Brief research report

Risk for eating disorders modulates interpretation bias in a semantic priming task

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ABSTRACT

The current study used a semantic priming paradigm to investigate the presence of implicit interpretation biases for food and body shape words among 118 undergraduate females. Reaction times (RTs) were recorded while participants made lexical decisions (i.e., word vs. non-word judgments) to lexical targets that were preceded by negatively valenced eating disorder related (e.g., fat-PIZZA), eating disorder unrelated (e.g., party-PIZZA), or semantically unrelated (e.g., umbrella-PIZZA) prime words. Self-reported eating disorder traits were assessed using the Body Shape Questionnaire (BSQ-34), the Eating Attitudes Test (EAT-26), and the Eating Disorder Examination (EDE-Q 6.0). Results suggested that biased RT priming effects for eating disorder related word pairs were strongly associated with measures of body dissatisfaction and ED symptomology. Specifically, scales targeting eating disordered cognitions (the BSQ-34 and the Shape/Weight Concern subscales of the EDE-Q 6.0) demonstrated the strongest association with implicit interpretation biases as assessed by performance on the semantic priming task.

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1. Introduction

Etiological models of eating disorders (EDs) propose that cognitive biases towards food and body shape information are central in manifesting and maintaining anorexia and bulimia nervosa (Williamson, Muller, Reas, & Thaw, 1999). Such biases present as selective attention and enhanced recall for body and food related information (Dobson & Dozois, 2004). Specifically, individuals suffering from anorexia nervosa demonstrate biased attention towards body-related words, while those with bulimia nervosa show an attention bias towards food-related words.

Investigations of subclinical ED populations have yielded mixed results. Some studies have found an association between high drive for thinness and a bias towards food words (e.g., Rodgers & DuBois, 2016), while others have failed to find any attentional biases towards food and shape words in similar population samples (e.g., Ben-Tovim, Walker, Fok, & Yap, 1989). Attentional biases in subclinical populations may also be influenced by priming where participants show greater attentional biases towards appearance words when primed with body-related stimuli (Labarge, Cash, & Brown, 1998). With respect to dietary restraint, Tapper, Pothos, Fadardi, and Ziori (2008) found that individuals high in restraint showed a bias towards shape- and food-related words, whereas Braet and Crombez (2003) and Jansen, Huygens, and Tenney (1998) did not replicate this pattern of results. A lexical decision study by Cassin, von Ranson, and Whiteford (2008) did not find evidence for biased attention or enhanced memory for body- and appearance-related words in women with high thin-ideal internalization.

The lack of consistent evidence for an attention bias in subclinical populations displaying ED traits suggests that the automatic diversion of attention towards food and/or body information may not be a consistent feature within this population. However, few studies have examined whether individuals, who show subclinical ED traits, demonstrate later-stage cognitive biases such as interpretation and semantic association biases. In attentional biases, the participants' attention is drawn preferentially towards specific stimuli at the early stages of processing. Interpretation biases, however, are present when the participant interprets ambiguous information in accordance with their cognitive schema (Rosser, Moss, & Rumsey, 2010). According to cognitive theory, increased body dissatisfaction should be associated with a greater propensity to interpret incoming information in a manner that is consistent with body self-schema (see Williamson, White, Yorke-Crowe, & Stewart, 2004 for a review). Recently, Martinelli, Holzinger, and Chasson (2015) used a Word Sentence Association Paradigm (WSAP) to investigate whether body dissatisfied females showed an interpretation bias for ambiguous sentences preceded by a negative
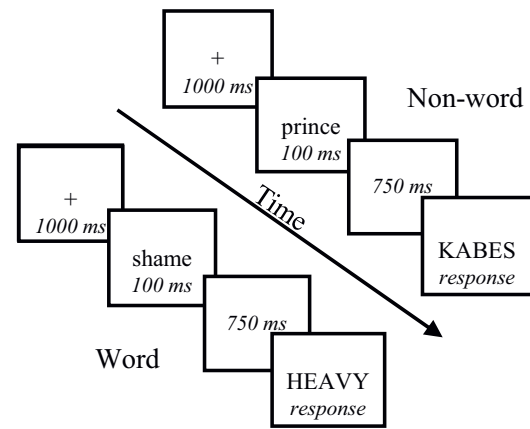
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prime[1] compared to sentences preceded by neutral primes.[2] The authors found that participants, who endorsed body dissatisfaction as well as dietary restraint, were more likely to endorse a relationship between negative prime words and ambiguous sentences. The results of this study provide evidence for a post-operative interpretation bias among nonclinical females reporting ED traits. Furthermore, the WSAP measures explicit interpretation biases, however this study suggests that an implicit interpretation bias may exist that operates independently of an attention bias. As outlined below, although implicit interpretation biases have been studied extensively in the depression and anxiety literature, they have yet to be investigated among individuals at risk for EDs.

In a seminal study of implicit interpretation biases in anxiety, Richards and French (1992) presented homographic words (i.e., words with two meanings) in a semantic priming paradigm. They demonstrated that individuals high in anxiety show increased implicit priming for the "threat" interpretation of homographs (e.g., arms-weapons) versus the non-threat meaning of homographs (e.g., arms-legs). Furthermore, a recent study found evidence that panic related interpretation biases in a subclinical sample were predictive of panic disorder onset, thus adding validity to the use of this paradigm in at-risk populations (Woud, Zhang, Becker, McNally, & Margraf, 2014).

The current study used a semantic priming paradigm to investigate implicit interpretation biases among a subclinical population demonstrating ED traits. Semantic priming occurs when a target word (e.g., cat) is preceded by a related prime (e.g., dog), resulting in a faster response time than when preceded by an unrelated word (Neely, 1991). The semantic priming paradigm offers certain advantages when compared to traditional paradigms used to investigate cognitive biases in EDs. Specifically, paradigms such as the Stroop task, lexical visual search tasks, and single unit lexical decision paradigms assess early attention mechanisms and automatic semantic activation. In ED populations, clinically relevant lexical nodes (e.g., the word "curvy") are activated more quickly as compared to control words, which reflects a schema-congruent bias in automatic activation (Williamson et al., 2004). However, these paradigms do not provide the information necessary to determine whether there is a negatively valenced semantic association made with the target lexical item (e.g., curvy-fat vs. curvy-sexy). That is, these paradigms do not assess how the lexical node is integrated within the individual's cognitive schema. This interpretation bias may be a crucial element in subclinical populations where the automated attention bias may not be fully developed, but at-risk individuals are nonetheless biased towards a negative interpretation towards food and body shape information.

The current study examined whether subclinical females, reporting ED traits, showed preferential activation of negatively valenced ED related interpretations of food and body shape words. ED traits were assessed using three self-report measures and implicit interpretation biases were measured using a lexical decision task. Based on recent results supporting the presence of explicit interpretation biases in a subclinical ED sample (Martinelli et al., 2015), we predicted that increased self-reported ED traits, and disturbances in body image in particular, would be associated with increases in implicit interpretation biases. Such findings would corroborate cognitive models of subclinical ED pathology and support a greater focus on interpretation biases, as opposed to attention biases, in subclinical samples.

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[1] For example, the negative prime word "fat" followed by "You walk into class and you notice two girls look at you and laugh."
[2] For example, the neutral prime word "satisfied" followed by "Your doctor tells you that you are at a healthy weight."

Fig. 1. Details of experimental procedure.
Schematic of the lexical decision task. The fixation point was presented for 1000 ms, followed by the prime word for 100 ms, a 750 ms pause, and finally the target, which remained on screen until a response was made.

2. Method

2.1. Participants

Participants included 118 female undergraduate students at the University of British Columbia—Okanagan, ages 18–25 who received course credit or a $10 honorarium for participation. All participants were native English speakers. Two participants were excluded due to lexical decision accuracy rates below 85%. One participant was excluded because she carried a formal diagnosis of anorexia nervosa at the time of testing, thus resulting in a final N of 115 participants. Mean age was 19.9 years ($SD = 1.47$) and mean body mass index (BMI) was 22.8 kg/m^2 ($SD = 3.3$).

2.2. Semantic priming task

RTs and accuracy were recorded while participants made lexical decisions (i.e., word vs. non-word judgments) to target words preceded by semantically related or unrelated primes. A total of 144 lexical pairs were presented, containing 72 real-word targets and 72 pronounceable non-word targets. Non-word targets were preceded by a random set of real-word primes (e.g., job-ODEAS; see Fig. 1). Of the 72 real word pairs, 24 targets were preceded by primes that were related to the ED interpretation of the target word (e.g., fat-PIZZA), 24 were preceded by primes that were associated with a non-ED interpretation of the target word (e.g., party-PIZZA), and 24 were preceded by primes that were semantically unrelated to the target word (e.g., umbrella-PIZZA). ED-related and non-ED-related word pairs were matched for semantic relatedness proportion using the University of South Florida Free Association Norms (Nelson, McEvoy, & Schreiber, 2004) and relatedness proportion values did not differ significantly ($p > .05$) between the two stimulus groups. Prime target pairs were counterbalanced across three conditions, therefore each participant saw each real-word target once, in one of the conditions listed above. Non-word target pairs were consistent across all three conditions. Stimuli were presented electronically using E-Prime 2.0 software (Psychology Software Tools, Pittsburgh, PA). Each trial consisted of a fixation point (1000 ms), followed by a prime word (100 ms) and a target word. Target words remained on the screen until a response was made. The stimulus onset asynchrony (SOA) between prime and target words was 750 ms (Fig. 1).