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Review article

Social learning theory and cognitive behavioral models of body dysmorphic disorder

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Abstract

Contemporary cognitive behavioral models of body dysmorphic disorder are reviewed, whereby the first by Neziroglu and colleagues emphasizes conditioning processes and relational frame theory and the latter by Veale emphasizes information processing. A brief review of the existing cognitive behavioral therapy research follows the presentation of the models. The majority of publications on BDD continue to deal with phenomenology and epidemiology, and much more research on cognitive behavioral treatment is needed. Treatment research should be geared towards testing elements of the models explicated in this article, and randomized controlled trials are greatly needed.

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Introduction

Cognitive behavioral theories explain the possible mechanisms involved in a disorder and at best why certain feelings and behaviors are maintained, but not necessarily how and why they develop. Theories for the development of body dysmorphic disorder (BDD) have been put forth by both Veale (Veale, 2004; Veale et al., 1996) and Neziroglu (Neziroglu, 2004; Neziroglu, Roberts, & Yaryura-Tobias, 2004). Although these two models are specific to BDD, they incorporate many of the elements of Cash's general cognitive social learning model of body image disturbance (2002, 2008). Cash's model discusses how historical factors (cultural socialization, interpersonal experiences, physical char-

acteristics, and personality attributes) lead to the development of body image perception and attitudes that elicit emotions and behaviors that are then maintained via negative reinforcement. Perception traditionally refers to body size or shape estimations while attitude refers to self-evaluations (i.e., body satisfaction) and investment (e.g., importance one places on appearance). The attitudes or schemas regarding one's appearance contribute to emotions, beliefs, and behaviors related to body dissatisfaction.

Neziroglu's model emphasizes evaluative and operant conditioning as well as the role of relational frames in developing BDD related beliefs. Veale's model emphasizes the role of imagery, attentional biases and effortful cognitive processes such as ruminating. At times, in order to explicate the models, it will be necessary to diverge and explain related phenomena such as relational frame theory since its application to disorders is relatively new and not well understood.

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A cognitive behavioral model based on classical (evaluative) and operant conditioning

Childhood operant conditioning

Early experiences which positively reinforce an individual for physical appearance may play an important role in BDD development. In clinical interviews with individuals with BDD, Neziroglu, Roberts, and Yaryura-Tobias, 2004 reported that for a significant portion of BDD individuals, appearance was one of, if not the most salient factor reinforced during their childhoods. These experiences may function to reinforce a sense that appearance is ultimately important to the exclusion of behavior (e.g., comments such as “Wow, you are the tallest kid on the team,” or, “You were wonderful on stage and you looked so good,” rather than, “You played the flute so well during the school concert”). Although not all BDD individuals were positively and/or intermittently reinforced for their overall general appearance, many were reinforced as children or adolescents for a particular body part, height, cuteness, poise, weight, and/or body shape. Often, individuals with BDD report being in the “attractive” crowd in school, early dating success, and other childhood and adolescent experiences where the importance of appearance is highlighted and exaggerated.

Early life experiences need not be positive to have an impact. BDD individuals report a significantly greater incidence of emotional and sexual abuse (Didie et al., 2006; Neziroglu, Khemlani-Patel, & Yaryura-Tobias, 2006a). Other kinds of trauma, such as car accidents resulting in scars or skin conditions (acne or psoriasis), are reported to result in unnecessary attention to appearance. Aversive early experiences (for example teasing, neglect, bullying) may condition the individual to the negative affect he/she may experience when observing body parts in later life (Cash, Winstead, & Janda, 1986; Osman, Cooper, Hackmann, & Veale, 2004; Rieves & Cash, 1996; Veale, 2004; Zimmerman & Mattia, 1999). Research has shown that peer teasing is positively correlated with body dissatisfaction even in elementary school children (Smolak, 2002). Cash et al. (1986) found that women and men who reported being teased or rejected by their peers for their appearance during childhood were more body dissatisfied as adults than non-teased controls. Similarly, Cash (1995) reported that teasing severity was highly correlated with a more negative body image. In adolescence, perception of overall physical appearance appears to be the most important factor in global self-esteem, especially in industrialized nations (Levine & Smolak,

2002). Experiences such as the ones mentioned above may build core beliefs regarding the value of attractiveness.

Social learning

Vicarious learning occurs by observing others being reinforced positively or negatively for a particular belief or behavior (Bandura, 1977). One can learn that physical attractiveness leads to rewards. This is perhaps most salient in the media and popular culture. It is difficult to find an unattractive lead female television or movie star. Recent reality shows capitalize on this entertainment theme: unattractive women must undergo a radical transformation in order to win her “prince charming.” In addition, children and adolescents are taught that physical attractiveness is necessary for success and are bombarded by advertisements for cosmetic products and surgery to achieve this goal.

Besides the individual's socio-cultural environment, one's immediate environment and family can provide numerous learning opportunities as well. This type of vicarious learning gives the individual further confirmation that appearance is an important trait valued in society. For example, Rieves and Cash (1996) found that there is an association between daughters' recollections of their mothers' earlier body image attitudes and the daughters' own current body image experiences. In addition, they found that sibling social comparisons were found to influence self-appraisal of appearance, whereby having a more attractive sibling may foster unfavorable self-evaluations, and a less attractive sibling may enhance self-appraisals of appearance. It appears, however, that direct comments about body, weight, and eating are stronger sources of parental influence than parental modeling (Levine & Smolak, 2002). How do the above mentioned factors contribute the development of BDD?

Symptom development through classical and evaluative conditioning

Evaluative conditioning is similar to classical (Pavlovian) conditioning with the latter referring to conditioning of physiological responses and the former to conditioning of liking or disliking a stimulus or stimuli. They are very similar although the usage of language that is unique to humans allows for some differences. It is not within the scope of this paper to discuss similarities and dissimilarities between the two. For a review, see De Houwer, Thomas, and Baeyens (2001). For the most part, the two have been used

interchangeably in the psychological literature with the term classical conditioning used more often.

BDD might begin with classically or evaluatively conditioned experiences. Aversive events involving one's physical appearance, such as being teased, abused, or reaching puberty earlier may serve as unconditioned stimuli (UCS) since they cause an unconditioned emotional response (UCR) such as anxiety, depression, disgust, or shame. The UCS can cause an aversive reaction and then when paired with a neutral stimulus (CS) elicit the same reaction. In other words, the teasing, abuse, and so forth, becomes associated with a word or body part (an aversive stimulus; CS) that is then also evaluated as negative. Therefore, both the UCS and CS evoke emotions such as anxiety, disgust, and so forth.

The following is an illustration of classical or evaluative conditioning. You are teased about your big head (UCS) and you feel ashamed (UCR) and thereafter you dislike or feel ashamed (CR) of anything you associate with your head such as your hairline (CS: evaluative conditioning). Because the teasing is evaluated to be aversive, all paired associations are also deemed to be aversive. In other words, your hairline (CS) is associated with teasing of the head (UCS) and both take on a negative valence and elicit the same response of shame (CR).

It can be hypothesized that (1) a biological predisposition, (2) early childhood reinforcement history, and (3) vicarious learning are necessary prerequisites for the development of BDD. These factors may cause a particular individual to have an increased sensitivity to this type of classical or evaluative conditioning event, since many individuals experience body-focused negative life events and do not develop a body image disorder. A diathesis-stress model is important in explaining the predisposition of some but not all individuals under these circumstances.

Information processing/development of belief system based on relational frame theory

Classical conditioning in humans is radically different than it is for all other animals because of our ability to think and verbalize our thoughts. We will briefly explain this difference in order to explicate how BDD individuals develop certain cognitions and emotions. We explained above how BDD individuals could develop certain aversive reactions to appearance through conditioning. We further propose that role language plays a significant role within this conditioning paradigm. Understanding this role requires that we first explain the development of relational frames and

relational frame theory (Hayes, Strosahl, & Wilson, 1999).

Bi-directional stimulus relations

Only for humans, does a word and the actual item or event enter into a bi-directional stimulus relation wherein each can equally stand for the other. For example, the word “cookie” and the actual cookie are equal for humans because of our ability to use language. We do not need to see the cookie in order to anticipate getting a cookie. Simply hearing the word “cookie” is a powerful enough stimulus, as the word and the food are equally powerful reinforcers.

Animals require a direct experience with an object for learning to occur; they learn about events that predict the onset of something (e.g., Show a cookie, say “cookie” and dog salivates). However, a human child can learn that touching a hot stove will burn without having direct experience with a hot stove. Our ability to use language allows us to learn about things even if we have never experienced the particular events.

In addition, for animals, the order in which the word “cookie” is said and the presentation of the actual cookie is important. The word “cookie” has to be said before the cookie in order for the animal to learn that the word and the actual object are the same. In humans, however, the word “cookie” could be said either before or after the child eats the cookie. We can then also teach a child that a cookie is similar to a muffin and eventually both words, cookie and muffin, will elicit the thought of a cookie and muffin even though the child has never seen a muffin. Humans can learn after the fact; in other words, they are taught once an event has occurred whereas other animals need to have the event precede the onset of the response. This bi-directionality is the most important defining feature of human language and cognition and explains why evaluative conditioning can occur and why arbitrary associations can be made.

Relational frames

Another important feature of human language and cognition involves the emergence of complex networks of related events. The ability to think relationally allows us not only to make predictions, similar to other animals via classical conditioning, but allows our mind to generate various other relations. Relational responding is established during early language training by teaching relational frames. We learn that things that are “similar.” We learn temporal and causal relations – “before and after” and “if/then.” We learn comparative and evaluative relations – “better than” and “bigger than.” Relational frame theory seeks to explain the

generative nature of language and cognitions. It draws from both classical and operant conditioning to explain various thoughts and emotions.

Language assists classical conditioning by stimulating complex networks of associated ideas, images, and evaluations. For example, a child could learn that having a pimple (UCS) is associated with disgust (UCR), and later any blemish (CS) elicits disgust (CR). The word pimple is similar to blemish, acne, bumps on face, or unsmooth face, and thus those similar words alone can elicit the same aversive affect (i.e., classical conditioning via the relational frame of coordination or similarity). Words that connote similar concepts conjure up similar thoughts. This is why a BDD individual may respond with aversive affect to any event or word that reminds him/her of a similar situation. For example, if he/she has a disgust reaction at one point to a pimple, anything similar to it may elicit the same reaction by thinking about it, even if it no longer exists. If one had been teased about his/her big head, then the word “big” could have an aversive feeling. Likewise, any similar associated body part (hairline/hair) could elicit the same response.

Arbitrary and non-arbitrary connections

Relational frame theory (Hayes, Barnes-Holmes, & Roche, 2001) would also suggest that as human beings, language enables us to make arbitrary and non-arbitrary connections among events and therefore develop certain beliefs based on these associations. In other words, due to language we think about the future, make plans, and we are able to evaluate and compare outcomes. Relational frame theory suggests that as human beings we use language as a way of making connections that may or may not be factual. Furthermore, as these associations are often communicated rather than experienced directly, faulty associations are rarely tested and thus not likely to be extinguished. For example, many people avoid consumption of raw eggs due to early instructions to do so, despite the low risk of salmonella infection today through this source. This habit of avoidance persists because of verbally imposed negative reinforcement. It is not difficult to see how pathological habits may develop in a predisposed individual, when health is attributed to the continued and excessive practice of similar rules. Perhaps in the case of BDD, persons make arbitrary associations between appearance, social success, and/or undesirable human traits. For example, a child may hear a parent make a comment about someone who is difficult to invite over to the house because she is a finicky eater. However, at the same time the parents may comment

that this child is so cute and pretty and it is a shame she is so difficult at meal times. The child may learn that people will put up with unpleasantness (finicky eating behavior) when the person is pretty. The child may in fact start comparing herself with her friend to see if she is just as pretty or prettier in order for people to accept her as well.

In addition to having language and cognitions elicit emotions, thoughts can take on meaning. For example, if you think of swallowing you may have a neutral response, but if you think of spitting and saving your saliva and swallowing it later, you may have a disgust reaction. This demonstrates that through language, we make arbitrary associations and have certain emotional responses to those thoughts. As early as 22–27 months, human children are able to understand the complex interrelationships among events even if they are not specifically taught each relationship (Lipkens, Hayes, & Hayes, 1993). As soon as we are able to think, we arbitrarily *relate* events that may occur together or events that we associate with past events. Therefore, there may be either direct conditioning of the CS and UCS or conditioning via the mediation of language. As the CS is paired with the CR, a set of cognitions are strengthened. Information is processed at this time, and a set of beliefs initially introduced through early life experiences continues to be reinforced. These beliefs may center on thoughts such as, “if I am attractive I will be more likely to obtain what I want,” “being attractive is the most important thing in the world,” “I need to be noticed,” “life is not worth living unless I am attractive,” and so forth. It is also during this time that attention is drawn to the perceived defective body part. Selective attention to the defective part leads to more focus on the defect and thus a strengthening of the conditioning process.

Information processing research in BDD

Recent research suggests that individuals with BDD perceive, process, and recall information in their immediate environment in biased ways. BDD researchers have suggested that this predisposition may play a further role in how early life experiences are processed and stored, contributing to the development and maintenance of BDD (Buhlmann & Wilhelm, 2004). Studies have found that individuals with BDD over-focus on details rather than global image (Deckersbach, Savage, & Phillips, 2000), selectively attend to emotional stimuli, especially BDD-related words (Buhlmann, McNally, Wilhelm, & Florin, 2002), and interpret ambiguous social, general, and BDD-related

situations as threatening as compared to individuals with OCD or other controls (Buhlmann, Wilhelm, & McNally, 2002). Furthermore, BDD individuals may also have difficulty identifying emotional expressions of other individuals (Buhlmann, McNally, Etoff, Tuschen-Caffier, & Wilhelm, 2004), and rate more expressions as contemptuous in self-referent situations (when they imagine themselves in the scenario) (Buhlmann & Wilhelm, 2004) and thus believe others are looking at them in a disapproving manner (ideational reference).

Higher-order conditioning

It is through higher-order conditioning that we can explain how multiple body parts may become foci of concern. BDD symptoms secondary to the patient's primary concern may be accounted for by such conditioning. The patient observes himself in the mirror and believes that the shape of his ears causes him to look disgusting. Then, he turns his attention to his hairline around his ears and – not surprisingly – continues to feel disgust. From this point forward, he may experience disgust when examining this area of his hairline. If such phenomena occur due to higher-order conditioning, it follows that these secondary concerns would be of secondary importance to the patient, in that higher-order conditioned stimuli produce less of a conditioned response than lower-ordered conditioned stimuli. In fact it is quite common for individuals with BDD to be preoccupied with more than one body part. Research has found that individuals are typically dissatisfied with up to three body parts, with one usually causing the most distress (Khemlani-Patel, 2001; Neziroglu, Khemlani-Patel, & Yaryura-Tobias, 2006b).

Higher-order conditioning may be direct or occur through relational framing. For example, initially a child is taught to see an object, then hear its name, and then say its name. Later the child can hear the name and point to the object. Once the object-word and word-object relation is explicitly trained (relational training) then derived relational responding emerges. If a child is taught “These are your nose, mouth, and ear,” then the child can identify the facial part when asked “Where is your nose, mouth, and ear?” even in the absence of differential reinforcement for doing so. This derived, arbitrarily applicable relation is referred to as “relational frame” and it is brought under the control of contextual cues through a process of differential reinforcement. After the history of reinforcement, a derived relation emerges without reinforcement; as human beings we can generalize to novel situations without direct reinforce-

ment of these situations by using what we have learned in the past. Thus, if a person has a disgust reaction to pimples and then equates pimples with blemishes, elevations on the skin, or redness or any other arbitrary relation, then new facial abnormalities can elicit the same response. This is similar to higher-order conditioning whereby the CS is paired with another CS and thus evokes the same response.

Maintenance of symptoms through operant conditioning

BDD is maintained via operant conditioning principles, specifically negative reinforcement, whereby aversive emotions are reduced or prevented by avoidance and safety seeking behaviors (e.g., checking, camouflaging). Cash (2002, 2008) refers to these avoidance behaviors as self-regulatory processes that function as a coping mechanism to avoid, escape, or manage body image discomfort, and these evasive actions are maintained via negative reinforcement. BDD patients may engage in behaviors such as camouflaging, reassurance seeking, mirror checking or avoiding, excessive grooming, and avoidance of social or public situations in an attempt to reduce disgust, anxiety, or negative feelings in general.

At times the individual may like the way he/she looks. In the case of mirror checking, the occasional, random positive feedback he/she receives from looking in the mirror results in encouraging the patient to continue mirror checking. Intermittent reinforcement is more resistant to extinction, meaning that if individuals remember occasionally checking the mirror and liking what they see in the past, they may continue to engage in mirror checking for a long time even though they infrequently get good results.

In addition to these compulsive behaviors, individuals with BDD compulsively compare their specific body parts with those of others, often concluding that they are less attractive. Theories of social comparison (Festinger, 1954) or social ranking (Allan & Gilbert, 1995) have been applied to body dissatisfaction. Thompson and colleagues (Heinberg & Thompson, 1992; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999; Thompson, Reed, Brannick, & Sacco, 1991) suggest that higher levels of comparison are associated with more body dissatisfaction, particularly if comparison is made to target persons who are considered more attractive. Heinberg and Thompson (1992) described this as “upward” (as opposed to “downward”) comparison comparing self to targets considered more attractive, and “particularistic” comparison (as

opposed to “universalistic”), comparing self on the basis of specific factors such as age, gender, and specific body features of the target. Cash (2008) used the term “unfair to compare” to describe a cognitive error involving biased appearance comparison, in which people selectively compare themselves to people whom they regard as being more attractive. The role of social comparison has not been studied in BDD specifically. However, we can apply the principles of relational frame theory and hypothesize that individuals with BDD have a relational learning history whereby comparative and evaluative frames have been classically conditioned.

In conclusion, the behavioral model of BDD developed by Neziroglu and colleagues suggests that a biological predisposition paired with early learning experiences (through both direct reinforcement of attractiveness as well as social learning) make individuals vulnerable to classical and evaluative conditioning experiences which can lead to BDD symptomatology. Also, relational frame theory may help us explain how certain thoughts elicit certain emotions and behaviors via relational responding. Some pairings are arbitrary and not clearly identified; it is a matter of how events are associated based on the learning experience of the person. BDD behaviors are maintained via negative reinforcement.

Cognitive behavioral model of BDD based on information processing

Although we have touched upon how some aspects of how BDD is maintained and the role of social comparisons and avoidance behaviors, now we will further explicate them. We will especially expand upon the factors involved in BDD's maintenance. In addition, we will consider the view of oneself as an aesthetic object and how this view leads to effortful cognitive processes such as ruminating, social comparing and self-attacking.

Veale (2004) had extensively discussed the view of oneself as an aesthetic object and the importance of external representations triggering negative appraisal of one's body image and then negative affect and rumination. In this regard, BDD has some links to the social phobia literature (Hackmann, 1998) where the emphasis is on perceived negative appraisals of others.

The self as an aesthetic object

Veale (2004) hypothesized that external events or an intrusive thought activate a distorted mental image. The

process of self-focused attention increases the awareness of the image and specific features within the image. Individuals with BDD view themselves as an aesthetic object and thus various external events (e.g., looking in a mirror or seeing a picture of one's self) or an intrusive thought (e.g., “Why is my nose too crooked?”) may trigger a process of self-focused attention. The *outcome* of this is the “self as an aesthetic object.”

The four main components of the self as an aesthetic object are: (a) mental imagery, (b) self-focused attention, (c) beliefs about the importance of self-focused attention, and (d) the lack of a self-serving bias.

Mental imagery

The outcome of self-focused attention is that individuals with BDD experience mental imagery or a “felt” impression of how they appear to others from an observer perspective (Osman, Cooper, Hackmann, & Veale, 2004). When individuals are asked to draw a picture of an impression of how they look to others, they are attempting to reproduce their mental imagery or “felt impression.” This is regarded as central to the experience of BDD as it drives the subsequent appraisals and response. Individuals with BDD and social phobia may use the observer perspective partly to distance themselves from and avoid emotion associated with negative evaluative experiences by others. The observer perspective may therefore become a maintaining factor through continued avoidance of emotion.

Self-focused attention

When anxious, a person can be in one of two possible modes, an orienting (“fight”) mode or a defense (“flight”) mode (Mogg & Bradley, 1998). In the orienting mode, a person scans the environment for threats and may be more sensitive or hyper-vigilant to signals of danger. Thus, in BDD persons may be comparing their appearance with others to determine their social standing in relation to others. When a threat is imminent, such as being physically close to a person who is perceived as more attractive, BDD individuals are more likely to resort to a safety-seeking, protective behavior, such as camouflaging, avoiding eye contact, or escaping the situation. In this mode, attention may be directed towards the source of safety (e.g., an escape route) and avoiding the threat (e.g., being self-focused, keeping one's head down, and avoiding eye contact).

It is hypothesized that a person with BDD is excessively self-focused on aversive imagery and verbal associations, thus preventing accurate observations of other's reactions which prevent the disconfirmation of fears of negative evaluation. A person with BDD might

appear to lack social skills as a result of these biased social observations, which in turn may generate a negative reaction in others that the individual experiences as a negative reaction to their appearance rather than their behavior. When the individual is alone, there are usually difficulties in concentration because the attentional capacity may be taken over by the constructed image and negative appraisals of one's appearance. Often the individual is unable to process external information or feedback about his or her appearance. In less severe cases, there appears to be some attentional capacity to external information so that the image may be less stable and associated with doubts about how the person appears to others. In this case, the individual may feel driven by a need to know exactly how he or she looks. Such persons might be rewarded only with certainty while looking in a mirror and focusing on what they see (rather than an impression of how they look). However, the longer one looks in the mirror, the more self-focused he/she becomes, the worse he/she feels, and the more it reinforces his/her view of being ugly and defective. When there is no external reflection available, individuals seem to use their image or "felt impression" as an internal mirror and way of checking how they look. The unintended consequence is the creation of further doubt, preoccupation, and at times confusion about how their appearance might alter from day to day or hour to hour. Drawing from the model of social phobia (Clark et al., 1995), BDD individuals in social situations shift to being self-focused in order to monitor and check their appearance from their image. The presence of others (or indeed a reflective surface) will induce the process of appearance comparison and switching between their internal image and that of another face or their own reflection.

Meta-cognitions about self-focused attention

The beliefs about the process of self-focused attention are unexplored. Clinically, individuals with BDD report that their motivation for self-focused attention is to check on how they appear to others, similar to checking in a mirror. Thus, while their attention is directed towards safety, they are also monitoring how much of a threat they are in and mentally preparing for possible humiliation or rejection.

Self-serving bias

Another form of selective attention occurs when it is directed externally at one's representation in a picture or mirror. Individuals with BDD may then experience an increase in depth and "hyper-reality." They appear to

have lost their self-serving bias (or "rose tinted glasses") in self-judgments of attractiveness. Jansen, Smeets, Martijn, and Nederkoorn (2006) first identified this phenomenon in individuals with eating disorders. The body image of eating symptomatic participants and controls were compared with inter-subjective evaluations of their own and others' bodies. Both groups rated the headless bodies of eating symptomatic individuals as less attractive. Contrary to the eating symptomatic individuals, the control group rated their own bodies as more attractive than others had rated them. The study suggests that the problem in eating disorders is not a distorted body image but a lack of one—that is, the lack of a self-serving body image bias. This study has not yet been replicated in BDD. However, Lambrou (2006) found that BDD individuals were similar to art and design student controls and both groups were superior to non-art controls in their self-estimations of aesthetic proportions. They were able to switch attention to focus on a photo of self, another person, or a building and come to a "better" aesthetic judgment than non-art controls. In keeping with the view of the self as an aesthetic object, perhaps individuals with BDD are more accurate than distorted in their body image perceptions.

Negative appraisal of body image

Individuals with BDD appraise and aesthetically judge their body image negatively in a process of activating assumptions and values about the importance of appearance. In BDD, appearance has become over-identified with the self and at the center of a "personal domain" (Veale, 2002), similar to Cash's (2002, 2008; Cash, Melnyk, & Hrabosky, 2004) concept of appearance investment or schematicity. An idealized value occurs when one of the values develops into such overriding importance that it defines the "self" or identity of the individual or becomes the very center of a personal domain. The idealized value in BDD is usually the importance of appearance of certain features, but other values may include social acceptance, perfectionism, symmetry, or youth. Such values will reinforce processing of the self as an aesthetic object, and in social situations, as a social object (Clark et al., 1995). Without these idealized values, it might be possible to adapt to a body image in the way that some individuals with a disfigurement may accept themselves and become less self-conscious (Lansdown, Rumsey, Bradbury, Carr, & Partridge, 1997). What is not known is whether the importance of appearance and the assumptions about a defect have developed before or after the experience of mental imagery. In other words,

in the absence of mental imagery of appearing defective and believing it as truth, would the person hold such beliefs and assumptions? Alternatively, have such assumptions developed as a consequence of the mental imagery and will they subside once the person no longer views such imagery as truth or they are no longer preoccupied and distressed by such imagery?

Rumination and appearance comparison

A further vicious cycle in maintaining preoccupation and distress in BDD is the process of appearance comparison and rumination. The outcome of such processes tends to be further evaluations and appraisals.

Appearance comparison

As discussed above, individuals with BDD excessively compare their feature perceived as defective to others. Many patients report compulsively collecting magazine pictures, videotapes of particular media celebrities, or photographs of themselves at an earlier age in order to compare/contrast their appearance. Appearance comparison is a core factor in the development and maintenance of body image problems (Thompson et al., 1999) and is not specific to BDD.

In BDD, it is hypothesized that selective attention to mental imagery and specific features prevents individuals with BDD from obtaining a representative or accurate view of the appearance of others. This process is likely to contribute to excessive focus on overall and specific features of appearance, and the resultant mental imagery. These factors are proposed to maintain negative beliefs and exaggerated ideals relating to appearance (in terms of both self-evaluation and perceived evaluation by others), and exaggerated beliefs about the importance of overall appearance and specific features in terms of identity.

Rumination

Individuals with BDD use effortful cognitive strategies such as ruminating, worry, and self-attacking in response to thoughts. They are trying to solve the wrong problem by responding to intrusive thoughts and images and as a result maintain the preoccupation and distress. The ruminative process suggests a further feedback loop in which engagement and trying to solve the appraisals and evaluations of one's appearance further contribute to preoccupation and distress.

Emotion

Emotions in BDD are complex and will depend upon the appraisal of the situation and event and subsequent

behavior. The emotions include (a) internal shame (or self-disgust) when the individual compares and ranks his or her appearance as lower than others; (b) external shame and anticipatory social anxiety based on judgments about how others are likely to scrutinize, humiliate, or reject the individual; (c) depression and hopelessness at the individual's failure to reach his or her aesthetic standard; (d) anger and frustration at oneself for damaging one's appearance (e.g., "do it yourself" surgery, skin-picking) and others not understanding or agreeing with their concerns; and (e) guilt and shame at damaging one's appearance by oneself or through cosmetic surgery.

Avoidance and safety-seeking behaviors

Avoidance and safety-seeking behaviors in BDD are generally engaged in by the individual for various functions. These include avoiding thinking about a body part or feature, altering appearance, camouflaging, distracting attention away from a feature, reducing uncertainty or distress, and avoiding situations or activities that activate increasing self-consciousness and imagery. Thus, there is another negative feedback loop. Safety behaviors may briefly decrease distress or uncertainty but are counter-productive and increase self-consciousness, preoccupation and distress. Furthermore, safety behaviors (a) involve enormous mental effort and attention which means less capacity for external information, (b) often lead to further monitoring (e.g., mirror checking to determine if the camouflage is "working"), (c) may objectively make one's appearance worse (for e.g., skin-picking), and (d) increase attention by others to one's appearance (for e.g., a person hold ups his/her hand against the face).

All safety-seeking behaviors are a major maintenance factor in the preoccupation and distress of BDD, and much clinical creativity may be required to help individuals cease using safety behaviors. Similarly, individuals will require exposure to situations avoided without their safety behaviors and with maximum attention on tasks and the environment (rather than the self).

Summary

Many similarities exist between Neziroglu and Veale's models, and Cash's nondisorder-specific model. They emphasize the impact of early life experiences and social learning in the development of body image beliefs and attitudes. These include parental role modeling, interactions with peers and family, aversive

experiences such as teasing and bullying, and media influences. All models attempt to explain avoidance behaviors, negative emotions, and selective attentional biases. Perhaps the only divergent point between the BDD models is the emphasis placed by Neziroglu and colleagues on conditioning and social learning as being central in the development and maintenance of BDD, and it views the problem more from a field perspective. On the other hand, Veale and colleagues emphasize to a greater degree the importance of cognitive processing, imagery from an observer perspective, and the role of safety-seeking behaviors.

Cognitive behavioral treatment of BDD

Treatment research

The cognitive behavioral treatment research for BDD consists largely of case studies or case series investigating treatment efficacy with little control of treatment format, length, and inclusion/exclusion of medications (Neziroglu & Khemlani-Patel, 2002) and with few randomized controlled studies. Despite the lack of rigorous methodology, overall CBT seems to be an effective treatment modality. It is unclear whether either component alone is effective.

Some studies have attempted to investigate the differential effectiveness of the treatment techniques for BDD. It appears that cognitive therapy alone (Geremia & Neziroglu, 2001) has positive results, as does exposure and response prevention (ERP) alone without the addition of other techniques (Campisi, 1995). Studies comparing ERP alone to a combination of ERP and cognitive therapy found that both therapy formats resulted in significant gains in BDD symptoms, anxiety, and depression with no significant differences between the groups (Khemlani-Patel, 2001). Another case series of five patients with BDD were treated with cognitive and behavioral therapy in a crossover trial indicated that behavioral therapy was more effective in reducing symptoms as compared to cognitive therapy (O'Grady, 2002). Group CBT also seems to hold promise, with patients improving on BDD symptom measures (Rosen, Reiter, & Orosan, 1995; Wilhelm, Otto, Lohr, & Deckersbach, 1999). A recent meta-analytic study found that CBT and serotonergic reuptake inhibitors improve BDD symptoms and decrease depression with modest effect sizes (Williams, Hadjistavropoulos, & Sharpe, 2006). Psychological treatments had higher effect sizes than medication, with no differences between CBT and behavioral therapy alone. Beyond the BDD treatment literature, a review of CBT for body image dissatisfaction

found that stand alone CBT is successful in improving various facets of body image and associated psychosocial functioning (e.g., self-esteem and social anxiety) (Jarry & Berardi, 2004). A meta-analysis of stand-alone CBT for body image dissatisfaction (Jarry & Ip, 2005) found that CBT is an effective treatment but produces the weakest effects for body image investment, which is particularly crucial for BDD since patients tend to be highly appearance invested (Hrabosky et al., 2008).

Many published articles have alluded to the difficulty in treating BDD. Spontaneous remission rates are extremely low (Phillips, Pagano, Menard, & Stout, 2006) and quality of life does not seem to improve post-treatment (Khemlani-Patel, 2001; Phillips, Menard, Fay, & Pagano, 2005), suggesting that treatment strategies should continue to be investigated. In fact, in a recent study (Hrabosky et al., 2008) patients with BDD, as compared to anorexics, bulimics, and clinical controls, reported exhibited greater body image disturbance, more investment in their appearance for self-worth, and a more deleterious impact of body image on quality of life.

As the models above suggest, examining the role of early life experiences, early operant conditioning, modeling, and the role of language in the development of beliefs may enhance traditional CBT. Rather than directly challenging the existence of the perceived defect, individuals can be taught to modify the attentional biases, and to cease effortful cognitive processes such as ruminating, self-attacking, and comparing. Behavioral experiments are used to test predictions during exposure without rituals. Incorporating the role of imagery and self-focused attention, the link with early experiences, and the lack of a self-serving bias can also be valuable components. This type of dialogue can assist in the process of engagement and validating the experience of BDD. Second, when assessing individuals, more negative self-beliefs about the self can be accessed via imagery and from earlier memories than via verbal techniques (Osman et al., 2004). There are a number of strategies for modifying the meaning of the image by historical reviews or re-scripting an image especially for teasing, bullying, and sexual trauma (Arntz & Weertman, 1999) or the beliefs about the imagery (Layden, Newman, Freeman, & Morse, 1993; Smucker, Dancu, Foa, & Niederee, 1995). Thus the strategy is to develop a different relationship with the image so that it is no longer regarded as truth but just a "picture in one's mind" that was constructed over time. This strategy is reflected in Cash's (2008) mindfulness and acceptance approach to body image CBT.

It may also be helpful to train individuals with BDD to increase the degree of attention away from self-referent information towards tasks or towards the environment. This strategy has been described for social anxiety (Bogels, Mulkens, & De Jong, 1997; Wild, Hackmann, & Clark, in press) and health anxiety (Wells, 1990). The principle of increasing attention on a task such as shaving or combing one's hair can also be applied to mirror retraining (Veale & Riley, 2001) or routine activities such as walking down a street and becoming more aware of the environment from a field perspective.

Given the potential arbitrary associations occurring in BDD, the incorporation of acceptance and commitment therapy (ACT) into the CBT protocol may teach individuals to recognize that language and cognitions cause us to formulate arbitrary relations and experience pain even without external stimuli. We can spontaneously think about being teased and feel upset even if we are out enjoying ourselves on vacation. A discussion of how ACT is derived from relational frame theory is beyond the scope of this article (see Eifert & Forsyth, 2005), but it is suffice to say that language may perpetuate our suffering. ACT focuses on a contextual functional analysis, acceptance rather than avoidance of aversive experiences, and diffusion from language. The aim is to act in personally valued directions and not according to the idealized value placed on appearance.

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