A dot probe study investigating attentional bias in males with regard to drive for muscul arity and internalisation of media images

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ABSTRACT

This study investigates attentional bias within males using a visual dot probe task, focusing particularly on any media internalisation, athlete internalisation and drive for muscularity differences related to this concept. 50 males, aged 18 – 30, participated in the study. Participants giving consent were asked to complete a dot probe task and three questionnaires; The Internalisation-General subscale of the Sociocultural Attitudes towards Appearance Questionnaire-3 (SATAQ-3), the Internalisation-Athlete subscale of the SATAQ-3 and the Drive for Muscularity Questionnaire.

Results were analysed using the Univariate Analysis of Variants (ANOVAS), finding Drive for muscularity had a significant interaction effect with probe position on participant’s reaction time to the dot probe.

Further analysis using Post Hoc t-testing revealed that participants low on Drive for Muscularity responded significantly faster to the dot probe when the probe appeared in the incongruent position compared to the congruent position.

Conclusions derived from quantitative data revealed participants may have experienced cognitive avoidance when completing the dot probe task and not attentional bias. Also the images used may not have been threatening enough to warrant significant results.

Furthermore the research highlights further findings from the study and the practical implications experienced.

| KEY WORDS: | Attentional Bias | Males | Drive for Muscularity | Media Internalisation | Dot Probe |
Introduction

Body Image and Drive for Muscularity
Interest surrounding body image originated by Paul Schilder, (Grogan, 1999), who defined body image as, ‘the picture of our own body which we form in our mind’ (Schilder, 1950, p. 11). Literature has focused primarily on women, with little focus on males, but ‘the lack of past attentiveness to male body image issues is one reason why assessment of muscularity has become a topic of interest’ (Cafri & Thompson, 2004, p. 18). Men, just like women find it almost impossible to meet society’s standards and eventually turn their anxieties and humiliation inwards (Pope, 2000) – resulting in male body dissatisfaction.

Watson (2009) suggests that in the 1990’s men’s health received increasing attention from the media and it is now a concern that men have similar insecurities as women. According to Daniel and Bridges (2009) the amount of dissatisfied men has risen from 15% to 43% with evidence suggesting these ‘men have become as concerned with their physical appearance as women’ (Davis & Scott-Robinson, 2000, p. 33). Young men are now being targeted by the media and are becoming more aware of their appearance (Grogan, 1999).

Women have learned to confront society’s ideals of beauty, while men ‘still labour under societal taboo against expressing such feelings’ (Pope, 2000, p. 5). Pope (2000) studied body builder’s insecurities about appearance and found insecure males were muscle dismorphic, ‘excessively preoccupied with body size and muscularity’ (Pope, 2000, p. 7). This is a ‘pathological disturbance’ concerned with ‘the idea one’s own body is insufficiently muscular’ (Pope et al., 2005, p. 395). Men admitted their preoccupation was uncontrollable but ‘none had sought treatment because they doubted anyone would understand’ (Pope, 2000, p. 7). This form of body image disturbance has received little investigation and is called bigorexia – reverse of anorexia nervosa (Pope et al., 2005). Many of these men use steroids to gain huge amounts of muscle, going beyond the limits of natural muscularity obtained by ordinary men (Pope, 2000). The expanding male body ideal is portrayed though the media and even action figures like G.I Joe have been growing more muscular over the years (Pope, 2000). Increasing muscularity however makes the male ideal progressively less attainable for the majority of men (Halliwell et al., 2007).

Body image problems can begin at a young age and some boys ‘examine their chest and biceps in the secrecy of their bathroom mirror’ (Pope, 2000, p. 180). Marie (2006) found that most men reported weight lifting as their method of physical exercise and this craze is now reflecting onto the younger generation – with many adolescents weight training to increase their muscle mass (Williams, 2006).

‘Men’s Health’ was the first male magazine to focus on fitness and beauty, with weight training emphasised by tips on how to get bigger muscles, ‘maximise gravity for best results – lift heavier things’ (Men’s Health, 2009, p. 1). The magazine quickly created a spin off, MH-18, aimed at adolescent boys (Labre, 2002) with both magazines sporting
images of tremendously muscular bodies (Labre, 2002). These advertisements affect men’s body image with more men reporting feelings of inadequacy about how they look (Pope, 2000). This issue is now widely researched, with many ways used to investigate its aspects.

**How body image is traditionally measured**

Researchers have investigated body dissatisfaction in males using many methods. Perceptual methods (measuring size and accuracy) and subjective methods (measuring thoughts/feelings around internalisation) have been used along with silhouette scales (measuring how different an individual’s present appearance compares to their wishful appearance) (Cafri & Thompson, 2004). Somatomorphic matrixes are also used to assess body image dissatisfaction with respect to muscularity and body fat (Cafri & Thompson, 2004).

Questionnaires are also a good way to investigate body dissatisfaction. Reas *et al.* (2002) developed the Body Checking Questionnaire (BCQ) to investigate body checking behaviours in males and females. The questionnaire has good internal consistency/reliability and is able to differentiate between clinical and non-clinical body image concerns. The Body Shape Questionnaire (BSQ) was also developed by Cooper *et al.* (1986) to assess women’s body issues and was later adapted to use with men.

Another questionnaire used to measure body dissatisfaction is the Drive for Muscularity Scale (DMS) (McCreary & Sasse, 2000). Drive for muscularity is ‘expressed in terms of dislike for a body part, thoughts that the body part is disgusting and beliefs that the body part is lacking muscle tone’ (Cash & Pruzinsky, 1990, p. 157). The scale was derived in order to assess individual’s perceptions of their own muscular appearance. However, the most widely used questionnaire to measure body image and dissatisfaction is the Sociocultural Attitudes towards Appearance Questionnaire-3 (SATAQ-3; Thompson *et al*., 2004). The SATAQ-3 ‘is a measure of one’s endorsement of societal appearance ideals’ (Calogero *et al*., 2004, p. 193) and is popular due to its excellent reliability and validity.

Other researchers have also used interviews to investigate body dissatisfaction. Olivardia *et al.* (2000) interviewed 24 muscle dismorphic males along with 30 normal weightlifters and found muscle dismorphic males differed significantly on measures of body dissatisfaction. Finally, a number of researchers have used experiments to study body dissatisfaction. Blond (2008) carried out an extensive review of experiments exposing men to advertisements featuring idealized male bodies, finding that such exposure had a significant negative effect on men’s body dissatisfaction. Dissatisfied men were at risk of negative self-evaluation and conclusions show that satisfied men ‘may be protected against negative impacts from seeing such images’ (Blond, 2008, p. 243).
Problems with traditional measures

Traditional measures of body dissatisfaction have proved helpful to psychologists and have advanced research greatly, but do suffer from a number of problems. For instance, the vast majority of traditional measures are questionnaires, using self-reports that are prone to bias. Individuals may give answers which they believe are required; they may lie or even misunderstand what the questions are asking.

Also, Likert scales used within the questionnaires are unable ‘to tap into the specific nature of male body concerns’ (Cafri & Thompson, 2004, p. 22) and silhouette scales exclude the dimension of muscularity so ‘there is no way to tap the central appearance concerns of males’ (Cafri & Thompson, 2004, p. 23). This form of assessment also prevents ‘an indirect assessment of male body image’ because the figures vary greatly with respect to body fat, and therefore ‘exclude assessment based on muscularity’ (Cafri & Thompson, 2004, p. 23). Due to the problems interpreting results from traditional measures, psychologists have turned to cognitive psychology to examine participant’s body image and drive for muscularity in terms of cognitive bias. One cognitive bias identified in this way is attentional bias.

Attentional bias

Attentional bias is caused when individuals internalise their body ideal to an extent that gives them great concern with their body shape and size. It is apparent that women who fear becoming fat and men who fear not being muscular enough have an attentional bias surrounding this area (Unterhalter et al., 2007). Attentional bias refers to the ‘hyper-attention to threatening material’ (Anon, 2010, p. 1) and it has been suggested that this attentional bias occurs when emotionally threatening stimuli are processed by individuals to a greater extent than neutral stimuli (Eysenck, 1992).

This can be explained with relation to Eysenck’s theory of hyper vigilance, which suggests that highly anxious individuals display attentional bias due to their hyper vigilant attentional processing systems (Keogh & French, 1996). Hyper vigilance refers to anxious individuals being more likely to scan their environment for threat related material, which in turn affects their attentional processing (Keogh & French1996). From his theory Eysenck (1992) argues that hyper vigilance manifests itself in many ways, with some participants showing general hyper vigilance; attention towards irrelevant stimuli and others specific hyper vigilance; attention selectively given to threat related rather than neutral stimuli (p. 43). These individuals are also more likely to interpret vague stimuli as threatening and attend to such stimuli readily (Eysenck, 1992).

According to Frederick et al. (2005) the ideal male body marketed to men is much more muscular to that which is marketed to women and these threatening images of men in turn have a huge impact on men’s attentional bias. There are many ways to investigate attentional bias, with the two most common experimental methods being the modified stroop task and the modified visual dot probe task.
Stroop test
The stroop task is widely used to measure attentional bias (Smith & Rieger, 2009) by comparing participant’s colour naming times for emotionally threatening and neutral words. It is believed participants with an attentional bias towards emotionally threatening words will take significantly longer to colour name them. This apparently happens because participants infer the meaning of the threatening words, inhibiting them from naming the colour as quickly as possible (Eysenck, 1992). The stroop task is also used to assess body image dissatisfaction; finding participants display ‘longer response times when colour naming body/food words’ (Smith & Rieger, 2009, p. 1) when compared to neutral words. The stroop task has also been used to investigate attentional bias in phobias (Amir et al., 2002) and schizophrenia (Phillips et al., 2005). However, many of the studies using the stroop test have found participants show delayed response times, which may indicate a direction of attention – either towards or away from the stimulus word, and for this reason the modified visual dot probe task was developed.

Dot probe
The dot probe task investigates selective attention to threat and Koster et al. (2004) state ‘responses to probes appearing at the location of threat information compared to the opposite location are interpreted as vigilance for threat’ (p. 1183). The task assesses whether participants direct attention towards target words/images (indicated by a fast response time) or away from them (slow response time) (Smith & Rieger, 2009).

Glauert et al. (2009) used the dot probe to investigate whether body dissatisfaction is associated with attentional bias towards ideal bodies. Results showed this was the case; participants had an automatic attentional bias. Humphreys and Paxton (2004) looked at the impact ideal images had on adolescent boys and found high muscular internalisers had a more negative response to viewing such images. Supporting this, research suggests ‘men’s body dissatisfaction increases when they see images of attractive muscular men’ (Blond, 2008, p. 244).

Results from dot probes can also suggest difficulty to disengage from threatening stimuli (Koster et al., 2004) and so some studies vary their stimuli presentation times. Many use 500ms and others who vary this have produced different results. For example Noel et al. (2006) found attentional bias exhibited at 50ms but not at 500ms. Explanation comes from different cognitive mechanisms operating when we see stimuli; our attention automatically shifts one of two ways – towards/away from the threat related stimuli (Field & Cox, 2008). Fast attention shifts occur with short presentation (50-200ms) – indicating attentional bias, and disengagement of attention occurs with longer presentation (1000ms or longer) – indicating cognitive avoidance.

It is therefore assumed that at less than 200ms attentional bias occurs and at longer presentations, cognitive avoidance occurs. However, studies using 500ms have produced inconsistent results; some suggest that at 500ms attentional bias is due to
delayed disengagement with stimuli and not attentional shifts (Field & Cox, 2008). Evidence is inconclusive and so this study will use 500ms; participants scoring highly on the SATAQ-3 and DMS should show attentional bias and a faster reaction time to threat related images.

Aim
To investigate attentional bias in males who score high(er) and low(er) on the SATAQ-3 (Thompson et al., 2004), and high(er) and low(er) on the Drive for Muscularity Questionnaire (McCreary, 2009) using a pictorial dot probe task.

Hypotheses

Hypothesis # 1
There will be a significant attentional bias towards the muscular body (concern related) pictures for participants with higher general internalisation in comparison to participants with lower general internalisation.

Hypothesis # 2
There will be a significant attentional bias towards the muscular body (concern related) pictures for participants with higher athlete internalisation in comparison to participants with lower athlete internalisation.

Hypothesis # 3
There will be a significant attentional bias towards for the muscular body (concern related) pictures for participants with higher drive for muscularity in comparison to participants with lower drive for muscularity.
Method

Design
This study was designed to investigate attentional bias in a non-clinical sample of young males between the ages of 18 and 30. A 2x2 mixed factorial experimental design was used, with a total of four independent variables (IV) being manipulated.

IV 1 was the congruency of the dot probe position. This was a within subject variable with two levels (congruent/incongruent).

IV 2 was general media internalization. This was a between-subjects variable with two levels (higher/lower).

IV 3 was athlete internalization. This was a between-subjects variable with two levels (higher/lower).

IV 4 was drive for muscularity. This was a between-subjects variable with two levels (higher/lower).

The dependent variable (DV) was the participant’s reaction time to the dot probe.

Participants
Opportunity sampling was used to select 50 male participants between the ages of 18 and 30. The mean age of participants was 21.16 years and the mean BMI of participants was 23.15.

Materials

Dot probe stimuli
30 images of male bodies and 38 images of household objects were taken from websites and used as the concern related stimuli (male bodies) and the neutral stimuli (household objects) for the dot probe task. The image groups were randomly paired together, totalling 30 picture pairs. 4 picture pairs were formed (using neutral images) for the dot probe trials (see Appendix 1 for copy of all images).

Dot probe task
The dot probe task used was prepared using Microsoft Visual Basic. Net software and presented on a 15.4” colour screen laptop. The picture pairs were presented for 500ms; with one image to the left hand side of the screen and one to the right (the background colour of the screen was black). In total, there were 4 practice trials and 30 test trials. A central fixation cross appeared on screen for one second (ensuring central fixation) followed by a picture pair. Immediately after the images disappeared a white dot probe
appeared in place of one of the pictures. Participants had been instructed to respond to the dot as quickly as possible by pressing the relevant key, f key for left and j key for right (the keys were marked ← LEFT and →RIGHT). The dot stayed on the screen until the participant responded.

Participant’s average reaction times were automatically transferred to a Microsoft Excel spreadsheet along with both the reaction times for congruent trials and incongruent trials. An example of a dot probe trail can be found in Appendix 2.

**Measures**

**Sociocultural Attitudes Towards Appearance Scale-3 (SATAQ-3; Thompson et al., 2004).** The SATAQ-3 (see Appendix 5) was used to assess the extent socio-cultural influences affect participant’s body image. This is a 30-item scale with responses made on a 5-point Likert scale (1 is definitely disagree and 5 is definitely agree). In total two subscales were used; the internalisation general subscale (9 items - item 3, item 4, item 7, item 8, item 11, item 12, item 15, item 16 and item 27) and the internalisation athlete subscale (5 items - item 19, item 20, item 23, item 24 and item 30). For the purpose of this study the two subscales were combined and re-numbered so the questionnaire was user friendly. The internalisation general items were numbered 1, 2, 3, 4, 5, 6, 7, 8 and 13 and the internalisation athlete items were numbered 9, 10, 11, 12 and 14.

The internalisation general subscale looks at the affects media has on one’s body image with high scores indicating that the media affects body image. The internalisation athlete subscale looks at how much one interprets pressures about muscularity and high scores indicate that pressures about muscularity affect body image. The SATAQ-3 was used as the two subscales have been reported as having high internal consistency; internalisation general has a Cronbach’s α at 0.96 and the internalisation athlete has a Cronbach’s α at 0.95 (Thompson et al., 2004).

**Drive for Muscularity Scale (McCreary, 2009).**

The Drive for Muscularity Scale (DMS) (see Appendix 5) was used to assess individual’s perceptions of their muscular appearance. This is a 15-item scale with responses made on a 6-point Likert scale (1 is always and 6 is never). The data from the DMS was reversed scored using SPSS as the scale uses a ‘reverse-direction scoring procedure’ - to keep the rating scale significant (McCreary, 2009, pg 1). The DMS was used as McCreary (2009) reported high internal consistency (Cronbach’s α = 0.91) for the scale.

**Procedure**

Males were approached and asked if they had time to take part in a short study; those who agreed were given a briefing sheet to read (providing their participant number and study summary). After, they were asked to sign a consent form (see Appendix 3), confirming they had read and understood the conditions of the study. Participants were
then sat in front of the laptop and asked to follow the standardised instructions (see Appendix 4).

When the dot probe task was completed the participants were given a questionnaire booklet to fill in (see Appendix 5). Participants were then thanked for taking part and given a debriefing sheet (see Appendix 6); explaining the purpose of the study and again reminding the participants of their right to withdraw.

**Analysis**

A mixed design was used and three 2x2 ANOVA’s were conducted. The first 2x2 ANOVA examined the effects of general internalisation (higher/lower) and the effects of the congruence of the images (congruent/incongruent) on participant’s reaction times (RT) to the dot probe. The second 2x2 ANOVA examined the effects of athlete internalisation (higher/lower) and the effects of the congruence of the images (congruent/incongruent) on participants RT’s. The third 2x2 ANOVA examined the effects of drive for muscularity (higher/lower) and the effects of the congruence of the images (congruent/incongruent) on participants RT’s.

**Ethics**

Ethical approval was obtained from a project supervisor (see Appendix 7). Ethical issues recognized included confidentiality, informed consent and right to withdraw. Confidentiality could not be given in this study as the findings may eventually be published. This was considered and dealt with accordingly as each participant was provided with a participant number and reminded their data would remain anonymous. Informed consent was able to be given by all participants as they signed a consent form confirming they had read and understood the conditions of the study and still willing to take part. Finally the right to withdraw was dealt with by informing participants they had the right to withdraw from the study at any time.
Results

Raw Data
Participant’s responses to the Sociocultural Attitudes towards Appearance Questionnaire-3 (SATAQ-3) and Drive for Muscularity Questionnaire (DMS) were recorded into a SPSS file along with their reaction times (RT) to the dot probe task. Items from the DMS were reversed and recoded as previously outlined in the method section (see Appendix 8 for raw data).

Preparation of Raw Data

Preparation of Questionnaire Data
An overall SATAQ-3 Internalisation General subscale (9 items) and Internalisation Athlete subscale (5 items) score using SPSS was calculated for each participant, by adding together responses to the questionnaires items (Thompson et al., 2004) and a DMS scale (15 items) score total was also calculated, by adding together all items (McCreary, 2009).

Preparation of Dot Probe task Reaction Time Data
RTs (in milliseconds) were recorded for responses when the dot probe replaced the threat picture (congruent) and the non-threat picture (incongruent). RT data was examined for individual outliers (above and below 3 standard deviations from the mean) and so participant 20 was removed at this point, therefore N=49.

Calculation of Means (M) and Standard Deviations (SD)
Means and standard deviations for dot probe reaction times (congruent/incongruent), SATAQ-3 (Internalisation General/Internalisation Athlete subscales) and DMS can be seen in Table 1. (See Appendix 10).

Table 1. Mean’s and SD’s of reaction time (milliseconds) for congruent and incongruent dot probe trials, SATAQ-3 Internalisation General, Internalisation Athlete, Drive for Muscularity scores and BMI.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Overall (N=49)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dot Probe Condition</td>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Congruent</td>
<td>506</td>
<td>0.09</td>
<td>-</td>
</tr>
<tr>
<td>Incongruent</td>
<td>489</td>
<td>0.07</td>
<td>-</td>
</tr>
<tr>
<td>Scale</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SATAQ-3 General</td>
<td></td>
<td>23.41</td>
<td>7.34</td>
</tr>
<tr>
<td>SATAQ-3 Athlete</td>
<td></td>
<td>14.76</td>
<td>4.74</td>
</tr>
<tr>
<td>Drive for Muscularity Scale</td>
<td></td>
<td>35.49</td>
<td>12.47</td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td>23.15</td>
<td>2.77</td>
</tr>
</tbody>
</table>
Each of the three scales were checked for internal consistency reliability, through calculation of Cronbach’s alpha (see Appendix 9). Cronbach’s alpha for the SATAQ-3 Internalisation-General scale = 0.90; SATAQ-3 Internalisation-Athlete scale = 0.89 and Drive for Muscularity = 0.90 indicating good internal consistency. A BMI score for each participant was calculated by dividing weight (in kg) by their height (meters$^2$).

The Effects of SATAQ-3 Media Internalisation on Dot Probe reaction times
To investigate the effects of general media internalisation participants were split into two groups – high/ low general media internalisers using median split within SPSS. The 26 participants with a SATAQ-3 General Internalisation score of equal to or less than the median of 24 were classified as low general internalisers (LMI) and the 23 participants with a SATAQ-3 General Internalisation score equal to or more than 25 were classified as high general internalisers (HMI).

The mean RTs and SDs for the congruent and incongruent trials along with a SATAQ-3 General Internalisation score for both the LMI and HMI groups were calculated and can be found in Table 2 (see Appendix 13 for SPSS).

Table 2. Mean RT’s and SD’s for congruent and incongruent trials, SATAQ-3 Internalisation General score and BMI for both the LMI and HMI groups.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Overall (N =49)</th>
<th>LMI (N =26)</th>
<th>HMI (N =23)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Dot Probe Congruent (ms)</td>
<td>506</td>
<td>0.09</td>
<td>490</td>
</tr>
<tr>
<td>Dot Probe Incongruent (ms)</td>
<td>489</td>
<td>0.07</td>
<td>477</td>
</tr>
<tr>
<td>SATAQ-3 Internalisation General</td>
<td>-</td>
<td>23.41</td>
<td>7.34</td>
</tr>
<tr>
<td>BMI</td>
<td>23.15</td>
<td>2.77</td>
<td>22.90</td>
</tr>
</tbody>
</table>

The LMI (n=26) group had a mean congruent reaction time of 490 (SD=0.09) and an incongruent reaction time of 477 (SD=0.08). The HMI (n=23) group had a mean congruent reaction time of 525 (SD=0.09) and an incongruent reaction time of 501 (SD=0.07).
The LMI group had a mean SATAQ-3 general media internalisation of 17.88 (SD=4.66) and a BMI of 22.90 (SD=3.14). The HMI group had a mean General Media Internalisation score of 29.65 (SD=4.00) and a BMI of 23.42 (SD=2.32).

A 2x2 mixed factorial ANOVA was conducted with SATAQ-3 Internalisation General group (high/low) as between subjects variable and dot Probe position (congruent/incongruent) as the within subjects variable and RT (ms) as the DV (see Appendix 11).

**Within-Subjects Main Effects**
In terms of within subjects main effects, the results showed that there was a significant main effect of probe position (congruent/incongruent) on participant’s RTs to the dot probe, \( F(1,47) = 9.63, p <.01 \); indicating a significant difference for all participants RTs between the two probe positions. Overall participants took significantly longer to respond to the probe when in the incongruent position (M=506) than when in the congruent position (M=489).

**Interaction Effects**
There was no significant interaction effect between probe position and SATAQ-3 General Media Internalisation on participants RTs to the dot probe, \( F(1,47) = 0.85, p >.05 \). Therefore, participants RTs did not depend on probe position and whether they were in the LMI or HMI group.

**Between-Subjects Main Effects**
In terms of between-subjects main effects, there was no significant main effect of General Media Internalisation (higher/lower) on participants RTs to the dot probe, \( F(1,47) = 1.68, p > .05 \), indicating no significant difference between the LMI and HMI groups RTs. Therefore irrespective of probe position, General Media Internalisation level did not significantly affect participants RTs.

**Estimated Marginal Means Graphs**
The results of the 2x2 mixed ANOVA are illustrated by the graph in Figure 1.
Figure 1. Means plot shows mean RTs for probe position for LMI and HMI groups.

Even though the interaction between probe position (congruent/incongruent) and media internalisation (higher/lower) wasn’t significant the graph in Figure 1 suggests that the LMI group were slightly faster to respond to the dot in the incongruent trials (M=477) than they were in the congruent trials (M=490). The graph also suggests that the LMI group were slightly faster (M=490, 477) than the HMI group (M=525, 501) to respond to the dot in both the congruent and incongruent trials. (Additionally all participants were significantly faster to respond to the dot probe in the incongruent position (M=489) compared to the congruent position (M=506).

The Effects of SATAQ-3 Athlete Internalisation on Dot Probe reaction times

To investigate the effects of SATAQ-3 athlete internalisation the participants were split into two groups – high and low athlete internalisers using median split within SPSS. The 29 participants with a SATAQ-3 Athlete Internalisation score of equal to or less than the median of 16 were classified as low athlete internalisers (LAI) and the 20 participants with a SATAQ-3 Athlete Internalisation score equal to or more than 17 were classified as high athlete internalisers (HAI).

The mean RTs and SDs for the congruent and incongruent trials along with a SATAQ-3 Athlete Internalisation score for both the LAI and HAI groups and can be found in Table 3 (see Appendix 13).

Table 3. Mean RT's and SD's for congruent and incongruent trials, with mean internalisation athlete score and BMI for both the LAI and HAI groups.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Overall (N =49)</th>
<th>Low Int.Ath (N =29)</th>
<th>High Int.Ath (N =20)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Dot Probe Congruent (ms)</td>
<td>506</td>
<td>0.09</td>
<td>492</td>
</tr>
<tr>
<td>Dot Probe Incongruent (ms)</td>
<td>489</td>
<td>0.07</td>
<td>477</td>
</tr>
<tr>
<td>SATAQ-3 Internalisation-Athlete</td>
<td>23.41</td>
<td>7.34</td>
<td>11.79</td>
</tr>
<tr>
<td>BMI</td>
<td>23.15</td>
<td>2.77</td>
<td>23.29</td>
</tr>
</tbody>
</table>

The LAI group (n=29) had a mean congruent reaction time of 492 (SD=0.09) and an incongruent reaction time of 477 (SD=0.07). The HAI group (n=20) had a mean congruent reaction time of 527 (SD=0.09) and an incongruent reaction time of 506 (SD=0.07).
The LAI group had a mean SATAQ-3 Athlete Internalisation of 11.79 (SD=3.79) and a BMI of 23.29 (SD=3.21). The HAI group had a mean athlete internalisation of 19.05 (SD=1.67) and a BMI of 22.94 (SD=2.03).

A 2x2 mixed factorial ANOVA was then conducted with SATAQ-3 Internalisation Athlete group (high/low) as between subjects variable and Dot Probe position (congruent/incongruent) as the within subjects variable and RT as the DV (see Appendix 11).

**Within-Subjects Main Effects**
In terms of within subjects main effects, the results showed that there was a significant main effect of probe position (congruent/incongruent) on participant’s RTs to the dot probe, $F(1,47) = 9.40$, $p < .01$; indicating that there was a significant difference for all participants RTs between the two probe positions. Overall participants took significantly longer to respond to the probe when in the incongruent position (M=506) than when in the congruent position (M=489).

**Interaction Effects**
There was no significant interaction effect between probe position and SATAQ-3 Athlete Internalisation on participants RTs to the dot probe, $F(1,47) = 0.21$, $p = >.05$. Therefore, participants RTs did not depend on probe position or whether they in the LAI or HAI group.

**Between-Subjects Main Effects**
In terms of between-subjects main effects, there was no significant main effect of Athlete Internalisation (higher/lower) on participants RTs to the dot probe, $F(1,47) = 1.88$, $p > .05$. Indicating there was no significant difference between the LAI and HAI groups RTs. Therefore irrespective of probe position, Athlete Internalisation level did not significantly affect participants RTs.

**Estimated Marginal Means Graphs**
The results of the 2x2 mixed ANOVA are illustrated by the graph in Figure 2.
Figure 2. Means plot shows mean RTs for probe position for LAI and HAI groups.

Even though the interaction between probe position (congruent/incongruent) and athlete internalisation (higher/lower) wasn’t significant the graph in Figure 2 suggests that the LAI group were slightly faster to respond to the dot in the incongruent trials (M=477) than they were in the congruent trials (M=492). The graph also suggests that the LAI group were slightly faster (M=492, 477) than the HAI group (M=527, 506) to respond to the dot in both the congruent and incongruent trials. (Additionally all participants were significantly faster to respond to the dot probe in the incongruent position (M=489) compared to the congruent position (M=506).

The Effects of Drive for Muscularity on Dot Probe reaction times

To investigate the effects of Drive for Muscularity participants were split into two groups – high and low Drive for Muscularity using median split within SPSS. The 27 participants with a Drive for Muscularity score of equal to or less than the median of 31 were classified as low Drive for Muscularity (LDM) and the 22 participants with a Drive for Muscularity score equal to or more than 32 were classified as high Drive for Muscularity (HDM).

The mean RTs and SDs for the congruent and incongruent trials along with a mean Drive for Muscularity score for both the LDM and HDM groups can be found in Table 4 (see Appendix 13).

Table 4. Mean RT’s and SD’s for congruent and incongruent trials, with mean Drive for Muscularity score and BMI for both the LDM and HDM groups.

<table>
<thead>
<tr>
<th>Measures</th>
<th>Overall (N =49)</th>
<th>Low DM (N =27)</th>
<th>High DM (N =22)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Dot Probe Congruent (ms)</td>
<td>506 0.09</td>
<td>503 0.09</td>
<td>511 0.09</td>
</tr>
<tr>
<td>Dot Probe Incongruent (ms)</td>
<td>489 0.07</td>
<td>474 0.07</td>
<td>507 0.07</td>
</tr>
<tr>
<td>Drive for Muscularity Scale</td>
<td>23.41 7.34</td>
<td>26.63 4.08</td>
<td>46.36 10.50</td>
</tr>
<tr>
<td>BMI</td>
<td>23.15 2.77</td>
<td>23.12 2.74</td>
<td>23.17 2.87</td>
</tr>
</tbody>
</table>

The LDM (n=27) group had a mean congruent reaction time of 503 (SD=0.09) and an incongruent reaction time of 474 (SD=0.07). The HDM (n=22) group had a mean congruent reaction time of 511 (SD=0.09) and an incongruent reaction time of 507 (SD=0.07).
The LDM group had a mean Drive for Muscularity score of 26.63 (SD=4.08) and a BMI of 23.12 (SD=2.74). The HDM group had a mean Drive for Muscularity score of 46.36 (SD=10.50) and a BMI of 23.17 (SD=2.87).

A 2x2 mixed factorial ANOVA was conducted with Drive for Muscularity group (high/low) as between subjects variable and dot probe position (congruent/incongruent) as the within subjects variable and RT as the DV (see Appendix 11).

**Within-Subjects Main Effects**
In terms of within subjects main effects, the results showed that there was a significant main effect of probe position (congruent/incongruent) on participant’s RTs to the dot probe, \(F(1,47) = 8.63, p = .005\); indicating there was a significant difference in participants RTs between the two probe positions. Overall participants took significantly longer to respond to the probe when in the incongruent position (M=506) than when in the congruent position (M=489).

**Between-Subjects Main Effects**
In terms of between-subjects main effects, there was no significant main effect of Drive for Muscularity (higher/lower) on participants RTs to the dot probe, \(F(1,47) = 0.80, p > .05\). Indicating there was no significant difference between the LDM and HDM groups RTs. Therefore irrespective of probe position, Drive for Muscularity level did not significantly affect participants RTs.

**Interaction Effects**
There was a significant interaction effect between probe position and Drive for Muscularity on participants RTs to the dot probe, \(F(1,47) = 5.01, p = <.05\). Therefore, participants RTs depended on probe position and whether they were in the LDM or HDM group.

**Estimated Marginal Means Graphs**
The results of the 2x2 mixed ANOVA are illustrated by the graph in Figure 3.
Figure 3. Means plot shows mean RTs for probe position for LDM and HDM groups.

Figure 3 shows the significant interaction between probe position (congruent/incongruent) and drive for muscularity (higher/lower). The significant interaction between probe position and drive for muscularity needed to be investigated further, therefore post hoc tests were conducted in order to find where the significance lay.

**Post Hoc Tests**
Four comparisons were completed and Bonferroni correction was needed to alter the significance level; ensuring the experimentwise error rate is kept at a significant level. Bonferroni correction – \( .05/4 = .0125 \) (new significance level).
This new significance level (\( p<.0125 \)) makes it harder to claim a significant result and in doing so decreases the chance of making a type 1 error to very acceptable levels.

**Paired t-test**
Two Paired \( t \)-tests were carried out to see where the significance lay within the groups (i.e. LDM group congruent and incongruent and HDM group congruent and incongruent) with RTs as the DV.

For the LDM group there was a significant difference between reaction times, with a sig. (2 tailed) value of 0.00, \( t=3.41, \text{df}=26, p < .0125 \). This is compared to the HDM group, having no significant difference between reaction times, 0.57 \( t=0.58, \text{df}=21, p > .0125 \) (see Appendix 12).
Looking at means it can be seen that the LDM group took significantly longer to respond to the dot probe in the congruent position (M=503) than when it was in the incongruent position (M=474).

**Independent t-test**
Two Independent \( t \)-tests were then carried out to see where the significance lay between the groups (i.e. LDM and HDM at congruent and also at incongruent) with RTs as the DV. As Levene’s Test of Equality of Variances was insignificant, equal variances were assumed.

The Independent \( t \)-test showed that there was no insignificant difference between LDM and HDM at the congruent probe position \( t= 0.31, \text{df} = 47, p > .0125 \) and also no significant difference between LDM and HDM at the incongruent probe position \( t= 1.59, \text{df} = 47, p > .0125 \) on LDM and HDM participants RTs (See Appendix 13).

Figure 3. shows that the LDM group were significantly faster (M=474) to respond to the dot in the incongruent trials than they were in the congruent trials (M=503). The graph
also suggests that the LDM group (M=503) were faster than the HDM group (M=511) to respond to the dot in the congruent position and significantly faster in the incongruent position - LDM group (M=474) and HDM group (M=507). Additionally both groups were faster to respond to the dot probe in the incongruent position compared to the congruent position.

Therefore Post Hoc testing indicated that the LDM participant’s reaction times were significantly longer in the congruent position when probe was replaced by a ‘threat’ picture than when it was replaced by a non-‘threat’ picture.

Discussion

Main findings
It is now clear the hypotheses stated before the study are unsupported. Participants didn’t have a significant attentional bias towards the concern related pictures and they were faster to respond to the incongruent images not the congruent images; therefore cognitive avoidance may have occurred, not attentional bias. These results are similar to those of Field and Cox (2008) who found that 500ms produced delayed disengagement and not attentional bias; perhaps a shorter presentation time would have produced attentional bias. Field and Cox (2008) suggested at 50-200ms attentional bias occurs and at 1000ms cognitive avoidance occurs, this study therefore may have produced evidence to suggest that at lower, 500ms cognitive avoidance occurs. Like Field and Cox (2008), Noel et al. (2006) also found attentional bias exhibited at 50ms but not at 500ms – this again reflects the results found in this study.

Results found also oppose those found by Glauert et al. (2009) who found attentional bias towards ideal bodies, in this study participants apparently showed an attentional bias towards the incongruent images. As the LDM group took significantly more time to respond to the congruent than incongruent images, this may show the participants are satisfied with their bodies (LDM) and therefore not paying attention to the congruent images and so took longer to respond to the probe in this position. These participants may therefore be protected from body image disturbances as stated by Blond (2008). Further research is therefore needed to understand this topic further.

Limitations
Throughout this study many limitations arose, including the sampling method used, the sample size and also the questionnaires. Opportunity sampling was used and could affect results obtained as it may have a biased sampling technique. It turned out that by using opportunity sampling the participants recruited were neither very high nor very low general media internalisers, athlete internalisers or had a very high or low drive for muscul arity. It may have been appropriate therefore to sample equal numbers of high and low media and athlete internalisers and also an equal number of males who had a drive for muscul arity with those that did not.
Another limitation is that the study relied conclusively on self-report measures (questionnaires) to establish levels of general media/athlete internalisation and drive for muscularity. The questionnaires used were appropriate as they provided a quick measure of the three aspects, although may have produced erroneous results if participants rushed the questionnaires or answered in a way they thought the researcher wanted them too.

These weaknesses could however, be overcome in many ways. In order to remove the problem of opportunity sampling, another sampling method could be used. This includes stratified sampling – where the target population is split into groups (i.e. HMI and LMI) and participants are taken from each group equally. This would then make the results obtained less biased and most representative of the target population.

In order to erase the problem of a small sample size, in future research a larger sample size could be used if time permits. Finally, to erase the problem of biased self-reported questionnaires interviews could be used to assess participant’s levels of media and athlete internalisation and drive for muscularity. This would be very time consuming especially with a larger sample size but would provide very reliable results.

**Implications and future research ideas**

As this study produced a significant interaction between Probe Position and Drive for Muscularity it may produce implications for future research. Due to the popularity and effectiveness of body image dissatisfaction literature, future research could take this significant interaction into account and look specifically at how to combine drive for muscularity with forms of therapy and treatment used to reduce its abundance. Implications for this research on a cultural scale could include government/NHS sponsored advertisement campaigns aimed at reducing body image dissatisfaction or informing people (particularly young people) of the dangers and health risks associated with such dissatisfactions.

In future research it would be worth repeating this study with a larger sample size as results produced may then be significant. It may also be worth carrying out the study in a clinical sample of participants – maybe the results were not significant due to the dot probe paradigm not being sensitive enough to detect attentional bias in a non-clinical sample.

Additionally, the current study could also be adapted to investigate whether or not an individual’s culture affects their attentional bias. It may be that different cultures have different body ideals and different levels of body dissatisfaction. It would therefore be possible to see which cultures have higher general media and athlete internalisation and also higher drives for muscularity.

Finally it may be the case that the images used in this study, were simply not threatening enough to achieve an attentional bias. Therefore in future research
investigators could determine levels of threat in a sample of images and use ones interpreted as the highest threat.

**Conclusion**

In conclusion this study has failed to provide evidence for attentional bias. The study was unique as no other studies have looked at attentional bias in male body dissatisfaction and drive for musculosity using a dot probe task and so more research should be carried out in this area in order to gain significant results. Results obtained were opposite to the ones anticipated and therefore future research with a larger sample size may in fact produce interesting results in relation to attentional bias and drive for musculosity.

**References**


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