Chapter 13
Looming Vulnerability in Obsessive Compulsive Disorder

Stephanie E. Cassin, Neil A. Rector, and John H. Riskind

Obsessive Compulsive Disorder: Description and Subtypes

Obsessive compulsive disorder (OCD) is characterized by the presence of recurrent *obsessions* and/or *compulsions* that are time consuming (i.e., occupy more than 1 h per day) and cause marked distress and/or functional impairment (i.e., interfere with daily routine or academic, occupational, or social functioning). Obsessions are persistent thoughts, ideas, and/or images that are regarded by the person as intrusive and/or inappropriate. Common obsessions include thoughts or images regarding germs and contamination, thoughts or impulses that are sexual or aggressive in nature, concerns regarding symmetry or exactness, worries about throwing things away, and concerns over somatic and religious matters (Abramowitz, Franklin, Schwartz, & Furr, 2003). Compulsions are ritualistic behaviors or covert mental acts that are performed to neutralize the anxiety caused by obsessions or to prevent a feared event (American Psychiatric Association, 2013). Common compulsions include cleaning, washing, checking, repeating, ordering, hoarding, counting, and praying (Abramowitz et al., 2003). Reassurance seeking is another compulsion that is observed clinically, but under-researched. Compulsions are either not connected in a rational way with the obsession they are designed to neutralize or they are clearly excessive. For instance, an individual who is consistently worried about germs might shower for 2 h and wash his or her hands 50 times each day to

S. E. Cassin
Department of Psychology, Ryerson University, Toronto, ON, Canada

Department of Psychiatry, University of Toronto, Toronto, ON, Canada

N. A. Rector
Department of Psychiatry, University of Toronto, Toronto, ON, Canada

J. H. Riskind (✉)
Department of Psychology, George Mason University, Fairfax, VI, USA
e-mail: jriskind@gmu.edu

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eliminate potential contaminants. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013), the content of the obsessions or compulsions cannot be confined to symptoms of another disorder (e.g., an anxiety disorder such as GAD, preoccupation with food as in eating disorders, preoccupation with drugs as in substance use disorders, preoccupation with serious illness as in hypochondriasis, preoccupation with sexual urges or fantasies as in paraphilias, concern with appearance as in body dysmorphic disorder, or ruminative thinking as in major depressive disorder). The DSM-5 no longer characterizes OCD as an anxiety disorder, despite its significant anxiety features. However, epidemiologic surveys suggest that the majority of individuals with OCD also meet full diagnostic criteria for an additional psychological disorder at the time of their assessment, most commonly a comorbid anxiety disorder (76%) or a depressive or bipolar disorder (63%) (APA, 2013).

There has been growing empirical support for the presence of symptom subgroups within the umbrella diagnosis of OCD. Following from the early distinction between "washers" and "checkers" based on clinical observation (Lewis & Mapother, 1941), a number of studies have employed multivariate statistical strategies to establish subtypes on the basis of manifest symptoms. A number of studies have examined the structural characteristics of extensive collections of OCD symptoms. Although studies have reported three to seven factor solutions, a four-factor model is the most consistently identified (reviewed by Mataix-Cols et al., 2004) and supported by meta-analyses (e.g., Bloch, Landeros-Weisenberger, Rosario, Pittenger, & Leckman, 2008) resulting in the following factors: (1) contamination obsessions and cleaning compulsions; (2) repugnant/harm obsessions (i.e., sexual, religious, harm-related, somatic) and checking compulsions; (3) symmetry obsessions and repeating, counting, and ordering compulsions; and (4) hoarding obsessions and compulsions although the latter is now conceptualized as Hoarding Disorder (APA, 2013). This model applies across all OCD age groups (Stewart et al., 2008). These dimensions may be present in differing degrees and combinations in any one individual and appear to be relatively stable over time. Of these subtypes, fearful thoughts and images regarding contamination appear to be the most common obsessional theme across numerous cultures (Khanna & Channabasavanna, 1988), as well as the most widely researched (Ball, Baer, & Otto, 1996).

Obsessive compulsive disorder affects 1–3% of the population (Torres et al., 2006), and the prevalence is fairly similar across cultures (Weissman, Bland, Canino, & Greewald, 1994) and genders (APA, 2013). It can become a chronic and debilitating disorder associated with severe impairments in academic, occupational, social, and family functioning (Piacentini & Bergman, 2000). With respect to academic and occupational functioning, individuals with OCD tend to have lower rates of employment, earn lower wages, have higher absenteeism, have lower levels of educational attainment, and have greater reliance on welfare payments, relative to those with anxiety disorders and those without mental health disorders (Knapp, Henderson, & Patel, 2003).

Psychological Models of Obsessive Compulsive Disorder

Behavioral Models of OCD

The origins of behavioral models of OCD derive largely from Mowrer's two-stage model of fear and avoidance behavior (Mowrer, 1939, 1960). Mowrer suggested that fear of stimuli, such as thoughts, images, or objects, were acquired through a classical conditioning process. According to the first stage of Mowrer's model, neutral stimuli, such as thoughts and images, become conditioned stimuli through pairing with an unconditioned stimulus that naturally provokes fear. As theorized, a traumatic event should represent the catalyst for the activation of obsessive compulsive symptoms. For example, an individual might develop contamination obsessions following a serious illness or doubting obsessions following a house fire.

According to the second stage of Mowrer's (1960) model, fear is maintained though operant conditioning processes, notably escape and avoidance behaviors. Learning theory frameworks were extended to account for the range of compulsive rituals observed in OCD. Compulsions were conceptualized as active avoidance strategies that are negatively reinforced and become habitual given their success in reducing the fear caused by the arrival of the obsession and the prevention of extinction (Dollard & Miller, 1950). For example, an individual with contamination obsessions might engage in excessive hand washing compulsions, avoid using public restrooms, and exit a room if another person is observed coughing or sneezing in order to reduce the chance of contamination. An individual with doubting obsessions might check the door locks, stove, and other appliances several times before leaving the house to ensure safety. This hypothesized functional relationship between obsessions causing distress and compulsive, escape, and avoidance behaviors reducing obsessional distress is so widely accepted that it is built into the modern nosologic description of the disorder (APA, 2013).

Beyond classical overt compulsions (such as washing and checking), a broader range of operant conditioning factors have been implicated in the maintenance of OCD. For instance, "safety behaviors," a term referring to a variety of overt or covert strategies that are typically more subtle than compulsions, are often used to avoid or escape a feared outcome (Deacon & Maack, 2008; Salkovskis, 1991). Using a sleeve to open a restroom door or carrying anti-bacterial hand sanitizer are two examples of safety behaviors that might be used by an individual with contamination fears. Similar to compulsions, safety behaviors are negatively reinforced by effectively reducing anxiety in the short term. They have been implicated in the maintenance, and perhaps even exacerbation, of OCD symptoms because they focus attention on feared stimuli and may be used to justify the non-occurrence of a catastrophe (Deacon & Maack, 2008; Salkovskis, 1991). Much research supports the role of operant conditioning in the maintenance of OCD; however, behavioral models have been challenged because there is relatively little prospective evidence to support the role of traumatic conditioning in the onset of OCD (e.g., Emmelkamp, 1982; Mineka & Zinbarg, 2006).

Cognitive Models of OCD

A number of cognitive models have been proposed to explain why some people are more vulnerable than others to developing OCD. Obsessions are experienced by 84% of the population, yet only a small fraction of individuals who experience obsessions actually meet the diagnostic criteria for OCD (Rachman & de Silva, 1978). The content of obsessions experienced by non-clinical individuals is similar to those experienced by individuals with OCD (Rachman & de Silva, 1978; Salkovskis & Harrison, 1984). For example, non-clinical individuals experience obsessive impulses to jump or push someone in front of the subway, violently punish a person or animal, disrupt peace in a gathering, harm small children or the elderly, say inappropriate things, or crash their car when driving. They may also have unwanted thoughts about accidents occurring to loved ones or about something being wrong with their health. Those individuals who meet the diagnostic criteria for OCD tend to experience their obsessions as less acceptable and more difficult to dismiss (e.g., Rachman & de Silva, 1978).

Early cognitive appraisal theories of OCD emphasized the impact of static threat appraisals on anxiety, such as overestimating the probability and cost of potential harm (Carr, 1974). In addition to faulty primary threat appraisals, which involve overestimating the probability and consequences of threat, individuals with OCD were also thought to make faulty secondary appraisals in which they underestimate their ability to effectively cope with the threat (McFall & Wollersheim, 1979). These early models were criticized for failing to specify how the threat appraisals in OCD differed from the threat appraisals found in other anxiety disorders (Salkovskis, 1985). That is, although these early cognitive appraisal theories would suggest that individuals with OCD make distorted appraisals regarding the likelihood of occurrence of contamination, the imminence of contamination, and their lack of control over contamination, they did not explain why some individuals were more prone to making distorted appraisals than others (Beck & Emery, 1985; Carr, 1974).

The contemporary cognitive-behavioral models of OCD that followed assumed that distress is mainly influenced by the way an individual appraises obsessive thoughts, images, and/or impulses, as opposed to by the content of the obsessions (Clark, 2004; Clark & Beck, 2010; Frost & Steketee, 2002; Rachman, 1993; Salkovskis, 1999). However, the models differed from one another with respect to the specific cognitive constructs that were emphasized in the etiology of OCD.

Rachman's Misinterpretation of Significance Theory. Rachman (1971, 1997, 1998) noted that the content of many obsessions reflect immoral themes of aggression, sex, and blasphemy. He proposed that individuals with OCD tend to make catastrophic misinterpretations of their negative automatic thoughts. For instance, they might believe that the intrusive thoughts are personally meaningful and reveal one's true character, and that they provide warning that negative events are about to occur or that one is about to lose control. For example, individuals with OCD might believe that if they have a sexual thought about their child, then it must mean that they are sexually deviant, dangerous, and at risk of actually harming their child.

Rachman (1998) proposed that individuals vulnerable to OCD possess preexisting beliefs that having an unacceptable thought increases the likelihood of the negative event featured in the thought occurring, or that having a morally repulsive thought is the moral equivalent of committing the act featured in the thought. These cognitive biases have been labeled "thought-action fusion" (TAF).

Salkovskis' Inflated Responsibility Theory. Salkovskis' (1985, 1989) model assumes that individuals with OCD appraise obsessional thoughts negatively due to deeper level core beliefs regarding personal responsibility for preventing harm to oneself or others. In an attempt to avoid being responsible for aversive events, individuals with OCD engage in a variety of neutralizing activities including performing rituals designed to prevent harm, seeking reassurance that harm has not occurred, or diffusing responsibility by communicating the potential for harm to others. They also begin to avoid stimuli that activate these obsessive thoughts. This avoidance may also take the form of thought suppression whereby effortful strategies are employed to control obsessions. Neutralizing activities, avoidance, and thought suppression are negatively reinforced because they temporarily reduce anxiety. However, they also serve to perpetuate the obsessions over time.

Clark's Meta-Cognitive Model. In Clark's meta-cognitive model (Clark, 2004), it is assumed that individuals with intrusive thoughts arrive at OCD because of mistaken meta-beliefs that they should be able to control such thoughts. The greater the extent that such individuals attempt to exert such control, the greater sense of their failure and the more they exacerbate their problems because they respond with greater attempts at thought control.

Obsessive Compulsive Cognitions Working Group. The Obsessive Compulsive Cognitions Working Group (OCCWG) was assembled to identify distorted beliefs that are relevant to OCD. Elaborating on Salkovskis' inflated responsibility theory, the OCCWG identified five additional categories of beliefs that are particularly relevant to OCD, including exaggerated appraisals of threat, perfectionism, intolerance of uncertainty, over-importance of thoughts, and need to control thoughts (OCCWG, 1997, 2001, 2003, 2005). Individuals with OCD have been shown to score higher than community and student controls on all of these belief domains, as assessed by the Obsessive Beliefs Questionnaire, and higher than non-OCD anxious controls on all belief domains with the exception of perfectionism and intolerance of uncertainty (OCCWG, 2005).

Other Research on Cognitive Factors. Other studies have found evidence that OCD is characterized by perfectionism, self-ambivalence, and sensitive self-domains (Bhar & Kyrios, 2007). Bhar and Kyrios found evidence that self-ambivalence was related to OCD symptoms, perfectionistic beliefs, and beliefs about the need for thought control. The more perfectionistic that the individual's self-standards are, the greater the discrepancy will be when an odd or inappropriate thought occurs, and the less confidently one can dismiss negative self-inferences about the meaning of such discrepancies. In a study comparing how OCD patients and non-clinical individuals attempt to control unwanted thoughts, self-punishment was higher in patients and showed the largest between-group discrepancy of the strategies examined (Amir, Cashman, & Foa, 1997). These findings imply that

individuals with OCD may be particularly self-judgmental when faced with apparent threats to their self-perception of morality.

Cognitive models focusing on the role of obsessive beliefs and catastrophic misappraisals have led to important advances in the conceptualization and treatment of OCD. However, given the heterogeneous nature of OCD, it is unlikely that one particular category of obsessive beliefs will account for all OCD symptom subtypes. Rather, there is growing consensus that appraisals might differ substantially across OCD subtypes, and that different models might be needed to account for the etiology and phenomenology of different subtypes (Purdon, 2009). For example, erroneous appraisals regarding the probability and severity of adverse consequences (e.g., diseases) appear to be particularly relevant to contamination concerns (Dorfan & Woody, 2006). Furthermore, several studies have reported that approximately half of all individuals diagnosed with OCD do not endorse elevated obsessive beliefs (Calamari et al., 2006; Taylor et al., 2006), suggesting that examination of additional cognitive vulnerability factors is warranted to better account for the symptom, cognition, and behavioral aspects of OCD. Cognitive vulnerability factors that have been the focus of recent research include meta-cognition (Purdon & Clark, 1999; Wells, 1997), "not just right experiences" (Coles, Frost, Heimberg, & Rheaume, 2003: Sica, Caudel, Chiri, Ghisi, & Marchetti, 2012), distrust and fear of the self (Aardema, Moulding, Radomsky, Allamby, & Souki, 2013; Julien, O'Connor, & Aardema, 2007), and looming vulnerability. The remainder of this chapter will focus on the LVM of OCD.

With the above background, it can be highlighted that all of the models above implicitly assume some form of vulnerability to the approach of threat. The focus of the assumed threat varies across these different models—e.g., failure to control intrusive thoughts, the threat of irresponsibility, or threat of contamination—differs but a cognitive process of simulating the approaching occurrence of the threat would presumably be critical in all.

Obsessive Compulsive Disorder: Looming Vulnerability

Description of the LVM

Existing cognitive theories of OCD have focused predominantly on static cognitive content in a given moment, including OCD-relevant beliefs, and appraisals of the probability or imminence of threat, perceived control over the threat, and magnitude of catastrophe. As previously described, the LVM assumes a pattern of increasing probabilities or other threat values predicts more anxiety and fear than a pattern of static probabilities of threat values or of decreasing values (Hsee, Tu, Lu, & Ruan, 2014).

Moreover, even assuming that two different people perceive the same probability or proximity of an outcome in the same given moment, they can still differ markedly in whether they see that probability or proximity as continuing to rapidly rise, as

unchanging or constant, or rapidly decreasing. As described herein, research has indicated that threats that approach (or "loom") on a probability or proximity dimension produce more negative responses than those that have static values on these dimensions or that recede (Hsee et al., 2014).

The LVM also suggests that whereas a person tends to habituate to and find ways to cope with threats that are static or very slow to change, the person will tend to stay fearful of threats that are perceived or imagined to be continuously advancing and escalating in danger (Riskind, Abreu, Strauss, & Holt, 1997). In the case of OCD, for example, feared stimuli, such as germs, that are perceived as constant and predictable factors will evoke minimal fear, whereas germs and contaminants that are perceived or played out in the mind as rapidly spreading and growing will lead to heightened fear of potential contaminants and slower distress reduction (Dorfan & Woody, 2006; Riskind, 1997).

Dynamic perceptions of rapidly escalating threat also adversely impact an individual's ability to evaluate and select the most appropriate coping strategy. The net result is that the person selects maladaptive strategies, such as behavioral compulsions, mental rituals, and avoidant coping strategies that are often selected by individuals with OCD because they quickly and effectively reduce or prevent anxiety. As a result, a negative reinforcement pattern is established.

Importantly, the LVM assumes that each specific symptom subtype of OCD has its own specific looming themes. For example, the model posits that individuals with the contamination subtype of OCD mentally play out and generate dynamic expectations of potential contaminants as spreading and growing and escalating in danger, causing him to have a sense of looming vulnerability, and resulting in an excessive fear of contamination. The fear of spreading contamination in OCD has been previously described by Foa and Kozak (1986). While conducting exposure therapy with a client with a urine phobia, they noted that they were able to reduce the client's fear by having him imagine that he was able to "freeze" drops of urine that were placed on his arm in order to prevent their spread.

Individuals with contamination obsessions and cleaning compulsions often describe contaminated objects as disgusting more so than threatening (Tolin, Worhunsky, & Maltby, 2004). Contamination concerns are thought to represent a blend of emotions including both fear and disgust (Woody & Teachman, 2000). Referring to an evolutionary perspective, one can postulate that the function of disgust is to prevent contamination and disease (Izard, 1993; Rozin, Markwith, & Nemeroff, 1992). There is some evidence that individuals with contamination-related OCD have a general predisposition to disgust (i.e., "disgust sensitivity") (Woody & Tolin, 2002), and it has been hypothesized that this disgust sensitivity serves a disease-avoidant function (Tolin et al., 2004). Regardless of whether disgust is ultimately based on a fear mechanism, the LVM posits that it is related to a cognitive process of perceiving or imagining a dynamic pattern of rapidly approaching and escalating threat. As described below, disgust sensitivity has been shown to be related to corresponding perceptions of looming vulnerability to disgusting situations.

Some individuals with OCD hold implausible beliefs regarding the spread or transmission of contagion (termed "sympathetic magic"; Nemeroff & Rozin, 1994). For example, they might hold the belief that contaminated objects remain contagious indefinitely and are capable of transmitting contamination permanently (Tolin et al., 2004). This belief causes them to avoid not only potential contaminants, but also secondary objects that might have come into contact with contaminants due to the belief that they have the same contagious properties as the original contaminant. For example, a woman who fears potential contaminants might remove her clothes and put them in the laundry after returning from the hospital, but then worry that the other clothes in the laundry basket are also contaminated, as well as the floor that the laundry basket is placed on. This phenomenon has been described as the "chain of contagion" in OCD (Tolin et al., 2004), and it is thought to account for increased avoidance of a wider range of potential contaminants as OCD progresses. But it is not just a person's static, abstract beliefs that may produce the chain of contagion, and the cognitive process that produces a sense of looming vulnerability may also be crucial. Looming vulnerability has been proposed as a cognitive mechanism underlying the "chain of contagion" because it blocks the habituation process. That is, the "chain of contagion" is a manifestation of the tendency of the person with OCD to perceive a pattern of escalating danger. Contaminants that are appraised as rapidly approaching and spreading outward from object to object might also be perceived as being sustained across several degrees of removal from the original contaminant (Tolin et al., 2004). Tolin et al. found that when they controlled for perceptions of looming vulnerability to contamination, the chain of contagion effect statistically disappeared.

Operationalization and Assessment of Looming Vulnerability in Obsessive Compulsive Disorder

The Looming Maladaptive Style Questionnaire (Riskind, Williams, Gessner, Chrosniak, & Cortina, 2000) is a general measure of tendency to interpret and perceive ambiguous threats as rapidly approaching and intensifying in threat values (e.g., the higher-order looming cognitive style). It is not specific to obsessive concerns, such as contamination. The questionnaire is designed to assess a person's general tendency to perceive the chances of harm, the proximity of the harm, etc. in ambiguous threats as increasing, escalating, and becoming greater by the moment (or "looming"). Respondents are presented with six brief vignettes describing two types of ambiguous, potentially stressful situations and are asked to read each vignette and then to imagine the scenario as vividly as possible. The social threat or *social looming* vignettes include: (1) the possibility of a romantic relationship breaking up; (2) inviting a very popular person to a party in front of a group of people; and (3) speaking in front of a large audience of strangers. The physical threat or *physical looming* vignettes include: (1) hearing a strange engine noise

while driving on the expressway in rush hour traffic; (2) developing heart palpitations while speaking with someone about a financial problem; and (3) the risk of getting into a car accident. After imagining each scenario, they are asked to respond to four questions on a Likert scale. The first question asks how worried or anxious respondents become when imagining the scenario ("not at all" to "very much"). The second question asks the extent to which the chances of having difficulty in the scenario are increasing or expanding with each moment ("chances are decreasing with time" to "chances are expanding with time"). The third question asks the extent to which the threat is growing larger with each moment ("threat is staying fairly constant" to "threat is growing rapidly larger"). The final question asks the extent to which the respondent visualizes the scenario as progressively worsening ("not at all" to "very much"). Responses to the final three questions are aggregated across the six vignettes to compute a total Looming Cognitive Style score. The Looming Vulnerability Scale is an expanded version of the LMSQ which includes items pertaining to looming vulnerability to contamination threat and looming vulnerability to panic attacks in order to assess the specificity of looming themes (Riskind, Rector, & Cassin, 2011).

The Looming of Disgust Questionnaire (Williams, Olatunji, Elwood, Connolly, & Lohr, 2006) was designed to assess the tendency to view potentially disgusting situations as rapidly rising in threat value. Similar to other looming measures, respondents are instructed to read brief vignettes and to vividly imagine themselves in each scenario. The eight vignettes correspond to the disgust domains assessed by the Disgust Scale (Haidt, McCauley, & Rozin, 1994): (1) you feel maggots from a garbage pail crawling up your leg; (2) a stranger vomits on your feet at a party; (3) the ashes of a cremated body spill onto you at a funeral; (4) you help an injured person who has exposed intestines; (5) you take a few large drinks of spoiled milk; (6) you observe a chef sneezing on food and preparing food with soiled hands; (7) you are stuck in an elevator with a person with severe body odor; and (8) you observe your roommate stirring soup with a flyswatter. Respondents complete six questions for each vignette on a Likert scale. Five of the questions form a total score for cognitive vulnerability to disgust: (1) Looming of Disgust (LOD) threat: the extent to which the level of threat increases as the scene unfolds; (2) LOD sick: the extent to which the threat of becoming nauseous or sick increases; (3) LOD disgust: the extent to which the level of disgust increases; (4) LOD spread: the speed with which the disgust stimulus is approaching, spreading, or moving; and (5) LOD imagine: the extent to which you feel disgusted when imagining yourself in the scene. The final question assesses secondary appraisals of disgust (LOD cope) and asks respondents to rate the extent to which they imagine being able to cope with the situation. The Looming of Disgust Questionnaire has been shown to discriminate between obsessive participants with contamination-related concerns, socially anxious participants, and non-anxious controls. Psychometric studies have supported the internal consistency and validity of the LODQ (Williams, Shahar, Riskind, & Joiner, 2005).

The Contamination Scenario-Based Questionnaire (Elwood, Riskind, & Olatunji, 2011; Riskind et al., 2011) was designed to specifically assess looming of

contamination. Respondents are presented with a picture of an aversive contamination scene (e.g., trash) and are asked to rate their fear and disgust of contamination, the perceived harm potential of the contaminants, and the subjective sense of looming vulnerability to the contamination on a Likert scale (ranging from "not at all" to "very much"). The perceived likelihood of harm subscale is computed by summing scores on two items. The first item asks about the likelihood that the germs or bacteria will harm the respondent. The second item asks about the likelihood that the germs or bacteria will make the respondent sick. The looming of contamination subscale is computed by summing scores on four items. Two of the items assess perceived spreading of contamination (i.e., the extent to which the germs or bacteria are moving toward the respondent, and the extent to which the germs or bacteria are actively and energetically moving toward the respondent). The remaining two items assess perceived growing of contamination (i.e., the extent to which the level of germs or bacteria is rapidly increasing, and the extent to which the germs or bacteria increase over a 10-min period). The perceived spreading and perceived growing of contamination subscales are significantly correlated with one another and have good internal consistency (Elwood et al., 2011).

The Looming of Contamination Questionnaire (Riskind, Abreu, et al., 1997) was designed to assess the subjective sense of looming vulnerability to contamination. Respondents are presented with five brief vignettes: (1) going to a dirty bathroom in a gas station; (2) sitting on the subway next to a man in dirty clothes who smells of urine; (3) shopping for produce next to a man who is coughing on the produce one wants to select; (4) shaking hands with someone who has just emptied the trashcan; and (5) talking to someone at a party who spits when speaking. Respondents are asked to read each vignette and then to imagine the scenario as vividly as possible. They are then asked to respond to seven questions for each vignette on a Likert scale, three of which assess the respondent's sense of looming vulnerability. The first question asks the speed with which contamination is spreading. The second question asks the extent to which the contamination is approaching moment by moment. The third question asks the extent to which the threat is growing larger with each moment. The final four questions assess other cognitive appraisals of threats, including the perceived probability of occurrence of contamination, imminence of the contamination, perceived lack of control over the approach of the contamination, and degree of worry when in similar contamination situations. Psychometric studies have supported the internal consistency and validity of the Looming of Contamination Questionnaire (Riskind, Abreu, et al., 1997).

The OCD Looming Vulnerability Measure (Riskind & Rector, 2007) was designed to assess the subjective sense of looming vulnerability to a range of potentially threatening situations relevant to OCD (e.g., contamination, hoarding, doubting, ordering/symmetry, and pure obsessions). Thus, tendencies to play out corresponding dynamic scenarios of looming threat in ambiguous situations are specified for each focus of OCD symptoms. Respondents are presented with 22 brief vignettes covering a range of OCD themes. Sample items include: Contamination Looming (e.g., using a dirty bathroom at a gas station); Hoarding Looming (e.g., having to discard an item that has personal meaning and that you might need again

one day); Doubting Looming (e.g., passing a busy intersection having a thought or image of having just caused an accident); Ordering/Symmetry Looming (e.g., passing by a painting on the wall that has become significantly tilted); and Pure Obsession Looming (e.g., having an urge to strike a pedestrian while driving, or having an image of yourself in a sexual act with a child, or having an urge to deface a place of worship). Respondents are asked to read each vignette and then to imagine the scenario as vividly as possible. They are then asked to respond to three questions for each vignette on a Likert scale. The first question asks how worried or anxious the respondent feels when imagining the scenario ("not at all" to "very much"). The second question asks the extent to which the threat is growing larger with each moment ("threat is staying fairly constant" to "threat is growing rapidly larger"). The third question asks the extent to which the threat is progressively worsening or expanding ("not at all" to "very much"). The last two questions assess the respondent's sense of looming vulnerability. Each of the OCD looming subscales has demonstrated adequate internal consistency (Riskind & Rector, 2007).

All of these looming vulnerability measures share the common feature of having a mood-induction and mental simulation component—whereby respondents are asked to vividly imagine themselves in potentially threatening scenarios—and are asked to rate the extent to which the threat is looming forward, spreading out, and increasing in intensity and/or dangerousness. However, the measures differ with respect to the type of threat being assessed (e.g., higher-order looming cognitive style, looming of disgust, looming of contamination, or looming of other OCD-relevant threats).

Empirical Data on Looming Vulnerability in Obsessive Compulsive Disorder

Mediational Model

As previously described, the LVM proposes that an individual who mentally plays out and who has dynamic expectations that threats are escalating, and germs and contaminants as continuously growing and rapidly changing and spreading will experience greater fear of exposure to potential contaminants. Further, the LVM proposes that this dynamic cognitive process contributes to fear and anxiety directly, as well as indirectly, by heightening static threat appraisals.

To test these predictions, undergraduate students were asked to read two brief vignettes describing close contact with an individual who is HIV-positive (i.e., sitting beside the person on a bus or near the person in a restaurant) (Riskind & Maddux, 1994). For each vignette, they responded to four items to assess the sense of looming vulnerability (e.g., extent to which the HIV is actively and energetically approaching, speed with which the situation is becoming more dangerous, the speed with which the HIV could be transmitted, and whether the speed is constant or accelerating) and eight items to assess static threat appraisals (e.g., perceived danger, likelihood of

harm, unpredictability of HIV, and lack of control over harm from HIV). As predicted by cognitive appraisal theories of anxiety, individuals with high-HIV fears rated the vignettes as higher on the static threat appraisals. Lending support to the LVM, individuals with high-HIV fears mentally play out scenarios of increasing looming vulnerability to HIV, imagining the virus to be rapidly spreading from people and across surfaces, whereas individuals with low-HIV fears did not have a sense of looming vulnerability (Riskind & Maddux, 1994). This cognitive process of simulating looming vulnerability was found to have a large indirect effect on fear of HIV, such that looming vulnerability predicted static threat appraisals, which in turn, predicted fear of HIV. However, there was also evidence for a significant, albeit smaller, direct effect of looming vulnerability on fear of HIV.

Another study was conducted to examine whether a sense of looming vulnerability to spreading contamination was linked to subclinical OCD (Riskind, Abreu, et al., 1997). Undergraduate students read vignettes of situations involving potential exposure to dirt, germs, or contamination, as described above in the Looming of Contamination Questionnaire. As would be expected, undergraduates with subclinical obsessional fears perceived the contamination threat as more probable, imminent, and uncontrollable, and they also had a much greater sense of looming vulnerability to spreading contamination compared to a control group with low obsessional fears. The results showed that perceptions of the contamination as spreading made distinct and significant contributions to fear of contamination symptoms with the effects of static threat appraisals removed. In contrast, the static threat appraisals had no significant associations with fear of contamination symptoms that were independent of perceptions of looming vulnerability. These findings support the proposition that the cognitive process producing a sense of looming vulnerability is positively correlated with OCD symptoms and contributes to contamination fears both directly and indirectly by triggering or intensifying static threat appraisals. According to this mediational model, the indirect effects of looming vulnerability are transmitted by heightening static threat appraisals.

Green and Teachman (2013) conducted a structural equation modeling study with 56 undergraduates to examine the relationship between "explicit, cognitive appraisals" (looming perceptions, likelihood estimates), and implicit measures of threat (an IAT test), in predicting contamination fear and distress. Interestingly, a disassociation was found between the explicit and implicit measures of threat, such that explicit self-report measures predicted explicit subjective distress measures, while on the other hand, implicit appraisals predicted avoidance behaviors. Of further interest, inspection of their SEM figure suggests that the two measures of looming perception may have exhibited a stronger association with subjective distress measures then did likelihood estimation although the authors did not specifically test the statistical significance of this difference.

Another study with undergraduate college students by Dorfan and Woody (2011) examined the capacity of cognitive factors, including looming vulnerability, to predict emotional responses, avoidance, and cleaning behavior during a behavioral avoidance test. Those authors constructed a "Washroom Appraisal Questionnaire" which yielded three subscales in a factor analysis: danger appraisals (items concerning perceived vulnerability to germs, level of risk/danger, likelihood of something

bad happening, likelihood of disease, and seriousness of disease), "looming germs spread"(acceleration of spread, germs spread through the air toward you, speed of germ spread, level of spread to others), and responsibility appraisals (responsibility itself, responsibility to others). When all three appraisal dimensions were entered simultaneously in the same step of a regression model, after controlling for gender, the looming germs spread appraisal factor was the only one to approach significance in predicting anxiety about touching contaminants ($p < 0.06$). This near significant effect was lost, however, when neuroticism was entered in a step prior to the appraisal factors.

Although this study did not find evidence of incremental prediction for looming vulnerability, it had some limitations. The main problem is that it did not include items that assessed whether individuals perceived or imagined the contamination in the washroom as escalating in threat, as we now do in the new looming contamination measures. Moreover, it only included a measure of perceived germ *movement,* and did not tap into perceptions that germs were rapidly growing versus spreading, which have also been found to predict contamination fears (Elwood et al., 2011). Another limitation is that their measure of "other danger appraisals" included items such as "perceived vulnerability"—which would be expected to contain some of the variance that properly belongs to the measure of looming vulnerability.

Taking a different and unique approach, Knapton (2015) used qualitative, cognitive linguistic analysis methods to analyze the spoken narratives of individuals with OCD. Each of her 15 participants completed an audio-recorded, semi-structured interview with questions about their experiences of OCD, descriptions of their OCD episodes as they unfold, and the onset of their OCD. Her findings indicated that perceptions of threats fluctuate as OCD episodes unfold, and that it is the perceived movement (or not) of the threat that induces distress.

Looming Manipulations

Studies using looming manipulations have supported the hypothesis that perceptions of looming vulnerability are a powerful causal antecedent of contamination fears. As previously mentioned, an early case study reported that an individual with a urine phobia was able to reduce his fear during exposure therapy by imagining that drops of urine that were placed on his arm were "frozen" and unable to spread (Foa & Kozak, 1986). Following this case study, a larger empirical investigation had undergraduate students with subclinical obsessions observe two videos of contamination scenes (i.e., a dirty toilet in a public restroom and a dirty trashcan covered with wet paper towels and toilet paper) with different sets of instructions (Riskind, Wheeler, & Picerno, 1997). Those in the control condition simply observed the videos and were not given any additional instructions. Those in the freeze imagery condition were told to visualize the contaminants as toxic but unable to move forward or spread out, whereas those in the looming imagery condition were told to visualize the contaminants as airborne, mobile, and rapidly spreading. As predicted, participants in the freeze imagery condition reported lower anxiety than those in the control

group. This finding was particularly true for individuals who scored high in imagination. The results for two indirect measures of fear of contamination also converged with the self-report findings. For example, individuals with subclinical obsessions in the freeze imagery condition demonstrated a greater willingness to stand near a contamination site (i.e., a filthy toilet) and to take a cookie from a tray strategically placed next to a large trashcan. In contrast, those in the looming imagery condition reported increased worry and urges to wash compared to the control group. However, looming imagery did not have a significant impact on indirect measures of fear of contamination. The authors noted that individuals with subclinical obsessions in the looming imagery condition might have been less motivated to comply with the looming imagery instructions because the imagery would heighten anxiety.

In another related, but more involved, study, Dorfan and Woody (2006) examined the effects of three imagery conditions on the distress associated with a contaminating stimulus. Undergraduate students underwent a contaminant exposure, in which urine drops were placed on the fingertips and palm of their non-dominant hand. They were then randomly presented with one of three different imagery scripts. In the moving harm imagery condition, they were informed that germs are dangerous and were told to imagine that any germs and contamination from the urine are moving across the skin and spreading through the air as they evaporate. In the static harm imagery condition, they were informed that germs are dangerous and were told to imagine that any germs or contamination from the urine are contained within the area of the hand where the urine is sitting and unable to spread from the current location. In the safety imagery condition, they were told to imagine that the urine is a clean and sterile substance from a healthy individual and contains no harmful germs or contaminants.

Participants in the moving harm imagery condition reported an immediate increase in distress that was sustained over the 30-min exposure period. In contrast, those in the static harm imagery and safety imagery conditions reported an immediate decrease in distress. In addition, those in the moving harm imagery condition reported significantly greater threat appraisals (e.g., likelihood of getting sick) compared to the static threat imagery and safety imagery groups. Those in the moving harm imagery condition also reported significantly greater lingering distress following hand washing than did the other two groups. The results also lent support to the LVM by demonstrating that individuals who imagine contaminants as moving forward and spreading outwards are not only slower to habituate, but are actually sensitized and increase their distress when confronted with a potential contaminant.

Spread of Contagion

Looming vulnerability has been proposed as a cognitive mechanism underlying the "chain of contagion," whereby individuals with OCD avoid not only contaminants, but also secondary objects that have come into contact with the original contaminant (Tolin et al., 2004). To test this prediction, individuals with OCD were

compared to an anxious control group and a non-anxious control group on a "chain of contagion" task designed to assess the extent to which contagion is transferred between previously uncontaminated objects (Tolin et al., 2004). Each participant was asked to identify the most contaminated object in the building (e.g., toilet, garbage can), and then asked to get as close as possible to the contaminated object. Next, the experimenter opened up a new box of 12 pencils, removed one pencil (Pencil #1) from the box, and systematically wiped the pencil over the contaminated object. The experimenter and participant then left the room with the contaminated object, and when the object was out of site, the participant was asked to rate the degree of contamination on Pencil #1 on a scale from 0 to 100. Next, Pencil #2 was removed from the box and was systematically wiped on Pencil #1. Pencil #1 was then discarded, and the participant was asked to rate the degree of contamination on Pencil #2. This procedure was repeated until contamination ratings were obtained for all 12 pencils in the box, each contaminated by the previous pencil. The exact same procedure was followed for a nonthreatening object (i.e., a piece of candy) which served as a control condition.

Lending support to the sympathetic magic phenomenon in OCD, individuals with OCD perceived that contamination persisted across points of removal. Across the 12 pencils, the contamination ratings provided by individuals with OCD decreased by an average of 40%, whereas the contamination ratings provided by the anxious controls and non-anxious controls decreased by 98% and 100%, respectively. In contrast, there were no differences between groups in the non-threat (i.e., candy) control condition, suggesting that the "chain of contagion" observed in OCD is specific to OCD threat-related stimuli. Individuals with OCD had a greater sense of looming vulnerability (as assessed by an interview version of the Looming of Contamination Scale; Riskind, Abreu, et al., 1997), and looming vulnerability was found to fully mediate the relationship between the diagnostic group and chain of contagion. The results suggest that individuals with OCD who appraise contamination as approaching forward, spreading out, and increasing in threat are also prone to assume that the contamination is transmitted indefinitely and across several degrees of removal from the original contaminant without diminishing substantially.

Attributing Human-Like Mental Properties to Germs

Research has shown that humans and even human infants have appeared to have an innate tendency to attribute human mental characteristics—such as intentions, thoughts, and even feelings to nonhuman agents and even inanimate objects (see Chap. 5). Moreover, such anthropomorphic tendencies can be strengthened when objects exhibit movement or activity (Morewedge, Preston, & Wegner, 2007). Riskind and Richards (2018) carried out two studies to examine the relationship between movement, contamination, and anthropomorphism. Following an initial study that established that there were associations between imagined germ movement, contamination fear, and the attribution of malevolent intentions to germs, they

conducted a second study that experimentally manipulated germ movement with a brief film clip of magnified germs. The results of the second study showed that the experimental manipulation of germ movement increased attributions of malevolent intentions to germs and enhanced the tendencies of individuals with higher levels of contamination fear to attribute some general human characteristics to germs (i.e., intentions, feelings). The pattern of findings revealed that the manipulation of germ movement had a far stronger effect on the anthropomorphic attributions of participants who were high in OCD contamination fears than on those who were low. No such findings were obtained for disgust sensitivity.

These intriguing findings suggest the possibility that the attribution of malevolent intentions to germs may be a cognitive distortion that contributes to the maintenance of contamination fear and may afford a novel treatment target. Moreover, perceived or imagined germ movement may serve as an antecedent to the attribution of malevolent intentions to germs and thus exacerbate the tendency to make these attributions. Future research could examine whether such anthropomorphic attributions of ill-intentions to germs play a role as determinants of other phenomena such as the spread of contagion effects. One would guess that the spread of contagion would be heightened were a person to view contaminants as ill-intentioned and malevolently motivated.

Disgust Sensitivity

Looming vulnerability is thought to be a common cognitive vulnerability to both fear and disgust because both such states are predicated on the approaching occurrence of contact with a threat or noxious stimulus. According to Williams et al. (2006), individuals characterized by disgust sensitivity likely perceive potentially disgusting stimuli as rapidly escalating and increasing in threat severity. To examine this prediction, undergraduate students who endorsed clinical levels of OCD symptoms, undergraduate students who endorsed clinical levels of social phobia symptoms, and non-anxious controls completed the Looming of Disgust Questionnaire and a measure of disgust sensitivity (Williams et al., 2006). It was found that the OCD group had significantly higher scores on the looming of disgust subscale, and on an item subscale that assessed the perceived ability to cope with the discussed scenario, in comparison to the social phobic group or the non-anxious controls. Furthermore, a moderate positive correlation was found between Looming of Disgust scores and disgust sensitivity, suggesting that these were related but distinct constructs.

Specificity to OCD

Supporting the idea that the general looming cognitive style represents a cognitive vulnerability for anxiety, the Looming Maladaptive Style Questionnaire was found to predict shared variance in a latent factor comprised of indicators of five

DSM-IV anxiety disorder symptoms (i.e., obsessive compulsive disorder, post-traumatic stress disorder, generalized anxiety disorder, social phobia, specific phobia) (Williams et al., 2005). Moreover, several other studies have found that the looming cognitive style predicts OCD symptom changes ranging from a week to 6 months later (Riskind, Tzur, Williams, Mann, & Shahar, 2007; Sica et al., 2012). However, in addition to the looming maladaptive style posing a cognitive vulnerability for anxiety, the LVM also proposes that some individuals with OCD have domain-specific fears, such as specific obsessional themes. For instance, individuals who exhibit perceptions of looming vulnerability in specific threat domains (e.g., contamination for OCD) should be more likely to develop heightened and persistent anxiety in those domains compared to individuals who lack those domain-specific perceptions.

To test the specificity of OCD-related looming themes, Riskind et al. (2011) tested individuals with OCD, generalized anxiety disorder, social phobia, and panic disorder, who completed a version of the Looming Vulnerability Scale that assessed looming style as a general underlying vulnerability to anxiety disorders and disorder-specific looming vulnerability themes (i.e., looming vulnerability with respect to contamination, physical, panic, and social threats). As would be expected, the anxiety disorder groups did not differ from one another with respect to scores on general looming cognitive style, but the OCD group scored higher than all other diagnostic groups on the looming vulnerability to contamination subscale. In contrast, the OCD, group scored lower than the social phobia group on the looming vulnerability to social threat subscale and lower than the panic disorder group on the looming vulnerability to panic threat subscale.

Looming Vulnerability Compared to Other Established Vulnerability Factors for OCD

Another question that has been given attention is whether looming vulnerability adds to the prediction of OCD symptoms afforded by other established vulnerability factors. For example, a recent study examined the unique contribution of looming vulnerability in the prediction of contamination fears, beyond the effects of two established factors—anxiety sensitivity and negative affectivity (Elwood et al., 2011). Undergraduate students completed measures of general looming cognitive style (The Looming Maladaptive Style Questionnaire), looming of contamination, static threat appraisals (i.e., likelihood of harm), anxiety sensitivity, and negative affectivity. Fear of contamination was moderately correlated with general looming cognitive style, looming of contamination, and perceived likelihood of harm, and was modestly correlated with anxiety sensitivity and negative affectivity. Hierarchical regression analyses demonstrated that the general looming cognitive style was a significant predictor of contamination fears even while controlling for static threat appraisals, anxiety sensitivity, and negative affectivity. Supporting an OCD-specific LVM, looming of contamination was a significant predictor of contamination fears in the final step of the model (beyond the effect of general looming

cognitive style). The study also examined the contribution of specific components of looming vulnerability to the prediction of contamination fears, namely fears of spreading contamination and of growing contamination. Hierarchical regression analyses demonstrated that the combined looming contamination factor was a significant predictor of contamination fears, but neither the spreading nor the growing component was a unique significant predictor.

The LVM assumes that a person's perceptions of a pattern of rapid threat escalation account for distress above and beyond the role of ingrained and stable obsessive beliefs, such as those assessed by Obsessive Beliefs Questionnaire (OBQ; OCCWG, 1997). For example, an individual with OCD might have an inflated sense of responsibility for preventing threat (static appraisal), but also perceive or imagine that the threat they will be responsible for is rapidly escalating and thus, perceive their personal responsibility as quickly increasing. To test this prediction, Riskind and Rector (2007) asked clinical patients with OCD to complete measures of looming vulnerability (the OCD Looming Vulnerability Measure), dysfunctional obsessive beliefs on the OBQ, and interpretations of intrusive thoughts (III) and OCD symptom severity. A hierarchical regression analysis was conducted to examine how much incremental variance in OCD symptom severity could be explained by OCD looming vulnerability beyond the effects contributed by dysfunctional obsessive beliefs and interpretations of intrusive thoughts (i.e., perfectionism, intolerance of uncertainty, inflated responsibility, exaggerated threat, importance of thoughts, need to control thoughts). As would be expected by cognitive appraisal theories of OCD (OCCWG, 1997, 2001, 2003, 2005; Rachman, 1998; Salkovskis, 1999), dysfunctional obsessive beliefs and interpretations of intrusive thoughts accounted for a significant amount of variance (24%) in OCD severity. As Riskind and Rector predicted, the measures of OCD looming vulnerability also contributed substantial additional variance (52%) to the prediction of OCD severity beyond the contribution of OCD beliefs.

Significant predictors in the analysis in that study included the Looming Contamination subscale and Looming Hoarding subscale, which each predicted unique variance in OCD severity. In addition, the Looming Pure Obsessions subscale (e.g., harming and sexual) was also a significant predictor although it unexpectedly predicted in the opposite or inverse direction. Unexpectedly, this finding showed that the person who perceives threats of harming others, or of having sexual or blasphemous impulses findings of an inverse relationship—as rapidly escalating and looming actually has less severe OCD symptoms than the person who does not.

A possible explanation for the above surprising results might be suggested by Lee and Kwon's (2003, p. 12) classification of obsessions into two subtypes, "autogenous" and "reactive", based on the manner by which they arise. Autogenous obsessions in their classification are similar to pure obsessions (relating to sex, aggression, or blasphemy), and are experienced as occurring spontaneously as they are said to have very loose connections with internal stimuli or thought processes. According to Lee and Kwon, such obsessions are more likely to be dealt with by cognitive avoidance strategies than the reactive type of the obsessions (relating to doubt, contamination, disorder/dissymmetry, and loss) that occur with more clearly identifi-

able external triggering stimuli and, are dealt with using more proactive strategies such as overt (visible, physical) compulsions. Thus, it may be that looming vulnerability to the threatening content associated with autogenous obsessions is a triggering agent for more active cognitive avoidance. If so, this presumably explains why looming vulnerability for the content of autogenous obsessions (i.e., pure obsessional content) was found to be related to a lesser severity of OCD symptoms. [It is important to note here, moreover, that Purdon et al. also found that pure obsessions were inversely related to OCD symptom severity although they did not assess looming vulnerability.]

In another recent study, Sica et al. (2012) utilized a longitudinal design to examine predictors of changes in OCD symptom severity over two 6-month intervals. The predictors were a measure of "Not just right experiences" (NJREs), defined as the unsettled feeling that something isn't "just as it should be," and the looming cognitive style, which, along with measures of OCD symptoms, and general distress (anxiety and depression) were administered to 187 college students on two consecutive 6-month intervals over the course of a year. The study found that both NJREs and looming cognitive style each independently and significantly accounted for variation in OCD symptoms over the two intervals, even when controlling for each other and general distress although the different pattern of outcomes slightly differed. They found that NJREs accounted for significant variation in hoarding symptoms, whereas looming cognitive style did not. On the other hand, looming cognitive style was predictive of variation in washing and checking, which NJRE's did not.

In yet other research, Riskind et al. (2007) found support for the incremental value of the looming cognitive style in predicting OCD symptom changes over a weeks' time. Their study examined both the looming cognitive style, and intolerance of uncertainty as predictors of short-term changes in OCD symptoms, and found that only looming cognitive style predicted variation in OCD symptoms between the two time points. Besides this, they found a significant interaction effect, indicating that the looming cognitive style predicted increased OCD symptoms better for the participants who had the highest levels OCD symptoms at baseline. Thus, these findings of Riskind et al.'s prospective study, like those of cross-sectional studies with clinical patients (e.g., Riskind & Rector, 2007) suggest the applicability of the looming cognitive style to the development and maintenance of clinically significant OCD.

Conceptual Issues and Future Research Directions

As described above, there is substantial research evidence supporting the role of looming vulnerability in OCD, particularly with respect to the contamination symptom subtype. A number of studies have examined the role of the perception of looming vulnerability in OCD, in both non-clinical and clinical patient samples. Most of this work has supported the main tenets of the LVM that looming vulnerability makes distinct and significant contributions to fear of contamination and OCD

severity above and beyond the effects of other established vulnerability factors, such as threat appraisals with static content, negative affect, anxiety sensitivity, and obsessive beliefs, and NJREs (Elwood et al., 2011; Riskind, Abreu, et al., 1997; Riskind & Maddux, 1994; Riskind & Rector, 2007; Sica et al., 2012).

Cross-sectional studies have provided suggestive evidence that looming vulnerability contributes to fear of contamination directly, as well as indirectly by triggering or intensifying static threat appraisals (Riskind, Abreu, et al., 1997; Riskind & Maddux, 1994). Research employing experimental research designs has also shown that threat appraisals, distress, and compulsive urges can all be impacted by manipulating fear imagery (Dorfan & Woody, 2006; Riskind, Wheeler, & Picerno, 1997). Although the general looming cognitive style seems to operate as a general vulnerability factor for a variety of anxiety disorders and syndromes, the additional specific looming content in OCD differs from the looming themes that characterize anxiety disorders such as social phobia, panic disorder, and generalized anxiety disorder (Riskind et al., 2011). Looming vulnerability has also been found to mediate the "chain of contagion" or "sympathetic magic" phenomenon observed in individuals with OCD (Tolin et al., 2004).

Most of the studies examining looming vulnerability in OCD have relied on self-report measures to assess perceptions of looming vulnerability and their contribution to contamination fears and OCD severity. In addition, participant samples have primarily relied on unselected students or students with subclinical obsessions. Although several studies employed clinical samples of OCD patients (e.g., Riskind et al., 2011; Riskind & Rector, 2007; Tolin, Woods, & Abramowitz, 2003) more such studies are needed. Several prospective studies, assessing OCD symptom changes over periods ranging from a week to 6 months, have shown that the general LCS is predictive of future increases in OCD symptoms (Sica et al., 2012). Additional experimental studies and prospective examinations of high-risk samples would be informative to clarify the direction of causality between looming vulnerability and the development of clinically significant OCD. It would also be informative to have additional studies examining OCD patient samples using a variety of assessment methods including self-report measures, behavioral approach/avoidance tests, and experimental tasks involving "freezing" or "spreading" OCD-relevant threats.

The heterogeneity of OCD has posed a significant challenge for research into OCD, including the LVM. It has been argued that different etiological models are likely required to account for the heterogeneous nature of OCD symptoms (Purdon, 2009).

Given the heterogeneity of OCD symptoms, the OCD Looming Vulnerability Measure (Riskind & Rector, 2007) was developed to assess a wider range of potentially threatening situations relevant to OCD (e.g., contamination, hoarding, doubting, ordering/symmetry, pure obsessions). This measure has the potential to advance research on looming vulnerability in OCD beyond contamination fears. Riskind and Rector (2007) found that looming vulnerability themes specific to hoarding and fears of asymmetry predicted OCD symptoms in clinical patients, even when controlling for OCCWG measures of OCD-relevant beliefs and appraisals. However,

large clinical samples comprised of individuals with a variety of OCD symptom subtypes will be required to more thoroughly examine the role of looming vulnerability in OCD. This line of research would help elucidate whether looming vulnerability is a cognitive vulnerability factor across OCD subtypes or a specific cognitive vulnerability factor associated more strongly with some OCD subtypes (e.g., contamination, hoarding) than others.

Other questions concern the relative roles of the general looming cognitive style and more domain-specific types of looming cognitive style (e.g., contamination looming, hoarding, etc.) in contributing to the development and maintenance of OCD symptoms. Future research is also needed to study more precisely the mechanisms behind the unexpected inverse relationship between the Looming Pure Obsessions subscale and OCD symptoms. Studies would be informative that can examine whether individuals with the general looming cognitive style are more likely to develop OCD-relevant looming cognitive styles, or whether the established effects of the general looming cognitive style on OCD symptoms are moderated or mediated by domain-specific forms of looming cognitive style. A further important question relevant to actual clinical work concerns the efficacy of "looming reduction" methods discussed in Chap. 14, for helping to ameliorate or control OCD symptoms in actual patients.

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