What Are People's Lay Theories About Mind Wandering and How Do Those Beliefs Affect Them?

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Many of the thoughts that pass through our minds each day are disconnected from the here and now. While we may seem engaged with our current activity or environment—our eyes scanning a page of text or locking with those of a conversation partner—our attention is often directed inwardly, to thoughts about current concerns, future plans, or fantasies. These types of thoughts, studied under the (somewhat interchangeably used) terms *stimulus-* or *task-unrelated thought*s, *decoupled thought*, *daydreaming*, and *mind wandering* (e.g., Antrobus, 1968; Singer & Schonbar, 1961; Smallwood & Schooler, 2006), are often spontaneous and unsolicited (Seli, Carriere, & Smilek, 2014; Seli, Risko, Smilek, & Schacter, 2016), yet occupy an astonishing 30–50% of our waking life (Kane et al., 2007; Killingsworth & Gilbert, 2010; Klinger & Cox, 1987; McVay, Kane, & Kwapil, 2009), with far-reaching and often negative consequences for our performance (see Mooneyham & Schooler, 2013 for a review), mood (Franklin et al., 2013; Killingsworth & Gilbert, 2010), and safety (e.g., Galera et al., 2012). Sometimes stimulus-unrelated thoughts have an intrusive character. *Intrusive thoughts* tend to be repetitive and revolve around fears or traumatic events (Clark & Rhyno, 2005). Like normal mind wandering, intrusive thoughts are highly common among healthy individuals (Clark & Rhyno, 2005), but they are also a hallmark feature of a surprising range of disorders, including depression, generalized anxiety disorder, insomnia, obsessive–compulsive disorder (OCD), and posttraumatic stress disorder (PTSD; Clark, 2005; Davies & Clark, 1998). Given the ubiquity and impact of stimulus-unrelated thoughts among healthy individuals, and the role the intrusive variant of such thoughts seems to play in a variety of disorders, an important question, which we will examine in this chapter, is: how do ordinary people make

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sense of such thoughts? That is, what do we know about the character and the consequences different *lay theories* about stimulus-unrelated thoughts?

Why Lay Theories Matter

Lay theories are beliefs (also referred to as *naïve theories*, *implicit theories*, *folk theories*, *meta-cognitive beliefs,* or *mindsets*) that function as a "lens" through which people interpret events and make sense of their own and other people's behavior (Dweck, Chiu, & Hong, 1995). Lay theories also inform people's predictions about the consequences of their own behavior and the kind of behavior that can be expected from other people. What distinguishes lay theories from scientific theories is that lay theories are not necessarily explicit, and typically not rigorously formulated (Heider, 1958). Nonetheless, when asked, people usually have no difficulty reporting on their lay theories (see Plaks, Levy, & Dweck, 2009). What lay theories have in common with scientific theories is that they often divide people into different camps. And which "camp" somebody is in can influence the person's behavior in important ways (e.g., see Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013, for a meta-analytic review).

Consider the following example from research on lay theories in the domain of willpower: A popular lay theory about willpower (e.g., Job, Dweck, & Walton, 2010; Job, Walton, Bernecker, & Dweck, 2013, 2015; Martijn, Tenbült, Merckelbach, Dreezens, & de Vries, 2002), which—perhaps not coincidentally—is echoed in influential scientific theories (e.g., Baumeister, Vohs, & Tice, 2007; Gailliot et al., 2007; Muraven & Baumeister, 2000), holds that willpower relies on a finite biological resource that becomes "depleted" with use (and can be replenished by consuming glucose). Laypeople do not necessarily formulate the theory in quite these terms, but they may say that activities that demand a lot of willpower from them will leave them feeling "exhausted" or "drained" (and perhaps in need of a sugary snack), and that they are unable to exert any more willpower until they have rested or "refueled". There is indeed evidence that exerting willpower causes a temporary state akin to depletion that can be reverted by glucose ingestion (see DeWall, Baumeister, Gailliot, & Maner, 2008; Gailliot & Baumeister, 2007; Gailliot et al., 2007; Gailliot, Peruche, Plant, & Baumeister, 2009; Hagger, Wood, Stiff, & Chatzisarantis, 2010). However, it has been found that this is true only for individuals who believe in the limited resource-theory. Those who do not believe in the theory show no depletion effect after exerting willpower (Carter, Kofler, Forster, & McCullough, 2015; Martijn et al., 2002; Job et al., 2010, 2013, 2015). Thus, the lay theory that willpower is a limited resource appears to affect people's actual behavior by way of a self-fulfilling prophecy. This example powerfully illustrates how important it is that we make lay theories an integral part of our scientific theories. If we fail to take into account people's beliefs about how they will think, feel, and behave in certain contexts, we can potentially derive incorrect or incomplete scientific theories about human cognition and behavior.

In the current chapter, we apply our focus on lay theories to the study of spontaneous stimulus-unrelated and intrusive thoughts. Over the last couple of decades, much progress has been made in gaining a better understanding of when people's minds wander off towards stimulus- or task-unrelated thoughts, what brain areas are involved in such mind wandering (e.g., Fox, Spreng, Ellamil, Andrews-Hanna, & Christoff, 2015), and what positive and negative consequences it has (e.g., Mooneyham & Schooler, 2013; Schooler et al., 2014). Only very recently have studies started to examine what kinds of beliefs laypeople have about this common experience, and how these beliefs may affect their tendency to mind wander. With regard to intrusive thoughts, there is a somewhat longer tradition of research focusing specifically on lay theories. This chapter brings together these different lines of research and gives an overview over their current state. First, we will discuss what kinds of—accurate or biased—lay theories people have about the frequency and meaning of spontaneous stimulus-unrelated thoughts. Next, we will focus on a key dimension that appears to be central to many lay theories: controllability. People are highly attuned to distinguishing between events and abilities that are under their personal control and events that lie outside of one's control (D'Andrade, 1987; Heider, 1958; Malle & Knobe, 1997; Molden & Dweck, 2006; Plaks, Grant, & Dweck, 2005). Recent evidence, which we will review in detail below, suggests that the extent to which people believe they have control over their tendency to mind wander affects how much they actually do so—similar to the self-fulfilling prophecy effect observed in the domain of willpower. Drawing on clinical psychology literature, we will also explore the impact of lay theories in the context of intrusive thoughts. There is extensive evidence that people's beliefs about the meaning and consequences of intrusive thoughts affect how people react to the occurrence of these thoughts. Particularly beliefs about the necessity to exert control over intrusive thoughts appear to play a key role in the development and maintenance of clinical disorders involving intrusive thoughts. Finally, we will discuss some future directions, focusing particularly on ways in which it may be possible to challenge or change people's theories about stimulus-unrelated thoughts.

How Much Mind Wandering Is Normal?

It is safe to say that most people mind wander a lot. Experience-sampling studies, in which participants are probed (e.g., via smart phones) at pseudo-random moments during their normal everyday activities, have consistently found that people mind wander circa 40% of the time (Cameron & Giuntoli, 1972; Franklin et al., 2013; Killingsworth & Gilbert, 2010; Klinger & Cox, 1987; Risko, Anderson, Sarwal, Engelhardt, & Kingstone, 2012). This figure is consistent with mind-wandering rates found during live or recorded lectures (Risko et al., 2012; Schacter & Szpunar, 2015; Wammes, Seli, Allan, Boucher, & Smilek, 2016), and during laboratory

experiments, in which participants are probed while performing reading, vigilance, or working memory tasks (e.g., Giambra, 1989, 1995; Grodsky & Giambra, 1990; McVay & Kane, 2009, 2010; McVay et al., 2009).

Procedures for assessing mind wandering vary between studies. Most typically, participants are probed at different times during their current activity and simply asked whether or not they were mind wandering just prior to being probed. Sometimes, participants are also asked to self-initiate a report whenever they notice that their mind has wandered off task. Of course, they can only "catch" these episodes themselves when they are aware that their thoughts have drifted away from the here and now—this is called mind wandering with *meta-awareness*. Research has shown that people often lack meta-awareness, however. That is, they fail to self-catch, but nonetheless report that they have been mind wandering when being probed by the computer, suggesting that they were not aware of the fact that they were mind wandering *until* being probed (Schooler, 2002; Schooler, Reichle, & Halpern, 2004; Schooler et al., 2011; Smallwood, McSpadden, & Schooler, 2007, 2008; Zedelius, Broadway, & Schooler, 2015).

Given that people often mind wander without meta-awareness, we were interested in how much people *think* they mind wander during day-to-day activities. Since thoughts are only ever directly accessible to the one having them, and we never know what goes on in other people's heads, we also wanted to know whether people would underestimate (or overestimate) how much other people mind wander compared to them. To answer these questions, we collected data from a stratified sample of 1326 US Americans (Zedelius, Protzko, Schooler, 2017a). We asked them to estimate how much time they spend mind wandering during a normal day, and how much they thought other people mind wander on average, with the order of these questions counter-balanced. Finally, we also asked them whether they thought that they mind wander less, more, or about the same amount as other people. We found that people collectively are surprisingly accurate in their beliefs about of what constitutes typical mind wandering rates. They estimated that people mind wander on average roughly 38% of the time. However, interestingly, we found that people tend to believe that they themselves mind wander somewhat less (roughly 33%) compared to others. This difference also emerged when participants were explicitly asked to make a comparative judgment about their own versus other people's propensity to mind wander. Thus, despite estimating a rather typical average mind-wandering rate, they seem to display a self-serving bias when it comes to assessing their own mind wandering. This is in line with research showing that people generally tend to view themselves in a favorable light (Chambers & Windschitl, 2004; Dunning, Heath, & Suls, 2004; Pronin, Gilovich, & Ross, 2004; Williams & Gilovich, 2008). While mind wandering is not by definition negative or undesirable, very frequent mind wandering could be interpreted as an uncomfortable lack of control over one's own thoughts. That said, it is possible that, if people were asked to report how much they themselves and the people around them had been mind wandering during a specific activity (say a lecture or a conversation), people may be more accurate at judging their own mind wandering and underestimate how much other people mind wander, simply because it is not easy to detect

mind wandering in other people. Thus, the self-serving bias may disappear when people reflect on their mind wandering during a particular situation rather than their general tendency to mind wander, a possibility that should be further investigated.

Lay Theories About the Meaning of Spontaneous Thoughts

According to experience-sampling research, the majority of spontaneous task-unrelated thoughts revolve around current concerns and plans for the future (e.g., Baird, Smallwood, & Schooler, 2011; Bernsten & Jacobsen, 2007; D'Argembeau, Renaud, & Van der Linden, 2011; Klinger, 2009, 2013; Klinger & Cox, 1987; Smallwood, Nind, & O'Connor, 2009). Thus, it seems fair to say that most stimulus-unrelated thoughts are relatively mundane in content, and not too dissimilar from more deliberate and task-related thoughts. The focus on current concerns and future plans also suggests that mind wandering may be functional, in that it can help with autobiographical planning and everyday problem solving (Baird et al., 2011; Bernsten & Jacobsen, 2007; Morsella, Ben-Zeev, Lanska, & Bargh, 2010). There is further evidence that mind wandering can be helpful for spurring creative ideas and insights. For instance, it has been shown that, when people were working on a creative idea generation task, engaging in a period of mind wandering (compared to performing a demanding task that left little room for mind wandering) helped them come up with a greater number of creative ideas afterwards (Baird et al., 2012). Moreover, a greater self-reported tendency to mind wander during everyday activities has been found to be associated with more creative insights in a creative problem-solving task (Baird et al., 2012; Zedelius & Schooler, 2015). Thus, all in all, there is evidence that spontaneous stimulus-unrelated thoughts, while often trivial in content, can be useful for planning, problem solving, and creative insights.

Research on lay theories of mind wandering has not directly addressed people's beliefs about the function of spontaneous stimulus-unrelated thoughts for *creative* insights per se, but suggests that common lay theories attribute a somewhat similar special meaning to spontaneous stimulus-unrelated thoughts. It has long been thought that semi-spontaneous thoughts—elicited through methods such as hypnosis, free association, or projective tests—reveal important insights, typically concerning an individual's secret motives and desires (Cramer, 1991; Holmes, 1968; Jacoby & Kelley, 1992; Murray, 1951; Poole, Lindsay, Memon, & Bull, 1995; Wegner & Smart, 1997). Inspired by this idea, Morewedge and colleagues reasoned that stimulus-unrelated thoughts that occur to us entirely spontaneously and during everyday activities could be interpreted by laypeople as providing meaningful self-insights due to our perceived lack of control over these thoughts (Morewedge, Giblin, & Norton, 2014). If a thought occurs to us uncontrollably and for no apparent reason, so the supposed lay theory goes, the thought must be personally meaningful. The authors indeed found that participants judged various types of spontaneous stimulus-unrelated thoughts, including dreaming, mind

wandering, and Freudian slips, as more meaningful and providing more self-insight than more deliberate thoughts. Moreover, participants rated the *same* thought (e.g., a positive or negative childhood memory) as more insightful when they imagined it occurring to them spontaneously during an unrelated task, then when they were simply asked to try to recall it. Thus, lay theories about the meaning of spontaneous stimulus-unrelated thoughts show some overlap with scientific theories in that both consider stimulus-unrelated thoughts a potential source of valuable insights. However, considering that most stimulus-unrelated thoughts revolve around mundane content, the special meaning laypeople attribute to those thoughts seems exaggerated.

Lay Theories About the Controllability of Stimulus-Unrelated Thoughts

We have speculated that people's lay theories about how much they mind wander and what meaning it has are pervaded by an experienced lack of control over their thoughts. Indeed, the fact that we spend a substantial amount of time engaged in stimulus-unrelated thoughts, often without being aware of it (Schooler et al., 2011; Seli et al., 2016) and despite the numerous costs frequently associated with it (Mooneyham & Schooler, 2013), suggests that we lack control over our stimulus-unrelated thoughts. On the other hand, there is some evidence that mind wandering is not entirely uncontrollable. First, people *sometimes* mind wander intentionally, for instance to cope with boredom (Seli et al., 2016). Moreover, it has been found that people mind wander more at "opportune" moments, that is, when task demands are low, then when a task requires their full attention (e.g., Levinson, Smallwood, & Davidson, 2012; Smallwood & Schooler, 2006; Smallwood, Obonsawin, & Reid, 2003). This suggests that people exert at least some amount of control over when they let their minds wander. One could counterargue that this type of context-dependent mind wandering does not reflect active, strategic control, but that people simply *cannot* mind wander as much when their working memory resources are tied up by a demanding task (Smallwood, 2010; see also McVay & Kane, 2010). However, the tendency for "opportune" or "strategic" mind wandering (Franklin et al., 2014) is greater among individuals with larger working memory capacity (Kane et al., 2007; Rummel & Boywitt, 2014). Thus if it were the case that demanding tasks only reduce mind wandering because they tax-limited working memory resources, we would expect that high-capacity individuals mind wander more during demanding tasks. Instead, they mind wander less during these tasks (yet more during undemanding tasks). Finally, evidence that people have at least some, however limited, control over their spontaneous stimulus-unrelated thoughts comes from the finding that people self-catch more stimulus-unrelated thoughts when they are more motivated to do so (Zedelius, Broadway, & Schooler, 2015).

In light of the mixed evidence for controllability, we expected that people would have different lay theories about the topic. Some may view mind wandering as something that is largely outside their control, due perhaps to spontaneous attentional fluctuations inherent in the functioning of the brain. Others may interpret episodes of mind wandering as failure on their part to pay attention or control their thoughts. Such different beliefs seem to be reflected in the way people talk about mind wandering. Sometimes people talk about it in a way that suggests passivity and a lack of control, using phrases such as: "My mind has wandered off again," or "My thoughts got carried away." Sometimes people use more actively formulated phrases that imply a certain level of personal control and responsibility, such as "I wasn't paying attention" or "I was thinking about something else". Moreover, we routinely demand of children or students that they pay attention to their current tasks and activities. Based on the principle that "ought implies can", demanding of others that they control their thoughts betrays the implicit theory that they *can* control their thoughts (Scruton, 1982; Stern, 2004, Vranas, 2007).

To formally assess people's beliefs about their ability to control their wandering minds, and examine whether these beliefs affect actual mind-wandering rates by way of a self-fulfilling prophecy, we developed a novel scale that assesses the extent to which individuals agree or disagree with statements presenting mind wandering as something that is controllable or largely outside of personal control (e.g., "Even in moments when it really matters, I can't do much to keep my mind from wandering"; "How much people mind wander is something about them that they can't change very much"; Zedelius, Protzko, & Schooler, 2017b). In several studies, conducted online with a community sample and in the laboratory with students, we found that scores on the scale varied among individuals, confirming our expectation that individuals have different lay theories about mind wandering and controllability. More interestingly, we found that individual differences in these lay theories predicted participants' self-reported mind-wandering rates during everyday activities (Study 1) as well as their probe-caught mind-wandering rates during a reading task in the laboratory, in which they read a short fictional text for comprehension (Studies 2–3). Individuals who believed that mind wandering is controllable reported fewer mind wandering episodes than those who believed that it is uncontrollable. Importantly, they also showed increased reading comprehension. Thus, it seems that people who believe that they have more control over their mind wandering actually mind wander less. An explanation for this finding is that people who believe that they have more control over their mind wandering regulate their attention more. This is in line with previous research showing that people are more likely to self-regulate their behavior when they believe that they have control over the behavior (e.g., Burnette et al., 2013).

The relationship between people's lay theories about mind wandering and their actual tendencies to mind wander can go in both directions. Individuals who mind wander a lot may infer that mind wandering must be very difficult or impossible to control. To show that lay theories about mind wandering can also affect mind-wandering rates, we experimentally manipulated lay theories

(Zedelius et al., 2017b, Study 4) by presenting participants with instructions promoting either a "controllable" theory or an "uncontrollable" theory, or neutral instructions. In all three conditions, participants were given the same definition of mind wandering and were told that mind wandering often happens spontaneously. The only difference was that we told participants that people are "surprisingly good at controlling their mind wandering", "simply by deciding to focus", or that mind wandering is "very hard if not impossible to control", and that people often fail to control their mind wandering "despite trying very hard to focus". After receiving instructions, participants performed the same reading task used in the earlier correlational studies (reading for comprehension), during which they were intermittently probed and asked whether or not they had been mind wandering just prior to the probe. The results showed that participants in the controllable condition reported fewer probe-caught mind wandering episodes and higher reading comprehension scores than those in the uncontrollable condition.

More research is needed to test the mechanism behind this effect. The (chronic or experimentally induced) belief that mind wandering is controllable could facilitate sustained attention, reducing the occurrence of task-unrelated thoughts. Alternatively it is possible that the belief leads people to *notice* task-unrelated thoughts more, enabling them to redirect their attention to the task, and thus making mind-wandering episodes more short-lived and less disruptive. It is also possible that individuals who believe that mind wandering is controllable (vs. uncontrollable) are better at regulating their attention in line with current task demands, leading them to mind wander more at opportune moments and less when demands are high. Finally, it is in principle possible that lay theories about mind wandering affect people's *interpretations* of what constitutes task-unrelated thought more than actual incidences of mind wandering, thus leading to biased self-reports. Note that this latter explanation, however, does not account for the finding that participants with a "controllable" lay theory of mind wandering reported not only fewer mind wandering episodes but also showed increased reading comprehension. That said, future research is necessary to examine these different potential mechanisms to help us get a better understanding of how lay theories affect people's reported and actual mind wandering.

Another unanswered question is where lay theories about the controllability of spontaneous stimulus-unrelated thoughts originate. In one study, we found that lay theories about the controllability of mind wandering correlated, albeit weakly, with lay theories about intelligence (Zedelius et al., 2017b, Study 1). Individuals who believed more strongly that one's tendency to mind-wander is something that is in principle controllable, were also slightly more likely to endorse the belief that intelligence is a skill that can be improved with practice. This suggests that these distinct lay theories may fit into a network of interrelated lay beliefs about cognitive capacities. More research is needed to investigate how different lay theories relate to each other and if they are causally linked. If so, it may be the case that strengthening one lay theory, say, that mind wandering is controllable, may also strengthen related beliefs, such as the belief that intelligence or other mental capacities can grow and be developed.

Lay Theories About Intrusive Thoughts

Beliefs about controllability have received particular attention in research on intrusive thoughts. Intrusive thoughts are spontaneous stimulus- or task-unrelated thoughts whose occurrence is experienced as unwanted or unacceptable (e.g., Rachman, 1981). Intrusive thoughts are not by definition negative in content. People also experience intrusive thoughts with positive or mixed content. Those can be thoughts that occur with a disruptive suddenness or intensity or thoughts that are deemed taboo, such as thoughts with sexual content or thoughts about a former romantic partner or a romantic alternative (Baird, Smallwood, Fishman, Mrazek, & Schooler, 2013; Byers, Purdon, & Clark, 1998; Bywaters, Andrade, & Turpin, 2004; Clark, Purdon, & Byers, 2000; Gonzaga, Haselton, Smurda, Davies, & Poore, 2008; Reynolds & Salkovskis, 1992). Most intrusive thoughts, however, revolve around worries and fears (Clark & de Silva, 1985). Moreover, following a minor or major traumatic event, it is common for individuals to reexperience the event in the form of intrusive thoughts and memories (Clark, 2005; Davies & Clark, 1998; Reynolds & Brewin, 1999).

There is considerable evidence that healthy individuals routinely experience intrusive thoughts (e.g., Bywaters et al., 2004; Clark, 2005; Rachman & de Silva, 1978; Sarason, Pierce, & Sarason, 1996; Wegner & Pennebaker, 1993), without necessarily experiencing great psychological distress, and sometimes even without being consciously aware of them (Baird et al., 2013). Yet, frequent intrusive thoughts can be a source of distress, and such thoughts are a defining feature of many clinical disorders; Depression and generalized anxiety disorder are associated with intrusive thoughts akin to rumination and self-doubt (Harrington & Blankenship, 2002; Reynolds & Brewin, 1999; Wenzlaff, Wegner, & Roper, 1988). Individuals suffering from insomnia report frequent intrusive thoughts related to their inability to sleep (e.g., Harvey, 2002; Harvey & Payne, 2002; Wicklow & Espie, 2000). OCD is characterized by repetitive intrusive thoughts and impulses, often involving some form of harm (Rachman, 1997), and PTSD is defined by frequent intrusive thoughts and memories related to a traumatic event (Clark, 2005; Davies & Clark, 1998; Reynolds & Brewin, 1999).

Interestingly, research has shown that the intrusive thoughts experienced by healthy individuals are surprisingly similar in form and content (albeit comparatively less frequent) to the intrusive thoughts observed in clinical populations (e.g., Clark & Rhyno, 2005; Rachman & de Silva, 1978; Radomsky et al., 2014; Sarason et al., 1996; Wegner & Pennebaker, 1993). Yet, individuals with disorders involving intrusive thoughts, compared to healthy individuals, generally perceive these thoughts as considerably more distressing, anxiety provoking, and difficult to control (Rachman & de Silva, 1978). What, then, explains the markedly different responses of these populations to rather similar types of mental events? Research suggests that an important difference between the intrusive thoughts of healthy individuals and those symptomatic of a disorder lies in people's lay theories about

the meaning and consequences of intrusive thoughts, particularly those related to the perceived need to control one's thoughts.

In the context of obsessive–compulsive disorder, Rachman (1997) proposed that intrusive thoughts are more likely to cause distress and develop into obsessions if an individual believes them to reveal insights into their true motives and desires. As discussed before, people generally tend to attribute such meaning to spontaneous stimulus-unrelated thoughts (Morewedge et al., 2014). While this tendency may be relatively inconsequential when it comes to mundane mind wandering (e.g., about a recent memory or a future activity), it can have severe consequences in the case of intrusive thoughts, which are often perceived as immoral, disgusting, or dangerous. The thought of causing another person harm, for instance, can lead a person to believe that he or she is fundamentally evil or worthless, a belief that causes understandable distress. Other common lay theories that can exacerbate the distress are, first, the belief that merely *having* a particular thought is itself dysfunctional or immoral, and, second, that one is likely to act upon one's thoughts. This latter belief is also referred to as *thought-action fusion* (see Shafran & Rachman, 2004 for a review). Both these beliefs have been found to be common among patients with OCD and PTSD (e.g., Bryant & Guthrie, 2005; Owens, Chard, & Cox, 2008). Moreover, these beliefs often lead to yet another, related, belief; the belief that it is necessary to gain full control over one's intrusive thoughts (Obsessive Compulsive Cognitions Working Group, 2005; Shafran, Thordardson, & Rachman, 1996).

The most drastic form of exerting control over one's thoughts is thought suppression—blocking the very occurrence of unwanted thoughts from the stream of consciousness. Thought suppression is a strategy often adopted spontaneously in response to intrusive thoughts (e.g., Clark & Purdon, 2009), and also an approach sometimes used in therapeutic treatments of disorders involving intrusive thoughts. One of the oldest, and still widely used, treatments for obsessive–compulsive disorder, for instance, is thought stopping, in which patients are taught to respond to intrusive thoughts by saying or thinking the word "stop" (or sometimes performing a corresponding action such as snapping a rubber band on the wrist; Hannan & Tolin, 2005; Wolpe, 1990). There is evidence, however, that thought stopping or suppression is mostly ineffective. Attempts to suppress thoughts, while effective for a very short period of time, can lead to rebound effects; that is, an increase rather than decrease in the number of intrusive thoughts, over time (for a meta-analysis, see Abramowitz, Tolin, & Street, 2001; for more recent studies, see Iijima & Tanno, 2012; Koster, Rassin, Crombez, & Näring, 2003; Lambert, Hu, Magee, Beadel, & Teachman, 2014; Logel, Iserman, Davies, Quinn, & Spencer, 2009), along with increased psychological distress (Beck, Gudmundsdottir, Paylo, Miller, & Grant, 2006; Wegner & Gold, 1995). To make things worse, rebound effects following attempts to suppress thoughts have also been shown to diminish the belief that thoughts are controllable (Beck et al., 2006; Magee, Harden, & Teachman, 2012), and increase psychological distress and self-blaming (Clark & Purdon, 2009; Magee & Teachman, 2007).

Different explanations for rebound effects following thought suppression have been proposed. According to Wegner's ironic monitoring theory (Wegner, 1994),

attempts to suppress a particular thought engage two processes: For one, a conscious control or operating process deliberately diverts attention away from the unwanted thought by bringing to mind other, unrelated thought content, such as when one thinks of happy memories or lists items on one's mental grocery list to refute an unwanted or intrusive thought. At the same time, a monitoring process scans the stream of consciousness to detect unwanted thought content when it intrudes. Ironically, in order to detect an unwanted thought when it occurs, the monitoring process has to also keep the thought itself and related thought content accessible in mind. Due to this heightened accessibility, the thought will, from time to time, enter the stream of consciousness, and the more other topics have been exhausted, the more likely it becomes that one's mind returns to the suppressed thought (Wegner & Erber, 1992). Moreover, when attentional resources are diverted from the process of actively generating unrelated thought content, the unwanted thought becomes more likely to occur. This makes for an increased rebound effect under conditions of high cognitive load or after an extended period of thought suppression (Wegner & Erber, 1992; Wenzlaff & Wegner, 2000).

While Wegner's theory remains the most prominent explanation of rebound effects following thought suppression, another, not necessarily alternative but complementary, explanation has been put forward, which places an emphasis on the role of beliefs. According to the motivational inference model (Förster & Liberman, 2001, 2004), individuals interpret the effort involved in suppressing intrusive thoughts as diagnostic of how much they want to engage in those thoughts or in activities associated with the thoughts. For example, if a person finds it very difficult to suppress thoughts about a former romantic partner, they may conclude that they must have a strong desire to think of that person, or to reengage with them. This, in turn, may encourage the person to engage more, rather than less, in the intrusive thought. Förster and Liberman tested this model in a number of studies. In one study (Förster & Liberman, 2001, Study 1), they instructed participants to suppress thoughts of a white bear. In one condition (high motivation condition), they then experimentally induced the lay theory central to the motivational inference model in participants by simply telling participants that having difficulty suppressing thoughts of white bears indicates a high motivation to think of white bears. In a second condition (low motivation condition), they gave opposite instructions (i.e., having difficulty suppressing thoughts of white bears indicates low motivation to think these thoughts), and in a control condition, they did not induce a lay theory. While the conditions did not differ in their *initial* success at suppressing thoughts of white bears, participants in the high motivation condition indeed showed a greater rebound effect than participants in the low motivation condition. Moreover, participants in the control condition showed the same strong rebound effect as those in the high motivation condition. These results suggest that the rebound effect is indeed caused by spontaneous motivational inferences.

Thus, to sum up the above research, different lay theories can exacerbate intrusive thoughts, both in frequency and in the psychological distress they cause, in several ways: first, lay theories about the meaning and consequences of intrusive thoughts—specifically, the beliefs that unwanted thoughts convey insights into

one's motives, that having unwanted thoughts is dysfunctional or immoral, and that one is likely to act upon one's intrusive thoughts—can cause distress and motivate individuals to try to control or suppress their thoughts. Second, attempts to suppress intrusive thoughts can increase the frequency and intensity of these thoughts by way of a rebound effect. Third, the belief that failures at thought suppression convey motivation to engage with an unwanted thought can further increase the rebound effect.

Earlier, we discussed evidence suggesting that the belief that one has control over one's spontaneous stimulus-unrelated thoughts, in the context of normal mind wandering, is associated with a reduced number of stimulus-unrelated thoughts. How does this finding relate to the seemingly contradicting findings that attempts to control intrusive thoughts so often lead to rebound effects? First, we note the distinction between having control over one's general tendency to mind wander and exerting control over the occurrence of a specific unwanted thought. Although the exact mechanisms that allow us to control our tendency to mind wander are not clearly defined, it likely requires the capacity to maintain sustained attention and involvement in one's current task or environment and the capacity to refocus attention when noticing that the mind has wandered off. These processes are different from the suppression of a particular thought. When suppressing a particular thought, processes such as Wegner's ironic monitoring and motivational inferences are much more applicable. One can more easily monitor a particular thought than a range of all kinds of thoughts that have the potential to come up during some activity. And having difficulty suppressing a particular thought can more easily give rise to the inference that one must have a strong desire to engage with this thought. Still, these processes are likely not entirely absent in people's responses to normal mind wandering. For instance, observing that one's mind frequently wanders off to a particular topic could lead an individual to try to temporarily suppress thoughts about that topic, which could evoke ironic monitoring effects. And having difficulty preventing a range of different task-unrelated thoughts might not trigger motivational inferences about any particular thought, but it could lead a person to conclude that they would rather engage in anything else but their primary activity.

Perhaps a more important distinction relevant to explain the different effects of control beliefs on normal mind wandering and intrusive thoughts is between the belief that control over one's thoughts is *possible* and the belief that exerting complete control is *necessary*. For individuals who believe that their intrusive thoughts are immoral or unacceptable, or that merely thinking these thoughts makes it more likely that one will act on them, thought control is often seen as necessary (Purdon & Clark, 2002; Shafran, Thordarson, & Rachman, 1996). This belief has more serious implications than the belief that control is merely possible. If control is necessary, every intrusive or unwanted thought represents a failure. This could maintain the vicious circle of trying harder to control one's thoughts and thereby increasing the change for rebound effects. To successfully regulate one's thoughts, it may be critical to have an accepting attitude towards occasional failure. Thus, we

suggest that the belief that one has the potential to exert some control over one's spontaneous stimulus-unrelated thoughts can be beneficial, as long as one does not hold the dysfunctional belief that absolute control is necessary.

Concluding Remarks and Future Directions

Many of the thoughts that pass through our minds are spontaneous and entirely unrelated to our current task or environment. Given how frequent such thoughts are, and how surprising—and sometimes even distressing—they can be, it is intriguing to ask how people make sense of these experiences. What kinds of implicit or explicit theories do they have to explain why their mind wanders off to a memory of an old flame, why a student is not paying attention, or why a distressing unwanted thought keeps coming up in their mind? And how do these theories, in turn, affect their thoughts and behavior? While the last decades have seen much progress in understanding the causes and consequences of spontaneous stimulus-unrelated thoughts, it is only recently that we have begun to ask these questions about people's lay theories about spontaneous stimulus-unrelated thoughts. Most of this research has focused on theories revolving around meaning and controllability. As we have discussed in this chapter, people tend to ascribe important meaning to spontaneous stimulus-unrelated thoughts. Spontaneous thoughts are often believed to convey insights into our motives and desires. Sometimes, overstating the meaning of spontaneous thoughts can have negative consequences, as is the case for intrusive thoughts. Such thoughts are often evaluated on moral grounds and are sometimes believed to be precursors of harmful actions. People hold different beliefs about the degree to which spontaneous stimulus-unrelated thoughts are controllable or outside their control. We have discussed recent findings showing that these beliefs can affect how much people actually mind wander. Individuals who believe that they can control their spontaneous thoughts mind wander less. We have also discussed the role dysfunctional control-related beliefs play in mental disorders involving intrusive thoughts. Particularly the belief that it is necessary to fully control one's unwanted thoughts can increase the frequency and intensity of these thoughts.

The research discussed in this chapter illustrates the important role that control-related beliefs play in how much people experience spontaneous stimulus-unrelated thoughts and how they respond to such thoughts. Thus, an intriguing question for future research is how to induce adaptive changes in people's lay beliefs in order to help them minimize disruptive mind wandering and distress in response to intrusive thoughts.

One approach to challenging people's lay theories is to be fairly explicit, for instance by simply telling them that they have a good amount of control over how much they mind wander during lectures or in class. This approach has been effective in the short term in the laboratory (Förster & Liberman, 2001, 2004; Reuven-Magril, Rosenman, Liberman, & Dar, 2009; Zedelius et al., 2017b),

but it is an open question whether it is equally effective in real-life settings and whether it has long-lasting effects. Encouraging evidence that such an approach could work comes from successful real-life interventions targeting lay theories related to intelligence (Blackwell, Trzesniewski, & Dweck, 2007; Burnette & Finkel, 2012; Yeager & Dweck, 2012; Yeager & Walton, 2011). However, it needs to be explored whether it is effective for theories about spontaneous and intrusive thoughts. In this area, people may have strongly held preexisting beliefs that may be anchored in moral or religious belief systems (e.g., concerning the meaning and moral implications of taboo thoughts; Berman, Abramowitz, Pardue, & Wheaton, 2010), and are more resistant to change. Moreover, changing people's lay theories in this way may be particularly difficult when people's day-to-day experiences seem to provide contradicting feedback. The belief that one has control over one's wandering mind, for instance, is easily challenged by frequent and frustrating experiences of mind-wandering in everyday life, or by frequent experiences of unwanted and intense intrusive thoughts.

Achieving long-lasting, stable change may require an approach that contains both explicit instructions about the efficacy of mental control while also providing practical, training to maintain sustained attentiveness. A training that seems to practice this skill is mindfulness meditation. Mindfulness meditation is derived from the Eastern Vipassana meditation (Kabat-Zinn, 2003) and typically involves focusing attention on one object (e.g., one's breath) and returning to it after noticing that one's mind has wandered. Supporting the view that mindfulness and mind-wandering are opposing constructs (Mrazek, Smallwood, & Schooler, 2012), studies have shown that a brief mindfulness exercise can temporarily reduce mind-wandering (Mrazek et al., 2012; Zeidan, Johnson, Diamond, David, & Goolkasian, 2010), and that mindfulness-meditation training over several weeks yields further improvements in attentional control (Jensen, Vangkilde, Frokjaer, & Hasselbalch, 2012; Jha et al., 2015; Mrazek, Franklin, Phillips, Baird, & Schooler, 2013; Posner, Rothbart, & Tang, 2015; Sedlmeier et al., 2012; Tang & Posner, 2009). Observing such improvements in oneself may also strengthen the belief that one has control over one's thoughts, a belief that, in turn, could further improve the effectiveness of the training itself, thus producing a mutually reinforcing effect of instruction and training. There is indeed preliminary evidence that mindfulness training increases people's endorsement of the belief that they have control over their spontaneous stimulus-unrelated thoughts (Mrazek et al., 2017). To what extent this belief can further increase the effectiveness of the training is a question that needs to be examined in future research.

We should note that any approach to changing people's lay theories of mind wandering in order to help them maintain better focus or experience less distress in response to intrusive thoughts should focus on promoting the belief that control is possible to some extent, but that full control is not the goal. As we have discussed earlier in the context of intrusive thoughts, the belief that it is necessary to fain full control over one's unwanted thoughts is particularly likely to lead to rebound effects and increased distress. In most mindfulness instructions, it is emphasized that complete thought control is neither possible nor desirable. It is understood that

spontaneous and sometimes intrusive thoughts are a constant part of the stream of consciousness. Instead of trying to control or suppress thoughts, practitioners are instructed to observe their thoughts in a detached, nonreactive manner and with a nonjudgmental attitude. It is therefore expected that engaging in mindfulness-based training will increase the likelihood that a person responds to intrusive thoughts with acceptance rather than suppression, a response style that has been shown to be associated with reduced suppression-related rebound and reduced psychological distress (Marcks & Woods, 2005, 2007; Najmi, Riemann, & Wegner, 2009). Thus, by fostering an accepting attitude, mindfulness-based training may be a good approach to challenging the dysfunctional belief that it is necessary to gain complete control over the occurrence of unwanted intrusive thoughts.

In recent years, it has been proposed that disorders involving intrusive thoughts can be treated effectively by challenging dysfunctional beliefs about control through a combination of explicit instruction and more experiential approaches. Marcks and Woods (2005), for instance, have noted that "creating effective acceptance-based procedures can be a challenge, since acceptance is naturally counter-intuitive. Furthermore, acceptance cannot be manipulated through simple instructions (i.e., "accept thought x"), but rather it must be done experientially." In cognitive or meta-cognitive therapies for OCD patients are often encouraged to seek out short exposure to stimuli or environments eliciting intrusive thoughts, a process that is thought to break thought-action fusion because the patient experiences directly that they do not, as is their fear, act on unwanted thoughts (e.g., Fisher & Wells, 2005; Wells, 2005). Mindfulness-based therapy has also been proposed to be a useful approach to treating OCD, again because adopting a detached perspective towards one's own thoughts is thought to reduce thought-action fusion and the belief that one must control unwanted intrusions (Hannan & Tolin, 2005; Wells, 2005; Wilkinson-Tough, Bocci, Thorne, & Herlihy, 2010; Wegner, 2011).

We have devoted much attention to the aspect of control in people's lay theories about spontaneous stimulus-unrelated thoughts. There are many other aspects to people's lay theories that future research could examine. For instance, we know from mind wandering research that engaging in stimulus-unrelated thoughts has widespread negative, and also some positive consequences. What beliefs do people have about how mind wandering affects them? Do these beliefs shape when or how much people mind wander, or how they experience it?

There is evidence that engaging in stimulus-unrelated thoughts often brings people in a more negative mood (Franklin et al., 2013; Killingsworth & Gilbert, 2010; although highly interesting mind wandering episodes can increase people's; see Franklin et al., 2013). Moreover, there is overwhelming evidence that mind wandering interferes with performance on even the simplest of tasks (see Mooneyham & Schooler, 2013). To what extent are people aware of these effects—both generally, and when it comes to *their own* tendency to mind wander? Do people believe that mind wandering makes them unhappy, or do they think it offers a pleasant distraction from boring activities? Do people hold different beliefs about how much mind wandering hurts their performance? If so, these beliefs could affect

how much people regulate their thoughts, similarly to what we have found for control-related beliefs. There is also evidence that engaging in stimulus-unrelated thoughts can be a source of creativity (Baird et al., 2012; Zedelius & Schooler, 2015. To what degree is this reflected in people's lay theories? Do some people embrace mind wandering episodes more than others because they believe it to bring about valuable creative insights? What other specific beliefs do people have about how spontaneous stimulus-unrelated thoughts influence their lives? These are all questions for future research that go beyond the question of how much control we have over our thoughts.

In conclusion, the present chapter has provided an overview of the relatively young field of research devoted to understanding how laypeople make sense of the spontaneous stimulus-unrelated thoughts that pass through their minds during much of their waking life. The research illustrates that people do not believe these thoughts to be merely trivial distractions of their day-to-day activities. It also shows that people's beliefs or lay theories matter. They affect how much people let their minds wander or regulate their thoughts, and how they respond to unwanted thought intrusions. Moreover, dysfunctional beliefs can lead people to engage in ineffective thought-control strategies, which cause much psychological distress. Many questions remain to be explored before we can truly appreciate the full manner in which people's lay theories about mind wandering affect their day-to-day lives, but it is clear that these questions deserve our attention.

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