HHS Public Access
Author manuscript
J Anxiety Disord. Author manuscript; available in PMC 2019 April 01.

Published in final edited form as:
J Anxiety Disord. 2018 April ; 55: 14–21. doi:10.1016/j.janxdis.2018.03.004.

Rethinking Avoidance: Toward a Balanced Approach to Avoidance in Treating Anxiety Disorders

Stefan G Hofmann, Ph.D.[a] and **Aleena C. Hay, Ph.D.**[a]

[a]Boston University, Department of Psychological and Brain Sciences, 648 Beacon St., 6th Floor, Boston, MA, 02215, USA

Abstract

Avoidance is typically considered a maladaptive behavioral response to excessive fear and anxiety, leading to the maintenance of anxiety disorders. Exposure is a core element of cognitive-behavioral therapy for anxiety disorders. One important aspect of this treatment is repeated and prolonged exposure to a threat while discouraging patients from using avoidance strategies, such as escape or safety behaviors. We will first revisit the role of avoidance learning in the development and maintenance of anxiety disorders, including important insights from the neuroscience literature. Next, we will consider both the *negative* and *positive* aspects of avoidance for therapeutic interventions. Finally, we will explore the application of adaptive avoidance in exposure therapy for anxiety disorders. We will argue that there are occasions when avoidance behaviors can serve as effective coping strategies to enhance the person's perception of control over the environment and the potential threat. We conclude that avoidance behaviors can be a valuable therapeutic element, depending on the function of these behaviors.

Keywords

avoidance; anxiety; fear; exposure; therapy; coping

The most effective strategies for treating anxiety disorders include exposure therapy, which is rooted in behaviorism and learning theories that began in the early 20th century (Watson, 1924). Since then, cognitive behavioral therapy (CBT) has emerged as an effective treatment for anxiety disorders (e.g., Carpenter et al., in press; Hofmann & Smits, 2008). However, despite its efficacy, many people still remain symptomatic (e.g., Taylor, Abramowitz, & McKay, 2012) while relatively few therapeutic innovations have been designed and implemented. In order to explore therapeutic strategies that may enhance the efficacy of exposure-based CBT for anxiety disorders, we will examine the role of avoidance behaviors in the psychopathology and treatment of anxiety disorders, including insights from pertinent neuroscience literature.

Corresponding author: Stefan G. Hofmann, Ph.D., Department of Psychological and Brain Sciences, Boston University, 648 Beacon St., 6th floor, Boston, MA 02215, Tel: 617 353 9233, Fax: 617 353 9609, shofmann@bu.edu.

The development of anxiety disorders, as presently defined, occurs when the conscious experience of fear and anxiety in humans becomes excessive and maladaptive (i.e., excessive in intensity, frequency, or duration; American Psychiatric Association, 2013). The contemporary nosology recognizes the distinction between fear and anxiety and notes that "fear is more associated with surges of autonomic arousal necessary for fight or flight, thoughts of immediate danger, and escape behaviors," whereas "anxiety is more often associated with muscle tension and vigilance in preparation for future danger and cautious or avoidance behaviors" (American Psychiatric Association, 2013, p. 189). Excessive avoidance is the hallmark of many emotional disorders, especially anxiety disorders (e.g., Barlow, 2002). For example, avoidance serves as a defining feature of agoraphobia, specific phobias, and social anxiety disorder, but not all anxiety disorders (as is the case in panic disorder, generalized anxiety disorder, and post-traumatic stress disorder). Thus, the Diagnostic and Statistical Manual of Mental Disorders −5 (DSM-5) makes the implicit assumption that avoidance behaviors are core features of all anxiety disorders, and that the fear and anxiety associated with the disorder are closely associated with avoidance tendencies. Additionally, when considering general clinical wisdom, avoidance is usually seen as primarily responsible for the maintenance of an anxiety disorder. However, taking a more balanced approach to considering the role of avoidance in anxiety disorders may allow for more nuanced and effective treatment of these disorders.

To explore the nature of the association between avoidance and anxiety disorders, we will first review learning theories, avoidance learning, and the role of avoidance in maintaining fear and anxiety (for an in-depth review, see Krypotos, Effting, Kindt, and Beckers, 2015). In reviewing these theories insights from the neuroscience literature will be utilized to shed light on our understanding of the neurobiology of avoidance. We will then discuss the role of avoidance in the treatment of anxiety disorders by exploring both *negative* and *positive* aspects of avoidance for therapeutic interventions. Finally, we will explore the applications of adaptive avoidance for exposure therapy treatment in anxiety disorders.

Learning Theories of Fear Conditioning and Avoidance Learning

Pavlovian Fear Conditioning

It has long been assumed that fear and anxiety problems are a result of Pavlovian conditioning. The case of Little Albert by Watson and Rayner (1920) demonstrates an early application of Pavlovian conditioning in humans. In this famous case, Little Albert, an 11-month-old boy, was first presented with a white rat (the conditioned stimulus or CS) to which he did not exhibit a fear response. However, as the scientists began to pair the rat with loud noises (i.e., unconditioned stimulus or US), the child began to exhibit signs of fear and avoidance when presented with the rat, even in the absence of the loud sound. It was found that after this pairing Little Albert also began to show a fear and avoidance response to other similar fluffy objects (e.g., a rabbit), suggesting fear generalization. When the boy was tested in a different context (by moving him to a different room) the fear response was still noticeable but significantly decreased. The implication of the Pavlovian conditioning model of fear to explain avoidance behavior is that avoidance is the direct response to fear and anxiety.

Watson and Rayner's (1920) classical experiment has often been used to illustrate the basic principles of fear conditioning, generalization, the context effect, extinction learning, and avoidance in a human being. However, retrospective and prospective studies raised questions about the validity of this simple model. For example, studies have shown that many individuals with specific phobias fail to identify any conditioning events (Menzies & Clarke, 1995) or report that such events occurred many years after the onset of the phobia (Hofmann, Ehlers, & Roth, 1995), or that they did not develop fear after experiencing an event that led to conditioned fear in other people (DiNardo, Guzy, & Bak, 1988). These observations have led to various modifications and alternative theories about the development of fear/anxiety and avoidance learning and anxiety disorders.

Perceptual-Defensive-Recuperative Model

Bolles and Fanselow (1980) put forth a model to explain the function of fear and fear-response elicited by mammals as a way to understand avoidance. According to this model, fear is a construct that is typically associated, either innately or through learning, with painful events, and thereby promotes defensive behavior and the inhibition of pain-related (e.g., nursing a wound; grooming) and recuperative (e.g., sleeping) behaviors. This model includes three main elements. First, an animal "perceives" a threat. Second, the animal enters a "defensive" phase, marked by decreased pain sensitivity. Third, after the threat has passed, the animal enters into a "recuperative" mode during which pain-related behaviors may resume after fear has subsided. This suggests that it is not concern about pain evoked by the threat that causes fear, but rather that fear inhibits pro-pain behaviors incompatible with threatening situations. In the context of avoidance, the goal of the defensive response is not to avoid pain, but rather to promote behaviors that will protect the animal from the threat.

Skinnerian Operant Conditioning

In the 1930's B.F. Skinner began to explore a new theory of learning, which became known as operant conditioning (Skinner, 1938). In his work with pigeons and rats, Skinner demonstrated operant conditioning, which is learning through the relationship between an action and its resultant outcome. The selected action will either increase (through reinforcement) or decrease (through punishment) in likelihood depending on the nature of the outcome. Avoidance learning is one example of operant conditioning. Translated to humans, an individual with social anxiety may select an action (avoiding going to a party), which leads to an outcome (reduced anxiety). This outcome positively reinforces the avoidance behavior by making avoidance more likely to occur when facing the option of whether or not to go to a party in the future. Avoidance is assumed to be learned through negative reinforcement because the avoidance behavior either prevents a stimulus from occurring or it reduces the potential harm of the stimulus.

Mowrer-Miller's Two-factor Theory

In the 1940s, Mowrer and colleagues began studying avoidance conditioning with the hope of understanding the role of avoidance in people with chronic anxiety problems (e.g., Mowrer, 1939, 1940). In animal paradigms, *avoidance conditioning* refers to laboratory procedures in which the animal learns to avoid aversive events, such as electric shocks or stimuli associated with them. Thus, avoidance is understood as a response to threat in order to escape or reduce harm. In this context, threat is defined as the impending occurrence of an event that is expected to have undesirable consequences (Carver & Connor-Smith, 2010). Mowrer chose operant avoidance (rather than Pavlovian conditioning) because he believed that operant conditioning was more closely related to human behaviors (Hull, 1943; Skinner, 1938). He believed that in situations of danger, certain stimuli become conditioned with fear, and avoidance behaviors subsequently reduce the fear, thereby reinforcing the avoidance behavior (e.g., Mowrer, 1939). Therefore, avoidance was seen as a learned response and the learned fear cues as a motivator of the same response in the future. This model has become known as the 2-factor-model (or the Mowrer-Miller model) of avoidance learning. According to this model, Pavlovian fear conditioning in which the CS predicted an aversive US associated with fear was assumed to be the first factor of avoidance learning. The second factor involves operant conditioning (negative reinforcement) because behaviors that allow the animal to escape from the CS and avoid the US were assumed to be reinforced through fear reduction.

The Mowrer-Miller model has had a profound influence on the nature and treatment of anxiety disorders. However, a number of studies and observations have since questioned the validity of the model. Specifically, some authors questioned whether fear reduction is, in fact, the reinforcer for the acquisition of avoidance responses, and whether the learned avoidance responses qualify as instrumental responses under the criteria of learning theory (Bolles, 1972; Levis, 1989; Masterson & Crawford, 1982). For a detailed criticism of the two-factor model see work by Krypotos and colleagues (Krypotos, et al., 2015). One critical issue with the Mowrer-Miller model has to do with the premise of fear reduction of avoidance: if the avoidance response prevents the occurrence of the US, presentations of the CS occur without the US. Therefore, the “fear” elicited by the CS, and the motivation to perform the avoidance response should diminish and eventually extinguish. However, it is well known that, although Pavlovian responses elicited by the CS extinguish (Kamin, Brimer, & Black, 1963; Starr & Mineka, 1977), avoidance continues, and is, in fact, fairly resistant to extinction (Solomon & Wynne, 1954). It may be that because the avoidance behavior removes an aversive stimulus, the avoidance behavior becomes reinforced. Thus, the CS-US relationship is intact because the CS is never explicitly paired with the absence of the US. Only in cases where an avoidance behavior occurs, does the US become omitted. Thus, the subject learns that the CS is still signaling threat, and the only way to omit the US is to avoid.

In addition to these arguments, the underlying neural circuits of avoidance are different from those involved in the acquisition and performance of the instrumental response (Balleine & O’Doherty, 2010; Cardinal et al., 2002; Everitt & Robins, 2005). The Pavlovian conditioning procedure offered a simpler paradigm to study the neurocircuitry underlying this learning as compared to the more complex instrumental conditioning approach to avoidance (LeDoux, Moscarello, Sears, Campese, 2017). As a result, animal researchers adopted simpler Pavlovian aversive conditioning paradigms to examine the neural mechanism of avoidance in relation to anxiety (Duvarci & Pare, 2014; Grundemann & Lüthi, 2015; Johansen, Cain, Ostroff, & LeDoux, 2011; LeDoux, 2000). This, however, might have led to an oversimplification of the role of avoidance in fear and anxiety. In fact, findings about the brain mechanisms of avoidance suggest that whereas the amygdala is required for acquisition and performance of aversive Pavlovian conditioning (Duvarci & Pare, 2014; Grundmann & Lüthi, 2015; Johansen et al., 2011; Phelps, Delgado, Nearing, & LeDoux, 2004; Phelps, O'Connor, Gatenby, Gore, Grillon, Davis, 2001) and active avoidance learning (Choi, Cain, & LeDoux, 2010), it is not required for the performance of avoidance after extensive training (Lazaro-Munoz, LeDoux, & Cain, 2010). With extensive learning, avoidance behaviors may shift to habitual behaviors, which are largely under the control of the nigro-striatal circuit. As we will discuss in more detail below, these behaviors then become resistant to extinction themselves and become difficult to unlearn.

Lovibond's Expectancy Model

While the aforementioned theories provide an explanation for many facets of avoidance learning, they do not take into account informational factors or how information is interpreted. The Lovibond expectancy model (Lovibond, 2006) accepts that avoidance learning includes Pavlovian conditioning and operant conditioning and allows for the preparedness theory (Seligman, 1971) as well. However, the expectancy model holds that avoidance learning occurs through explicit knowledge of all stimulus outcomes (Krypotos, Effting, Kindt, and Beckers, 2015). Furthermore, this theory posits that an organism's expectancies about a situation play a role in both Pavlovian and operant conditioning.

Three-factor Theory of Pavlovian, Instrumental, and Habit Learning

Alternatively, it may be that in addition to Pavlovian and operant conditioning, habit learning is involved in avoidance (Ilango, Shumake, Wetzel, & Ohl, 2014; Lazaro-Munoz, LeDoux, & Cain, 2010; LeDoux et al., 2017). The formation of these processes has been shown to be dependent on the amygdala, especially in fear and avoidance learning (e.g., LeDoux, 2015).

Threat stimuli, which elicit fear, can produce conditioned reactive responses, such as freezing or immobility (Amorapanth, LeDoux, & Nader, 2000) as well as activate endocrine and autonomic systems. Specifically, the lateral nucleus of the amygdala has become the focus of much research attention, because it appears to be the one place where the CS and the US are integrated. It is well established that this structure is required for both the acquisition and expression of fear learning in animals (Amorapanth, LeDoux, & Nader, 2000; Blair, Sotres-Bayon, Moita, & Ledoux, 2005) and humans (Cheng, Knight, Smith, Stein, & Helmstetter, 2003). More specifically, the literature suggests that exposure to the threat-arousing CS enters the lateral nucleus via both cortical and thalamic sensory input (Doron & Ledoux, 1999; Moscarello & LeDoux, 2013). The lateral nucleus, in turn, activates the central nucleus of the amygdala, which activates brainstem areas involved in controlling specific components of the reaction to the stimulus, such as freezing behavior controlled by the periaqueductal grey (De Oca, DeCola, Maren, & Fanselow, 1998). The central nucleus also activates the paraventricular hypothalamus, which controls endocrine responses of the hypothalamic-pituitary-adrenal axis, as well as the lateral hypothalamus, which controls autonomic responses (Gray, Carney, & Magnuson, 1989; Turner, 1973). While the amygdala is certainly involved in the acquisition of a reactive response to a CS, it and other circuits have also been implicated in the extinction of this response. Indeed, it has been shown that infralimbic cortex, the ventral hippocampus, and the basolateral amygdala all play key roles in the extinction of the fear response to a CS (Bravo-Rivera, Roman-Ortiz, Montesinos-Cartagena, & Quirk, 2015; Sierra-Mercado, Padilla-Coreano, & Quirk, 2011). In humans, it has been shown that the medial frontal cortex and amygdala play similar roles (Sperl et al., 2018).

Conditioned stimuli can produce conditioned reactive responses but can also serve as cues to avoid upcoming threat. As such, in addition to this conditioned reactive response to threat, the amygdala also appears to be involved in active coping with threat (e.g., Cain & LeDoux, 2008). As previously mentioned, the CS-US association is encoded in the amygdala. However, the CS may signal an animal to select an action that avoids the undesirable US. Specifically, an animal may *learn* that certain actions can preclude the occurrence of the US. In avoidance conditioning, the animal learns to avoid a shock *prior* to its onset. This behavior is distinct from *escape*, which occurs during or after the presentation of the shock. Avoidance action selection processes have been shown to be under the control of the ventral tegmental area (VTA)-ventral striatum dopaminergic pathway, with mediating influences from the amygdala in shaping the action taken elicited by the CS (Anstrom, Miczek, & Budygin, 2009; Hollerman & Schultz, 1998; Tian & Uchida, 2015; Tovote, Fadok, & Lüthi, 2015; Watanabe, Sakagami, & Haruno, 2013).

It is well known that appetitive stimuli induce an increase in burst-firing within the VTA, which produces rapid increases in phasic dopamine signaling in the ventral striatum (Grace & Bunney, 1984a, 1984b; Phillips, Robinson, Stuber, Carelli, & Wightman, 2003; Wickham et al., 2013). Aversive stimuli and cues have also been shown to regulate phasic dopamine release in the ventral striatum and other reward areas (Anstrom et al., 2009; Budygin et al., 2012; Park, Bucher, Budygin, & Wightman, 2015; Roitman, Wheeler, Wightman, & Carelli, 2008). In humans, appetitive and aversive stimuli are seen to activate the VTA-nucleus accumbens (NAc) pathway (Hausler, Oroz Artigas, Trautner, & Weber, 2016; Pohlack, Nees, Ruttorf, Schad, & Flor, 2012). Moreover, it has been shown that lesions of the basolateral amygdala impair responses to the CS and decrease phasic dopamine signaling in the ventral striatum in response to these stimuli (Jones et al., 2010). Finally, disconnection of the basal amygdala (including the basolateral amygdala) to the nucleus accumbens causes reduction in avoidance behavior (Ramirez, Moscarello, LeDoux, & Sears, 2015).

Taken together, the evidence points to a process by which threat stimuli (i.e., the CS) activate the mesolimbic dopamine system and aid in action selection. This process is regulated by inputs from key structures, such as the basolateral amygdala, which in turn can regulate phasic dopamine signaling and alter the actions selected. Other circuits are also important in regulated active avoidance. Tovote and colleagues suggest that multiple other inputs into the VTA, such as the lateral habenula, bed nucleus of the stria terminalis, and hippocampus all converge to regulate VTA output into the ventral striatum (2015). Top-down processes are also seem to be important in avoidance behaviors, such as the prefrontal cortex and ventral striatal communication (Bravo-Rivera et al., 2015); however, the directionality of this circuit is unknown.

While active avoidance is certainly advantageous in avoiding potentially harmful stimuli, the drawback to this behavior occurs when the stimuli are not, or are no longer, predictive of harm. Once avoidance behavior is well-learned, it can become a habit, at which point it loses its connection to the reinforcing properties of the US (Balleine & O'Doherty, 2010; Cardinal, Parkinson, Hall, & Everitt, 2002; Dezfouli & Balleine, 2012; Dickinson, 1985; Dickinson & Balleine, 2002; Everitt & Robbins, 2005). This can be maladaptive because the individual will choose to avoid even if a new contingency is developed and avoidance could possibly cause harm. It has been shown that the ventral striatum is more involved in *learning* a new action, whereas the dorsal striatum is more heavily involved in habit formation of that action. Ventral striatal-dependent behaviors also have a tendency to be more prone to extinction training, whereas dorsal striatal dependent behaviors are often extinction-resistant (Balleine & O'Doherty, 2010; Cardinal, Parkinson, Hall, & Everitt, 2002; Dezfouli & Balleine, 2012; Dickinson, 1985; Dickinson & Balleine, 2002; Everitt & Robbins, 2005; Liljeholm, Dunne, & O'Doherty, 2015; Yin & Knowlton, 2006). Thus, with repeated avoidance behaviors, the circuit involved in avoidance behavior may shift towards the dorsal striatum in both animals and humans (Knowlton & Patterson, 2016; Martinez et al., 2013; Tang, Pawlak, Prokopenko, & West, 2007). In this case, avoidance behavior may become maladaptive when the CS no longer cues threat. Similarly, humans may avoid feared stimuli even in the absence of true threat. Taken together, these findings favor a 3-factor learning process of avoidance learning: Pavlovian, instrumental, and habit learning.

Adaptive Avoidance

Having discussed the negative impact of avoidance in primarily animal and some human studies, we will next explore some of the possible adaptive aspects of avoidance in humans. This is especially important as these aspects of avoidance may not often be highlighted in the treatment of anxiety disorders, despite their potentially important role. Some of these concepts are less grounded in neuroscience and experimental research and more linked to clinical models and approaches. As we will describe below, it can be argued that some behaviors that are categorized as avoidance strategies are in fact adaptive coping strategies in certain clinical contexts.

Avoidance as Coping

Coping is a complex concept with many different distinctions (e.g., Carver & Connor-Smith, 2010; Skinner, Edge, Altman, & Sherwood, 2003). Problem-focused coping is directed at the threat itself by attempting to remove it, evade it, or to diminish its impact if it cannot be evaded. In contrast, emotion-focused coping is aimed at minimizing distress triggered by the threat. Examples of emotion-focused coping include self-soothing (e.g., relaxation, seeking emotional support) or expressing negative affect (e.g., yelling, crying). Problem-focused and emotion-focused coping have slightly different goals, even though these goals can be related. For example, seeking support is emotion-focused if the goal is to seek reassurance, and it is problem focused if the goal is to obtain instrumental help. Additionally, these two coping strategies can facilitate one another. For example, effective problem-focused coping diminishes the threat, but thereby also diminishes the emotional response generated by that threat. Similarly, effective emotion-focused coping diminishes emotional distress, making it possible to approach the problem more calmly and perhaps yielding better problem-focused coping. The interrelatedness between these two coping strategies makes it more useful to think of the two as complementary rather than two distinct and independent coping functions (Lazarus, 2006).

Another important distinction in the coping literature is *engagement* (or *approach coping*) versus *disengagement* (or *avoidance coping*). Engagement is aimed at dealing with the threat and the related emotions, whereas disengagement is aimed at escaping the threat and the related emotions (e.g., Carver & Connor-Smith, 2010; Skinner et al., 2003). Engagement coping includes problem-focused coping and some forms of emotion-focused coping, such as support seeking, emotion regulation, acceptance, and cognitive restructuring. Disengagement coping is often emotion-focused, because it includes attempts to avoid the unpleasant feelings associated with the threat, such as through escape, denial, and distancing.

Disengagement coping is often, but not always, a maladaptive coping response. In the short term, denial, for example, may be beneficial early on in a traumatic episode or if it occurs in a situation that is both uncontrollable and too threatening (Roth & Cohen, 1986). However, it is not likely to be beneficial over the longer term, because it does not effectively target the threat and its impact. For example, ongoing denial of a traumatic experience is not an adaptive form of emotion regulation in the long-term. In contrast, distancing or efforts to disengage from a situation temporarily in an attempt to diminish its significance can be an adaptive emotion-focused disengagement strategy. Distancing is similar to the technique of defusion from Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2012). With distancing and defusion strategies, taking a step back from painful negative thoughts (e.g., no one likes me) may be encouraged. By engaging in defusion or distancing, it may be possible to distance oneself from that thought, leading to a reduced belief in the emotional content of the thought. Generally, this process can allow individuals to better cope with negative thoughts. While most disengagement strategies are emotion-focused, there are some that are problem-focused, such as escape. Escape behavior occurs when an individual perceives threat and avoids the situation as a result. Certainly, if used flexibly and accurately for the situation, the use of an escape strategy can be helpful to avoid harm. However, an overreliance on the escape strategy irrespective of true threat can become harmful, For example, always leaving social situations because they seem frightening would be considered maladaptive as it would lead to social isolation and increased anxiety. Examples of adaptive avoidance strategies that are either primarily problem-focused or emotion-focused and engagement or disengagement oriented are depicted in Table 1. Notably, some disengagement strategies can create problems of their own. For example, excessive alcohol use as a way to cope with traumatic stress can lead to social and health problems.

Passive vs. Active Avoidance

Avoidance can be *passive* or *active*. Active avoidance is any behavior shown to prevent the occurrence of harm (such as a shock in animals). This typically leads to escape behaviors or overt behaviors that prevent harm. In contrast, in a typical passive avoidance test, animals are placed on a platform and receive a brief footshock every time the animal steps down. Thus, the animal learns that not moving (i.e., passive avoidance) avoids the footshock.

This passive avoidance response can be turned into successful coping when the animal (e.g., a rat) learns to associate a tone with a footshock, for example, and then a few days later receives the tone in another context. The rat initially freezes, but then the tone is turned off as soon as the animal makes any movement. The next time, more movement is required to turn off the tone. After some training, the rat learns to run to the other side of the chamber as soon as the tone comes on, thus escaping the tone. Eventually it learns to avoid the tone altogether by running to the other side of the chamber as soon as it is placed in the box (LeDoux et al., 2017). Animals that had been trained to master the tone showed no signs of being threatened by the tone later, even in the original context where the stressful shock had occurred. In other words, the animal learned control over its environment, making the threat cues irrelevant. This finding highlights the importance of an individuals' perceived control over their environment in reducing anxiety, which has notable implications for treatment.

Similarly, cues associated with a trauma or other stress in humans may start out with a narrow focus (e.g., the place where the trauma occurred) but may widen to include similar contexts. In order to control their anxiety, people with anxiety disorders often avoid these contextual cues, leading to the maintenance of the anxiety. However, when behaviors can terminate exposure to the CS, avoidance can become successful coping. This might be one of the many possible reasons why behavioral activation (i.e., simple activities that increase pleasure and decrease displeasure) is such an effective intervention for patients with depression. It may also be worth noting that the animals in the previously described footshock experiments did not have to perform a difficult task (they only had to move across the chamber in order to succeed in terminating the CS). If they had been required to perform some complex task, it is possible that the animal might have reached a state of learned helplessness (e.g., Seligman, 1972) before figuring out how to succeed. Similarly, a person who cannot bear to go to work after having experienced a traumatic event in the workplace might be encouraged to do some pleasant tasks, rather than staying at home brooding. If the feared situation is so intense as to create a learned helplessness response in the individual facing it, avoidance of this situation while learning other coping strategies is warranted. These learned strategies may then help the individual to be able to effectively engage in the therapeutic approach of a feared situation in the future.

Proactive Avoidance

Although most discussions of coping emphasize responses to threat and harm, some coping can occur proactively before the occurrence of the threat or once there are warning signs of threat (Aspinwall & Taylor, 1997). Proactive avoidance is widely accepted as an adaptive form of avoidance, but is important to consider nonetheless. Such proactive avoidance is intended to prevent threatening situations from arising or from becoming stronger. When the organism gains control over the situations through its own actions, anxiety can diminish. Therefore, proactive avoidance involves what has come to be known as *agency* (Moscarello & Hartley, 2017). Proactive avoidance is nearly always problem-focused and involves resources that will be useful to detect potential threat. If the potential threat is perceived, proactive avoidance allows the agent to engage in strategies that will prevent the threat from becoming more challenging by engaging in problem-focused coping. Proactive avoidance can be considered active coping because the organism directly engages with the stress-related cues and events in order to change their impact and allow the organism to exert control over them (LeDoux & Gorman, 2001).

Avoidance and Safety

Safety behaviors are behaviors that are intended to prevent, escape from, or reduce the actual or anticipated harm of a perceived threat. Such behaviors are typically discouraged in exposure therapy because they are believed to maintain anxiety disorders (e.g., Salkovskis, Clark, Hackmann, Wells, & Gelder, 1999). In contrast, others have argued that safety behaviors do not necessarily interfere with exposure therapy (Milosevic & Radomsky, 2008; Rachman, Radomsky, & Shafran, 2008), and may even be beneficial by reducing beliefs about threat (Milosevic & Radomzky, 2013a) and enhancing treatment tolerability and acceptability (Milosevic & Radomzky, 2013b), depending on the function of the safety behaviors (Blakey & Abramowitz, 2016; Goetz, Davine, Siwiec, & Lee, 2016).

The key distinction between adaptive and maladaptive use of safety behaviors appears to be whether or not these behaviors serve the function to prevent or restore beliefs about the threat (Blakey & Abramowitz, 2016; Goetz, Davine, Siwiec, & Lee, 2016). *Restorative* safety behaviors allow for full confrontation with the threat and do not interfere with meaningful indicators of successful exposure, whereas *preventive* safety behaviors may hinder engagement with the stimulus or experience and can thereby weaken exposure outcomes. For example, in contamination fear and excessive washing behavior, active avoidance of contaminated objects (e.g., avoidance of drinking fountains) may be considered as a preventive strategy, whereas washing following exposure to a contaminant (e.g., use of hand-sanitizer) may be restorative. Preventive safety behaviors are often used shortly before or during confrontation with the threat, whereas restorative safety behaviors typically follow confrontation with the threat.

Similar to safety behaviors, studies with humans and animals have shown that avoidance is attenuated by the administration of explicit visual signals during “non-threat” periods, which are known as *safety signals* (Seynin, Moustafa, Beck, Servatius, & Meyers, 2015). Periods that are free from aversive events (safety periods) are believed to represent an appetitive component that is capable of modulating avoidance behavior in rodents (Berger & Brush, 1975; Denny & Weissman, 1964). It has further been argued that signals associated with these safety periods may provide positive reinforcement and become inhibitors of fear (Christianson et al., 2012; Sheynin et al., 2015). Interestingly, there is some evidence that women may have different relative sensitivity to reward versus punishment than men, and those with inhibited temperament appear to have greater sensitivity to punishment than those with uninhibited temperament (Sheynin et al., 2015). This suggests that extinction-based CBT might benefit from the use of safety signals, especially if given to individuals with high reward sensitivity during longer safe periods.

Conclusion

Despite the strong focus in anxiety treatment on the negative aspects of avoidance in terms of maintaining anxiety, there are important positives aspects of avoidance that should be highlighted when it comes to treating individuals with anxiety disorders. Our review suggests that the adaptiveness of avoidance behaviors varies depending on their function; some avoidance may even be adaptive by promoting the effects of exposure therapy. Specifically, behaviors that could be defined as avoidance coping (disengagement) can be adaptive, especially in the short-term, if a situation is perceived as uncontrollable. In this case, avoidance can act as an effective emotion-focused coping strategy. Similarly, active and proactive avoidance behaviors that effectively prevent the occurrence of a stimulus that causes harm can serve an adaptive function. Safety behaviors intended to enhance the perception of control have the same effect. The commonality between these avoidance strategies is that the organism gains a sense of control over the environment and the potential threat.

Avoidance strategies that enhance the sense of control are usually adaptive and should, therefore, be encouraged rather than discouraged. In order to ascertain whether avoidance is adaptive or maladaptive, it is important to assess the function of the behavior. For example, behaviors that are used to avert future oriented perceived negative outcomes can hinder engagement with the stimulus or experience and can, therefore, weaken exposure outcomes. In contrast, behaviors that allow the patient to confront threat may not interfere with meaningful indicators of successful exposure. Indeed, in a therapeutic setting, during an exposure exercise, briefly allowing patients to escape an exposure and then quickly re-enter it (i.e., retreat and reenter technique) may increase patients' sense of control over the situation thus increasing their willingness and ability to approach the anxiety-provoking situation. Additionally, this momentary avoidance may allow patients to keep their emotional reaction at a level that is perceived as controllable.

This is consistent with other recent literature suggesting that some avoidance behaviors allow clients to feel a greater sense of control over therapy without sacrificing treatment gains, especially during the early stage of treatment (e.g., Deacon et al., 2010; Levy & Radomsky, 2014; Milosevic & Radomsky, 2013b; Taylor & Alden, 2011; Telch & Lancaster; 2012). Therefore, some authors have advocated for a judicious use of safety behaviors during the early stage of exposure therapy (Rachman, Radomsky, & Shafran 2008). In order to optimize the adaptive use of these behaviors in treatment, it has been recommended that they are gradually faded over the course of the exposure (Telch & Lancaster, 2012) and that clinicians actively monitor anticipatory and peak fear reductions to determine the function of these behaviors.

The concrete recommendation for clinical practice is to be flexible in one's categorization of avoidance behavior. The rigid application of avoidance behavior in response to non-threatening stimulus can be problematic. Yet, using avoidance strategically in moderation can allow patients to more quickly and effectively approach anxiety-provoking situations. It is recommended that clinicians carefully assess the function of the behavior. Avoidance behavior that enhances the patient's perception of control over the threat can be adaptive and might actually be encouraged during the initial phase of the treatment. These as well as other insights from neuroscience have the potential to significantly enhance the efficacy of exposure therapy for anxiety disorders. Some of these insights suggest that the success of exposure is associated with inhibitory learning (Craske, Treanor, Conway, Zboznik, & Vervliet, 2014) and other new learning that interferes with the original memory (Dunsmoor, Niv, Daw, & Phelps, 2015), which changes harm expectancy (Hofmann, 2008). We noticed during our review that the neurocircuitry of avoidance in rats is fairly well researched, whereas very little has been done in humans, possibly because of the complexity of avoidance behaviors in humans. We recommend that future research more systematically translates findings from animal work and basic neuroscience to avoidance in humans with the goal to enhance the treatment for anxiety disorders.

Acknowledgments

Dr. Hofmann receives financial support from the Alexander von Humboldt Foundation (as part of the Humboldt Prize), NIH/NCCIH (R01AT007257), NIH/NIMH (R01MH099021, U01MH108168), and the James S. McDonnell Foundation 21st Century Science Initiative in Understanding Human Cognition – Special Initiative. He receives compensation for his work as an advisor from the Palo Alto Health Sciences and for his work as a Subject Matter Expert from John Wiley & Sons, Inc. and SilverCloud Health, Inc. He also receives royalties and payments for his editorial work from various publishers.

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Highlights

- Role of avoidance learning in anxiety disorders is reviewed
- There are both *negative* and *positive* aspects of avoidance for therapeutic interventions
- Some avoidance can be adaptive and serve as effective emotion-focused coping
- Positive aspects of avoidance should be highlighted when treating anxiety disorders
- Avoidance strategies that enhance sense of control should be judiciously encouraged

Table 1

Examples of adaptive emotion vs. problem-focused engagement vs. disengagement-oriented avoidance strategies

	Engagement	**Disengagement**
Emotion-focused	Seeking social support	Denial, Distancing
Problem-focused	Proactive coping	Escape