849, ηp^2 = .01. Overall mean for the low IAC group was 51.48 (SE = 3.62) and 54.28 for high (SE = 3.62). Another ANOVA was conducted to assess the differences by sound condition when self and other where treated as one. It also checked to see if there was an effect of order. There was a significant effect of sound (F(3, 84) = 5.67, p = .001, ηp^2 = .17), but no effect of order (F(1, 28) = 4.15, p = .051, ηp^2 = .13), or group (F(1, 28) = .00, p = .968, ηp^2 = .00). There was no interaction between sound and order (F (3, 84) = 2.31, p = .083, ηp^2 = .08), no interaction between sound and group (F(3, 84) = .68, p =.564, ηp^2 = .02), and no interaction between sound, group and order (F(3, 84) = 1.03, p = .383, ηp^2 = .04).

Paired samples t-test examined effect of sound on performance (see appendix X). Using a Bonferroni adjusted alpha level of .008, no significance difference was found between positive and negative conditions (t(31) = .56, p = .583), positive and neutral (t(31) = 2.17, p =.038), negative and neutral (t (31) = 1.42, p = .165), silent and positive (t(31) = 2.19, p =.036), and between silent and negative sound conditions (t (31) = 2.16, p = .038). There was a significant difference between silent and neutral conditions; t(31) = 3.81, p =.001. Neutral distractor sounds led to poorer performance compared to the silent condition (see Table 3 for means). These results show that whilst there was a significant difference between silence and distracting stimuli, this was only present in the neutral condition, contrary to the hypothesis of this experiment.

Performance, IAW and Confidence. Output for this analysis can be found in Appendix Y. There was no significant correlation between performance and IAC, or significant correlations with body measurements which could have affected IAC. There was also no significant correlation between performance in any sound condition and any dimensions of interoception.

Correlations between Dimensions of Interoception. Output for this analysis can be found in Appendix Y. IAC was significantly positively correlated with IAW (r = .61, n = 32, p< .001 [.428, .761]) and confidence (r =.57, n =32, p = .001, [.275, .807]). IAW was not significantly correlated with IS, but confidence was (r =.43, n = 32 p = .013, [.023, .762,]).

Performance and MAIA. Output for this analysis can be found in Appendix Y. The self-regulation scale of the MAIA was significantly positively correlated with total percent correct (*r* = .39, *n* = 32, p = .026 [.118,.658]) as well as positive percent correct (*r* = .38, *p* = .033 [.068 , .696]). There were no other significant correlations with any of the MAIA scales.

Time 1 vs Time 2 Analysis. Output for the analysis of the differences in IAC between Time 1 and 2 can be found in Appendix Z. Paired samples t-tests were conducted to see if there where changes in body measurements that may account for differences in accuracy. There was a significant difference in the scores for WHR from Time 1 (M = .84, SD = .10) and Time 2 (M = .82, SD = .09); t(26) = 2.54, p = .017. However, there was not a significant difference in the scores for body fat percentage from Time 1 (M = 29.07, SD = 5.74) to Time 2 (M = 29.15, SD = 5.58); t(15) = -1.01, p = .331. On average, BMI at Time 1 (M = 28.29, SD = 6.98) compared to 2 (M = 27.98, SD = 6.95) was higher. This difference, -.31, BCa 95% CI [-.058, .734], was not significant; t(26) = 1.34, p = .192.

A first analysis revealed no significant difference in IAC between Time 1 (M=.45, SD = .28) and Time 2 (M=.44, SD = .31); *t*(28) = .33, *p* = .747 (BCa 95% CI [-.069, .108]). When participants were separated into groups depending on whether they improved or not, there was a difference in IAC scores for Time 1 (M=.47, SD=.23) and 2 (M=.62, SD=.23) for the group who improved. This difference, .15, BCa 95% CI [-.195, -.093), was significant; *t*(14)= -5.25, *p* = < .001. There was also a difference in IAC between Time 1 (M=.44, SD=.34) compared to 2 (M=.24, SD=.25,) for the group whose performance decreased. This difference, -.20 , BCa 95% CI [.097, .330], was significant; *t*(13)= 3.680, *p* = .003. Means and changes in accuracy in the HTT depending on time and group can be found in Appendix AA.

Discussion

The first hypothesis in Experiment 2 was that there would be a detrimental effect of emotional distractor words of performance compared to neutral and silent. The second hypothesis was that distraction for emotional stimuli would be greater in high IAC individuals compared to low IAC and would lead to a reduction in memory for words presented at the same time as these distractors. The results did not support either of these hypotheses. There was no effect of IAC group on performance for the task. There was an effect of sound, but only between neutral and silent conditions, with neutral distractor words leading to the worst performance. The final aim was to determine whether IAC as measured using the HTT was stable in the absence of training or manipulation. There was a significant difference between IAC score from time one to time two for the group whose performance improved, as well as for the group that did not.

The results of Experiment 2 did not support the findings of Buchner et al. (2004) who report a general effect of distraction by emotionally valent stimuli when group differences where not examined. The only significant difference in the sound conditions was between neutral and silent. Why performance was so low in the neutral condition is unclear, however it is possible that participants found certain neutral words more salient and captured their attention more, despite their neutral valency. The results from Experiment 2 also did not support previous research, which has found IAC to affect distraction from salient stimuli (e.g., Werner et al., 2014), as no differences in performance were found between high and low IAC groups. Body measurements and age were shown not to be correlated with IAC, which suggests they did not play a confounding role. While MAIA scores were examined based on research by Chambers et al. (2008) suggesting a relationship between mindfulness and increased sustained attention, a significant relationship between MAIA and performance was only found on one scale. Given that the other scales of the MAIA have been found to be related to mindfulness (Mehling et al., 2012), and were not correlated with performance, it is unclear if there is a genuine relationship. Additionally, the MAIA scores were measured during Experiment 1, and participants could have potentially provided alternative ratings if the MAIA was measured before the memory task in Experiment 2.

The lack of a significant effect of IAC may be due to experimental variables such as insufficiently valent emotional stimuli. While Bush and Geer (2001) and Buchanan et al. (2006) found effects of emotional words, they used taboo/sexual words, and it is possible that the words used in this study did not create sufficient autonomic arousal. However, while some studies have found IAC to be related to increases in physiological arousal (Herbert et al., 2007a; Herbert et al., 2010), others have not found such effects (Kindermann & Werner, 2014; Sloan & Sandt, 2010; Wiens et al., 2000). Wiens et al. (2000) suggested IAC may be independent of sympathetic activity and arousal, so it is not yet clear whether increased distraction would be accompanied by arousal, even if the distractor words were more salient. Future research should check for autonomic responses, such as skin conductance or heart rate in response to stimuli, to see if a physiological reaction occurs. It is also possible that this study did not recruit a sufficient amount of high IAC individuals, which is why no significant effects were obtained. For example, Werner et al. (2014) only found an effect for negative word interference for high IAC individuals, and no effect at all was found for low IAC, suggesting they allocated resources for the cognitive task and less to the emotional stimuli.

Another possibility for the absence of any effects is that there is no relationship between interoception and emotional processing, or that cognitive effects play a more significant role in susceptibility to distraction. Bush and Geer (2001) argued that salient words undergo more elaborate processing and lead to better recall when they are the focal task. When emotional words are distractors, this may increase attention and require more conscious processing compared to less salient distractions, leading to distraction from the focal task, and it is possible that interoception, if it plays a role, is less of a contributing factor. However, this still does not explain why this study found no effect of emotional words on performance, or why neutral distractors led to the worst performance. This may be due to a small sample size in Experiment 2, as Buchner et al. (2004) had a sample size of 64. Emotional processing could have been mediated by top down control, which was found in a study by Marsh et al. (in press) using a similar distraction paradigm. In Marsh et al. (in press), there was evidence to suggest that greater top down cognitive control, thought to be influenced by greater working memory, led to less disruption from emotional irrelevant sound. It is possible that this study recruited participants with greater top down control leading to greater protection from distraction, especially given the small sample size. However, this is only speculative without evidence that participants had greater working memory or superior attentional control.

The sample may have been too small to determine low and high perceivers, as the median was low (0.44) in comparison to previous studies (e.g., .66, Ainley et al., 2012; .56, Ainley et al., 2013; .59, Durlik et al., 2014; .57, Durlik & Tsakiris, 2015; .70, Lenggenhager et al., 2013; 78, Michael et al., 2015). Many studies have cited .85 as a cut off point for high and low interoceptive abilities (Herbert, Pollatos et al., 2007; Herbert, Ulbrich et al., 2007; Montoya, Schandry & Müller, 1993; Pollatos & Schandry, 2004; Pollatos et al., 2005a, b) but did not provide justification for this decision. For this reason, a median split was chosen as the best option for this study. However, it is possible that the low median was a contributor to the lack of significant findings, and a larger sample may have been required to obtain a greater number of high perceivers.

The results of Experiment 2 suggest that the changes that occurred in accuracy in the HTT were unrelated with changes in body measurements. Whilst there was a significant difference between WHR from Experiment 1 to 2, this was not accompanied by changes in BMI or body fat. The results found that, in the absence of manipulations or training (e.g., self-observation, Ainley et al., 2012; mental training, Bornemann & Singer, 2016; fasting, Herbert, Muth et al., 2012) scores on the HTT where not stable from one experiment to another, which supports the findings of Pennebaker and Hoover (1984) who found IAC was not stable over the course of a week. This result should be viewed with caution, as this effect only emerged when participants were separated in groups depending on whether their performance increased or decreased. However, it has been argued that group data obscures results, and that it is best to view cardiac data on a more individual basis (Pennebaker 1982, as cited in Cameron, 2001a). Whilst some participants showed little variation in IAC, some individuals had a much greater difference. It is possible that individual participants practiced and improved their performance in their own time without instruction, but this would not explain why the other group of participants displayed a reduction in performance, especially as they were given no performance feedback. Whilst it is possible that interoception changes over time, the lack of test-retest reliability of the HTT is problematic for researchers unless they are testing variables which measure present state. For example, if the HTT is a genuine measure of cardiac sensitivity, but scores vary, it cannot be used for self-report questionnaires or other measures which relate to the past or the future. It can only provide meaningful evidence for variables which are relevant to the present, such as responses to a cognitive task or physiological responses.

General Discussion

The results of both experiments in this study did not support the hypotheses linking IAC with EI or susceptibility to distraction from emotional stimuli. No relationship was found between EI and IAC, or EI with IAW. There was a relationship between EI and IS measured using the MAIA, which support the results of previous research (Cali et al., 2015). However, the was no relationship between the EI and the BAQ. Most importantly, the results of both these experiments have also added to the debate as to whether HTTs are a valid and reliable method of measuring individual interoceptive abilities. Experiment 2 found that the HTT task had low test-retest reliability for most participants, which could be due to IAC being a state, rather than trait variable. However, the results from Experiment 1 suggests that IAC as measured using the HTT may not be entirely valid.

One of the major issues with the HTT is that is difficult to determine what sensations participants are experiencing. Pennebaker (1982) commented that different participants label different symptoms in different ways and may also respond to different parts of the stimulus (as cited in Cameron, 2001a). For example, with heartbeat perception, it is difficult to determine whether a participant felt an electric, chemical or a mechanical change (Pennebaker, 1982, as cited in Cameron, 2001a). Cameron (2001a) suggested that even if there is a strong correlation between genuine number of heartbeats and reported heartbeats, this may not be a perception of heartbeat, but something else, such as blood being pumped through the aorta. Another reason both studies may have failed to replicate significant results in emotional intensity (Barrett et al., 2004; Critchley et al., 2004; Furman et al., 2013; Herbert et al., 2007a; Herbert et al., 2010; Kindermann & Werner, 2014; Wiens et al., 2000) and cognition (Pollatos & Schandry, 2008; Umeda et al., 2016; Werner et al., 2010) compared to other studies, is because the HTT performance has been found to differ depending on the instructions. Stricter instructions, such as asking participants only to count heartbeats that they genuinely feel and not to count any that they are not sure of, have been found to decrease performance (Ehlers, Breuer, Dohn, and Fiegenbaum, 1995). Because participants in both Experiment 1 and 2 were encourage not to guess, this may have elicited more conservative reporting. However, given than many researchers including Reed et al. (as cited in Cameron, 2001a) and Khalsa et al. (2009) have suggested that the one of the greatest issues in the HTT is that participants often report guessing, it seemed necessary to discourage this behaviour in the present study.

Participants in Experiment 1 and 2 reported feeling distracted by other body sensations, such as breathing, which made it difficult for them to perceive their heartbeat. This is supported by previous research which argued HTT is influenced by modification of breathing, such as holding breathe, which is often used by participants to reduce distraction and noise during the HTT (Jones 1994, as cited in Cameron, 2001a). Depending on the intensity of these competing sensations, it is likely that perception of heartbeat could have been impaired. Pennebaker (as cited in Cameron, 2001a) argues that the intensity of a stimulus is crucial to the extent that other factors will influence perception of it. For example, if instructed to decide whether their hand had been touched, an individual would be less likely to be influenced by other sources if the object hitting their hand was a hammer as opposed to a feather. A heartbeat is arguably more akin to a feather, and can be influenced by many other sensations in the body which are more “hammer-like”, such as a full bladder, a twitch, or even the movement of the lungs (Pennebaker 1982, as cited in Cameron, 2001a). Hunger or pain may also play a role. Because of this, it is possible that competing physiological processes within the body may have limited the ability of participants to focus on their heartbeat, which may be a much subtler sensation (Pennebaker 1982, as cited in Cameron, 2001a).

The lack of independent criteria to indicate whether awareness occurred is a limitation for studies of interoception (Cameron 2001a). Some have argued that the methods found to be least reliable, notably the HTT and HDT, are still being used (Jones, 1994, as cited in Cameron, 2001a), and it could be argued that there is enough doubt regarding the reliability and validity of these to justify more research into these methodologies, or alternatively, using alternative methods to measure interoceptive abilities. One example of such a method is heartbeat evoked potential (HEP) which measures event related potentials time locked to heartbeats. It is thought to reflect neural responses to cardiac signals and has been explored in several studies as a potential alternative to techniques such as the HTT (e.g., Baranauskas, Grabauskaitė, & Griškova-Bulanova, in press; Pollatos et al., 2005a; Wei et al., 2016). It is important to continue research into the potential relationship between interoception, emotion and cognition, particularly as it may have clinical implications for psychiatric research (e.g., Dunn et al., 2007; Paulus & Stein, 2010; Stern, 2014. However, it is even more important that methods used to measure interoception are valid, reliable, and can provide meaningful information about the way it affects human experiences.

Conclusion

Overall, the results of these two experiments have found that despite expectations, there were no relationships between IAC and either emotional intensity or distraction from emotional stimuli. There was an association between self-reported experience of internal sensations and emotional intensity, which replicated the findings of previous studies, suggesting that IS, thought to be a separate component of interception, is related to the experience of emotion. It is possible that the EIS is not an adequate measure for assessing differences in IAC, given that it was restricted in valence choices. It may also be possible that, if interoception changes over time, questionnaires which ask about hypothetical situations cannot be related to IAC, which can only measure an individuals present state. In addition, given the conflicting results from previous research, it is still unclear as to whether the HTT is measuring what it is intended to measure, and there is a possibility that participants, particularly those with higher IAC, are guessing rather than reporting genuinely perceived heartbeats. It is possible that studies of interoception should move away from these tasks altogether and potentially move towards more unconscious methods of measurement, given the methodological problems which have been highlighted in the literature and by the current experiments.

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Appendix A

Body Awareness Questionnaire

Body Awareness Questionnaire

Listed below are a number of statements regarding your sensitivity to normal, non-emotive body processes. For each statement, select a number from 1 to 7 that best describes how the statement describes you and circle the number in the box to the right of the statement.

	Not at all true of me						Very true of me
1. I notice differences in the way my body reacts to various foods.	1	2	3	4	5	6	7
2. I can always tell when I bump myself whether or not it will become a bruise.	1	2	3	4	5	6	7
3. I always know when I've exerted myself to the point where I'll be sore the next day.	1	2	3	4	5	6	7
4. I am always aware of changes in my energy level when I eat certain foods.	1	2	3	4	5	6	7
5. I know in advance when I'm getting the flu.	1	2	3	4	5	6	7
6. I know I'm running a fever without taking my temperature.	1	2	3	4	5	6	7
7. I can distinguish between tiredness because of hunger and tiredness because of lack of sleep.	1	2	3	4	5	6	7
8. I can accurately predict what time of day lack of sleep will catch up with me.	1	2	3	4	5	6	7
9. I am aware of a cycle in my activity level throughout the day.	1	2	3	4	5	6	7

10. I *don't* notice seasonal rhythms and cycles in the way my body functions.	1	2	3	4	5	6	7
11. As soon as I wake up in the morning, I know how much energy I'll have during the day	1	2	3	4	5	6	7
12. I can tell when I go to bed how well I will sleep that night.	1	2	3	4	5	6	7
13. I notice distinct body reactions when I am fatigued.	1	2	3	4	5	6	7
14. I notice specific body responses to changes in the weather.	1	2	3	4	5	6	7
15. I can predict how much sleep I will need at night in order to wake up	1	2	3	4	5	6	7
16. When my exercise habits change, I can predict very accurately how that will affect my energy level.	1	2	3	4	5	6	7
17. There seems to be a "best" time for me to go to sleep at night.	1	2	3	4	5	6	7
18. I notice specific bodily reactions to being overhungry.	1	2	3	4	5	6	7

Appendix B

The Multidimensional Assessment of Interoceptive Awareness (MAIA)

Below you will find a list of statements. Please indicate how often each statement applies to you generally in daily life

Circle one number on each line

		Never					Always
1.	When I am tense I notice where the tension is located in my body.	0	1	2	3	4	5
2.	I notice when I am uncomfortable in my body.	0	1	2	3	4	5
3.	I notice where in my body I am comfortable.	0	1	2	3	4	5
4.	I notice changes in my breathing, such as whether it slows down or speeds up.	0	1	2	3	4	5
5.	I do not notice (I ignore) physical tension or discomfort until they become more severe.	0	1	2	3	4	5
6.	I distract myself from sensations of discomfort.	0	1	2	3	4	5
7.	When I feel pain or discomfort, I try to power through it.	0	1	2	3	4	5
8.	When I feel physical pain, I become upset.	0	1	2	3	4	5
9.	I start to worry that something is wrong if I feel any discomfort.	0	1	2	3	4	5
10.	I can notice an unpleasant body sensation without worrying about it.	0	1	2	3	4	5
11.	I can pay attention to my breath without being distracted by things happening around me.	0	1	2	3	4	5
12.	I can maintain awareness of my inner bodily sensations even when there is a lot going on around me.	0	1	2	3	4	5
13.	When I am in conversation with someone, I can pay attention to my posture.	0	1	2	3	4	5
14.	I can return awareness to my body if I am distracted.	0	1	2	3	4	5
15.	I can refocus my attention from thinking to sensing my body	0	1	2	3	4	5

16.	I can maintain awareness of my whole body even when a part of me is in pain or discomfort.	0	1	2	3	4	5
17.	I am able to consciously focus on my body as a whole.	0	1	2	3	4	5
18.	I notice how my body changes when I am angry.	0	1	2	3	4	5
19.	When something is wrong in my life I can feel it in my body.	0	1	2	3	4	5
20.	I notice that my body feels different after a peaceful experience.	0	1	2	3	4	5
21.	I notice that my breathing becomes free and easy when I feel comfortable.	0	1	2	3	4	5
22.	I notice how my body changes when I feel happy / joyful.	0	1	2	3	4	5
23.	When I feel overwhelmed I can find a calm place inside.	0	1	2	3	4	5
24.	When I bring awareness to my body I feel a sense of calm.	0	1	2	3	4	5
25.	I can use my breath to reduce tension.	0	1	2	3	4	5
26.	When I am caught up in thoughts, I can calm my mind by focusing on my body/breathing.	0	1	2	3	4	5
27.	I listen for information from my body about my emotional state.	0	1	2	3	4	5
28.	When I am upset, I take time to explore how my body feels.	0	1	2	3	4	5
29.	I listen to my body to inform me about what to do.	0	1	2	3	4	5
30.	I am at home in my body.	0	1	2	3	4	5
31.	I feel my body is a safe place.	0	1	2	3	4	5
32.	I trust my body sensations.	0	1	2	3	4	5

Appendix C

Emotional Intensity Scale

Emotional Intensity Scale

Imagine yourself in the following situations and then tick the answer that best describes how you usually feel.

1. Someone compliments me. I feel:

☐	1	It has little effect on me.
☐	2	Mildly pleased.
☐	3	Pleased.
☐	4	Very pleased.
☐	5	Ecstatic-on top of the world.

2. I think about awful things that might happen. I feel:

☐	1	It has little effect on me.
☐	2	A little worried.
☐	3	Worried.
☐	4	Very worried.
☐	5	So extremely worried that I can almost think of nothing else.

3. I am happy. I feel:

☐	1	It has little effect on me.
☐	2	Mildly happy.
☐	3	Happy.
☐	4	Extremely happy.
☐	5	Euphoric-so happy I could burst.

4. I see a child suffer. I feel:

☐	1	It has little effect on me.
☐	2	A little upset.
☐	3	Upset.
☐	4	Very upset.
☐	5	So extremely upset I feel sick to my stomach.

5. Someone I am very attracted to asks me out for coffee. I feel:

☐	1	Ecstatic-on top of the world.
☐	2	Very thrilled.
☐	3	Thrilled.
☐	4	Mildly thrilled.
☐	5	It has little effect on me.

6. Something frustrates me. I feel:

- [ ] 1 It has little effect on me.
- [ ] 2 A little frustrated.
- [ ] 3 Frustrated.
- [ ] 4 Very frustrated.
- [ ] 5 So extremely tense and frustrated that my muscles knot up.

7. I achieve a personal best in my favorite sport. I feel:

- [ ] 1 It has little effect on me.
- [ ] 2 Mildly pleased.
- [ ] 3 Happy.
- [ ] 4 Very happy.
- [ ] 5 Ecstatic – on top of the world

8. I say or do something I should not have done. I feel:

- [ ] 1 It has little effect on me.
- [ ] 2 A twinge of guilt.
- [ ] 3 Guilty.
- [ ] 4 Very guilty.
- [ ] 5 Extremely guilty.

9. I am at the park with a favorite child. I feel:

- [ ] 1 It has little effect on me.
- [ ] 2 Slightly playful.
- [ ] 3 Playful.
- [ ] 4 Very playful.
- [ ] 5 So playful I feel like running around the park.

10. Someone criticizes me. I feel:

- [ ] 1 It has little effect on me.
- [ ] 2 I am a bit taken aback.
- [ ] 3 Upset.
- [ ] 4 Very upset.
- [ ] 5 So extremely upset I could cry.

11. I receive positive feedback from a favorite professor. I feel:

- [ ] 1 Thrilled-so happy I could burst.
- [ ] 2 Very happy.
- [ ] 3 Happy.
- [ ] 4 Mildly pleased.
- [ ] 5 It has little effect on me.

12. People do things to annoy me. I feel:

- [ ] 1 It has little effect on me.
- [ ] 2 A little bothered.
- [ ] 3 Annoyed.
- [ ] 4 Very annoyed.
- [ ] 5 So extremely annoyed I feel like hitting them.

13. I hear a speech by a leader whose ideas I respect. I feel:

- 1 It has little effect on me.
- 2 Slightly impressed.
- 3 Impressed.
- 4 Very impressed.
- 5 Inspired-so impressed I have a new sense of purpose.

14. I have an embarrassing experience. I feel:

- 1 It has little effect on me.
- 2 A little ill at ease.
- 3 Embarrassed.
- 4 Very embarrassed.
- 5 So embarrassed I want to die.

15. Someone I know is rude to me. I feel:

- 1 So incredibly hurt I could cry.
- 2 Very hurt.
- 3 Hurt.
- 4 A little hurt.
- 5 It has little effect on me.

16. I am at a fun party. I feel:

- 1 It has little effect on me.
- 2 A little lighthearted.
- 3 Lively.
- 4 Very lively.
- 5 So lively that I almost feel like a new person.

17. Something wonderful happens to me. I feel:

- 1 Extremely joyful-exuberant.
- 2 Extremely glad.
- 3 Glad.
- 4 A little glad.
- 5 It has little effect on me.

18. I see a sad movie. I feel:

- 1 So extremely sad that I feel like weeping.
- 2 Very sad.
- 3 Sad.
- 4 A little sad.
- 5 It has little effect on me.

19. I have accomplished something valuable. I feel:

- 1 It has little effect on me.
- 2 A little satisfied.
- 3 Satisfied.
- 4 Very satisfied.
- 5 So satisfied it's as if my entire life was worthwhile.

20. Something angers me. I feel:

- [ ] 1 It has little effect on me.
- [ ] 2 A little angry.
- [ ] 3 Angry.
- [ ] 4 Very angry.
- [ ] 5 So angry I could explode.

21. A person with whom I am involved prepares me a candlelight dinner. I feel:

- [ ] 1 It has little effect on me.
- [ ] 2 Slightly romantic.
- [ ] 3 Romantic.
- [ ] 4 Very romantic.
- [ ] 5 So passionate nothing else matters.

22. I have hurt someone's feelings. I feel:

- [ ] 1 It has little effect on me.
- [ ] 2 A little sorry.
- [ ] 3 Sorry.
- [ ] 4 Very sorry.
- [ ] 5 So extremely sorry I will do anything to make it up to them.

23. I am late for work or school and I find myself in a traffic jam. I feel:

- [ ] 1 In a rage.
- [ ] 2 Very angry.
- [ ] 3 Angry.
- [ ] 4 Slightly angry.
- [ ] 5 It has little effect on me.

24. I am involved in a situation in which I must do well, such as an important exam or job interview. I feel:

- [ ] 1 It has little effect on me.
- [ ] 2 Slightly anxious.
- [ ] 3 Anxious.
- [ ] 4 Very anxious.
- [ ] 5 So extremely anxious I can think of nothing else.

25. My boss gives me an unexpected pat on the back and says, 'nice work'. I feel:

- [ ] 1 Exuberant-my day is perfect.
- [ ] 2 Very gratified.
- [ ] 3 Gratified.
- [ ] 4 Slightly gratified.
- [ ] 5 It has little effect on me.

26. I am involved in a romantic relationship. I feel:

- [ ] 1 So consumed with passion I can think of nothing else.
- [ ] 2 Very passionate.
- [ ] 3 Passionate.
- [ ] 4 Mildly passionate.
- [ ] 5 It has little effect on me.

27. I attend the funeral of a casual acquaintance. I feel:

- 1 It has little effect on me.
- 2 Mildly sad.
- 3 Sad.
- 4 Very sad.
- 5 So extremely sad that I cannot control my tears.

28. I am in an argument. I feel:

- 1 It has little effect on me.
- 2 Mildly angry.
- 3 Angry.
- 4 Very angry.
- 5 So incredibly angry I find it difficult to remain composed.

29. Payments on my bills are overdue. I feel:

- 1 In such a panic I can think of nothing else.
- 2 Very worried.
- 3 Worried.
- 4 Mildly worried.
- 5 It has little effect on me.

30. Someone surprises me with a gift. I feel:

- 1 It has little effect on me.
- 2 A little grateful.
- 3 Grateful.
- 4 Very grateful.
- 5 So grateful I want to run out and buy them a gift in return.

Appendix D

Breakdown of EIS

Number	Question	Most Extreme Answer	Emotion
1	Someone compliments me. I feel:	Ecstatic-on top of the world.	Joy
2	I think about awful things that might happen. I feel:	So extremely worried that I can almost think of nothing else.	Fear
3	I am happy. I feel:	Euphoric-so happy I could burst.	Joy
4	I see a child suffer. I feel:	So extremely upset I feel sick to my stomach.	Sadness
5	Someone I am very attracted to asks me out for coffee. I feel:	Ecstatic-on top of the world.	Love
6	Something frustrates me. I feel:	So extremely tense and frustrated that my muscles knot up.	Anger
7	I achieve a personal best in my favorite sport. I feel:	Ecstatic – on top of the world	Joy
8	I say or do something I should not have done. I feel:	Extremely guilty.	Sadness
9	I am at the park with a favorite child. I feel:	So playful I feel like running around the park.	Joy
10	Someone criticizes me. I feel:	So extremely upset I could cry.	Sadness
11	I receive positive feedback from a favorite professor. I feel:	Thrilled-so happy I could burst.	Joy
12	People do things to annoy me. I feel:	So extremely annoyed I feel like hitting them.	Anger
13	I hear a speech by a leader whose ideas I respect. I feel:	Inspired-so impressed I have a new sense of purpose.	Joy
14	I have an embarrassing experience. I feel:	So embarrassed I want to die.	Sadness
15	Someone I know is rude to me. I feel:	So incredibly hurt I could cry.	Sadness

16	I am at a fun party. I feel:	So lively that I almost feel like a new person.	Joy
17	Something wonderful happens to me. I feel:	Extremely joyful-exuberant.	Joy
18	I see a sad movie. I feel:	So extremely sad that I feel like weeping.	Sadness
19	I have accomplished something valuable. I feel:	So satisfied it's as if my entire life was worthwhile.	Joy
20	Something angers me. I feel:	So angry I could explode.	Anger
21	A person with whom I am involved prepares me a candlelight dinner. I feel:	So passionate nothing else matters.	Love
22	I have hurt someone's feelings. I feel:	So extremely sorry I will do anything to make it up to them.	Sadness
23	I am late for work or school and I find myself in a traffic jam. I feel:	In a rage.	Anger
24	I am involved in a situation in which I must do well, such as an important exam or job interview. I feel:	So extremely anxious I can think of nothing else.	Fear
25	My boss gives me an unexpected pat on the back and says, 'nice work'. I feel:	Exuberant-my day is perfect.	Joy
26	I am involved in a romantic relationship. I feel:	So consumed with passion I can think of nothing else.	Love
27	I attend the funeral of a casual acquaintance. I feel:	So extremely sad that I cannot control my tears.	Sadness
28	I am in an argument. I feel:	So incredibly angry I find it difficult to remain composed.	Anger
29	Payments on my bills are overdue. I feel:	In such a panic I can think of nothing else.	Fear
30	Someone surprises me with a gift. I feel:	So grateful I want to run out and buy them a gift in return.	Joy

Appendix E

Personal Health Questionnaire (PHQ-9)

PHQ-9

	Over the last 2 weeks, *on how many days* have you been bothered by any of the following problems? Please answer by circling the number which best	Not at all	Several days	More than half the days	Nearly every day
		0	1	2	3
1	Little interest or pleasure in doing things				
2	Feeling down, depressed or hopeless	0	1	2	3
3	Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4	Feeling tired or having little energy	0	1	2	3
5	Poor appetite or overeating	0	1	2	3
6	Feeling bad about yourself – or that you are a failure or have let yourself or your family down	0	1	2	3
7	Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8	Moving or speaking so slowly that other people could have noticed, or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9	Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

Appendix F

Generalised Anxiety Disorder Assessment (GAD-7)

GAD-7

Over the last 2 weeks, on how many days have you been bothered by any of the following problems? Please answer by circling the number which best describes this.		Not at all	Several days	More than half the days	Nearly every day
1	Feeling nervous, anxious or on edge	0	1	2	3
2	Not being able to stop or control worrying	0	1	2	3
3	Worrying too much about different things	0	1	2	3
4	Trouble relaxing	0	1	2	3
5	Being so restless it is hard to sit still	0	1	2	3
6	Becoming easily annoyed or irritable	0	1	2	3
7	Feeling afraid as if something awful might happen	0	1	2	3

Appendix G

Information Sheet for Study 1

Exploring the impact of interoceptive abilities on emotional intensity

Dear Participant,

My name is Melissa Barker, and I am a Masters by Research student conducting this research under the supervision of Dr Cassie Richardson and Professor Linden Ball. We would like to invite you to take part in our research study. Before you decide whether if you would like to take part, it is important for you to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully and to decide whether or not you wish to take part. If there is anything that is not clear or if you would like more information, feel free to talk to me before deciding.

What is the purpose of the study?

The purpose of this study is to investigate interoception, which refers to the feeling of change in organs and internal parts of the body. For example, this may include being aware that you are hungry, thirsty, or that your heart is beating faster than normal. It is thought that people differ to the degree that they experience these sensations, and research has suggested that these differences may be linked to a variety of psychological processes such as memory, decision making and the experience of emotion. This study aims to examine interoception and how it relates to the intensity of emotional experience on a day to day basis.

Why have I been invited to participate?

We would like to invite people aged 18 or older without any diagnosed cardiac, neurological and psychiatric conditions, as well as those not currently taking vasoactive and/or psychoactive medications. As you will be filling out questionnaires that are written in English, we would like to invite people with English as their first language. We are inviting approximately 70 people to participate in this study.

Do I have to take part?

No, it is up to you to decide whether or not to take part. If you do, you will be given this information sheet to keep and be asked to sign a consent form. You are still free to withdraw from the study at any time and without giving a reason.

If you are a current UCLan student, we would like to reassure you that by choosing to either take part or not take part in the study will have no impact on your marks, assessments or future studies.

If you wish to withdraw your data once the final part of the experiment is over, you must inform the researcher before you leave. Once you have completed the entire experiment your personal details will be anonymised and we will be unable to identify which data is yours, so it is important you tell us of your wish to withdraw before you leave.

What will happen to me if I take part?

There are three parts to the study:

1. **Measurement of height, weight, the circumference of your waist and hips, and skinfold thickness** (approximately 5 minutes).
2. **Completion of questionnaires** (approximately 15 minutes).
3. **A heartbeat tracking task** (approximately 10 minutes).

If you agree to take part, we would like you to come to the School of Psychology, which is located in the Darwin Building at the University of Central Lancashire, Preston PR1 2HE.

During the first part of the study, we will measure your height and weight, the circumference of your hips and waist, and skinfold thickness. There is a separate information and consent form for you read and sign regarding this, and you are not expected to have any of these measurements taken if you are not comfortable with them.

You will then be asked to complete five questionnaires relating to your mood and bodily awareness. Following this, we will record your heart rate whilst you are instructed to silently count the number of heartbeats, without manually checking, that you feel in your body from the time you hear “start” to when you hear “stop”. This will be repeated six times using different intervals of time. After the heartbeat tracking task is completed, you will be asked to estimate randomly presented time intervals. You will then be instructed to tap your finger each time you feel your heartrate for a duration of 1 minute. Finally, you will be asked to rate your confidence in your performance during the heartbeat tracking task using a pencil mark on a continuous visual analogue scale (“Total guess/No heartbeat awareness” to “Complete confidence/Full perception of heartbeat

If you are a Year 1 or 2 Psychology student at the University of Central Lancashire, you will be offered 4 SONA points for your time.

What are the possible benefits of taking part?

There is no immediate benefit from taking part in this study. However, the information we gather from this study will help us to further understand interoception and emotion.

What are the possible risks of taking part?

There are no risks involved in taking part in this study.

Will what I say in this study be kept confidential?

Yes. All information gathered during this study is kept strictly confidential, and stored securely at the School of Psychology at the University of Central Lancashire. The data recorded from this study will be saved to a desktop computer which is password protected so nobody other than the researchers will be able to see the data. The data will be kept for a period of five years and will then be deleted. Any data collected will be retained confidentially and made anonymous so that it will not be possible to identify you from the data or any reports on the project. No identifiable personal data will be retained or published. However, signed consent forms will be stored in a locked filing cabinet and will not be shared with any other organisation. The identifiable data (consent forms) will not be linked to your performance data in any way. All consent forms will be kept for a period of five years and then shredded and disposed of through the university's secure waste disposal system.

What should I do if I want to take part?

If you would like to take part in the study, please sign the consent form and let the researcher know that you wish to take part.

Contact for Further Information

If you would like to have any further information you can email myself or my supervisor using the contact details below.

Melissa Barker
E: MBarker1@uclan.ac.uk.

Dr Cassie Richardson
E: CRichardson5@uclan.ac.uk
T: (01772) 893427

How do I make a complaint?
If you have any concerns about the research that you wish to raise with somebody who is independent of the research team, you should raise this with the University Officer for Ethics at OfficerForEthics@uclan.ac.uk.

Thank you for taking your time to read this information sheet.

Appendix H

Consent Form for Study 1

Exploring the impact of interoceptive abilities on emotional intensity

Melissa Barker
MBarker1@uclan.ac.uk

Please read the following statements and initial the boxes to indicate your agreement

1. I confirm that I have read and understand the information sheet, for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time up until one month after I have completed the study. ☐

3. I agree to take part in the above study. ☐

Name of Participant: ……………………………………………………… Date:

Signature: ……………………………………………………………………………

Name of Researcher: …………………………………………………….. Date:

Signature: ……………………………………………………………………

Appendix I

Body Measurement Information Sheet and Consent Form

uclan

Body Measurement Form

As part of this experiment, we would like to take some measurements of subcutaneous fat. Subcutaneous fat is the layer of fat which we all have underneath our skin. Previous research suggests that this layer may distort some of our perceptions of bodily sensations, and we would like to this into account when you take part in the heart beat tracking task.

There are lots of ways of measuring subcutaneous fat, each with their own advantages and disadvantages. Because of this, we would like to use three techniques to make our measurements as accurate as possible. These include:

1. **Body Mass Index (BMI)**
2. **Waist to hip ratio**
3. **Skinfold Thickness**

BMI

In order to measure BMI, you will be ask to step on the scales provided in order to measure your weight, and then your height will be measured using a tape measure.

Waist to hip ratio

To measure waist to hip ratio, we will use a tape measure to measure the width of your hips and you waist. The image below shows the exact locations of where this measurement will be taken.

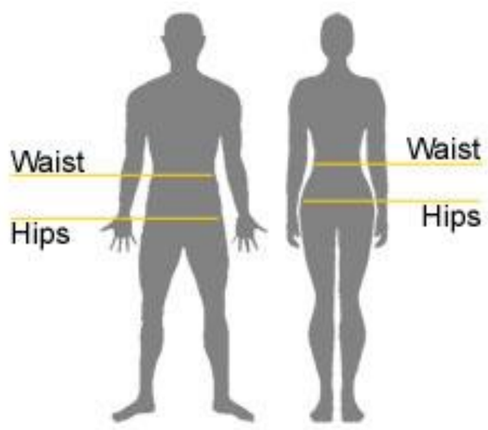


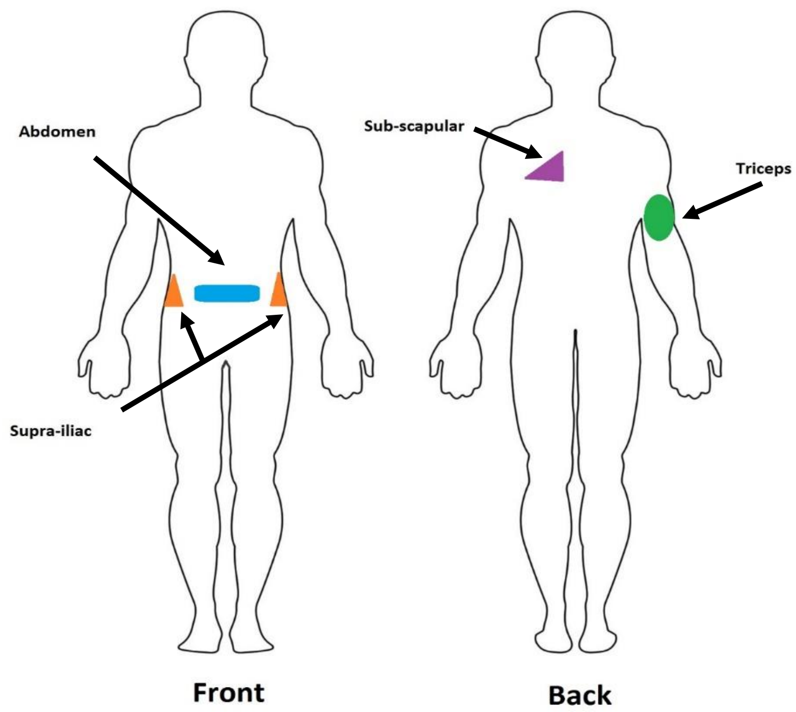
Photo taken from http://www.livewelllouisiana.com/img/waist-to-hip-man-and-woman2.jpg

Skinfold Thickness

To measure skinfold thickness, you will be asked to allow us to measure the width of the skin on four different body sites:

1. Tricep (located on the back of the top of your arm)
2. Abdomen (the skin to the left and right of your belly-button)
3. Supra-iliac (the skin just above your hip bone)
4. Sub-scapular (the skin at the bottom of your shoulder blade)

Each of these locations are shown in the picture below to give you an idea of where you will be touched as part of the measurement process.



Your skin will be slightly pinched at these sites to raise a double layer of skin and the underlying subcutaneous fat (but not the muscle). The process is completely painless and will not cause you any harm. The width of the pinched area will be measured using callipers, a special type of hinged ruler designed for this purpose. These measurements can be taken on bare skin as well as over your clothes. It is entirely up to you which you would prefer depending on how comfortable you are.

We do not want you to do anything you are not comfortable with during this experiment. Below is a consent form to say that you agree to us taking these measurements. If you consent to the measurement, please put your initials in the box. If you do not, please leave the box blank. You are under no obligation to say yes and may still take part in the experiment if you choose to say no to any or all of these.

If you have any questions at all, please do not hesitate to ask the experimenter.

1. I confirm that I have read and understand the Body Measurement Form. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I agree to have my BMI measured ☐

3. I agree to have my waist to hip ratio measured ☐

4. I agree to have my skinfold thickness measured ☐

Name of Participant: ……………………………………………………… Date: ………………….

Signature: ………………………………..

Name of Researcher: …………………………………………………….. Date: ………………….

Signature: ………………………………………………………………….

Appendix J

Study One Data Screening Output and Calculated Z Scores

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
AGE	70	100.0%	0	0.0%	70	100.0%
WHRatio	67	95.7%	3	4.3%	70	100.0%
BMI	67	95.7%	3	4.3%	70	100.0%
BODYFAT	42	60.0%	28	40.0%	70	100.0%
IAC	70	100.0%	0	0.0%	70	100.0%
CONFIDENCE	70	100.0%	0	0.0%	70	100.0%
IAW	70	100.0%	0	0.0%	70	100.0%
BAQ	70	100.0%	0	0.0%	70	100.0%
PHQ9	70	100.0%	0	0.0%	70	100.0%
GAD7	70	100.0%	0	0.0%	70	100.0%
MAIAnoticing	70	100.0%	0	0.0%	70	100.0%
MAIAnotdistracting	70	100.0%	0	0.0%	70	100.0%
MAIAnotworrying	70	100.0%	0	0.0%	70	100.0%
MAIAattentionalreg	70	100.0%	0	0.0%	70	100.0%
MAIAEmotionalAwareness	70	100.0%	0	0.0%	70	100.0%
MAIAselfregulation	70	100.0%	0	0.0%	70	100.0%
MAIAbodylistening	70	100.0%	0	0.0%	70	100.0%
MAIATrusting	70	100.0%	0	0.0%	70	100.0%
MAIAtotal	70	100.0%	0	0.0%	70	100.0%
EISpositive	70	100.0%	0	0.0%	70	100.0%
EISnegative	70	100.0%	0	0.0%	70	100.0%
EIStotal	70	100.0%	0	0.0%	70	100.0%
AngerTotal	70	100.0%	0	0.0%	70	100.0%
FearTotal	70	100.0%	0	0.0%	70	100.0%
SadnessTotal	70	100.0%	0	0.0%	70	100.0%
LoveTotal	70	100.0%	0	0.0%	70	100.0%
JoyTotal	70	100.0%	0	0.0%	70	100.0%

Descriptives

			Statistic	Std. Error
AGE	Mean		23.8571	1.02440
	95% Confidence Interval for Mean	Lower Bound	21.8135	
		Upper Bound	25.9008	
	5% Trimmed Mean		22.4762	
	Median		21.0000	
	Variance		73.458	
	Std. Deviation		8.57074	
	Minimum		18.00	
	Maximum		67.00	
	Range		49.00	
	Interquartile Range		5.00	
	Skewness		3.451	.287
	Kurtosis		13.813	.566
WHRatio	Mean		.8231	.00980
	95% Confidence Interval for Mean	Lower Bound	.8035	
		Upper Bound	.8427	
	5% Trimmed Mean		.8184	
	Median		.8148	
	Variance		.006	
	Std. Deviation		.08022	
	Minimum		.70	
	Maximum		1.06	
	Range		.36	
	Interquartile Range		.09	
	Skewness		.873	.293
	Kurtosis		.767	.578
BMI	Mean		26.2221	.72459
	95% Confidence Interval for Mean	Lower Bound	24.7755	
		Upper Bound	27.6688	
	5% Trimmed Mean		25.7536	
	Median		24.9082	
	Variance		35.177	
	Std. Deviation		5.93099	
	Minimum		18.97	
	Maximum		47.88	
	Range		28.91	
	Interquartile Range		9.12	

	Skewness		1.247	.293
	Kurtosis		1.972	.578
BODYFAT	Mean		29.1446	.94762
	95% Confidence Interval for Mean	Lower Bound	27.2308	
		Upper Bound	31.0583	
	5% Trimmed Mean		28.9643	
	Median		27.9707	
	Variance		37.715	
	Std. Deviation		6.14125	
	Minimum		19.81	
	Maximum		42.21	
	Range		22.40	
	Interquartile Range		9.44	
	Skewness		.408	.365
	Kurtosis		-.822	.717
IAC	Mean		.4087	.03527
	95% Confidence Interval for Mean	Lower Bound	.3383	
		Upper Bound	.4790	
	5% Trimmed Mean		.4023	
	Median		.4289	
	Variance		.087	
	Std. Deviation		.29510	
	Minimum		.00	
	Maximum		.94	
	Range		.94	
	Interquartile Range		.53	
	Skewness		.110	.287
	Kurtosis		-1.085	.566
CONFIDENCE	Mean		34.9571	2.55841
	95% Confidence Interval for Mean	Lower Bound	29.8533	
		Upper Bound	40.0610	
	5% Trimmed Mean		34.3671	
	Median		32.5000	
	Variance		458.183	
	Std. Deviation		21.40521	
	Minimum		.00	
	Maximum		88.75	
	Range		88.75	
	Interquartile Range		31.31	
	Skewness		.357	.287
	Kurtosis		-.419	.566

IAW	Mean		5.9092	3.09958
	95% Confidence Interval for Mean	Lower Bound	-.2743	
		Upper Bound	12.0927	
	5% Trimmed Mean		5.1447	
	Median		.0204	
	Variance		672.519	
	Std. Deviation		25.93298	
	Minimum		-59.34	
	Maximum		82.76	
	Range		142.10	
	Interquartile Range		38.45	
	Skewness		.426	.287
	Kurtosis		.573	.566
BAQ	Mean		79.9429	1.83839
	95% Confidence Interval for Mean	Lower Bound	76.2754	
		Upper Bound	83.6103	
	5% Trimmed Mean		79.8968	
	Median		84.0000	
	Variance		236.576	
	Std. Deviation		15.38104	
	Minimum		33.00	
	Maximum		123.00	
	Range		90.00	
	Interquartile Range		24.50	
	Skewness		-.157	.287
	Kurtosis		.530	.566
PHQ9	Mean		9.1286	.64282
	95% Confidence Interval for Mean	Lower Bound	7.8462	
		Upper Bound	10.4110	
	5% Trimmed Mean		8.9524	
	Median		9.0000	
	Variance		28.925	
	Std. Deviation		5.37822	
	Minimum		.00	
	Maximum		23.00	
	Range		23.00	
	Interquartile Range		8.00	
	Skewness		.441	.287
	Kurtosis		-.193	.566
GAD7	Mean		6.9286	.63713
		Lower Bound	5.6575	

	95% Confidence Interval for Mean	Upper Bound	8.1996	
	5% Trimmed Mean		6.6032	
	Median		6.0000	
	Variance		28.415	
	Std. Deviation		5.33058	
	Minimum		.00	
	Maximum		21.00	
	Range		21.00	
	Interquartile Range		6.25	
	Skewness		.887	.287
	Kurtosis		.160	.566
MAIAnoticing	Mean		13.1571	.39281
	95% Confidence Interval for Mean	Lower Bound	12.3735	
		Upper Bound	13.9408	
	5% Trimmed Mean		13.2460	
	Median		13.0000	
	Variance		10.801	
	Std. Deviation		3.28649	
	Minimum		4.00	
	Maximum		20.00	
	Range		16.00	
	Interquartile Range		4.00	
	Skewness		-.393	.287
	Kurtosis		.171	.566
MAIAnotdistracting	Mean		5.6857	.34923
	95% Confidence Interval for Mean	Lower Bound	4.9890	
		Upper Bound	6.3824	
	5% Trimmed Mean		5.6032	
	Median		5.0000	
	Variance		8.537	
	Std. Deviation		2.92190	
	Minimum		.00	
	Maximum		15.00	
	Range		15.00	
	Interquartile Range		4.00	
	Skewness		.550	.287
	Kurtosis		.740	.566
MAIAnotworrying	Mean		8.5857	.34623
	95% Confidence Interval for Mean	Lower Bound	7.8950	
		Upper Bound	9.2764	

	5% Trimmed Mean		8.5556	
	Median		9.0000	
	Variance		8.391	
	Std. Deviation		2.89674	
	Minimum		2.00	
	Maximum		15.00	
	Range		13.00	
	Interquartile Range		5.00	
	Skewness		.165	.287
	Kurtosis		-.603	.566
MAIAattentionalreg	Mean		18.8286	.73057
	95% Confidence Interval for Mean	Lower Bound	17.3711	
		Upper Bound	20.2860	
	5% Trimmed Mean		18.8730	
	Median		19.5000	
	Variance		37.361	
	Std. Deviation		6.11240	
	Minimum		6.00	
	Maximum		31.00	
	Range		25.00	
	Interquartile Range		9.25	
	Skewness		-.114	.287
	Kurtosis		-.740	.566
MAIAEmotionalAwareness	Mean		16.7286	.57300
	95% Confidence Interval for Mean	Lower Bound	15.5855	
		Upper Bound	17.8717	
	5% Trimmed Mean		16.9127	
	Median		18.0000	
	Variance		22.983	
	Std. Deviation		4.79408	
	Minimum		3.00	
	Maximum		25.00	
	Range		22.00	
	Interquartile Range		6.25	
	Skewness		-.696	.287
	Kurtosis		.148	.566
MAIAselfregulation	Mean		11.0286	.49677
	95% Confidence Interval for Mean	Lower Bound	10.0375	
		Upper Bound	12.0196	
	5% Trimmed Mean		11.2778	
	Median		12.0000	

	Variance		17.275	
	Std. Deviation		4.15626	
	Minimum		.00	
	Maximum		17.00	
	Range		17.00	
	Interquartile Range		5.00	
	Skewness		-.814	.287
	Kurtosis		.434	.566
MAIAbodylistening	Mean		5.9000	.43887
	95% Confidence Interval for Mean	Lower Bound	5.0245	
		Upper Bound	6.7755	
	5% Trimmed Mean		5.8413	
	Median		6.0000	
	Variance		13.483	
	Std. Deviation		3.67187	
	Minimum		.00	
	Maximum		15.00	
	Range		15.00	
	Interquartile Range		6.00	
	Skewness		.162	.287
	Kurtosis		-.769	.566
MAIATrusting	Mean		10.0571	.39030
	95% Confidence Interval for Mean	Lower Bound	9.2785	
		Upper Bound	10.8358	
	5% Trimmed Mean		10.1984	
	Median		10.0000	
	Variance		10.663	
	Std. Deviation		3.26548	
	Minimum		2.00	
	Maximum		15.00	
	Range		13.00	
	Interquartile Range		4.00	
	Skewness		-.515	.287
	Kurtosis		-.073	.566
MAIAtotal	Mean		89.9714	2.22744
	95% Confidence Interval for Mean	Lower Bound	85.5278	
		Upper Bound	94.4150	
	5% Trimmed Mean		90.1984	
	Median		90.0000	
	Variance		347.304	
	Std. Deviation		18.63608	

	Minimum		44.00	
	Maximum		126.00	
	Range		82.00	
	Interquartile Range		30.25	
	Skewness		-.139	.287
	Kurtosis		-.697	.566
EISpositive	Mean		48.6143	.84179
	95% Confidence Interval for Mean	Lower Bound	46.9350	
		Upper Bound	50.2936	
	5% Trimmed Mean		48.9286	
	Median		50.0000	
	Variance		49.603	
	Std. Deviation		7.04292	
	Minimum		31.00	
	Maximum		63.00	
	Range		32.00	
	Interquartile Range		8.00	
	Skewness		-.862	.287
	Kurtosis		.402	.566
EISnegative	Mean		51.5429	1.23956
	95% Confidence Interval for Mean	Lower Bound	49.0700	
		Upper Bound	54.0157	
	5% Trimmed Mean		51.8254	
	Median		51.0000	
	Variance		107.556	
	Std. Deviation		10.37093	
	Minimum		26.00	
	Maximum		71.00	
	Range		45.00	
	Interquartile Range		12.25	
	Skewness		-.376	.287
	Kurtosis		-.102	.566
EIStotal	Mean		100.1571	1.81261
	95% Confidence Interval for Mean	Lower Bound	96.5411	
		Upper Bound	103.7732	
	5% Trimmed Mean		100.8492	
	Median		101.5000	
	Variance		229.989	
	Std. Deviation		15.16540	
	Minimum		61.00	
	Maximum		128.00	

	Range		67.00	
	Interquartile Range		18.00	
	Skewness		-.759	.287
	Kurtosis		.308	.566
AngerTotal	Mean		15.8429	.48225
	95% Confidence Interval for Mean	Lower Bound	14.8808	
		Upper Bound	16.8049	
	5% Trimmed Mean		15.8730	
	Median		16.5000	
	Variance		16.279	
	Std. Deviation		4.03476	
	Minimum		7.00	
	Maximum		24.00	
	Range		17.00	
	Interquartile Range		4.50	
	Skewness		-.246	.287
	Kurtosis		-.138	.566
FearTotal	Mean		9.6857	.32846
	95% Confidence Interval for Mean	Lower Bound	9.0305	
		Upper Bound	10.3410	
	5% Trimmed Mean		9.6984	
	Median		10.0000	
	Variance		7.552	
	Std. Deviation		2.74808	
	Minimum		3.00	
	Maximum		15.00	
	Range		12.00	
	Interquartile Range		4.25	
	Skewness		-.067	.287
	Kurtosis		-.718	.566
SadnessTotal	Mean		26.0143	.62339
	95% Confidence Interval for Mean	Lower Bound	24.7707	
		Upper Bound	27.2579	
	5% Trimmed Mean		26.2143	
	Median		27.0000	
	Variance		27.203	
	Std. Deviation		5.21562	
	Minimum		11.00	
	Maximum		35.00	
	Range		24.00	
	Interquartile Range		7.00	

	Skewness		-.565	.287
	Kurtosis		.319	.566
LoveTotal	Mean		10.2286	.23127
	95% Confidence Interval for Mean	Lower Bound	9.7672	
		Upper Bound	10.6899	
	5% Trimmed Mean		10.2778	
	Median		10.0000	
	Variance		3.744	
	Std. Deviation		1.93497	
	Minimum		5.00	
	Maximum		15.00	
	Range		10.00	
	Interquartile Range		3.00	
	Skewness		-.432	.287
	Kurtosis		.561	.566
JoyTotal	Mean		38.3857	.66665
	95% Confidence Interval for Mean	Lower Bound	37.0558	
		Upper Bound	39.7157	
	5% Trimmed Mean		38.6508	
	Median		40.0000	
	Variance		31.110	
	Std. Deviation		5.57763	
	Minimum		25.00	
	Maximum		48.00	
	Range		23.00	
	Interquartile Range		7.25	
	Skewness		-.847	.287
	Kurtosis		.205	.566

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
AGE	.257	70	.000	.579	70	.000
WHRatio	.118	67	.022	.944	67	.005
BMI	.137	67	.003	.898	67	.000
BODYFAT	.134	42	.058	.952	42	.076
IAC	.128	70	.006	.935	70	.001
CONFIDENCE	.096	70	.187	.972	70	.126
IAW	.108	70	.041	.981	70	.357
BAQ	.118	70	.017	.967	70	.063

PHQ9	.079	70	.200*	.969	70	.080
GAD7	.149	70	.001	.919	70	.000
MAIAnoticing	.110	70	.037	.979	70	.304
MAIAnotdistracting	.164	70	.000	.961	70	.027
MAIAnotworrying	.122	70	.011	.976	70	.193
MAIAattentionalreg	.125	70	.009	.977	70	.228
MAIAEmotionalAwareness	.165	70	.000	.951	70	.008
MAIAselfregulation	.121	70	.013	.939	70	.002
MAIAbodylistening	.099	70	.083	.966	70	.051
MAIATrusting	.107	70	.044	.954	70	.012
MAIAtotal	.072	70	.200*	.984	70	.488
EISpositive	.127	70	.007	.928	70	.001
EISnegative	.068	70	.200*	.980	70	.308
EIStotal	.112	70	.030	.947	70	.005
AngerTotal	.116	70	.021	.966	70	.055
FearTotal	.127	70	.007	.970	70	.091
SadnessTotal	.099	70	.087	.970	70	.092
LoveTotal	.153	70	.000	.956	70	.014
JoyTotal	.130	70	.005	.930	70	.001

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Z Score Calculations

	Skew	SE_Skew	Kurtosis	SE_Kurtosis	Z-Skew	Z-Kurtosis
Age	3.451	.287	13.813	.566	12.02	24.40
WHRatio	0.873	0.293	0.767	0.578	2.98	1.33
BMI	1.247	0.293	1.972	0.578	4.26	3.41
BODYFAT	0.408	0.365	-0.822	0.717	1.12	-1.15
IAC	0.11	0.287	-1.085	0.566	0.38	-1.92
CONFIDENCE	0.357	0.287	-0.419	0.566	1.24	-0.74
IAW	.426	.287	.573	.566	1.48	1.01
BAQ	-0.157	0.287	0.53	0.566	-0.55	0.94
PHQ9	0.441	0.287	-0.193	0.566	1.54	-0.34
GAD7	0.887	0.287	0.16	0.566	3.09	0.28
MAIAnoticing	-0.393	0.287	0.171	0.566	-1.37	0.30
MAIAnotdistracting	0.55	0.287	0.74	0.566	1.92	1.31
MAIAnotworrying	0.165	0.287	-0.603	0.566	0.57	-1.07
MAIAattentionalreg	-0.114	0.287	-0.74	0.566	-0.40	-1.31
MAIAEmotionalAwareness	-0.696	0.287	0.148	0.566	-2.43	0.26
MAIAselfregulation	-0.814	0.287	0.434	0.566	-2.84	0.77
MAIAbodylistening	0.162	0.287	-0.769	0.566	0.56	-1.36
MAIATrusting	-0.515	0.287	-0.073	0.566	-1.79	-0.13
MAIAtotal	-0.139	0.287	-0.697	0.566	-0.48	-1.23
EISpositive	-0.862	0.287	0.402	0.566	-3.00	0.71
EISnegative	-0.376	0.287	-0.102	0.566	-1.31	-0.18
EIStotal	-0.759	0.287	0.308	0.566	-2.64	0.54
AngerTotal	-0.246	0.287	-0.138	0.566	-0.86	-0.24
FearTotal	-0.067	0.287	-0.718	0.566	-0.23	-1.27
SadnessTotal	-0.565	0.287	0.319	0.566	-1.97	0.56
LoveTotal	-0.432	0.287	0.561	0.566	-1.51	0.99
JoyTotal	-0.847	0.287	0.205	0.566	-2.95	0.36

Appendix K

Confounding Effects of Body Measurements and Age on IAC (Correlation)

Bootstrap Specifications

Sampling Method	Simple
Number of Samples	1000
Confidence Interval Level	95.0%
Confidence Interval Type	Bias-corrected and accelerated (BCa)

Correlations – IAC and Waist to Hip Ratio

Descriptive Statistics

			Bootstrap[a]			
					BCa 95% Confidence Interval	
		Statistic	Bias	Std. Error	Lower	Upper
IAC	Mean	.4154	-.0007	.0373	.3413	.4845
	Std. Deviation	.29734	-.00314	.01771	.26657	.32039
	N	67	0	0	.	.
WHRatio	Mean	.8231	-.0002	.0096	.8077	.8399
	Std. Deviation	.08022	-.00092	.00810	.06474	.09433
	N	67	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				IAC	WHRatio
IAC	Pearson Correlation			1	.174
	Sig. (2-tailed)				.160
	N			67	67
	Bootstrap[c]	Bias		0	.003
		Std. Error		0	.104
		BCa 95% Confidence Interval	Lower	.	-.038
			Upper	.	.384

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations – IAC and BMI

Descriptive Statistics

		Statistic	Bootstrap[a] Bias	Std. Error	BCa 95% Confidence Interval Lower	Upper
IAC	Mean	.4171	.0024	.0355	.3458	.4968
	Std. Deviation	.29704	-.00248	.01711	.26638	.32119
	N	67	0	0	.	.
BMI	Mean	26.2221	-.0209	.7442	24.9337	27.5792
	Std. Deviation	5.93099	-.07491	.69926	4.70932	7.07066
	N	67	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				IAC	BMI
IAC	Pearson Correlation			1	.064
	Sig. (2-tailed)				.608
	N			67	67
	Bootstrap[c]	Bias		0	-.005
		Std. Error		0	.102
		BCa 95% Confidence Interval	Lower	.	-.125
			Upper	.	.250

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations – IAC and Body Fat

Descriptive Statistics

			Bootstrap[a]			
					BCa 95% Confidence Interval	
		Statistic	Bias	Std. Error	Lower	Upper
IAC	Mean	.4370	-.0005	.0451	.3450	.5236
	Std. Deviation	.30812	-.00358	.02182	.26722	.33981
	N	42	0	0	.	.
BODYFAT	Mean	29.1446	.0097	.9642	27.3843	31.0556
	Std. Deviation	6.14125	-.10670	.50106	5.23068	6.82325
	N	42	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				IAC	BODYFAT
IAC	Pearson Correlation			1	-.206
	Sig. (2-tailed)				.191
	N			42	42
	Bootstrap[c]	Bias		0	.002
		Std. Error		0	.136
		BCa 95% Confidence Interval	Lower	.	-.444
			Upper	.	.070

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations – IAC and Age

Descriptive Statistics

			Bootstrap[a]			
					BCa 95% Confidence Interval	
		Statistic	Bias	Std. Error	Lower	Upper
IAC	Mean	.4087	.0003	.0351	.3398	.4798
	Std. Deviation	.29510	-.00268	.01698	.26560	.31943
	N	70	0	0	.	.
AGE	Mean	23.8571	.0089	1.0263	22.1857	25.9317
	Std. Deviation	8.57074	-.31588	2.06782	4.56627	11.52005
	N	70	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				IAC	AGE
IAC	Pearson Correlation			1	-.222
	Sig. (2-tailed)				.065
	N			70	70
	Bootstrap[c]	Bias		0	.007
		Std. Error		0	.107
		BCa 95% Confidence Interval	Lower	.	-.390
			Upper	.	.029

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

<u>Correlations – IAC and PHQ-9</u>

Descriptive Statistics

		Statistic	Bootstrap[a] Bias	Std. Error	BCa 95% Confidence Interval Lower	Upper
IAC	Mean	.4087	-.0002	.0344	.3441	.4764
	Std. Deviation	.29510	-.00290	.01688	.26578	.31827
	N	70	0	0	.	.
PHQ9	Mean	9.1286	-.0047	.6554	7.8204	10.4429
	Std. Deviation	5.37822	-.06921	.43339	4.61439	6.00206
	N	70	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				IAC	PHQ9
IAC	Pearson Correlation			1	.031
	Sig. (2-tailed)				.797
	N			70	70
	Bootstrap[c]	Bias		0	.006
		Std. Error		0	.109
		BCa 95% Confidence Interval	Lower	.	-.170
			Upper	.	.263
PHQ9	Pearson Correlation			.031	1
	Sig. (2-tailed)			.797	
	N			70	70
	Bootstrap[c]	Bias		.006	0
		Std. Error		.109	0
		BCa 95% Confidence Interval	Lower	-.170	.
			Upper	.263	.

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations – IAC and GAD-7

Descriptive Statistics

		Statistic	Bootstrap[a]			
			Bias	Std. Error	BCa 95% Confidence Interval	
					Lower	Upper
IAC	Mean	.4087	.0015	.0351	.3347	.4793
	Std. Deviation	.29510	-.00274	.01718	.26413	.31985
	N	70	0	0	.	.
GAD7	Mean	6.9286	-.0220	.6511	5.7143	8.1819
	Std. Deviation	5.33058	-.07163	.46612	4.44380	6.02890
	N	70	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				IAC	GAD7
IAC	Pearson Correlation			1	-.065
	Sig. (2-tailed)				.594
	N			70	70
	Bootstrap[c]	Bias		0	-.002
		Std. Error		0	.113
		BCa 95% Confidence Interval	Lower	.	-.300
			Upper	.	.158
GAD7	Pearson Correlation			-.065	1
	Sig. (2-tailed)			.594	
	N			70	70
	Bootstrap[c]	Bias		-.002	0
		Std. Error		.113	0
		BCa 95% Confidence Interval	Lower	-.300	.
			Upper	.158	.

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Appendix L

Correlations between IAC and Questionnaire Measures (BAQ, MAIA, EIS)

IAC and BAQ

Bootstrap Specifications

Sampling Method	Simple
Number of Samples	1000
Confidence Interval Level	95.0%
Confidence Interval Type	Percentile

Correlations

					IAC	BAQ
IAC	Pearson Correlation				1	.071
	Sig. (2-tailed)					.558
	N				70	70
	Bootstrap[c]	Bias			0	.006
		Std. Error			0	.126
		95% Confidence Interval		Lower	1	-.173
				Upper	1	.316
BAQ	Pearson Correlation				.071	1
	Sig. (2-tailed)				.558	
	N				70	70
	Bootstrap[c]	Bias			.006	0
		Std. Error			.126	0
		95% Confidence Interval		Lower	-.173	1
				Upper	.316	1

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

IAC and MAIA

Descriptive Statistics

		Statistic	Bootstrap[a]			
			Bias	Std. Error	BCa 95% Confidence Interval	
					Lower	Upper
IAC	Mean	.4087	-.0007	.0349	.3424	.4720
	Std. Deviation	.29510	-.00232	.01650	.26725	.31882
	N	70	0	0	.	.
MAIAtotal	Mean	89.9714	-.0086	2.2304	85.5948	94.1337
	Std. Deviation	18.63608	-.15948	1.27041	16.39771	20.64342
	N	70	0	0	.	.
MAIAnoticing	Mean	13.1571	.0102	.3853	12.3429	13.9429
	Std. Deviation	3.28649	-.05012	.27964	2.80514	3.68151
	N	70	0	0	.	.
MAIAnotdistracting	Mean	5.6857	-.0264	.3534	5.0571	6.2816
	Std. Deviation	2.92190	-.04017	.28851	2.42110	3.35234
	N	70	0	0	.	.
MAIAnotworrying	Mean	8.5857	.0074	.3509	7.9286	9.2571
	Std. Deviation	2.89674	-.01670	.20125	2.52008	3.23301
	N	70	0	0	.	.
MAIAattentionalreg	Mean	18.8286	.0293	.7311	17.3286	20.3429
	Std. Deviation	6.11240	-.06034	.40584	5.34338	6.71850
	N	70	0	0	.	.
MAIAEmotionalAwareness	Mean	16.7286	-.0228	.5724	15.6714	17.7482
	Std. Deviation	4.79408	-.03347	.40882	4.04885	5.46979
	N	70	0	0	.	.
MAIAselfregulation	Mean	11.0286	.0130	.4996	10.0143	12.0128
	Std. Deviation	4.15626	-.04640	.38258	3.47578	4.76991
	N	70	0	0	.	.
MAIAbodylistening	Mean	5.9000	-.0167	.4368	5.1143	6.6571
	Std. Deviation	3.67187	-.03603	.25812	3.20446	4.07385
	N	70	0	0	.	.
MAIATrusting	Mean	10.0571	-.0026	.3816	9.3429	10.7440
	Std. Deviation	3.26548	-.03877	.26340	2.75681	3.66885
	N	70	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

				MAIAtotal	MAIAnoticing	MAIAnotdistracting	MAIAnotworrying	MAIAattentionalreg	MAIAEmotionalAwareness	MAIAselfregulation	MAIAbodylistening	MAIATrusting
IAC	Pearson Correlation			.032	.001	.027	.070	-.039	.053	.021	.030	.033
	Sig. (2-tailed)			.790	.995	.825	.565	.746	.661	.865	.805	.785
	N			70	70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		-.002	-.002	.003	.002	.000	-.005	.000	.000	-.001
		Std. Error		.120	.108	.130	.111	.120	.125	.111	.126	.122
		BCa 95% Confidence Interval	Lower	-.208	-.204	-.228	-.135	-.266	-.188	-.194	-.225	-.210
			Upper	.255	.205	.294	.285	.187	.289	.227	.277	.275
			Upper	.701	.334	.132	.409	.495	.400	.737	.486	.

Correlations – IAC and EIS (Total and Subscales)

Descriptive Statistics

		Statistic	Bootstrap[a] Bias	Std. Error	BCa 95% Confidence Interval Lower	Upper
IAC	Mean	.4087	-.0003	.0353	.3455	.4757
	Std. Deviation	.29510	-.00270	.01673	.26566	.31881
	N	70	0	0	.	.
EISpositive	Mean	48.6143	-.0002	.8430	46.7862	50.1677
	Std. Deviation	7.04292	-.08444	.64649	5.70522	8.07187
	N	70	0	0	.	.
EISnegative	Mean	51.5429	.0209	1.1843	49.1286	53.9714
	Std. Deviation	10.37093	-.09218	.84931	8.79246	11.71480
	N	70	0	0	.	.
EIStotal	Mean	100.1571	.0208	1.7543	96.2612	103.6960
	Std. Deviation	15.16540	-.16632	1.37606	12.58296	17.34403
	N	70	0	0	.	.
AngerTotal	Mean	15.8429	.0054	.4699	14.8714	16.8254
	Std. Deviation	4.03476	-.03947	.32583	3.45548	4.52527
	N	70	0	0	.	.

FearTotal	Mean	9.6857	.0133	.3188	9.0675	10.3857
	Std. Deviation	2.74808	-.01758	.18041	2.42021	3.04142
	N	70	0	0	.	.
SadnessTotal	Mean	26.0143	.0022	.5998	24.6567	27.2537
	Std. Deviation	5.21562	-.05541	.47188	4.34925	5.97880
	N	70	0	0	.	.
LoveTotal	Mean	10.2286	-.0055	.2272	9.7857	10.6714
	Std. Deviation	1.93497	-.02127	.17782	1.61344	2.21274
	N	70	0	0	.	.
JoyTotal	Mean	38.3857	.0053	.6697	36.8714	39.6000
	Std. Deviation	5.57763	-.06923	.49533	4.60057	6.32480
	N	70	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

				EISpositive	EISnegative	EIStotal	AngerTotal	FearTotal	SadnessTotal	LoveTotal	JoyTotal
IAC	Pearson Correlation			.027	.004	.016	-.015	.046	-.004	-.011	.038
	Sig. (2-tailed)			.824	.971	.899	.900	.703	.974	.927	.755
	N			70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		.000	.003	.003	.002	-.001	.003	.003	.000
		Std. Error		.122	.128	.130	.121	.120	.128	.119	.128
		BCa 95% Confidence Interval	Lower	-.221	-.257	-.244	-.288	-.191	-.253	-.242	-.222
			Upper	.268	.265	.284	.238	.275	.248	.253	.292

Appendix M

Correlation between EIS and IS (measured with BAQ and MAIA subscales) and scales of IS with each other

Bootstrap Specifications

Sampling Method	Simple
Number of Samples	1000
Confidence Interval Level	95.0%
Confidence Interval Type	Bias-corrected and accelerated (BCa)

BAQ and EIS

Descriptive Statistics

			Bootstrap[a]			
					BCa 95% Confidence Interval	
		Statistic	Bias	Std. Error	Lower	Upper
BAQ	Mean	79.9429	.0571	1.8552	76.1456	84.0373
	Std. Deviation	15.38104	-.17043	1.46769	12.86837	17.88992
	N	70	0	0	.	.
EISpositive	Mean	48.6143	.0006	.8537	46.6778	50.4143
	Std. Deviation	7.04292	-.07955	.63712	5.75489	8.03965
	N	70	0	0	.	.
EISnegative	Mean	51.5429	-.0763	1.2191	49.2216	53.7281
	Std. Deviation	10.37093	-.10548	.85385	8.70226	11.73598
	N	70	0	0	.	.
EIStotal	Mean	100.1571	-.0757	1.8081	96.5505	103.3476
	Std. Deviation	15.16540	-.17192	1.38922	12.44306	17.36311
	N	70	0	0	.	.
AngerTotal	Mean	15.8429	-.0104	.4747	14.8857	16.7443
	Std. Deviation	4.03476	-.05085	.32883	3.40897	4.54283
	N	70	0	0	.	.
FearTotal	Mean	9.6857	-.0225	.3231	9.1034	10.2571
	Std. Deviation	2.74808	-.01877	.18432	2.39670	3.06171
	N	70	0	0	.	.
SadnessTotal	Mean	26.0143	-.0434	.6140	24.8499	27.0286
	Std. Deviation	5.21562	-.06214	.46785	4.32021	5.93681
	N	70	0	0	.	.

LoveTotal	Mean	10.2286	-.0039	.2314	9.7857	10.6429
	Std. Deviation	1.93497	-.01531	.17839	1.58233	2.25944
	N	70	0	0	.	.
JoyTotal	Mean	38.3857	.0045	.6736	36.8102	39.7571
	Std. Deviation	5.57763	-.06725	.48624	4.64359	6.28990
	N	70	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

				EISpositive	EISnegative	EIStotal	AngerTotal	FearTotal	SadnessTotal	LoveTotal	JoyTotal
BAQ	Pearson Correlation			.092	.046	.074	-.007	.058	.066	.069	.092
	Sig. (2-tailed)			.450	.707	.543	.953	.634	.588	.570	.450
	N			70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		-.002	-.001	-.004	-.002	.002	-.002	-.001	-.002
		Std. Error		.154	.115	.129	.115	.114	.113	.136	.154
		BCa 95% Confidence Interval	Lower	-.205	-.176	-.174	-.221	-.157	-.170	-.186	-.215
			Upper	.374	.256	.328	.211	.285	.270	.330	.384
			Upper	.987	.678	.878	.701	.496	.632	.802	.

MAIA and EIS

Descriptive Statistics

			Bootstrap[a]			
					BCa 95% Confidence Interval	
		Statistic	Bias	Std. Error	Lower	Upper
EISpositive	Mean	48.6143	.0720	.8612	46.9162	50.4695
	Std. Deviation	7.04292	-.11123	.67245	5.68068	8.03132
	N	70	0	0	.	.
EISnegative	Mean	51.5429	.0248	1.2368	48.9143	54.0857
	Std. Deviation	10.37093	-.06971	.85148	8.62564	11.85054
	N	70	0	0	.	.
EIStotal	Mean	100.1571	.0968	1.8210	96.2249	104.0834
	Std. Deviation	15.16540	-.17762	1.37288	12.36365	17.32615

	N	70	0	0	.	.
AngerTotal	Mean	15.8429	.0115	.4842	14.7677	16.9152
	Std. Deviation	4.03476	-.05111	.32996	3.41600	4.51139
	N	70	0	0	.	.
FearTotal	Mean	9.6857	.0016	.3219	9.0286	10.3143
	Std. Deviation	2.74808	-.02110	.19550	2.36924	3.06982
	N	70	0	0	.	.
SadnessTotal	Mean	26.0143	.0118	.6274	24.6814	27.1901
	Std. Deviation	5.21562	-.02685	.46244	4.36682	6.04152
	N	70	0	0	.	.
LoveTotal	Mean	10.2286	.0177	.2322	9.7586	10.7143
	Std. Deviation	1.93497	-.03271	.18909	1.59622	2.19018
	N	70	0	0	.	.
JoyTotal	Mean	38.3857	.0543	.6807	37.1086	39.8426
	Std. Deviation	5.57763	-.07576	.50411	4.55767	6.30264
	N	70	0	0	.	.
MAIAnoticing	Mean	13.1571	.0184	.3872	12.3714	13.9286
	Std. Deviation	3.28649	-.04321	.28821	2.79049	3.72099
	N	70	0	0	.	.
MAIAnotdistracting	Mean	5.6857	-.0051	.3483	5.0143	6.3455
	Std. Deviation	2.92190	-.02261	.28895	2.37371	3.42181
	N	70	0	0	.	.
MAIAnotworrying	Mean	8.5857	.0054	.3431	7.8751	9.2677
	Std. Deviation	2.89674	-.01274	.20791	2.51540	3.26796
	N	70	0	0	.	.
MAIAattentionalreg	Mean	18.8286	.0259	.7253	17.4772	20.3143
	Std. Deviation	6.11240	-.06183	.40406	5.33500	6.74418
	N	70	0	0	.	.
MAIAEmotionalAwareness	Mean	16.7286	.0119	.5768	15.5857	17.8137
	Std. Deviation	4.79408	-.03714	.40546	4.00720	5.50232
	N	70	0	0	.	.
MAIAselfregulation	Mean	11.0286	.0219	.4962	10.1000	12.0000
	Std. Deviation	4.15626	-.05703	.38559	3.43178	4.71745
	N	70	0	0	.	.
MAIAbodylistening	Mean	5.9000	.0219	.4384	5.1000	6.8143
	Std. Deviation	3.67187	-.02410	.24325	3.21819	4.05644
	N	70	0	0	.	.
MAIATrusting	Mean	10.0571	.0369	.3881	9.2571	10.8714
	Std. Deviation	3.26548	-.04634	.27570	2.75424	3.67091
	N	70	0	0	.	.
MAIAtotal	Mean	89.9714	.1372	2.2004	85.8408	94.5920

	Std. Deviation	18.63608	-.15966	1.21187	16.51622	20.53091
	N	70	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

				MAIAnoticing	MAIAnotdistracting	MAIAnotworrying	MAIAattentionalreg	MAIAEmotionalAwareness	MAIAselfregulation	MAIAbodylistening	MAIATrusting	MAIAtotal
EISpositive	Pearson Correlation			.115	.058	-.030	.054	.418**	-.015	.202	.119	.207
	Sig. (2-tailed)			.344	.633	.805	.657	.000	.902	.094	.325	.085
	N			70	70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		.011	.002	-.005	.009	.003	.013	.001	.006	.007
		Std. Error		.133	.117	.127	.122	.112	.115	.130	.104	.118
		BCa 95% Confidence Interval	Lower	-.152	-.175	-.263	-.170	.177	-.227	-.050	-.091	-.031
			Upper	.406	.286	.210	.341	.638	.274	.443	.342	.465
EISnegative	Pearson Correlation			-.005	-.048	-.208	-.267*	.390**	-.337**	.084	-.130	-.109
	Sig. (2-tailed)			.967	.694	.085	.026	.001	.004	.487	.284	.368
	N			70	70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		.009	.006	-.002	.003	.002	.001	-.002	-.001	.003
		Std. Error		.133	.118	.127	.114	.116	.083	.122	.105	.119
		BCa 95% Confi	Lower	-.278	-.282	-.439	-.478	.124	-.488	-.142	-.311	-.340

		dence Interval	Upper	.268	.208	.034	-.025	.614	-.177	.312	.078	.128
EIStotal	Pearson Correlation			.050	-.006	-.156	-.157	.460**	-.237*	.151	-.033	.022
	Sig. (2-tailed)			.682	.962	.198	.193	.000	.048	.211	.785	.859
	N			70	70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		.009	.005	-.003	.003	.002	.003	-.003	.001	.003
		Std. Error		.133	.116	.133	.117	.108	.085	.118	.106	.115
		BCa 95% Confidence Interval	Lower	-.213	-.240	-.393	-.375	.200	-.398	-.082	-.235	-.204
			Upper	.322	.235	.090	.097	.665	-.040	.376	.179	.245
AngerTotal	Pearson Correlation			-.042	-.151	-.021	-.267*	.276*	-.418**	-.006	-.135	-.169
	Sig. (2-tailed)			.731	.214	.866	.026	.021	.000	.961	.267	.163
	N			70	70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		.008	.001	-.004	.000	.002	.002	-.006	.004	.002
		Std. Error		.135	.114	.123	.117	.127	.081	.123	.119	.120
		BCa 95% Confidence Interval	Lower	-.325	-.371	-.258	-.476	.000	-.572	-.243	-.367	-.403
			Upper	.232	.089	.200	-.037	.513	-.257	.214	.113	.060
FearTotal	Pearson Correlation			-.023	-.141	-.288*	-.255*	.286*	-.289*	.008	-.092	-.160
	Sig. (2-tailed)			.848	.246	.016	.033	.016	.015	.945	.451	.186

	N			70	70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		.005	.009	.002	.000	.002	-.004	-.005	-.005	.001
		Std. Error		.126	.127	.123	.113	.114	.097	.129	.125	.122
		BCa 95% Confidence Interval	Lower	-.273	-.376	-.511	-.468	.047	-.461	-.223	-.332	-.377
			Upper	.249	.139	-.043	-.027	.516	-.118	.240	.132	.088
SadnessTotal	Pearson Correlation			.035	.095	-.245*	-.189	.410**	-.195	.168	-.106	-.003
	Sig. (2-tailed)			.777	.432	.041	.116	.000	.107	.164	.384	.983
	N			70	70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		.008	.005	-.001	.004	.001	.000	-.001	-.003	.003
		Std. Error		.123	.111	.123	.110	.106	.096	.113	.109	.113
		BCa 95% Confidence Interval	Lower	-.213	-.131	-.457	-.388	.167	-.366	-.056	-.292	-.222
			Upper	.294	.329	-.025	.039	.614	-.011	.389	.099	.230
LoveTotal	Pearson Correlation			.115	.105	-.032	.028	.249*	-.013	.168	.076	.148
	Sig. (2-tailed)			.343	.386	.793	.819	.038	.912	.163	.532	.220
	N			70	70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		.008	.001	-.007	.005	.001	.011	.001	.005	.004
		Std. Error		.113	.121	.134	.118	.122	.110	.129	.122	.113

		BCa 95% Confidence Interval	Lower	-.133	-.163	-.262	-.193	-.009	-.228	-.078	-.169	-.066
			Upper	.368	.330	.211	.278	.497	.249	.415	.317	.382
JoyTotal	Pearson Correlation			.105	.037	-.027	.059	.441**	-.014	.197	.124	.210
	Sig. (2-tailed)			.387	.762	.826	.630	.000	.907	.103	.304	.081
	N			70	70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		.009	.002	-.003	.009	.002	.013	.000	.007	.007
		Std. Error		.136	.124	.125	.122	.109	.117	.127	.106	.117
		BCa 95% Confidence Interval	Lower	-.164	-.206	-.256	-.169	.201	-.229	-.055	-.087	-.027
			Upper	.394	.278	.215	.351	.641	.261	.442	.343	.463

BAQ and MAIA

				BAQ
BAQ	Pearson Correlation			1
	Sig. (2-tailed)			
	N			70
	Bootstrap[c]	Bias		0
		Std. Error		0
		95% Confidence Interval	Lower	1
			Upper	1
MAIAnoticing	Pearson Correlation			.550**
	Sig. (2-tailed)			.000
	N			70

	Bootstrap[c]	Bias		-.001
		Std. Error		.087
		95% Confidence Interval	Lower	.368
			Upper	.705
MAIAnotdistracting	Pearson Correlation			-.037
	Sig. (2-tailed)			.762
	N			70
	Bootstrap[c]	Bias		-.008
		Std. Error		.126
		95% Confidence Interval	Lower	-.284
			Upper	.205
MAIAnotworrying	Pearson Correlation			.092
	Sig. (2-tailed)			.446
	N			70
	Bootstrap[c]	Bias		.000
		Std. Error		.099
		95% Confidence Interval	Lower	-.110
			Upper	.287
MAIAattentionalreg	Pearson Correlation			.459**
	Sig. (2-tailed)			.000
	N			70
	Bootstrap[c]	Bias		.003
		Std. Error		.082
		95% Confidence Interval	Lower	.298
			Upper	.615
MAIAEmotionalAwareness	Pearson Correlation			.474**
	Sig. (2-tailed)			.000
	N			70
	Bootstrap[c]	Bias		.003
		Std. Error		.104
		95% Confidence Interval	Lower	.253
			Upper	.659
MAIAselfregulation	Pearson Correlation			.434**
	Sig. (2-tailed)			.000
	N			70
	Bootstrap[c]	Bias		-.006
		Std. Error		.105
		95% Confidence Interval	Lower	.206
			Upper	.622
MAIAbodylistening	Pearson Correlation			.450**
	Sig. (2-tailed)			.000

	N			70
	Bootstrap[c]	Bias		-.005
		Std. Error		.095
		95% Confidence Interval	Lower	.243
			Upper	.610
MAIATrusting	Pearson Correlation			.163
	Sig. (2-tailed)			.177
	N			70
	Bootstrap[c]	Bias		.002
		Std. Error		.106
		95% Confidence Interval	Lower	-.034
			Upper	.366
MAIAtotal	Pearson Correlation			.592**
	Sig. (2-tailed)			.000
	N			70
	Bootstrap[c]	Bias		-.001
		Std. Error		.075
		95% Confidence Interval	Lower	.427
			Upper	.715

Appendix N

Correlations between IAC, Confidence and IAW, Confidence, IAW and EIS, and Confidence, IAW and IS (BAQ + MAIA)

IAC, IAW and Confidence Ratings

Descriptive Statistics

			Bootstrap[a]			
					BCa 95% Confidence Interval	
		Statistic	Bias	Std. Error	Lower	Upper
IAC	Mean	.4087	.0006	.0350	.3383	.4805
	Std. Deviation	.29510	-.00261	.01729	.26428	.32052
	N	70	0	0	.	.
CONFIDENCE	Mean	34.9571	.0342	2.5535	29.6714	40.1552
	Std. Deviation	21.40521	-.18392	1.56412	18.41363	23.75819
	N	70	0	0	.	.
IAW	Mean	5.9092	.0260	3.0752	-.2323	12.3804
	Std. Deviation	25.93298	-.39593	2.39652	22.39254	29.19180
	N	70	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				IAC	CONFIDENCE	IAW
IAC	Pearson Correlation			1	.520**	.709**
	Sig. (2-tailed)				.000	.000
	N			70	70	70
	Bootstrap[c]	Bias		0	.002	-.001
		Std. Error		0	.099	.046
		BCa 95% Confidence Interval	Lower	.	.305	.610
			Upper	.	.699	.796
CONFIDENCE	Pearson Correlation			.520**	1	-.234
	Sig. (2-tailed)			.000		.051
	N			70	70	70
	Bootstrap[c]	Bias		.002	0	.008
		Std. Error		.099	0	.102

		BCa 95% Confidence Interval	Lower	.305	.	-.425
			Upper	.699	.	.004
IAW	Pearson Correlation			.709**	-.234	1
	Sig. (2-tailed)			.000	.051	
	N			70	70	70
	Bootstrap[c]	Bias		-.001	.008	0
		Std. Error		.046	.102	0
		BCa 95% Confidence Interval	Lower	.610	-.425	.
			Upper	.796	.004	.

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

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Confidence, IAW and EIS

Descriptive Statistics

			Bootstrap[a]			
					BCa 95% Confidence Interval	
		Statistic	Bias	Std. Error	Lower	Upper
CONFIDENCE	Mean	34.9571	-.1334	2.5050	30.0794	39.7011
	Std. Deviation	21.40521	-.26718	1.61131	18.54372	23.68136
	N	70	0	0	.	.
IAW	Mean	5.9092	.1901	3.0697	-.2550	12.3129
	Std. Deviation	25.93298	-.11272	2.38052	21.65706	29.91170
	N	70	0	0	.	.
EISpositive	Mean	48.6143	.0021	.8189	46.8995	50.2438
	Std. Deviation	7.04292	-.07063	.63007	5.83415	8.05290
	N	70	0	0	.	.
EISnegative	Mean	51.5429	.0239	1.2008	49.2000	53.8915
	Std. Deviation	10.37093	-.13188	.82408	8.73465	11.65450
	N	70	0	0	.	.
EIStotal	Mean	100.1571	.0260	1.7736	96.5308	103.5527
	Std. Deviation	15.16540	-.16343	1.31502	12.65680	17.40886
	N	70	0	0	.	.
AngerTotal	Mean	15.8429	.0036	.4725	14.9429	16.6826
	Std. Deviation	4.03476	-.04148	.30881	3.44661	4.53270
	N	70	0	0	.	.
FearTotal	Mean	9.6857	.0087	.3123	9.0857	10.3000

	Std. Deviation	2.74808	-.03330	.18517	2.39824	3.02340
	N	70	0	0	.	.
SadnessTotal	Mean	26.0143	.0116	.6082	24.7967	27.1143
	Std. Deviation	5.21562	-.07582	.46014	4.37097	5.92893
	N	70	0	0	.	.
LoveTotal	Mean	10.2286	-.0111	.2314	9.8143	10.6286
	Std. Deviation	1.93497	-.02715	.17859	1.62095	2.21556
	N	70	0	0	.	.
JoyTotal	Mean	38.3857	.0132	.6505	37.0429	39.7435
	Std. Deviation	5.57763	-.05130	.47904	4.67656	6.33214
	N	70	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				EISpositive	EISnegative	EIStotal	AngerTotal	FearTotal	SadnessTotal	LoveTotal	JoyTotal
CONFIDENCE	Pearson Correlation			.043	.009	.026	-.028	.041	.017	.071	.030
	Sig. (2-tailed)			.721	.944	.831	.816	.737	.887	.557	.804
	N			70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		.000	-.004	-.002	-.002	-.004	-.005	-.003	.002
		Std. Error		.125	.136	.136	.128	.129	.134	.120	.131
		BCa 95% Confidence Interval	Lower	-.216	-.254	-.265	-.274	-.208	-.258	-.165	-.238
			Upper	.296	.253	.293	.209	.277	.280	.300	.300
IAW	Pearson Correlation			-.005	-.002	-.004	.006	.019	-.019	-.072	.018
	Sig. (2-tailed)			.966	.986	.975	.961	.876	.877	.556	.880
	N			70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		.006	.005	.006	.004	.003	.004	.004	.006
		Std. Error		.107	.106	.108	.103	.102	.112	.098	.107
		BCa 95% Confidence Interval	Lower	-.222	-.205	-.208	-.191	-.201	-.249	-.262	-.197
			Upper	.227	.228	.222	.218	.233	.225	.125	.248

Confidence, IAW and IS

Descriptive Statistics

		Statistic	Bootstrap[a]			
			Bias	Std. Error	BCa 95% Confidence Interval	
					Lower	Upper
CONFIDENCE	Mean	34.9571	.0835	2.4642	29.9504	40.2968
	Std. Deviation	21.40521	-.14119	1.58316	18.54590	24.01788
	N	70	0	0	.	.
IAW	Mean	5.9092	.0954	3.0483	-.0879	12.4282
	Std. Deviation	25.93298	-.21694	2.42742	21.84251	29.64609
	N	70	0	0	.	.
MAIAnoticing	Mean	13.1571	-.0186	.3872	12.3857	13.8572
	Std. Deviation	3.28649	-.01892	.28464	2.78030	3.75635
	N	70	0	0	.	.
MAIAnotdistracting	Mean	5.6857	-.0198	.3535	5.0265	6.3000
	Std. Deviation	2.92190	-.05306	.27350	2.45879	3.29456
	N	70	0	0	.	.
MAIAnotworrying	Mean	8.5857	.0109	.3548	7.8620	9.3286
	Std. Deviation	2.89674	-.03935	.20151	2.55498	3.17257
	N	70	0	0	.	.
MAIAattentionalreg	Mean	18.8286	-.0042	.7174	17.3776	20.3081
	Std. Deviation	6.11240	-.04168	.41694	5.32230	6.81404
	N	70	0	0	.	.
MAIAEmotionalAwareness	Mean	16.7286	-.0187	.5697	15.5616	17.7000
	Std. Deviation	4.79408	-.05491	.41498	4.06740	5.45834
	N	70	0	0	.	.
MAIAselfregulation	Mean	11.0286	-.0161	.4991	10.0143	11.9571
	Std. Deviation	4.15626	-.03541	.37984	3.39459	4.78928
	N	70	0	0	.	.
MAIAbodylistening	Mean	5.9000	-.0088	.4317	5.1000	6.7286
	Std. Deviation	3.67187	-.04083	.24275	3.23313	4.03115
	N	70	0	0	.	.
MAIATrusting	Mean	10.0571	.0081	.3967	9.2488	10.8000
	Std. Deviation	3.26548	-.04063	.26563	2.78344	3.66532
	N	70	0	0	.	.
MAIAtotal	Mean	89.9714	-.0672	2.2441	85.7390	94.1317
	Std. Deviation	18.63608	-.18124	1.29861	16.24405	20.60689
	N	70	0	0	.	.
BAQ	Mean	79.9429	-.0339	1.8307	76.2649	83.4281

Std. Deviation	15.38104	-.16123	1.47774	12.76075	17.77239
N	70	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				MAIA noticing	MAIA notdistracting	MAIA notworrying	MAIA attentionalreg	MAIA EmotionalAwareness	MAIA selfregulation	MAIA bodylistening	MAIA Trusting	MAIA total	BAQ
CONFIDENCE	Pearson Correlation			.015	-.135	.027	.072	.018	.104	.043	.063	.056	.152
	Sig. (2-tailed)			.900	.265	.822	.555	.884	.392	.726	.605	.642	.210
	N			70	70	70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		.007	.003	-.002	.008	.007	.007	.008	-.001	.010	.007
		Std. Error		.133	.104	.108	.126	.127	.126	.120	.135	.123	.126
		BCa 95% Confidence Interval	Lower	-.276	-.344	-.181	-.197	-.244	-.167	-.195	-.208	-.198	-.124
			Upper	.300	.082	.224	.352	.303	.381	.320	.316	.327	.421
IAW	Pearson Correlation			-.012	.142	.057	-.104	.046	-.062	-.001	-.014	-.010	-.044
	Sig. (2-tailed)			.923	.241	.640	.391	.706	.610	.993	.908	.936	.716
	N			70	70	70	70	70	70	70	70	70	70
	Bootstrap[c]	Bias		-.002	-.004	.012	-.004	-.008	-.003	-.003	.002	-.005	.000
		Std. Error		.118	.123	.119	.105	.126	.116	.115	.109	.135	.121
		BCa 95% Confidence Interval	Lower	-.239	-.096	-.189	-.314	-.196	-.280	-.219	-.239	-.265	-.278
			Upper	.217	.370	.327	.093	.265	.142	.212	.198	.234	.194

Appendix O

Data Screening and Correlations for Temporal Output

Data Screening

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
StandardDeviationTimeAfterRWave	40	97.6%	1	2.4%	41	100.0%
IAC	40	97.6%	1	2.4%	41	100.0%
StDDiffBetweenTriggers	40	97.6%	1	2.4%	41	100.0%

Descriptives

			Statistic	Std. Error
StandardDeviationTimeAfterRWave	Mean		.2330	.00881
	95% Confidence Interval for Mean	Lower Bound	.2152	
		Upper Bound	.2508	
	5% Trimmed Mean		.2315	
	Median		.2219	
	Variance		.003	
	Std. Deviation		.05573	
	Minimum		.13	
	Maximum		.37	
	Range		.24	
	Interquartile Range		.09	
	Skewness		.339	.374
	Kurtosis		-.357	.733
IAC	Mean		.4750	.04205
	95% Confidence Interval for Mean	Lower Bound	.3899	
		Upper Bound	.5600	
	5% Trimmed Mean		.4759	
	Median		.4501	
	Variance		.071	
	Std. Deviation		.26598	
	Minimum		.00	
	Maximum		.93	
	Range		.93	
	Interquartile Range		.38	
	Skewness		-.096	.374

	Kurtosis		-.849	.733
StDDiffBetweenTriggers	Mean		1.5266	.31597
	95% Confidence Interval for Mean	Lower Bound	.8875	
		Upper Bound	2.1657	
	5% Trimmed Mean		1.2871	
	Median		.3562	
	Variance		3.994	
	Std. Deviation		1.99840	
	Minimum		.06	
	Maximum		8.36	
	Range		8.30	
	Interquartile Range		2.62	
	Skewness		1.663	.374
	Kurtosis		2.562	.733

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
StandardDeviationTimeAfterRWave	.110	40	.200*	.974	40	.487
IAC	.103	40	.200*	.962	40	.201
StDDiffBetweenTriggers	.282	40	.000	.739	40	.000

*. This is a lower bound of the true significance.

Z Score Calculations

		Statistic	Std. Error	Z Score
StandardDeviationTimeAfterRWave	Skewness	0.34	0.37	0.91
	Kurtosis	-0.36	0.73	-0.49
HBTScore	Skewness	-0.10	0.37	-0.26
	Kurtosis	-0.85	0.73	-1.16
StDDiffBetweenTriggers	Skewness	1.66	0.37	4.45
	Kurtosis	2.56	0.73	3.50

Correlations for Temporal Analysis

Descriptive Statistics

		Statistic	Bootstrap[a] Bias	Std. Error	95% Confidence Interval Lower	Upper
StandardDeviationTimeAfterRWave	Mean	.2330	-.0001	.0089	.2162	.2512
	Std. Deviation	.05573	-.00074	.00555	.04434	.06537
	N	40	0	0	40	40
IAC	Mean	.4750	-.0003	.0417	.3923	.5592
	Std. Deviation	.26598	-.00406	.02138	.22068	.30236
	N	40	0	0	40	40
StDDiffBetweenTriggers	Mean	1.5266	-.0077	.3000	.9834	2.1463
	Std. Deviation	1.99840	-.05789	.31717	1.33283	2.53881
	N	40	0	0	40	40

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				StandardDeviationTimeAfterRWave	IAC	StDDiffBetweenTriggers
StandardDeviationTimeAfterRWave	Pearson Correlation			1	.322*	-.122
	Sig. (2-tailed)				.042	.452
	N			40	40	40
	Bootstrap[c]	Bias		0	.007	.000
		Std. Error		0	.163	.159
		95% Confidence Interval	Lower	1	.008	-.400
			Upper	1	.633	.202
IAC	Pearson Correlation			.322*	1	-.701**
	Sig. (2-tailed)			.042		.000
	N			40	40	40
	Bootstrap[c]	Bias		.007	0	-.001
		Std. Error		.163	0	.063
		95% Confidence Interval	Lower	.008	1	-.796
			Upper	.633	1	-.554

StDDiffBetweenTriggers	Pearson Correlation			-.122	-.701**	1
	Sig. (2-tailed)			.452	.000	
	N			40	40	40
	Bootstrap[c]	Bias		.000	-.001	0
		Std. Error		.159	.063	0
		95% Confidence Interval	Lower	-.400	-.796	1
			Upper	.202	-.554	1

*. Correlation is significant at the 0.05 level (2-tailed).

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

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Appendix P

Means for valency, arousal, dominance, concreteness and arousal ratings for to be remembered nouns

Word	Mean Valence	Mean Arousal	Mean Dominance	Mean Concreteness	LogFreq(Zipf)
minibus	4.89	3.56	4.53	4.55	3.07
analyst	5	3.24	4.76	4.23	3.48
episode	5	3.67	5.4	3.22	4.23
monitor	5.05	3.86	5.81	3.65	4.07
vacancy	5.05	3.68	5.21	3.28	3.18
cabinet	5.1	3.75	5.78	4.89	4.64
leotard	5.1	3.95	5	4.74	2.83
Average	**5.027143**	**3.672857**	**5.212857**	**4.08**	**3.642857**

Appendix Q

Means for valency, arousal, dominance, concreteness and arousal ratings for distractor adjectives

Word	Mean Valence	Mean Arousal	Mean Dominance	Mean Concreteness	LogFreq (Zipf)	Length (Letters)
Negative Other						
aggressive	3.08	5.87	5.49	2.54	4.24	10.00
deceitful	2.60	5.18	4.11	2.13	2.76	9.00
malicious	2.32	4.95	4.78	2.33	3.22	9.00
malignant	3.10	4.42	4.20	2.52	2.65	9.00
merciless	3.05	5.05	5.05	1.96	2.93	9.00
unfriendly	2.30	4.05	4.45	2.12	2.70	10.00
violent	2.26	6.30	3.65	3.10	4.34	7.00
Average	**2.67**	**5.12**	**4.53**	**2.39**	**3.26**	**9.00**
Positive Other						
supportive	6.95	3.83	6.58	2.20	3.87	10.00
virtuous	6.85	5.10	6.73	1.68	2.84	8.00
adoring	7.38	4.86	6.29	2.34	2.92	7.00
trustworthy	7.25	4.22	7.29	2.39	3.02	11.00
devoted	7.16	4.22	6.21	1.88	3.79	7.00
forgiving	6.74	3.95	6.45	1.78	3.15	9.00
generous	7.43	5.70	6.81	2.25	4.26	8.00
Average	**7.11**	**4.55**	**6.62**	**2.07**	**3.41**	**8.57**
Negative Self						
desperate	3.19	5.00	3.21	1.73	4.59	9.00
powerless	2.90	3.95	3.04	2.11	3.34	9.00
cowardly	2.85	5.14	3.85	1.96	3.06	8.00
depressive	2.64	3.48	3.64	2.19	2.71	10.00
unhappy	1.84	5.10	3.71	2.04	4.15	7.00

frustrated	2.55	5.40	3.85	2.47	4.08	10.00
discouraged	3.18	3.38	3.50	1.90	3.05	11.00
Average	2.74	4.49	3.54	2.06	3.57	9.14
Positive Self						
creative	7.06	4.86	6.78	1.93	4.33	8.00
confident	7.56	4.62	7.04	2.62	4.87	9.00
talented	7.95	4.55	6.14	2.04	4.18	8.00
flexible	6.74	4.45	6.68	2.64	3.98	8.00
outgoing	6.89	5.71	5.65	2.30	3.48	8.00
positive	7.57	5.50	7.26	2.44	4.80	8.00
radiant	7.29	5.03	6.54	2.45	3.08	7.00
Average	**7.29**	**4.96**	**6.58**	**2.35**	**4.10**	**8.00**
Neutral						
dramatic	5.17	6.59	4.77	2.12	4.46	8.00
impulsive	4.67	6.00	3.72	2.25	2.99	9.00
rigorous	4.81	5.81	6.18	2.57	3.46	8.00
dominant	5.15	5.36	6.78	1.66	3.91	8.00
punctual	5.73	4.27	6.85	1.87	2.65	8.00
bearable	5.72	3.57	5.47	2.25	2.81	8.00
tireless	4.95	4.41	6.09	2.38	2.91	8.00
Average	**5.17**	**5.14**	**5.69**	**2.16**	**3.31**	**8.14**

Appendix R

Translations and equivalent words for distractor adjectives based on Wentura, Rothermund and Bak (2000)

Direct English Translation/Alternative	**Original German Word (English Translation)**
Aggressive	aggressiv(aggressive)
Deceitful	betxiigerisch(deceitful)
Malicious	boshaft(malicious)
Malignant	bSsartig(malignant,vicious)
Merciless	erbarmungslos(merciless)
Unfriendly	unfreundlich(unfriendly)
Violent	gewaltt&tig(violent)
Desperate	verzweifelt(desperate)
Powerless	ohnmachtig(powerless)
Cowardly	feige(cowardly)
Depressive	deprimiert(depressed)
Unhappy	ungliicklich(unhappy)
Frustrated	frustriert(frustrated)
Discouraged	entmutigt(discouraged)
Supportive	rucksichtsvoll(considerate) solidarisch(showssolidarity)
Virtuous	gerecht(Just)
Adoring	liebevoll(loving zartlich(affectionate)
Trustworthy	ehrlich(honest)
Devoted	treu(faithful,loyal)
Forgiving	verstandnisvoll (understanding) warmherzig(warm-hearted)
Generous	entgegenkommend(obliging)
Creative	kreativ(creative)
Confident	selbstsicher (self-confident)

Talented	einfallsreich(inventive) intelligent(intelligent) geschickt(skillful)
Flexible	flexibel(flexible)
Outgoing	lebhaft(lively)
Positive	optimistisch(optimistic)
Radiant	vergnugt(cheerful) gliicklich(happy)

Appendix S

Information Sheet for Study Two

Exploring the impact of interoceptive abilities on memory and susceptibility to distraction

Dear Participant,

My name is Melissa Barker, and I am a Masters by Research student conducting this research as part of my dissertation, under the supervision of Dr Cassie Richardson and Professor Linden Ball. We would like to invite you to take part in our research study. Before you decide whether if you would like to take part, it is important for you to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully and to decide whether or not you wish to take part. If there is anything that is not clear or if you would like more information, feel free to talk to me before deciding.

What is the purpose of the study?

The purpose of this study is to investigate interoception, which refers to the feeling of change in organs and internal parts of the body. For example, this may include being aware that you are hungry, thirsty, or that your heart is beating faster than normal. It is thought that people differ to the degree that they experience these sensations, and previous research has suggested that these differences may be linked to a variety of psychological processes such as memory, decision making and the experience of emotion. This study aims to examine interoception and how it relates to memory and susceptibility to distraction. We also aim to investigate the effect that the timing of your heartbeat has on susceptibility to distraction.

Why have I been invited to participate?

We would like to invite people aged 18 or older without any diagnosed cardiac, neurological and psychiatric conditions, as well as those not currently taking vasoactive and/or psychoactive medications. Because the tasks in this experiment involve listening to information via headphones as well as visually on the screen, we are inviting people with corrected, or corrected-to-normal vision and hearing. Because the study also involves listening to and seeing words written in English, we are looking for participants whose first language is English. We are inviting approximately 30 people to participate in this study.

Do I have to take part?

No, it is up to you to decide whether or not to take part. If you do, you will be given this information sheet to keep and be asked to sign a consent form. You are still free to withdraw from the study at any time and without giving a reason.

If you are a current UCLan student, we would like to reassure you that by choosing to either take part or not take part in the study will have no impact on your marks, assessments or future studies.

If you wish to withdraw your data once the final part of the experiment is over, you must inform the researcher before you leave. Once you have completed the entire experiment your personal details will be anonymised and we will be unable to identify which data is yours, so it is important you tell us of your wish to withdraw before you leave.

What will happen to me if I take part?

There are three parts to the study:

1. **Measurement of height, weight, the circumference of your waist and hips, and skinfold thickness** (approximately 5 minutes).
2. **A heartbeat tracking task** (approximately 10 minutes).
3. **A computer-based memory task** (approximately 30 minutes).

If you agree to take part, we would like you to come to the School of Psychology, which is located in the Darwin Building at the University of Central Lancashire, Preston PR1 2HE.

During the first part of the study, we will measure your height and weight, the circumference of your hips and waist, and skinfold thickness. There is a separate information and consent form for you read and sign regarding this, and you are not expected to have any of these measurements taken if you are not comfortable with them.

We will then record your heart rate whilst you are instructed to silently count the number of heartbeats, without manually checking, that you feel in your body from the time you hear “start” to when you hear “stop”. This will be repeated six times using different intervals of time. After the heartbeat tracking task is completed, you will be asked to estimate randomly presented time intervals. You will then be instructed to tap your finger each time you feel your heartrate for a duration of 1 minute. This part of the experiment will be filmed, but the footage will be destroyed once the data has been logged. You will be asked to rate your confidence in your performance during the heartbeat tracking task using a pencil mark on a continuous visual analogue scale (“Total guess/No heartbeat awareness” to “Complete confidence/Full perception of heartbeat

You will then be asked to complete a computer-based memory task while hearing alternating sound sequences. In this task, you will be asked to remember a sequence of six nouns which will be presented visually on the screen. During the task, ECG electrodes will be attached to your wrist in order to monitor your heartrate.

If you are a Year 1 or 2 Psychology student at the University of Central Lancashire, you will be offered 6 SONA points for your time.

What are the possible benefits of taking part?

There is no immediate benefit from taking part in this study. However, the information we gather from this study will help us to further understand memory and distraction.

What are the possible risks of taking part?

There are no risks involved in taking part in this study.

Will what I say in this study be kept confidential?

Yes. All information gathered during this study is kept strictly confidential, and stored securely at the School of Psychology at the University of Central Lancashire. The data recorded from this study will be saved to a desktop computer which is password protected so nobody other than the researchers will be able to see the data. The data will be kept for a period of five years and will then be deleted. Any data collected will be retained confidentially and made anonymous so that it will not be possible to identify you from the data or any reports on the project. No identifiable personal data will be retained or published. However, signed consent forms will be stored in a locked filing cabinet and will not be shared with any other organisation. The identifiable data (consent forms) will not be linked to your performance data in any way. All consent forms will be kept for a period of five years and then shredded and disposed of through the university's secure waste disposal system.

What should I do if I want to take part?

If you would like to take part in the study, please sign the consent form and let the researcher know that you wish to take part.

Contact for Further Information

If you would like to have any further information you can email myself or my supervisor using the contact details below.

Melissa Barker
E: MBarker1@uclan.ac.uk.

Dr Cassie Richardson
E: CRichardson5@uclan.ac.uk
T: (01772) 893427

How do I make a complaint?
If you have any concerns about the research that you wish to raise with somebody who is independent of the research team, you should raise this with the University Officer for Ethics at OfficerForEthics@uclan.ac.uk.

Thank you for taking your time to read this information sheet.

Appendix T

Consent Form for Study Two

Exploring the impact of interoceptive abilities on memory and susceptibility to distraction

Melissa Barker
MBarker1@uclan.ac.uk

Please read the following statements and initial the boxes to indicate your agreement

1. I confirm that I have read and understand the information sheet, for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time up until one month after I have completed the study. ☐

3. I agree to take part in the above study. ☐

Name of Participant: …………………………………………………… Date:

Signature: …………………………………………………………………………

Name of Researcher: ……………………………………………………. Date:

Signature: ……………………………………………………………………

Appendix U

Debrief for Study Two

School of Psychology
Darwin Building
University of Central Lancashire
Preston PRl 2HE

Exploring the impact of interoceptive abilities on memory and susceptibility to distraction

Thank you for taking the time to complete this study, your participation is greatly appreciated.

This study aimed to examine interoception and how it relates to distraction by emotional words. Previous research has suggested that memory for emotional words is more pronounced in individuals who are more accurate at detecting their own heartbeat. One reason for this may be related to the somatic marker hypothesis, which proposes that specific signals from the body (somatic markers) arise when reading emotional words which can then be reactivated during a recall task and help improve memory. In this study, we wanted to investigate if the reverse is true, and whether people with greater interoceptive accuracy are more easily distracted by emotional words than those less accurate. Individuals with better cardiac perception may have more precise access to internal bodily signals which influence their memory and their tendency to be distracted by sounds, such as emotional words.

We also used a sample of your heartrate in order to cause the words you heard to be played at certain points in your cardiac cycle. Previous research has found that memory for words is reduced when they are displayed at systole (the final stage of the cardiac cycle where blood is pumped out of your heart) rather than diastole (when the heart refills with blood). We wanted to examine whether unwanted information presented during systole, such as distracting noises, will have less of a negative impact on your performance compared to when they are presented at diastole. We also want to investigate whether this effect is influenced by your performance during the heart beat tracking task.

We also asked if we could take a variety of body measurements to measure levels of subcutaneous fat, which is the layer of fat which we all have underneath our skin. Previous research suggests that this layer may distort some of our perceptions of bodily sensations, and we took these measurements to examine whether this may affect performance during the heart beat tracking task.

You will never be identified in any presentation of the findings of this study, and it will not be possible to link the results back to you. All data collected will be stored in a locked filing cabinet, and all electronic data will be held on a password protected computer. It is intended that the results of the study will be used for an undergraduate dissertation, with the possibility of being used as part of wider research in the future.

If you would like to withdraw from the study, it is perfectly fine to do so, but please inform the experimenter of this before you leave the room as your data will be anonymised after you have left.

If you have any further questions about the study now or later please do not hesitate to contact us via the contact details below. If you have any concerns about your mood or performance, you should consult with your GP. Students at UCLan can also access Student Support Services using the contact details below:

UCLan Counselling Service

Telephone: 01772 – 892572 Email: CoRecep@uclan.ac.uk

The UCLan Counselling Service provides a free and confidential service to all registered UCLan students where you will be welcomed and treated with respect. The counselling service is staffed by a team of professionally trained and experienced professionals and is open throughout the year except, during short periods over the Christmas and Easter Breaks.

If you are unhappy or have concerns about any aspect of the project, and do not wish to contact the research team, you can contact the University Officer for Ethics (officerforethics@uclan.ac.uk) who is entirely independent of the research and will respond to your concerns.

Once again, thank you for taking the time to participate in this study.

Melissa Barker
E: MBarker1@uclan.ac.uk

Dr Cassie Richardson
T: (01772) 893427
E: CRichardson5@uclan.ac.uk

Appendix V

Data Screening Output and Z scores for Study Two

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
WHRatioT1	27	81.8%	6	18.2%	33	100.0%
WHRatioT2	31	93.9%	2	6.1%	33	100.0%
BMIT1	27	81.8%	6	18.2%	33	100.0%
BMIT2	31	93.9%	2	6.1%	33	100.0%
BodyFatT1	16	48.5%	17	51.5%	33	100.0%
BodyFatT2	19	57.6%	14	42.4%	33	100.0%
IACT1	29	87.9%	4	12.1%	33	100.0%
IACT2	33	100.0%	0	0.0%	33	100.0%
ConfidenceT1	29	87.9%	4	12.1%	33	100.0%
ConfidenceT2	33	100.0%	0	0.0%	33	100.0%
BAQ	33	100.0%	0	0.0%	33	100.0%
PHQ9	33	100.0%	0	0.0%	33	100.0%
GAD7	33	100.0%	0	0.0%	33	100.0%
MAIANoticing	33	100.0%	0	0.0%	33	100.0%
MAIANotDistracting	33	100.0%	0	0.0%	33	100.0%
MAIANotWorrying	33	100.0%	0	0.0%	33	100.0%
MAIAAttentionalRegulation	33	100.0%	0	0.0%	33	100.0%
MAIAEmotionalAwareness	33	100.0%	0	0.0%	33	100.0%
MAIASelfRegulation	33	100.0%	0	0.0%	33	100.0%
MAIABodyListening	33	100.0%	0	0.0%	33	100.0%
MAIATrusting	33	100.0%	0	0.0%	33	100.0%
MAIATotal	33	100.0%	0	0.0%	33	100.0%
EISPositive	33	100.0%	0	0.0%	33	100.0%
EISNegative	33	100.0%	0	0.0%	33	100.0%
EISTotal	33	100.0%	0	0.0%	33	100.0%
AngerTotal	33	100.0%	0	0.0%	33	100.0%
FearTotal	33	100.0%	0	0.0%	33	100.0%
SadnessTotal	33	100.0%	0	0.0%	33	100.0%
LoveTotal	33	100.0%	0	0.0%	33	100.0%
JoyTotal	33	100.0%	0	0.0%	33	100.0%
NPC	32	97.0%	1	3.0%	33	100.0%
PPC	32	97.0%	1	3.0%	33	100.0%
NeutralPC	32	97.0%	1	3.0%	33	100.0%
SPC	32	97.0%	1	3.0%	33	100.0%

IncreaseT1	15	45.5%	18	54.5%	33	100.0%
IncreaseT2	15	45.5%	18	54.5%	33	100.0%
DecreaseT1	14	42.4%	19	57.6%	33	100.0%
DecreaseT2	14	42.4%	19	57.6%	33	100.0%
DiffHBT	29	87.9%	4	12.1%	33	100.0%
DiffBMI	27	81.8%	6	18.2%	33	100.0%
DiffWHR	27	81.8%	6	18.2%	33	100.0%
DiffBodyFat	15	45.5%	18	54.5%	33	100.0%
ConfidenceDiff	29	87.9%	4	12.1%	33	100.0%

Descriptives

			Statistic	Std. Error
WHRatioT1	Mean		.8379	.01879
	95% Confidence Interval for Mean	Lower Bound	.7992	
		Upper Bound	.8765	
	5% Trimmed Mean		.8337	
	Median		.8217	
	Variance		.010	
	Std. Deviation		.09764	
	Minimum		.70	
	Maximum		1.06	
	Range		.36	
	Interquartile Range		.15	
	Skewness		.553	.448
	Kurtosis		-.295	.872
WHRatioT2	Mean		.8220	.01578
	95% Confidence Interval for Mean	Lower Bound	.7898	
		Upper Bound	.8542	
	5% Trimmed Mean		.8189	
	Median		.8025	
	Variance		.008	
	Std. Deviation		.08784	
	Minimum		.68	
	Maximum		1.03	
	Range		.35	
	Interquartile Range		.14	
	Skewness		.437	.421
	Kurtosis		-.485	.821
BMIT1	Mean		28.2902	1.34406
		Lower Bound	25.5274	

	95% Confidence Interval for Mean	Upper Bound	31.0529	
	5% Trimmed Mean		27.7463	
	Median		24.9588	
	Variance		48.776	
	Std. Deviation		6.98395	
	Minimum		19.51	
	Maximum		47.88	
	Range		28.37	
	Interquartile Range		9.42	
	Skewness		1.121	.448
	Kurtosis		1.264	.872
BMIT2	Mean		27.3305	1.21209
	95% Confidence Interval for Mean	Lower Bound	24.8551	
		Upper Bound	29.8059	
	5% Trimmed Mean		26.6359	
	Median		24.6423	
	Variance		45.544	
	Std. Deviation		6.74863	
	Minimum		20.20	
	Maximum		48.74	
	Range		28.54	
	Interquartile Range		8.83	
	Skewness		1.522	.421
	Kurtosis		2.571	.821
BodyFatT1	Mean		29.0654	1.43493
	95% Confidence Interval for Mean	Lower Bound	26.0069	
		Upper Bound	32.1239	
	5% Trimmed Mean		28.8109	
	Median		28.0990	
	Variance		32.945	
	Std. Deviation		5.73973	
	Minimum		21.63	
	Maximum		41.08	
	Range		19.45	
	Interquartile Range		8.92	
	Skewness		.645	.564
	Kurtosis		-.487	1.091
BodyFatT2	Mean		29.2901	1.36890
	95% Confidence Interval for Mean	Lower Bound	26.4141	
		Upper Bound	32.1660	

	5% Trimmed Mean		29.1686	
	Median		28.1847	
	Variance		35.604	
	Std. Deviation		5.96689	
	Minimum		20.13	
	Maximum		40.64	
	Range		20.51	
	Interquartile Range		9.38	
	Skewness		.355	.524
	Kurtosis		-.910	1.014
IACT1	Mean		.4531	.05249
	95% Confidence Interval for Mean	Lower Bound	.3456	
		Upper Bound	.5607	
	5% Trimmed Mean		.4513	
	Median		.4432	
	Variance		.080	
	Std. Deviation		.28269	
	Minimum		.00	
	Maximum		.94	
	Range		.94	
	Interquartile Range		.39	
	Skewness		-.012	.434
	Kurtosis		-.872	.845
IACT2	Mean		.4014	.05390
	95% Confidence Interval for Mean	Lower Bound	.2916	
		Upper Bound	.5112	
	5% Trimmed Mean		.3939	
	Median		.4074	
	Variance		.096	
	Std. Deviation		.30963	
	Minimum		.00	
	Maximum		.96	
	Range		.96	
	Interquartile Range		.61	
	Skewness		.042	.409
	Kurtosis		-1.336	.798
ConfidenceT1	Mean		37.3707	3.83591
	95% Confidence Interval for Mean	Lower Bound	29.5132	
		Upper Bound	45.2282	
	5% Trimmed Mean		36.8080	
	Median		36.2500	

	Variance		426.713	
	Std. Deviation		20.65702	
	Minimum		.00	
	Maximum		88.75	
	Range		88.75	
	Interquartile Range		24.38	
	Skewness		.331	.434
	Kurtosis		.148	.845
ConfidenceT2	Mean		40.9091	4.62371
	95% Confidence Interval for Mean	Lower Bound	31.4909	
		Upper Bound	50.3273	
	5% Trimmed Mean		40.5934	
	Median		40.0000	
	Variance		705.495	
	Std. Deviation		26.56116	
	Minimum		.00	
	Maximum		87.50	
	Range		87.50	
	Interquartile Range		39.38	
	Skewness		.110	.409
	Kurtosis		-1.115	.798
BAQ	Mean		78.1212	2.73438
	95% Confidence Interval for Mean	Lower Bound	72.5515	
		Upper Bound	83.6910	
	5% Trimmed Mean		78.4815	
	Median		79.0000	
	Variance		246.735	
	Std. Deviation		15.70780	
	Minimum		33.00	
	Maximum		114.00	
	Range		81.00	
	Interquartile Range		24.50	
	Skewness		-.476	.409
	Kurtosis		1.002	.798
PHQ9	Mean		10.6061	.96525
	95% Confidence Interval for Mean	Lower Bound	8.6399	
		Upper Bound	12.5722	
	5% Trimmed Mean		10.6397	
	Median		10.0000	
	Variance		30.746	
	Std. Deviation		5.54493	

	Minimum		.00	
	Maximum		21.00	
	Range		21.00	
	Interquartile Range		7.00	
	Skewness		-.035	.409
	Kurtosis		-.446	.798
GAD7	Mean		8.6061	1.04078
	95% Confidence Interval for Mean	Lower Bound	6.4861	
		Upper Bound	10.7261	
	5% Trimmed Mean		8.4394	
	Median		7.0000	
	Variance		35.746	
	Std. Deviation		5.97881	
	Minimum		.00	
	Maximum		21.00	
	Range		21.00	
	Interquartile Range		10.00	
	Skewness		.443	.409
	Kurtosis		-.880	.798
MAIANoticing	Mean		12.9394	.54171
	95% Confidence Interval for Mean	Lower Bound	11.8360	
		Upper Bound	14.0428	
	5% Trimmed Mean		12.8889	
	Median		13.0000	
	Variance		9.684	
	Std. Deviation		3.11187	
	Minimum		6.00	
	Maximum		20.00	
	Range		14.00	
	Interquartile Range		4.00	
	Skewness		.245	.409
	Kurtosis		.517	.798
MAIANotDistracting	Mean		5.0909	.51006
	95% Confidence Interval for Mean	Lower Bound	4.0520	
		Upper Bound	6.1299	
	5% Trimmed Mean		4.9327	
	Median		5.0000	
	Variance		8.585	
	Std. Deviation		2.93006	
	Minimum		.00	
	Maximum		15.00	

	Range		15.00	
	Interquartile Range		2.50	
	Skewness		1.135	.409
	Kurtosis		3.134	.798
MAIANotWorrying	Mean		9.0303	.52130
	95% Confidence Interval for Mean	Lower Bound	7.9685	
		Upper Bound	10.0922	
	5% Trimmed Mean		9.0000	
	Median		9.0000	
	Variance		8.968	
	Std. Deviation		2.99463	
	Minimum		4.00	
	Maximum		15.00	
	Range		11.00	
	Interquartile Range		5.00	
	Skewness		.333	.409
	Kurtosis		-.738	.798
MAIAAttentionalRegulation	Mean		19.1818	1.11842
	95% Confidence Interval for Mean	Lower Bound	16.9037	
		Upper Bound	21.4600	
	5% Trimmed Mean		19.1801	
	Median		20.0000	
	Variance		41.278	
	Std. Deviation		6.42483	
	Minimum		7.00	
	Maximum		31.00	
	Range		24.00	
	Interquartile Range		9.00	
	Skewness		.022	.409
	Kurtosis		-.860	.798
MAIAEmotionalAwareness	Mean		15.5455	.89938
	95% Confidence Interval for Mean	Lower Bound	13.7135	
		Upper Bound	17.3774	
	5% Trimmed Mean		15.8064	
	Median		17.0000	
	Variance		26.693	
	Std. Deviation		5.16654	
	Minimum		3.00	
	Maximum		23.00	
	Range		20.00	
	Interquartile Range		7.00	

	Skewness		-.716	.409
	Kurtosis		-.288	.798
MAIASelfRegulation	Mean		10.3939	.81874
	95% Confidence Interval for Mean	Lower Bound	8.7262	
		Upper Bound	12.0617	
	5% Trimmed Mean		10.6044	
	Median		11.0000	
	Variance		22.121	
	Std. Deviation		4.70332	
	Minimum		.00	
	Maximum		17.00	
	Range		17.00	
	Interquartile Range		6.00	
	Skewness		-.707	.409
	Kurtosis		-.001	.798
MAIABodyListening	Mean		5.5455	.68823
	95% Confidence Interval for Mean	Lower Bound	4.1436	
		Upper Bound	6.9473	
	5% Trimmed Mean		5.4949	
	Median		6.0000	
	Variance		15.631	
	Std. Deviation		3.95357	
	Minimum		.00	
	Maximum		12.00	
	Range		12.00	
	Interquartile Range		7.00	
	Skewness		.099	.409
	Kurtosis		-1.160	.798
MAIATrusting	Mean		9.1515	.59052
	95% Confidence Interval for Mean	Lower Bound	7.9487	
		Upper Bound	10.3544	
	5% Trimmed Mean		9.2020	
	Median		9.0000	
	Variance		11.508	
	Std. Deviation		3.39228	
	Minimum		2.00	
	Maximum		15.00	
	Range		13.00	
	Interquartile Range		4.50	
	Skewness		-.133	.409
	Kurtosis		-.306	.798

MAIATotal	Mean		86.8788	3.32966
	95% Confidence Interval for Mean	Lower Bound	80.0965	
		Upper Bound	93.6611	
	5% Trimmed Mean		87.0892	
	Median		88.0000	
	Variance		365.860	
	Std. Deviation		19.12746	
	Minimum		44.00	
	Maximum		124.00	
	Range		80.00	
	Interquartile Range		26.50	
	Skewness		-.102	.409
	Kurtosis		-.348	.798
EISPositive	Mean		45.9091	1.26309
	95% Confidence Interval for Mean	Lower Bound	43.3363	
		Upper Bound	48.4819	
	5% Trimmed Mean		46.0875	
	Median		47.0000	
	Variance		52.648	
	Std. Deviation		7.25588	
	Minimum		31.00	
	Maximum		58.00	
	Range		27.00	
	Interquartile Range		10.50	
	Skewness		-.587	.409
	Kurtosis		-.399	.798
EISNegative	Mean		50.2727	1.67495
	95% Confidence Interval for Mean	Lower Bound	46.8610	
		Upper Bound	53.6845	
	5% Trimmed Mean		50.5152	
	Median		51.0000	
	Variance		92.580	
	Std. Deviation		9.62183	
	Minimum		26.00	
	Maximum		69.00	
	Range		43.00	
	Interquartile Range		11.00	
	Skewness		-.474	.409
	Kurtosis		.577	.798
EISTotal	Mean		96.1818	2.61350
		Lower Bound	90.8583	

	95% Confidence Interval for Mean	Upper Bound	101.5054	
	5% Trimmed Mean		96.8906	
	Median		99.0000	
	Variance		225.403	
	Std. Deviation		15.01344	
	Minimum		61.00	
	Maximum		119.00	
	Range		58.00	
	Interquartile Range		23.00	
	Skewness		-.834	.409
	Kurtosis		.002	.798
AngerTotal	Mean		15.4848	.75141
	95% Confidence Interval for Mean	Lower Bound	13.9543	
		Upper Bound	17.0154	
	5% Trimmed Mean		15.4714	
	Median		17.0000	
	Variance		18.633	
	Std. Deviation		4.31655	
	Minimum		8.00	
	Maximum		24.00	
	Range		16.00	
	Interquartile Range		4.00	
	Skewness		-.212	.409
	Kurtosis		-.350	.798
FearTotal	Mean		9.6364	.46835
	95% Confidence Interval for Mean	Lower Bound	8.6824	
		Upper Bound	10.5904	
	5% Trimmed Mean		9.6296	
	Median		10.0000	
	Variance		7.239	
	Std. Deviation		2.69047	
	Minimum		5.00	
	Maximum		14.00	
	Range		9.00	
	Interquartile Range		4.00	
	Skewness		-.078	.409
	Kurtosis		-1.190	.798
SadnessTotal	Mean		25.1515	.86287
	95% Confidence Interval for Mean	Lower Bound	23.3939	
		Upper Bound	26.9091	

	5% Trimmed Mean		25.2811	
	Median		26.0000	
	Variance		24.570	
	Std. Deviation		4.95682	
	Minimum		12.00	
	Maximum		34.00	
	Range		22.00	
	Interquartile Range		5.00	
	Skewness		-.532	.409
	Kurtosis		.497	.798
LoveTotal	Mean		9.6364	.36364
	95% Confidence Interval for Mean	Lower Bound	8.8957	
		Upper Bound	10.3771	
	5% Trimmed Mean		9.6852	
	Median		10.0000	
	Variance		4.364	
	Std. Deviation		2.08893	
	Minimum		5.00	
	Maximum		13.00	
	Range		8.00	
	Interquartile Range		3.00	
	Skewness		-.336	.409
	Kurtosis		-.249	.798
JoyTotal	Mean		36.2727	1.00780
	95% Confidence Interval for Mean	Lower Bound	34.2199	
		Upper Bound	38.3256	
	5% Trimmed Mean		36.3805	
	Median		37.0000	
	Variance		33.517	
	Std. Deviation		5.78939	
	Minimum		25.00	
	Maximum		46.00	
	Range		21.00	
	Interquartile Range		7.50	
	Skewness		-.451	.409
	Kurtosis		-.534	.798
NPC	Mean		51.3997	2.75544
	95% Confidence Interval for Mean	Lower Bound	45.7800	
		Upper Bound	57.0195	
	5% Trimmed Mean		51.2370	
	Median		50.0000	

	Variance		242.958	
	Std. Deviation		15.58712	
	Minimum		19.79	
	Maximum		87.50	
	Range		67.71	
	Interquartile Range		18.75	
	Skewness		.319	.414
	Kurtosis		.500	.809
PPC	Mean		53.1901	2.44066
	95% Confidence Interval for Mean	Lower Bound	48.2124	
		Upper Bound	58.1679	
	5% Trimmed Mean		53.2407	
	Median		52.0833	
	Variance		190.618	
	Std. Deviation		13.80644	
	Minimum		22.92	
	Maximum		83.33	
	Range		60.42	
	Interquartile Range		19.27	
	Skewness		.142	.414
	Kurtosis		-.242	.809
NeutralPC	Mean		49.5443	2.92352
	95% Confidence Interval for Mean	Lower Bound	43.5817	
		Upper Bound	55.5068	
	5% Trimmed Mean		48.9294	
	Median		46.8750	
	Variance		273.503	
	Std. Deviation		16.53793	
	Minimum		20.83	
	Maximum		91.67	
	Range		70.83	
	Interquartile Range		20.83	
	Skewness		.644	.414
	Kurtosis		.265	.809
SPC	Mean		56.7057	3.15528
	95% Confidence Interval for Mean	Lower Bound	50.2705	
		Upper Bound	63.1410	
	5% Trimmed Mean		56.9300	
	Median		57.2917	
	Variance		318.586	
	Std. Deviation		17.84898	

	Minimum		12.50	
	Maximum		93.75	
	Range		81.25	
	Interquartile Range		30.73	
	Skewness		-.110	.414
	Kurtosis		-.271	.809
IncreaseT1	Mean		.4688	.05879
	95% Confidence Interval for Mean	Lower Bound	.3427	
		Upper Bound	.5949	
	5% Trimmed Mean		.4720	
	Median		.4570	
	Variance		.052	
	Std. Deviation		.22770	
	Minimum		.00	
	Maximum		.88	
	Range		.88	
	Interquartile Range		.34	
	Skewness		-.117	.580
	Kurtosis		.158	1.121
IncreaseT2	Mean		.6243	.06017
	95% Confidence Interval for Mean	Lower Bound	.4952	
		Upper Bound	.7534	
	5% Trimmed Mean		.6404	
	Median		.6603	
	Variance		.054	
	Std. Deviation		.23305	
	Minimum		.00	
	Maximum		.96	
	Range		.96	
	Interquartile Range		.23	
	Skewness		-1.282	.580
	Kurtosis		2.882	1.121
DecreaseT1	Mean		.4363	.09091
	95% Confidence Interval for Mean	Lower Bound	.2399	
		Upper Bound	.6327	
	5% Trimmed Mean		.4324	
	Median		.4330	
	Variance		.116	
	Std. Deviation		.34014	
	Minimum		.00	
	Maximum		.94	

	Range		.94	
	Interquartile Range		.68	
	Skewness		.118	.597
	Kurtosis		-1.441	1.154
DecreaseT2	Mean		.2397	.06759
	95% Confidence Interval for Mean	Lower Bound	.0937	
		Upper Bound	.3858	
	5% Trimmed Mean		.2227	
	Median		.2132	
	Variance		.064	
	Std. Deviation		.25291	
	Minimum		.00	
	Maximum		.79	
	Range		.79	
	Interquartile Range		.42	
	Skewness		.836	.597
	Kurtosis		-.135	1.154
DiffHBT	Mean		-.0145	.04441
	95% Confidence Interval for Mean	Lower Bound	-.1055	
		Upper Bound	.0765	
	5% Trimmed Mean		.0011	
	Median		.0000	
	Variance		.057	
	Std. Deviation		.23914	
	Minimum		-.77	
	Maximum		.35	
	Range		1.12	
	Interquartile Range		.30	
	Skewness		-1.037	.434
	Kurtosis		2.283	.845
DiffBMI	Mean		-.3080	.23014
	95% Confidence Interval for Mean	Lower Bound	-.7810	
		Upper Bound	.1651	
	5% Trimmed Mean		-.2144	
	Median		-.0734	
	Variance		1.430	
	Std. Deviation		1.19585	
	Minimum		-4.04	
	Maximum		1.44	
	Range		5.48	
	Interquartile Range		1.67	

	Skewness		-1.382	.448
	Kurtosis		2.385	.872
DiffWHR	Mean		-.0166	.00652
	95% Confidence Interval for Mean	Lower Bound	-.0300	
		Upper Bound	-.0032	
	5% Trimmed Mean		-.0158	
	Median		-.0139	
	Variance		.001	
	Std. Deviation		.03387	
	Minimum		-.09	
	Maximum		.05	
	Range		.14	
	Interquartile Range		.04	
	Skewness		-.622	.448
	Kurtosis		.410	.872
DiffBodyFat	Mean		.0893	.08891
	95% Confidence Interval for Mean	Lower Bound	-.1014	
		Upper Bound	.2800	
	5% Trimmed Mean		.0891	
	Median		.1311	
	Variance		.119	
	Std. Deviation		.34434	
	Minimum		-.44	
	Maximum		.63	
	Range		1.07	
	Interquartile Range		.56	
	Skewness		-.220	.580
	Kurtosis		-1.142	1.121
ConfidenceDiff	Mean		6.0776	5.10915
	95% Confidence Interval for Mean	Lower Bound	-4.3880	
		Upper Bound	16.5432	
	5% Trimmed Mean		6.3482	
	Median		7.5000	
	Variance		757.000	
	Std. Deviation		27.51364	
	Minimum		-48.75	
	Maximum		58.75	
	Range		107.50	
	Interquartile Range		32.50	
	Skewness		-.259	.434
	Kurtosis		-.292	.845

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
WHRatioT1	.091	27	.200*	.951	27	.226
WHRatioT2	.131	31	.187	.964	31	.373
BMIT1	.202	27	.006	.898	27	.012
BMIT2	.206	31	.002	.848	31	.000
BodyFatT1	.154	16	.200*	.940	16	.352
BodyFatT2	.130	19	.200*	.961	19	.585
IACT1	.077	29	.200*	.962	29	.363
IACT2	.146	33	.072	.917	33	.016
ConfidenceT1	.080	29	.200*	.985	29	.938
ConfidenceT2	.127	33	.195	.946	33	.099
BAQ	.100	33	.200*	.962	33	.288
PHQ9	.091	33	.200*	.973	33	.581
GAD7	.123	33	.200*	.945	33	.096
MAIANoticing	.129	33	.181	.970	33	.486
MAIANotDistracting	.240	33	.000	.890	33	.003
MAIANotWorrying	.145	33	.076	.949	33	.122
MAIAAttentionalRegulation	.144	33	.079	.969	33	.445
MAIAEmotionalAwareness	.167	33	.019	.931	33	.036
MAIASelfRegulation	.134	33	.137	.930	33	.034
MAIABodyListening	.104	33	.200*	.934	33	.045
MAIATrusting	.129	33	.182	.966	33	.370
MAIATotal	.081	33	.200*	.986	33	.938
EISPositive	.172	33	.015	.937	33	.056
EISNegative	.125	33	.200*	.959	33	.244
EISTotal	.158	33	.035	.922	33	.021
AngerTotal	.183	33	.007	.928	33	.030
FearTotal	.148	33	.063	.928	33	.030
SadnessTotal	.135	33	.131	.963	33	.310
LoveTotal	.145	33	.076	.949	33	.129
JoyTotal	.118	33	.200*	.957	33	.207
NPC	.117	32	.200*	.968	32	.442
PPC	.089	32	.200*	.982	32	.866
NeutralPC	.114	32	.200*	.963	32	.337
SPC	.141	32	.106	.958	32	.238
IncreaseT1	.091	15	.200*	.988	15	.998
IncreaseT2	.176	15	.200*	.911	15	.141
DecreaseT1	.136	14	.200*	.918	14	.206

DecreaseT2	.222	14	.060	.876	14	.051
DiffHBT	.117	29	.200*	.935	29	.073
DiffBMI	.187	27	.016	.894	27	.010
DiffWHR	.127	27	.200*	.939	27	.117
DiffBodyFat	.147	15	.200*	.948	15	.488
ConfidenceDiff	.086	29	.200*	.978	29	.788

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Z Scores for Data Screen – Study Two

		Statistic	Std. Error	Z Score
WHRatioT1	Skewness	0.59	0.42	1.41
	Kurtosis	-0.23	0.82	-0.28
WHRatioT2	Skewness	0.42	0.45	0.93
	Kurtosis	-0.51	0.87	-0.59
BMIT1	Skewness	1.26	0.42	2.99
	Kurtosis	1.65	0.82	2.00
BMIT2	Skewness	1.40	0.45	3.11
	Kurtosis	2.09	0.87	2.40
BodyFatT1	Skewness	0.39	0.52	0.75
	Kurtosis	-0.85	1.01	-0.83
BodyFatT2	Skewness	0.61	0.56	1.08
	Kurtosis	-0.63	1.09	-0.58
SchandryMeanT1	Skewness	0.16	0.41	0.38
	Kurtosis	-0.98	0.80	-1.23
SchandryMeanT2	Skewness	-0.17	0.43	-0.40
	Kurtosis	-1.24	0.85	-1.47
ConfidenceT1	Skewness	0.44	0.41	1.07
	Kurtosis	0.27	0.80	0.33
ConfidenceT2	Skewness	-0.08	0.43	-0.18
	Kurtosis	-1.16	0.85	-1.37
BAQ	Skewness	-0.48	0.41	-1.16
	Kurtosis	1.00	0.80	1.26
PHQ9	Skewness	-0.04	0.41	-0.09
	Kurtosis	-0.45	0.80	-0.56
GAD7	Skewness	0.44	0.41	1.08
	Kurtosis	-0.88	0.80	-1.10
MAIANoticing	Skewness	0.25	0.41	0.60
	Kurtosis	0.52	0.80	0.65
MAIANotDistracting	Skewness	1.14	0.41	2.78
	Kurtosis	3.13	0.80	3.93
MAIANotWorrying	Skewness	0.33	0.41	0.81
	Kurtosis	-0.74	0.80	-0.92
MAIAAttentionalRegulation	Skewness	0.02	0.41	0.05

	Kurtosis	-0.86	0.80	-1.08
MAIAEmotionalAwareness	Skewness	-0.72	0.41	-1.75
	Kurtosis	-0.29	0.80	-0.36
MAIASelfRegulation	Skewness	-0.71	0.41	-1.73
	Kurtosis	0.00	0.80	0.00
MAIABodyListening	Skewness	0.10	0.41	0.24
	Kurtosis	-1.16	0.80	-1.45
MAIATrusting	Skewness	-0.13	0.41	-0.33
	Kurtosis	-0.31	0.80	-0.38
MAIATotal	Skewness	-0.10	0.41	-0.25
	Kurtosis	-0.35	0.80	-0.44
EISPositive	Skewness	-0.59	0.41	-1.44
	Kurtosis	-0.40	0.80	-0.50
EISNegative	Skewness	-0.47	0.41	-1.16
	Kurtosis	0.58	0.80	0.72
EISTotal	Skewness	-0.83	0.41	-2.04
	Kurtosis	0.00	0.80	0.00
AngerTotal	Skewness	-0.21	0.41	-0.52
	Kurtosis	-0.35	0.80	-0.44
FearTotal	Skewness	-0.08	0.41	-0.19
	Kurtosis	-1.19	0.80	-1.49
SadnessTotal	Skewness	-0.53	0.41	-1.30
	Kurtosis	0.50	0.80	0.62
LoveTotal	Skewness	-0.34	0.41	-0.82
	Kurtosis	-0.25	0.80	-0.31
JoyTotal	Skewness	-0.45	0.41	-1.10
	Kurtosis	-0.53	0.80	-0.67
NPC	Skewness	0.32	0.41	0.77
	Kurtosis	0.50	0.81	0.62
PPC	Skewness	0.14	0.41	0.34
	Kurtosis	-0.24	0.81	-0.30
NeutralPC	Skewness	0.64	0.41	1.56
	Kurtosis	0.27	0.81	0.33
SPC	Skewness	-0.11	0.41	-0.27
	Kurtosis	-0.27	0.81	-0.33
IncreaseT1	Skewness	-0.12	0.58	-0.20
	Kurtosis	0.16	1.12	0.14
IncreaseT2	Skewness	-1.28	0.58	-2.21
	Kurtosis	2.88	1.12	2.57
DecreaseT1	Skewness	0.12	0.60	0.20
	Kurtosis	-1.44	1.15	-1.25
DecreaseT2	Skewness	0.84	0.60	1.40
	Kurtosis	-0.14	1.15	-0.12
DiffHBT	Skewness	-1.04	0.43	-2.39
	Kurtosis	2.28	0.85	2.70
DiffBMI	Skewness	-1.38	0.45	-3.08

	Kurtosis	2.39	0.87	2.74
DiffWHR	Skewness	-0.62	0.45	-1.39
	Kurtosis	0.41	0.87	0.47
DiffBodyFat	Skewness	-0.22	0.58	-0.38
	Kurtosis	-1.14	1.12	-1.02
ConfidenceDiff	Skewness	-0.26	0.43	-0.60
	Kurtosis	-0.29	0.85	-0.35

<u>Behavioural Data Screening</u>

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
IAC	32	97.0%	1	3.0%	33	100.0%
NOTotal	32	97.0%	1	3.0%	33	100.0%
NSTotal	32	97.0%	1	3.0%	33	100.0%
Ntotal	32	97.0%	1	3.0%	33	100.0%
POTotal	32	97.0%	1	3.0%	33	100.0%
PSTotal	32	97.0%	1	3.0%	33	100.0%
Stotal	32	97.0%	1	3.0%	33	100.0%
NOPercent	32	97.0%	1	3.0%	33	100.0%
NSPercent	32	97.0%	1	3.0%	33	100.0%
NeutralTotalPercent	32	97.0%	1	3.0%	33	100.0%
POPercent	32	97.0%	1	3.0%	33	100.0%
PSPercent	32	97.0%	1	3.0%	33	100.0%
SPercent	32	97.0%	1	3.0%	33	100.0%
PositiveTotalPercent	32	97.0%	1	3.0%	33	100.0%
NegativeTotalPercent	32	97.0%	1	3.0%	33	100.0%
TotalPercentCorrect	32	97.0%	1	3.0%	33	100.0%

Descriptives

			Statistic	Std. Error
IAC	Mean		.4012	.05561
	95% Confidence Interval for Mean	Lower Bound	.2878	
		Upper Bound	.5146	
	5% Trimmed Mean		.3936	
	Median		.4198	
	Variance		.099	
	Std. Deviation		.31458	
	Minimum		.00	

	Maximum		.96	
	Range		.96	
	Interquartile Range		.63	
	Skewness		.043	.414
	Kurtosis		-1.397	.809
NOTotal	Mean		24.6563	1.36755
	95% Confidence Interval for Mean	Lower Bound	21.8671	
		Upper Bound	27.4454	
	5% Trimmed Mean		24.4514	
	Median		23.0000	
	Variance		59.846	
	Std. Deviation		7.73600	
	Minimum		12.00	
	Maximum		41.00	
	Range		29.00	
	Interquartile Range		12.25	
	Skewness		.418	.414
	Kurtosis		-.748	.809
NSTotal	Mean		25.5625	1.45007
	95% Confidence Interval for Mean	Lower Bound	22.6051	
		Upper Bound	28.5199	
	5% Trimmed Mean		25.7153	
	Median		25.0000	
	Variance		67.286	
	Std. Deviation		8.20282	
	Minimum		6.00	
	Maximum		45.00	
	Range		39.00	
	Interquartile Range		9.75	
	Skewness		-.134	.414
	Kurtosis		.903	.809
Ntotal	Mean		23.7813	1.40329
	95% Confidence Interval for Mean	Lower Bound	20.9192	
		Upper Bound	26.6433	
	5% Trimmed Mean		23.4861	
	Median		22.5000	
	Variance		63.015	
	Std. Deviation		7.93821	
	Minimum		10.00	
	Maximum		44.00	
	Range		34.00	

	Interquartile Range		10.00	
	Skewness		.644	.414
	Kurtosis		.265	.809
POTotal	Mean		24.9375	1.30827
	95% Confidence Interval for Mean	Lower Bound	22.2693	
		Upper Bound	27.6057	
	5% Trimmed Mean		24.9861	
	Median		24.5000	
	Variance		54.770	
	Std. Deviation		7.40069	
	Minimum		11.00	
	Maximum		38.00	
	Range		27.00	
	Interquartile Range		11.50	
	Skewness		.001	.414
	Kurtosis		-.571	.809
PSTotal	Mean		26.1250	1.23438
	95% Confidence Interval for Mean	Lower Bound	23.6075	
		Upper Bound	28.6425	
	5% Trimmed Mean		26.2083	
	Median		25.5000	
	Variance		48.758	
	Std. Deviation		6.98270	
	Minimum		11.00	
	Maximum		42.00	
	Range		31.00	
	Interquartile Range		9.50	
	Skewness		-.062	.414
	Kurtosis		.212	.809
Stotal	Mean		27.2188	1.51454
	95% Confidence Interval for Mean	Lower Bound	24.1298	
		Upper Bound	30.3077	
	5% Trimmed Mean		27.3264	
	Median		27.5000	
	Variance		73.402	
	Std. Deviation		8.56751	
	Minimum		6.00	
	Maximum		45.00	
	Range		39.00	
	Interquartile Range		14.75	
	Skewness		-.110	.414

	Kurtosis		-.271	.809
NOPercent	Mean		51.3672	2.84905
	95% Confidence Interval for Mean	Lower Bound	45.5565	
		Upper Bound	57.1779	
	5% Trimmed Mean		50.9404	
	Median		47.9167	
	Variance		259.747	
	Std. Deviation		16.11668	
	Minimum		25.00	
	Maximum		85.42	
	Range		60.42	
	Interquartile Range		25.52	
	Skewness		.418	.414
	Kurtosis		-.748	.809
NSPercent	Mean		53.2552	3.02097
	95% Confidence Interval for Mean	Lower Bound	47.0939	
		Upper Bound	59.4165	
	5% Trimmed Mean		53.5735	
	Median		52.0833	
	Variance		292.041	
	Std. Deviation		17.08921	
	Minimum		12.50	
	Maximum		93.75	
	Range		81.25	
	Interquartile Range		20.31	
	Skewness		-.134	.414
	Kurtosis		.903	.809
NeutralTotalPercent	Mean		49.5443	2.92352
	95% Confidence Interval for Mean	Lower Bound	43.5817	
		Upper Bound	55.5068	
	5% Trimmed Mean		48.9294	
	Median		46.8750	
	Variance		273.503	
	Std. Deviation		16.53793	
	Minimum		20.83	
	Maximum		91.67	
	Range		70.83	
	Interquartile Range		20.83	
	Skewness		.644	.414
	Kurtosis		.265	.809
POPercent	Mean		51.9531	2.72556

	95% Confidence Interval for Mean	Lower Bound	46.3943	
		Upper Bound	57.5119	
	5% Trimmed Mean		52.0544	
	Median		51.0417	
	Variance		237.718	
	Std. Deviation		15.41810	
	Minimum		22.92	
	Maximum		79.17	
	Range		56.25	
	Interquartile Range		23.96	
	Skewness		.001	.414
	Kurtosis		-.571	.809
PSPercent	Mean		54.4271	2.57162
	95% Confidence Interval for Mean	Lower Bound	49.1822	
		Upper Bound	59.6719	
	5% Trimmed Mean		54.6007	
	Median		53.1250	
	Variance		211.624	
	Std. Deviation		14.54729	
	Minimum		22.92	
	Maximum		87.50	
	Range		64.58	
	Interquartile Range		19.79	
	Skewness		-.062	.414
	Kurtosis		.212	.809
SPercent	Mean		56.7057	3.15528
	95% Confidence Interval for Mean	Lower Bound	50.2705	
		Upper Bound	63.1410	
	5% Trimmed Mean		56.9300	
	Median		57.2917	
	Variance		318.586	
	Std. Deviation		17.84898	
	Minimum		12.50	
	Maximum		93.75	
	Range		81.25	
	Interquartile Range		30.73	
	Skewness		-.110	.414
	Kurtosis		-.271	.809
PositiveTotalPercent	Mean		53.1901	2.44066
	95% Confidence Interval for Mean	Lower Bound	48.2124	
		Upper Bound	58.1679	

	5% Trimmed Mean		53.2407	
	Median		52.0833	
	Variance		190.618	
	Std. Deviation		13.80644	
	Minimum		22.92	
	Maximum		83.33	
	Range		60.42	
	Interquartile Range		19.27	
	Skewness		.142	.414
	Kurtosis		-.242	.809
NegativeTotalPercent	Mean		52.3112	2.70380
	95% Confidence Interval for Mean	Lower Bound	46.7968	
		Upper Bound	57.8256	
	5% Trimmed Mean		52.3582	
	Median		51.0417	
	Variance		233.936	
	Std. Deviation		15.29498	
	Minimum		21.88	
	Maximum		82.29	
	Range		60.42	
	Interquartile Range		22.14	
	Skewness		.204	.414
	Kurtosis		-.347	.809
TotalPercentCorrect	Mean		52.8754	2.52773
	95% Confidence Interval for Mean	Lower Bound	47.7201	
		Upper Bound	58.0308	
	5% Trimmed Mean		52.7681	
	Median		50.0000	
	Variance		204.462	
	Std. Deviation		14.29901	
	Minimum		21.88	
	Maximum		84.38	
	Range		62.50	
	Interquartile Range		19.88	
	Skewness		.275	.414
	Kurtosis		-.190	.809

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
IAC	.151	32	.060	.910	32	.011
NOTotal	.116	32	.200*	.958	32	.244
NSTotal	.135	32	.146	.959	32	.263
Ntotal	.114	32	.200*	.963	32	.337
POTotal	.072	32	.200*	.975	32	.662
PSTotal	.091	32	.200*	.979	32	.781
Stotal	.141	32	.106	.958	32	.238
NOPercent	.116	32	.200*	.958	32	.244
NSPercent	.135	32	.146	.959	32	.263
NeutralTotalPercent	.114	32	.200*	.963	32	.337
POPercent	.072	32	.200*	.975	32	.662
PSPercent	.091	32	.200*	.979	32	.781
SPercent	.141	32	.106	.958	32	.238
PositiveTotalPercent	.089	32	.200*	.982	32	.866
NegativeTotalPercent	.117	32	.200*	.969	32	.472
TotalPercentCorrect	.118	32	.200*	.977	32	.694

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Z score calculations for Behavioural Data

		Statistic	Std. Error	Z Score
NOTotal	Skewness	0.42	0.41	1.01
	Kurtosis	-0.75	0.81	-0.92
NSTotal	Skewness	-0.13	0.41	-0.32
	Kurtosis	0.90	0.81	1.12
Ntotal	Skewness	0.64	0.41	1.56
	Kurtosis	0.27	0.81	0.33
POTotal	Skewness	0.00	0.41	0.00
	Kurtosis	-0.57	0.81	-0.71
PSTotal	Skewness	-0.06	0.41	-0.15
	Kurtosis	0.21	0.81	0.26
Stotal	Skewness	-0.11	0.41	-0.27
	Kurtosis	-0.27	0.81	-0.33
NOPercent	Skewness	0.42	0.41	1.01
	Kurtosis	-0.75	0.81	-0.92
NSPercent	Skewness	-0.13	0.41	-0.32
	Kurtosis	0.90	0.81	1.12
NeutralTotalPercent	Skewness	0.64	0.41	1.56
	Kurtosis	0.27	0.81	0.33

POPercent	Skewness	0.00	0.41	0.00
	Kurtosis	-0.57	0.81	-0.71
PSPercent	Skewness	-0.06	0.41	-0.15
	Kurtosis	0.21	0.81	0.26
SPercent	Skewness	-0.11	0.41	-0.27
	Kurtosis	-0.27	0.81	-0.33
PositiveTotalPercent	Skewness	0.14	0.41	0.34
	Kurtosis	-0.24	0.81	-0.30
NegativeTotalPercent	Skewness	0.20	0.41	0.49
	Kurtosis	-0.35	0.81	-0.43

Appendix W

ANOVAS examining interaction between Sound Condition and IAC Group

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

SoundCondition	Dependent Variable
1	NOPercent
2	NSPercent
3	NeutralTotalPercent
4	POPercent
5	PSPercent
6	SPercent

Between-Subjects Factors

		Value Label	N
Groups1Low2High	1.00	Low	16
	2.00	High	16

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
SoundCondition	Pillai's Trace	.372	3.079[b]	5.000	26.000	.026	.372
	Wilks' Lambda	.628	3.079[b]	5.000	26.000	.026	.372
	Hotelling's Trace	.592	3.079[b]	5.000	26.000	.026	.372
	Roy's Largest Root	.592	3.079[b]	5.000	26.000	.026	.372
SoundCondition * Groups1Low2High	Pillai's Trace	.054	.300[b]	5.000	26.000	.909	.054
	Wilks' Lambda	.946	.300[b]	5.000	26.000	.909	.054
	Hotelling's Trace	.058	.300[b]	5.000	26.000	.909	.054
	Roy's Largest Root	.058	.300[b]	5.000	26.000	.909	.054

a. Design: Intercept + Groups1Low2High
 Within Subjects Design: SoundCondition

b. Exact statistic

c.

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
SoundCondition	.726	8.991	14	.832	.888	1.000	.200

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + Groups1Low2High

Within Subjects Design: SoundCondition

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
SoundCondition	Sphericity Assumed	1006.244	5	201.249	2.693	.023	.082
	Greenhouse-Geisser	1006.244	4.442	226.544	2.693	.029	.082
	Huynh-Feldt	1006.244	5.000	201.249	2.693	.023	.082
	Lower-bound	1006.244	1.000	1006.244	2.693	.111	.082
SoundCondition * Groups1Low2High	Sphericity Assumed	148.858	5	29.772	.398	.849	.013
	Greenhouse-Geisser	148.858	4.442	33.514	.398	.829	.013
	Huynh-Feldt	148.858	5.000	29.772	.398	.849	.013
	Lower-bound	148.858	1.000	148.858	.398	.533	.013
Error(SoundCondition)	Sphericity Assumed	11211.073	150	74.740			
	Greenhouse-Geisser	11211.073	133.251	84.135			
	Huynh-Feldt	11211.073	150.000	74.740			
	Lower-bound	11211.073	30.000	373.702			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	SoundCondition	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
SoundCondition	Linear	486.346	1	486.346	4.725	.038	.136
	Quadratic	271.429	1	271.429	5.238	.029	.149
	Cubic	13.937	1	13.937	.198	.660	.007
	Order 4	164.000	1	164.000	2.244	.145	.070
	Order 5	70.532	1	70.532	.936	.341	.030
SoundCondition * Groups1Low2High	Linear	20.556	1	20.556	.200	.658	.007
	Quadratic	.058	1	.058	.001	.974	.000
	Cubic	13.129	1	13.129	.186	.669	.006
	Order 4	17.439	1	17.439	.239	.629	.008
	Order 5	97.676	1	97.676	1.296	.264	.041
Error(SoundCondition)	Linear	3087.778	30	102.926			
	Quadratic	1554.633	30	51.821			
	Cubic	2115.343	30	70.511			
	Order 4	2192.383	30	73.079			
	Order 5	2260.936	30	75.365			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	536795.813	1	536795.813	427.684	.000	.934
Groups1Low2High	376.180	1	376.180	.300	.588	.010
Error	37653.673	30	1255.122			

Estimated Marginal Means

1. Grand Mean

Measure: MEASURE_1

Mean	Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
52.875	2.557	47.654	58.097

2. Groups1Low2High

Measure: MEASURE_1

Groups1Low2High	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Low	51.476	3.616	44.091	58.860
High	54.275	3.616	46.891	61.660

3. SoundCondition

Measure: MEASURE_1

SoundCondition	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	51.367	2.885	45.474	57.260
2	53.255	3.022	47.084	59.427
3	49.544	2.971	43.476	55.612
4	51.953	2.748	46.342	57.564
5	54.427	2.611	49.094	59.760
6	56.706	3.201	50.168	63.243

4. Groups1Low2High * SoundCondition

Measure: MEASURE_1

Groups1Low2High	SoundCondition	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Low	1	50.000	4.081	41.666	58.334
	2	50.260	4.274	41.533	58.988
	3	49.219	4.202	40.637	57.800
	4	50.000	3.886	42.064	57.936
	5	53.776	3.693	46.234	61.318
	6	55.599	4.527	46.354	64.844
High	1	52.734	4.081	44.401	61.068
	2	56.250	4.274	47.522	64.978
	3	49.870	4.202	41.288	58.451
	4	53.906	3.886	45.971	61.842
	5	55.078	3.693	47.536	62.620
	6	57.813	4.527	48.567	67.058

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

SoundCondition	Dependent Variable
1	NeutralTotalPercent
2	PositiveTotalPercent
3	NegativeTotalPercen t
4	SPercent

Between-Subjects Factors

		Value Label	N
Order	1.00	Before	16
	2.00	After	16
Groups1Low2High	1.00	Low	16
	2.00	High	16

Descriptive Statistics

	Order	Groups1Low2High	Mean	Std. Deviation	N
NeutralTotalPercent	Before	Low	45.0000	14.17075	10
		High	44.0972	8.78136	6
		Total	44.6615	12.09934	16
	After	Low	56.2500	13.75631	6
		High	53.3333	22.46396	10
		Total	54.4271	19.18289	16
	Total	Low	49.2188	14.66988	16
		High	49.8698	18.70316	16
		Total	49.5443	16.53793	32
PositiveTotalPercent	Before	Low	48.6458	13.97586	10
		High	48.2639	8.35068	6
		Total	48.5026	11.85225	16
	After	Low	57.2917	11.44886	6
		High	58.2292	16.46617	10
		Total	57.8776	14.37333	16
	Total	Low	51.8880	13.40054	16
		High	54.4922	14.51730	16
		Total	53.1901	13.80644	32
NegativeTotalPercent	Before	Low	48.8542	19.14735	10
		High	47.9167	10.05627	6
		Total	48.5026	15.93429	16
	After	Low	52.2569	12.31489	6
		High	58.4375	15.19430	10
		Total	56.1198	14.09333	16
	Total	Low	50.1302	16.53540	16
		High	54.4922	14.13865	16
		Total	52.3112	15.29498	32

SPercent	Before	Low	48.5417	17.76068	10
		High	49.3056	11.61197	6
		Total	48.8281	15.30872	16
	After	Low	67.3611	16.06555	6
		High	62.9167	18.28909	10
		Total	64.5833	17.07825	16
	Total	Low	55.5990	19.07464	16
		High	57.8125	17.08672	16
		Total	56.7057	17.84898	32

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
SoundCondition	Pillai's Trace	.355	4.779[b]	3.000	26.000	.009	.355
	Wilks' Lambda	.645	4.779[b]	3.000	26.000	.009	.355
	Hotelling's Trace	.551	4.779[b]	3.000	26.000	.009	.355
	Roy's Largest Root	.551	4.779[b]	3.000	26.000	.009	.355
SoundCondition * Order	Pillai's Trace	.195	2.098[b]	3.000	26.000	.125	.195
	Wilks' Lambda	.805	2.098[b]	3.000	26.000	.125	.195
	Hotelling's Trace	.242	2.098[b]	3.000	26.000	.125	.195
	Roy's Largest Root	.242	2.098[b]	3.000	26.000	.125	.195
SoundCondition * Groups1Low2High	Pillai's Trace	.060	.550[b]	3.000	26.000	.653	.060
	Wilks' Lambda	.940	.550[b]	3.000	26.000	.653	.060
	Hotelling's Trace	.063	.550[b]	3.000	26.000	.653	.060
	Roy's Largest Root	.063	.550[b]	3.000	26.000	.653	.060
SoundCondition * Order * Groups1Low2High	Pillai's Trace	.090	.858[b]	3.000	26.000	.475	.090
	Wilks' Lambda	.910	.858[b]	3.000	26.000	.475	.090
	Hotelling's Trace	.099	.858[b]	3.000	26.000	.475	.090
	Roy's Largest Root	.099	.858[b]	3.000	26.000	.475	.090

a. Design: Intercept + Order + Groups1Low2High + Order * Groups1Low2High
 Within Subjects Design: SoundCondition

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
SoundCondition	.911	2.502	5	.776	.948	1.000	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept + Order + Groups1Low2High + Order * Groups1Low2High

Within Subjects Design: SoundCondition

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
SoundCondition	Sphericity Assumed	858.283	3	286.094	5.669	.001	.168
	Greenhouse-Geisser	858.283	2.844	301.757	5.669	.002	.168
	Huynh-Feldt	858.283	3.000	286.094	5.669	.001	.168
	Lower-bound	858.283	1.000	858.283	5.669	.024	.168
SoundCondition * Order	Sphericity Assumed	349.082	3	116.361	2.306	.083	.076
	Greenhouse-Geisser	349.082	2.844	122.731	2.306	.086	.076
	Huynh-Feldt	349.082	3.000	116.361	2.306	.083	.076
	Lower-bound	349.082	1.000	349.082	2.306	.140	.076
SoundCondition * Groups1Low2High	Sphericity Assumed	103.517	3	34.506	.684	.564	.024
	Greenhouse-Geisser	103.517	2.844	36.395	.684	.557	.024
	Huynh-Feldt	103.517	3.000	34.506	.684	.564	.024
	Lower-bound	103.517	1.000	103.517	.684	.415	.024
SoundCondition * Order * Groups1Low2High	Sphericity Assumed	156.039	3	52.013	1.031	.383	.036
	Greenhouse-Geisser	156.039	2.844	54.861	1.031	.381	.036
	Huynh-Feldt	156.039	3.000	52.013	1.031	.383	.036

	Lower-bound	156.039	1.000	156.039	1.031	.319	.036
Error(SoundCondition)	Sphericity Assumed	4239.430	84	50.469			
	Greenhouse-Geisser	4239.430	79.640	53.232			
	Huynh-Feldt	4239.430	84.000	50.469			
	Lower-bound	4239.430	28.000	151.408			

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	SoundCondition	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
SoundCondition	Linear	651.584	1	651.584	12.156	.002	.303
	Quadratic	22.380	1	22.380	.428	.518	.015
	Cubic	184.318	1	184.318	4.047	.054	.126
SoundCondition * Order	Linear	90.943	1	90.943	1.697	.203	.057
	Quadratic	194.730	1	194.730	3.726	.064	.117
	Cubic	63.409	1	63.409	1.392	.248	.047
SoundCondition * Groups1Low2High	Linear	2.442	1	2.442	.046	.833	.002
	Quadratic	82.900	1	82.900	1.586	.218	.054
	Cubic	18.175	1	18.175	.399	.533	.014
SoundCondition * Order * Groups1Low2High	Linear	1.343	1	1.343	.025	.875	.001
	Quadratic	114.950	1	114.950	2.199	.149	.073
	Cubic	39.746	1	39.746	.873	.358	.030
Error(SoundCondition)	Linear	1500.877	28	53.603			
	Quadratic	1463.442	28	52.266			
	Cubic	1275.110	28	45.540			

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	336048.395	1	336048.395	407.352	.000	.936
Order	3422.784	1	3422.784	4.149	.051	.129
Groups1Low2High	1.357	1	1.357	.002	.968	.000
Order * Groups1Low2High	.692	1	.692	.001	.977	.000
Error	23098.859	28	824.959			

1. Order

Measure: MEASURE_1

Order	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Before	47.578	3.708	39.983	55.174
After	58.260	3.708	50.664	65.855

2. SoundCondition

Measure: MEASURE_1

SoundCondition	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	49.670	3.024	43.476	55.864
2	53.108	2.489	48.010	58.205
3	51.866	2.812	46.107	57.626
4	57.031	3.050	50.784	63.279

3. Order * SoundCondition

Measure: MEASURE_1

Order	SoundCondition	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Before	1	44.549	4.276	35.789	53.308
	2	48.455	3.519	41.246	55.664
	3	48.385	3.977	40.240	56.531
	4	48.924	4.313	40.088	57.759
After	1	54.792	4.276	46.032	63.551
	2	57.760	3.519	50.551	64.970
	3	55.347	3.977	47.202	63.493
	4	65.139	4.313	56.303	73.974

Appendix X

T-Tests examining differences in performance based on sound condition

Bootstrap
T-Test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PositiveTotalPercent	53.1901	32	13.80644	2.44066
	NegativeTotalPercent	52.3112	32	15.29498	2.70380
Pair 2	PositiveTotalPercent	53.1901	32	13.80644	2.44066
	SPercent	56.7057	32	17.84898	3.15528
Pair 3	NegativeTotalPercent	52.3112	32	15.29498	2.70380
	SPercent	56.7057	32	17.84898	3.15528
Pair 4	NegativeTotalPercent	52.3112	32	15.29498	2.70380
	NeutralTotalPercent	49.5443	32	16.53793	2.92352
Pair 5	PositiveTotalPercent	53.1901	32	13.80644	2.44066
	NeutralTotalPercent	49.5443	32	16.53793	2.92352
Pair 6	NeutralTotalPercent	49.5443	32	16.53793	2.92352
	SPercent	56.7057	32	17.84898	3.15528

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	PositiveTotalPercent & NegativeTotalPercent	32	.815	.000
Pair 2	PositiveTotalPercent & SPercent	32	.865	.000
Pair 3	NegativeTotalPercent & SPercent	32	.770	.000
Pair 4	NegativeTotalPercent & NeutralTotalPercent	32	.764	.000
Pair 5	PositiveTotalPercent & NeutralTotalPercent	32	.818	.000
Pair 6	NeutralTotalPercent & SPercent	32	.812	.000

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	PositiveTotalPercent - NegativeTotalPercent	.87891	8.96118	1.58413	-2.35194	4.10976	.555	31	.583
Pair 2	PositiveTotalPercent - SPercent	-3.51563	9.09163	1.60719	-6.79351	-.23774	-2.187	31	.036
Pair 3	NegativeTotalPercent - SPercent	-4.39453	11.48955	2.03109	-8.53696	-.25211	-2.164	31	.038
Pair 4	NegativeTotalPercent - NeutralTotalPercent	2.76693	10.99729	1.94406	-1.19802	6.73187	1.423	31	.165
Pair 5	PositiveTotalPercent - NeutralTotalPercent	3.64583	9.52133	1.68315	.21303	7.07864	2.166	31	.038
Pair 6	NeutralTotalPercent - SPercent	-7.16146	10.62213	1.87775	-10.99115	-3.33177	-3.814	31	.001

Appendix Y

Correlations between Body Measurements and IAC, Performance and IAC, Performance and Questionnaires

IAC and WHR

Descriptive Statistics

			Bootstrap[a]			
					BCa 95% Confidence Interval	
		Statistic	Bias	Std. Error	Lower	Upper
IACT2	Mean	.4195	.0012	.0547	.3143	.5298
	Std. Deviation	.30936	-.00655	.02470	.26793	.33683
	N	31	0	0	.	.
WHRatioT2	Mean	.8220	-.0001	.0156	.7944	.8497
	Std. Deviation	.08784	-.00211	.00908	.07200	.10026
	N	31	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				IACT2	WHRatioT2
IACT2	Pearson Correlation			1	.283
	Sig. (2-tailed)				.123
	N			31	31
	Bootstrap[c]	Bias		0	.008
		Std. Error		0	.180
		BCa 95% Confidence Interval	Lower	.	-.064
			Upper	.	.664

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

IAC and BMI

Descriptive Statistics

			Bootstrap[a]			
					BCa 95% Confidence Interval	
		Statistic	Bias	Std. Error	Lower	Upper
IACT2	Mean	.4213	.0012	.0539	.3053	.5351
	Std. Deviation	.30809	-.00458	.02493	.25936	.34167
	N	31	0	0	.	.
BMIT2	Mean	27.3305	.0099	1.1907	25.3219	29.7509
	Std. Deviation	6.74863	-.18358	1.24959	4.36424	8.75487
	N	31	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				IACT2	BMIT2
IACT2	Pearson Correlation			1	.210
	Sig. (2-tailed)				.257
	N			31	31
	Bootstrap[c]	Bias		0	-.005
		Std. Error		0	.183
		BCa 95% Confidence Interval	Lower	.	-.212
			Upper	.	.562

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

<u>IAC and Body Fat</u>

Descriptive Statistics

			Bootstrap[a]			
					BCa 95% Confidence Interval	
		Statistic	Bias	Std. Error	Lower	Upper
IACT2	Mean	.3950	-.0019	.0714	.2597	.5257
	Std. Deviation	.32186	-.00909	.03269	.26977	.35554
	N	19	0	0	.	.
BodyFatT2	Mean	29.2901	.0065	1.3945	26.7361	31.9696
	Std. Deviation	5.96689	-.19011	.70367	4.74712	6.71645
	N	19	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				IACT2	BodyFatT2
IACT2	Pearson Correlation			1	-.286
	Sig. (2-tailed)				.236
	N			19	19
	Bootstrap[c]	Bias		0	-.011
		Std. Error		0	.200
		BCa 95% Confidence Interval	Lower	.	-.642
			Upper	.	.082

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

Descriptive Statistics

		Statistic	Bootstrap[a] Bias	Std. Error	BCa 95% Confidence Interval Lower	Upper
IACT2	Mean	.4012	-.0021	.0528	.3032	.4939
	Std. Deviation	.31458	-.00746	.02306	.27784	.33571
	N	32	0	0	.	.
NPC	Mean	51.3997	-.0643	2.6802	46.4707	56.3802
	Std. Deviation	15.58712	-.53018	2.12210	11.99791	17.84872
	N	32	0	0	.	.
PPC	Mean	53.1901	-.0536	2.3432	48.9848	57.5846
	Std. Deviation	13.80644	-.39869	1.54664	11.22612	15.57062
	N	32	0	0	.	.
NeutralPC	Mean	49.5443	-.0961	2.8519	44.4661	54.6875
	Std. Deviation	16.53793	-.56674	2.11786	12.95837	18.85352
	N	32	0	0	.	.
SPC	Mean	56.7057	-.0701	3.0893	50.5322	62.5000
	Std. Deviation	17.84898	-.53736	1.95901	14.83849	19.87621
	N	32	0	0	.	.
TotalPercentCorrect	Mean	52.8754	-.0697	2.4493	48.2335	57.5153
	Std. Deviation	14.29901	-.43778	1.63715	11.66623	16.03676
	N	32	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				IACT2	NPC	PPC	NeutralPC	SPC	TotalPercentCorrect
IACT2	Pearson Correlation			1	.079	.113	.073	.091	.089
	Sig. (2-tailed)				.668	.539	.692	.619	.627
	N			32	32	32	32	32	32
	Bootstrap[c]	Bias		0	-.023	-.022	-.021	-.020	-.023
		Std. Error		0	.172	.195	.179	.188	.191
		BCa 95% Confidence Interval	Lower	.	-.248	-.295	-.293	-.293	-.278
			Upper	.	.328	.453	.357	.388	.391
		BCa 95% Confidence Interval	Lower	-.278	.901	.904	.797	.834	.
			Upper	.391	.978	.976	.947	.965	.

Descriptive Statistics

			Bootstrap[a]			
					BCa 95% Confidence Interval	
		Statistic	Bias	Std. Error	Lower	Upper
IACT2	Mean	.4012	.0002	.0531	.2999	.5093
	Std. Deviation	.31458	-.00549	.02271	.28052	.33929
	N	32	0	0	.	.
IAWT2	Mean	-1.9453	-.3398	4.6818	-10.6045	6.8255
	Std. Deviation	27.04594	-.64373	3.66529	19.64533	32.12650
	N	32	0	0	.	.
ConfidenceT2	Mean	42.0703	.3580	4.7391	31.4318	52.1008
	Std. Deviation	26.12125	-.54496	2.20070	22.40971	28.86399
	N	32	0	0	.	.
BAQ	Mean	77.7500	.0903	2.8247	72.4159	83.3029
	Std. Deviation	15.81139	-.36437	2.09457	12.18957	18.91091
	N	32	0	0	.	.
NPC	Mean	51.3997	.0613	2.6181	45.9890	56.7973
	Std. Deviation	15.58712	-.37117	2.04005	11.98297	18.27563
	N	32	0	0	.	.
PPC	Mean	53.1901	-.0433	2.2991	48.5626	57.7713
	Std. Deviation	13.80644	-.28123	1.54164	11.19814	15.91198
	N	32	0	0	.	.
NeutralPC	Mean	49.5443	.0038	2.7820	44.2057	54.8028
	Std. Deviation	16.53793	-.32313	2.06747	13.20742	19.29303
	N	32	0	0	.	.
SPC	Mean	56.7057	.0651	3.0137	50.6462	63.3464
	Std. Deviation	17.84898	-.40882	1.94028	14.72567	20.33547
	N	32	0	0	.	.
TotalPercentCorrect	Mean	52.8754	.0229	2.3706	48.0432	57.8396
	Std. Deviation	14.29901	-.31030	1.58589	11.70920	16.32298
	N	32	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

				IACT2	IAWT2	ConfidenceT2	BAQ	NPC	PPC	Neutral PC	SPC	Total Percent Correct
IACT2	Pearson Correlation			1	.610**	.574**	.040	.079	.113	.073	.091	.089
	Sig. (2-tailed)				.000	.001	.827	.668	.539	.692	.619	.627
	N			32	32	32	32	32	32	32	32	32
	Bootstrap[c]	Bias		0	-.001	-.003	.016	-.010	-.008	-.007	-.012	-.010
		Std. Error		0	.087	.128	.193	.172	.195	.176	.189	.189
		BCa 95% Confidence Interval	Lower	.	.428	.275	-.297	-.267	-.298	-.256	-.278	-.267
			Upper	.	.761	.807	.483	.358	.477	.363	.430	.408
IAWT2	Pearson Correlation			.610**	1	-.299	-.374*	-.094	-.016	.030	-.118	-.089
	Sig. (2-tailed)			.000		.097	.035	.610	.933	.871	.521	.628
	N			32	32	32	32	32	32	32	32	32
	Bootstrap[c]	Bias		-.001	0	.011	.028	.007	.012	.006	.009	.007
		Std. Error		.087	0	.134	.211	.131	.165	.147	.147	.147
		BCa 95% Confidence Interval	Lower	.428	.	-.531	-.708	-.323	-.345	-.258	-.407	-.358
			Upper	.761	.	.022	.168	.191	.369	.331	.233	.239
ConfidenceT2	Pearson Correlation			.574**	-.299	1	.433*	.191	.150	.056	.232	.198
	Sig. (2-tailed)			.001	.097		.013	.295	.412	.761	.202	.276
	N			32	32	32	32	32	32	32	32	32

	Bootstrap[c]	Bias		-.003	.011	0	.001	-.014	-.011	-.010	-.017	-.013
		Std. Error		.128	.134	0	.175	.187	.191	.191	.180	.188
		BCa 95% Confidence Interval	Lower	.275	-.531	.	.023	-.198	-.260	-.290	-.124	-.183
			Upper	.807	.022	.	.762	.509	.494	.387	.526	.513
BAQ	Pearson Correlation			.040	-.374*	.433*	1	-.116	.003	-.194	.074	-.013
	Sig. (2-tailed)			.827	.035	.013		.526	.985	.286	.687	.943
	N			32	32	32	32	32	32	32	32	32
	Bootstrap[c]	Bias		.016	.028	.001	0	-.008	.002	-.009	-.001	-.003
		Std. Error		.193	.211	.175	0	.181	.195	.197	.171	.188
		BCa 95% Confidence Interval	Lower	-.297	-.708	.023	.	-.467	-.400	-.555	-.283	-.385
			Upper	.483	.168	.762	.	.243	.396	.172	.414	.361

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

*. Correlation is significant at the 0.05 level (2-tailed).

c. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Performance and MAIA

Descriptive Statistics

		Statistic	Bootstrap[a] Bias	Bootstrap[a] Std. Error	BCa 95% Confidence Interval Lower	BCa 95% Confidence Interval Upper
NPC	Mean	51.3997	-.1099	2.6428	46.5169	56.1274
	Std. Deviation	15.58712	-.34226	2.12684	11.96378	18.50041
	N	32	0	0	.	.
PPC	Mean	53.1901	-.0982	2.4038	48.8300	57.3549
	Std. Deviation	13.80644	-.26737	1.57998	11.19931	15.92918
	N	32	0	0	.	.
NeutralPC	Mean	49.5443	-.0764	2.8242	44.6615	54.6712
	Std. Deviation	16.53793	-.37497	2.18092	12.79295	19.44852
	N	32	0	0	.	.
SPC	Mean	56.7057	-.1594	2.9885	51.2026	61.9792
	Std. Deviation	17.84898	-.31938	2.02092	14.40068	20.58951
	N	32	0	0	.	.
TotalPercentCorrect	Mean	52.8754	-.1111	2.4374	48.5894	57.1289
	Std. Deviation	14.29901	-.27936	1.68858	11.63080	16.48441
	N	32	0	0	.	.
MAIANoticing	Mean	12.9375	-.0068	.5441	11.8750	14.0000
	Std. Deviation	3.16164	-.08141	.44177	2.41347	3.73653
	N	32	0	0	.	.
MAIANotDistracting	Mean	5.0938	-.0016	.5342	4.2188	6.1563
	Std. Deviation	2.97689	-.10892	.55760	2.03894	3.74994
	N	32	0	0	.	.
MAIANotWorrying	Mean	9.1875	.0004	.5009	8.2500	10.1875
	Std. Deviation	2.90092	-.06713	.27634	2.39481	3.24843
	N	32	0	0	.	.
MAIAAttentionalRegulation	Mean	19.3438	.0015	1.1317	17.1508	21.7813

	Std. Deviation	6.45885	-.13415	.58097	5.49693	7.16753
	N	32	0	0	.	.
MAIAEmotionalAwareness	Mean	15.3750	-.0150	.8814	13.5938	17.0992
	Std. Deviation	5.15408	-.11035	.55982	4.16832	5.87338
	N	32	0	0	.	.
MAIASelfRegulation	Mean	10.3125	-.0286	.8150	8.8125	11.7500
	Std. Deviation	4.75488	-.09632	.56135	3.81410	5.46340
	N	32	0	0	.	.
MAIABodyListening	Mean	5.5000	-.0091	.6904	4.1563	6.8606
	Std. Deviation	4.00806	-.06935	.32309	3.40540	4.43411
	N	32	0	0	.	.
MAIATrusting	Mean	9.1563	-.0124	.5752	8.1080	10.1563
	Std. Deviation	3.44645	-.06730	.38435	2.73584	3.99193
	N	32	0	0	.	.
MAIATotal	Mean	86.9063	-.0716	3.3402	80.2866	93.4063
	Std. Deviation	19.43286	-.39140	2.01445	15.94800	22.16739
	N	32	0	0	.	.

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Correlations

			MAIANoticing	MAIANotDistracting	MAIANotWorrying	MAIAAttentionalRegulation	MAIAEmotionalAwareness	MAIASelfRegulation	MAIABodyListening	MAIATrusting	MAIATotal
NPC	Pearson Correlation		.165	.025	.105	-.019	.147	.341	.254	.250	.259
	Sig. (2-tailed)		.367	.891	.568	.918	.421	.056	.161	.168	.152
	N		32	32	32	32	32	32	32	32	32
	Bootstrap[c]	Bias	-.012	.005	.010	.004	-.005	.004	.006	-.008	.002
		Std. Error	.212	.175	.161	.178	.151	.129	.171	.147	.138

		BCa 95% Confidence Interval	Lower	-.284	-.328	-.209	-.340	-.160	.079	-.104	-.040	-.011
			Upper	.505	.431	.462	.317	.401	.585	.577	.501	.526
PPC	Pearson Correlation			.062	.105	.226	.057	.283	.378*	.281	.267	.352*
	Sig. (2-tailed)			.737	.566	.213	.758	.116	.033	.120	.140	.048
	N			32	32	32	32	32	32	32	32	32
	Bootstrap[c]	Bias		-.002	-.001	.008	.007	-.001	.009	.006	-.001	.004
		Std. Error		.215	.152	.158	.196	.143	.150	.159	.143	.142
		BCa 95% Confidence Interval	Lower	-.328	-.187	-.128	-.292	-.060	.068	-.091	-.041	.035
			Upper	.450	.388	.570	.428	.552	.696	.570	.537	.619
NeutralPC	Pearson Correlation			.043	.084	.005	-.137	.071	.206	.115	.172	.099
	Sig. (2-tailed)			.815	.647	.980	.455	.698	.258	.531	.346	.591
	N			32	32	32	32	32	32	32	32	32
	Bootstrap[c]	Bias		-.015	.011	.011	-.003	-.009	-.001	.005	-.007	-.003
		Std. Error		.242	.195	.165	.176	.162	.165	.189	.165	.173
		BCa 95% Confidence Interval	Lower	-.441	-.303	-.309	-.445	-.258	-.130	-.273	-.178	-.262

		ce Interval	Upper	.439	.527	.390	.179	.343	.514	.485	.467	.416
SPC	Pearson Correlation			.203	.129	.119	-.066	.316	.348	.198	.258	.304
	Sig. (2-tailed)			.265	.480	.517	.722	.078	.051	.278	.154	.090
	N			32	32	32	32	32	32	32	32	32
	Bootstrap[c]	Bias		-.007	.000	.008	.010	-.003	.005	.000	-.003	-.001
		Std. Error		.183	.142	.169	.206	.135	.150	.158	.139	.139
		BCa 95% Confidence Interval	Lower	-.169	-.171	-.221	-.434	-.014	.045	-.148	-.036	.028
			Upper	.518	.421	.473	.324	.548	.632	.498	.515	.558
TotalPercentCorrect	Pearson Correlation			.125	.109	.149	.027	.237	.393*	.282	.260	.332
	Sig. (2-tailed)			.495	.554	.414	.882	.192	.026	.118	.150	.064
	N			32	32	32	32	32	32	32	32	32
	Bootstrap[c]	Bias		-.008	.000	.011	.008	-.001	.007	.005	-.005	.003
		Std. Error		.212	.162	.164	.190	.145	.134	.161	.140	.133
		BCa 95% Confidence Interval	Lower	-.293	-.238	-.198	-.321	-.090	.118	-.074	-.035	.035
			Upper	.484	.448	.507	.385	.514	.658	.580	.503	.584

Appendix Z

Time 1 vs Time 2 Differences

Changes in WHR

Paired Samples Statistics

				Bootstrap[a]			
						BCa 95% Confidence Interval	
			Statistic	Bias	Std. Error	Lower	Upper
Pair 1	WHRatioT1	Mean	.8379	.0002	.0184	.8003	.8774
		N	27				
		Std. Deviation	.09764	-.00196	.01215	.07547	.11520
		Std. Error Mean	.01879				
	WHRatioT2	Mean	.8213	.0001	.0172	.7863	.8579
		N	27				
		Std. Deviation	.09056	-.00184	.01063	.07222	.10540
		Std. Error Mean	.01743				

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Paired Samples Correlations

					Bootstrap for Correlation[a]			
						Std.	BCa 95% Confidence Interval	
		N	Correlation	Sig.	Bias	Error	Lower	Upper
Pair 1	WHRatioT1 & WHRatioT2	27	.938	.000	-.002	.028	.866	.976

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	WHRatioT1 - WHRatioT2	.01658	.03387	.00652	.00318	.02998	2.543	26	.017

Bootstrap for Paired Samples Test

		Mean	Bootstrap[a] Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval Lower	Upper
Pair 1	WHRatioT1 - WHRatioT2	.01658	.00017	.00628	.017	.00480	.03012

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

<u>Changes in BMI</u>

Paired Samples Statistics

			Statistic	Bootstrap[a] Bias	Std. Error	BCa 95% Confidence Interval Lower	Upper
Pair 1	BMIT1	Mean	28.2902	-.0252	1.3426	25.8639	30.8065
		N	27				
		Std. Deviation	6.98395	-.29428	1.13695	5.00996	8.30304
		Std. Error Mean	1.34406				
	BMIT2	Mean	27.9822	-.0248	1.3219	25.6501	30.5619
		N	27				
		Std. Deviation	6.95146	-.31964	1.25269	4.77154	8.45147
		Std. Error Mean	1.33781				

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Paired Samples Correlations

		N	Correlation	Sig.	Bootstrap for Correlation[a] Bias	Std. Error	BCa 95% Confidence Interval Lower	Upper
Pair 1	BMIT1 & BMIT2	27	.985	.000	-.002	.010	.957	.995

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	BMIT1 - BMIT2	.30798	1.19585	.23014	-.16508	.78105	1.338	26	.192

Bootstrap for Paired Samples Test

		Mean	Bootstrap[a]				
			Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval	
						Lower	Upper
Pair 1	BMIT1 - BMIT2	.30798	-.00037	.22699	.211	-.05808	.73433

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Changes in Body Fat

Paired Samples Statistics

			Statistic	Bootstrap[a]			
				Bias	Std. Error	BCa 95% Confidence Interval	
						Lower	Upper
Pair 1	BodyFatT1	Mean	29.0654	-.0394	1.4255	26.5987	31.7950
		N	16				
		Std. Deviation	5.73973	-.25764	.85416	4.28908	6.58433
		Std. Error Mean	1.43493				
	BodyFatT2	Mean	29.1492	-.0429	1.3842	26.7611	31.7635
		N	16				
		Std. Deviation	5.57856	-.24212	.79717	4.23915	6.35629
		Std. Error Mean	1.39464				

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Paired Samples Correlations

		N	Correlation	Sig.	Bootstrap for Correlation[a] Bias	Std. Error	BCa 95% Confidence Interval Lower	Upper
Pair 1	BodyFatT1 & BodyFatT2	16	.999	.000	.000	.001	.997	.999

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Paired Samples Test

		Paired Differences Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	BodyFatT1 - BodyFatT2	-.08375	.33341	.08335	-.26141	.09392	-1.005	15	.331

Bootstrap for Paired Samples Test

		Mean	Bootstrap[a] Bias	Std. Error	Sig. (2-tailed)	BCa 95% Confidence Interval Lower	Upper
Pair 1	BodyFatT1 - BodyFatT2	-.08375	.00357	.07989	.332	-.22673	.06625

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Overall Changes in IAC

Paired Samples Statistics

			Statistic	Bootstrap[a] Bias	Std. Error	95% Confidence Interval Lower	Upper
Pair 1	IACT1	Mean	.4531	-.0034	.0524	.3472	.5558
		N	29				
		Std. Deviation	.28269	-.00788	.02699	.22074	.32554
		Std. Error Mean	.05249				
	IACT2	Mean	.4386	-.0036	.0560	.3254	.5448
		N	29				
		Std. Deviation	.30838	-.00769	.02522	.24791	.35082
		Std. Error Mean	.05726				

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Paired Samples Correlations

		N	Correlation	Sig.	Bootstrap for Correlation[a] Bias	Std. Error	95% Confidence Interval Lower	Upper
Pair 1	IACT1 & IACT2	29	.676	.000	-.009	.133	.347	.866

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Paired Samples Test

		Paired Differences Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	IACT1 - IACT2	.01449	.23914	.04441	-.07647	.10545	.326	28	.747

Bootstrap for Paired Samples Test

		Mean	Bootstrap[a] Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval Lower	Upper
Pair 1	IACT1 - IACT2	.01449	.00020	.04460	.776	-.06871	.10784

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Change in IAC depending on Increase or Decrease in Accuracy

Paired Samples Statistics

				Bootstrap[a]			
						BCa 95% Confidence Interval	
			Statistic	Bias	Std. Error	Lower	Upper
Pair 1	IncreaseT1	Mean	.4832	.0019	.0592	.3569	.6098
		N	14				
		Std. Deviation	.22910	-.01428	.04140	.17178	.26098
		Std. Error Mean	.06123				
	IncreaseT2	Mean	.6250	.0043	.0621	.4753	.7563
		N	14				
		Std. Deviation	.24183	-.01951	.05859	.13970	.30384
		Std. Error Mean	.06463				
Pair 2	DecreaseT1	Mean	.4363	-.0044	.0891	.2651	.6053
		N	14				
		Std. Deviation	.34014	-.01432	.03964	.27637	.37529
		Std. Error Mean	.09091				
	DecreaseT2	Mean	.2397	-.0002	.0664	.1155	.3803
		N	14				
		Std. Deviation	.25291	-.01350	.04366	.17753	.29824
		Std. Error Mean	.06759				

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Paired Samples Correlations

					Bootstrap for Correlation[a]			
							BCa 95% Confidence Interval	
		N	Correlation	Sig.	Bias	Std. Error	Lower	Upper
Pair 1	IncreaseT1 & IncreaseT2	14	.901	.000	-.013	.060	.766	.958
Pair 2	DecreaseT1 & DecreaseT2	14	.812	.000	.006	.151	.385	.989

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	IncreaseT1 - IncreaseT2	-.14180	.10570	.02825	-.20283	-.08077	-5.020	13	.000
Pair 2	DecreaseT1 - DecreaseT2	.19657	.19988	.05342	.08117	.31198	3.680	13	.003

Bootstrap for Paired Samples Test

		Mean	Bootstrap[a]				
						BCa 95% Confidence Interval	
			Bias	Std. Error	Sig. (2-tailed)	Lower	Upper
Pair 1	IncreaseT1 - IncreaseT2	-.14180	-.00241	.02718	.002	-.19497	-.09281
Pair 2	DecreaseT1 - DecreaseT2	.19657	-.00420	.05108	.023	.11755	.28321

a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

Appendix AA

Means and changes in accuracy in the HTT depending on time and group

Increased Accuracy			Decreased Accuracy		
Time One	Time Two	Change	Time One	Time Two	Change
0.27	0.61	0.34	0.77	0	-0.77
0.23	0.53	0.3	0.93	0.58	-0.35
0.42	0.72	0.3	0.75	0.41	-0.34
0.63	0.91	0.28	0.6	0.36	-0.24
0.44	0.68	0.24	0.44	0.25	-0.19
0.46	0.66	0.2	0.43	0.24	-0.19
0.62	0.77	0.15	0.18	0	-0.18
0.35	0.48	0.13	0.94	0.79	-0.15
0.5	0.6	0.1	0.62	0.48	-0.14
0.88	0.96	0.08	0.31	0.18	-0.13
0.51	0.59	0.08	0.08	0.03	-0.05
0.29	0.35	0.06	0.04	0.03	-0.01
0.65	0.68	0.03	0.02	0.01	-0.01
0.79	0.82	0.03	0	0	0
0	0	0			