

CHAPTER 3

Desire and Desire Regulation

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A good deal of people's waking time is, more or less directly, spent thinking about and dealing with desire. There is no question that desires are often benign, functional, and evolutionary adaptive for the individual. However, there are cases where desire stands in conflict with important (self-regulatory) goals or (moral) values. Prime examples include the ex-smoker who, upon seeing other people smoke, reexperiences a strong craving for a cigarette despite her intention to never smoke again, or two colleagues at work who cannot help feeling sexually attracted to each other despite the fact that one of them has made public vows of faith on the not-so-long-ago wedding day. And sometimes, much more trivially, the time or opportunity to fulfill a certain desire is just not "right," such as when someone feels a strong need to pee on a long bus ride and, alas, the toilet is broken. There are both individual and societal reasons for why the capacity for desire regulation is such a highly important aspect of everyday functioning.

The primary questions that we seek to answer in this chapter are: What is desire? When does it become problematic? How does desire regulation work? When and why can it go wrong? And how can it be improved? To approach issues of desire regulation, we will draw both on the literature of self-control and emotion regulation. The self-control literature is central because desires are driving forces that sometimes need to be held in check through inhibition or overriding. Self-control research has yielded a wealth of insights on how such *inhibitory* processes may work and when they may be disturbed. More recently, the field has begun to scrutinize anticipatory, preventive strategies through which people actively set the stage for later self-control successes (Fujita, 2011;

Hofmann & Kotabe, 2012), which we believe to be an essential component of desire regulation. The literature on emotion regulation is also relevant in that desires share many similarities with emotions (Hofmann & Kotabe, 2013). Therefore, we argue that an emotion-regulation perspective may yield important practical insights into how people may become more successful at regulating problematic desires. Also, the emotion-regulation literature has, since the conception of the process model of emotion regulation (Gross, 1998), always adopted a broad focus encompassing both early-stage (antecedent-focused) and late-stage (response-focused) forms of emotion regulation, which resonates with our approach in the present chapter.

Until recently, cases of desire regulation have been mainly studied under the rubric of goal conflicts (e.g., a short-term “goal” to enjoy tasty chocolate versus a long-term goal to lose weight; a short-term “goal” to enjoy sex versus a long-term goal to be faithful). While such a terminology is elegant, parsimonious, and highly general, we believe it may actually hinder a deeper understanding of the *specific* characteristics of the two opponents involved in these motivational struggles (see Hofmann & Nordgren, Introduction, this volume). That is, by framing desire as “just” another (short-term) goal, we might sacrifice a closer analysis of the specific laws that trigger and fuel desire, and the most effective strategies to tame it. By treating desire as an affective-motivational phenomenon of its own kind, however, we can begin to ask more specific questions about how desire waxes and wanes in close interaction with environmental characteristics and how it can be strategically up- or down-regulated.

What Is Desire?

Even though the term *desire* can refer to all kinds of wishes and wants, we stay with the more narrow definition of *appetitive* desires as “those motivations that propel us to approach certain stimuli in our environment and engage in activities with them that provide us with a relative gain in immediate pleasure (including relief from discomfort)” (see Hofmann & Nordgren, Introduction, this volume). Such a definition includes desires rooted in physiological need states, such as for food, alcohol, sex, or rest, or acquired through a history of reinforcement learning as in the case of drugs, media addiction, spending urges, and so forth (Hofmann & Kotabe, 2013). Moreover, we use the term *craving* to refer to desires across domains that are particularly high intensity (e.g., “drug craving,” “food craving”).

Desire Components

In this chapter and elsewhere (Hofmann & Kotabe, 2013), we argue that desires are much like emotions. That is, desires share many of the major

hallmark characteristics of an emotion (see also Franken, 2003; Franken, Chapter 19, this volume). Like emotions, desires are multifaceted phenomena combining affective, motivational, and cognitive components.

The affective component consists of a feeling of “wanting” of varying intensity. Desires “tell” us that a given thing, person, or activity has high momentary relevance against the backdrop of our current goals, bodily need states, and learning history. We see phenomenological experience of wanting as the core emotional experience of desire. It is separable from the mixed emotional consequences that enacting versus inhibiting desires may have—including pleasure and possibly guilt from desire enactment and frustration, and possibly pride from desire nonenactment (Kotabe, Righetti, & Hofmann, 2014). In line with an influential distinction by Berridge, Robinson, and Aldridge (2009), we identify desire with wanting (incentive salience) rather than liking (desire’s hedonic impact). From a neuropsychological perspective, the current consensus is that desire originates in largely subcortical neural systems that include mesolimbic dopamine projections (Berridge et al., 2009; Peciña & Berridge, 2005). Reward signals from midbrain regions are then forwarded to prefrontal regions in the brain involved in reward representation and integration, with the orbitofrontal cortex (OFC) being among the regions most consistently implicated in the conscious representation of desire (Van der Laan, de Ridder, Viergevera, & Smeets, 2011).

The motivational component encompasses desire’s power to prepare and instigate behavior. Desiring something means wanting to *have*, *consume*, or *do* something that we expect will yield pleasure (or reduce discomfort). When we feel tempted by a lavish-looking desert, we expect its consumption to provide us with high sensual pleasure. When an alcohol addict craves a glass of whiskey, he or she may expect that doing so will reduce distress—including, ironically, distress caused by the addiction itself. Hence, desire propels us to approach and consume things through the more or less explicit promise of pleasure or relief. Although such hedonic motives may not be the only reasons why we pursue desire, they are clearly a defining feature of desire’s motivational component.

Next to the affective and motivational components desire also has an important cognitive component. According to Kavanagh, Andrade, and May’s (2005) elaborated intrusion theory of desire (Andrade, May, Van Dillen, & Kavanagh, Chapter 1, this volume), desire is typically accompanied by intrusive thoughts about the object of desire. Such cognitions comprise expectations about the consequences of desire enactment and the feasibility of attaining the desired object, as well as mental simulations and fantasies. These cognitions can be quite biased through processes of motivated reasoning (see also de Ridder, de Witt Huberts, & Evers, Chapter 10, this volume), with stronger desires typically leading to more biased and distorted cognitions (Kavanagh et al., 2005). Moreover, the connection between cognition and affect is most likely not a one-way street. As a person mentally elaborates a desire, its strength may in turn,

increase, as it occupies even more mental resources and triggers further elaborations. Such a dynamic processing perspective may explain why desire sometimes escalates to the point where opposing mental representations such as those related to self-regulatory goals get “crowded out,” that is, temporarily forgotten (Hofmann, Friese, Schmeichel, & Baddeley, 2011; Hofmann & Van Dillen, 2012; Kavanagh et al., 2005).

Sampling Desires

How often do people experience desire and what are these desires about? In a recent experience sampling project, called the Everyday Temptations Study, we set out to approach this question empirically by collecting base rate information on the prevalence of various appetitive desires in everyday life (Hofmann, Baumeister, Förster, & Vohs, 2012a; Hofmann, Vohs, & Baumeister, 2012c). We used the experience-sampling method to capture desires “where the action takes place”—that is, as people navigate their everyday environments (Csikszentmihalyi & Larsen, 1987; Mehl & Conner, 2012). More than 200 participants from Germany were equipped with smartphones for a week. On multiple random occasions each day, they received a questionnaire via these smartphones and were asked whether they were currently experiencing a desire from a list of 15 desire domains including food, nonalcoholic drinks, sleep, sex, social contact, leisure, sports, spending, media, alcohol, tobacco, and other drugs. Participants reported a current desire about 50% of the time they were signaled. Thus, desiring something seems to be a very frequent feature of everyday life.

What were these desires about? Even though our list was probably nonexhaustive, it is informative to look at the relative frequency breakdown with which various desires were experienced over the course of the day. Figure 3.1 presents this data, together with the frequency breakdown from a similar study conducted recently in the United States involving about 100 subjects (Friese & Hofmann, 2014). The most frequently reported desires were those to eat, drink, and sleep, followed by desires for leisure/rest, social contact, and media use. These frequencies were largely replicated in the United States (i.e., the correlation of percentages for the desire categories assessed in both countries was $r = .95$).

How Does Desire Influence Behavior?

Desire emerges in a relatively automatic fashion as reward-processing centers in midbrain regions (e.g., the ventral striatum) evaluate external stimuli (or mental images thereof) against the backdrop of internal need states and an individual’s learning history (Hofmann, Friese, & Strack, 2009b; Hofmann & Van Dillen, 2012). This early reward processing may have the potential to trigger fast, impulsive, and habitual responses, which may

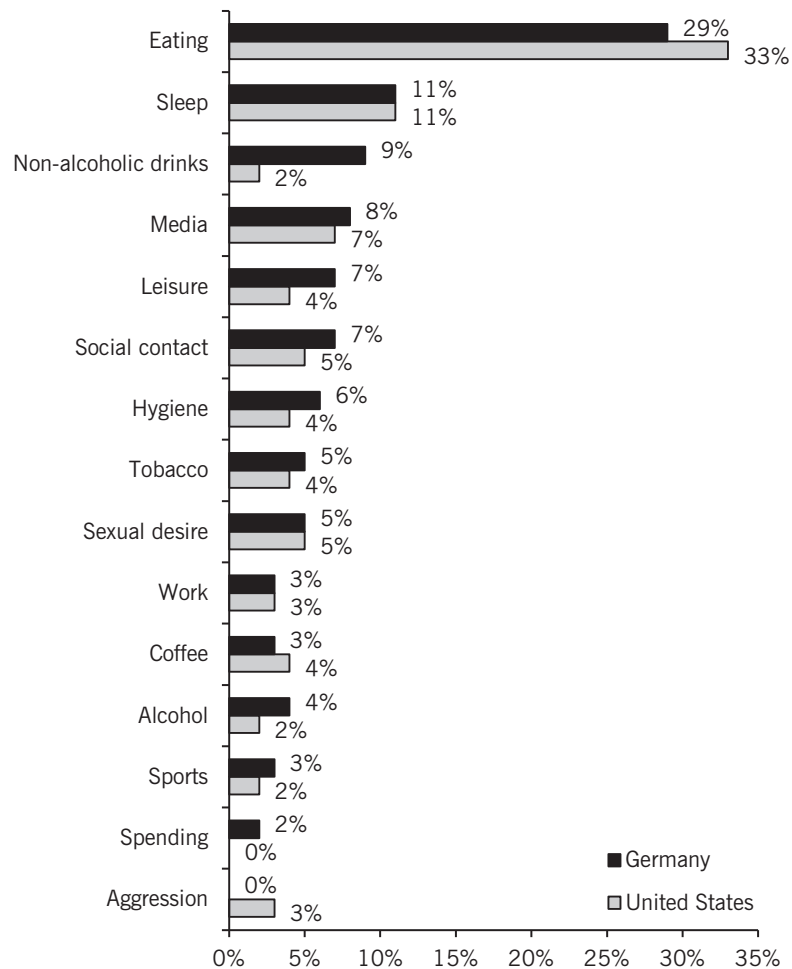


FIGURE 3.1. Desire frequencies from two experience-sampling studies conducted in Germany (Hofmann et al., 2013) and the United States (Frieze & Hofmann, 2014). Spending desires were not assessed in the United States, and desires to aggress were not assessed in Germany.

even happen outside of conscious awareness (e.g., Mogenson, Jones, & Yim, 1980; Winkielman, Berridge, & Wilbarger, 2005). Such impulsive responses may be most relevant in situations where the desired stimulus is already quite close in space and time.

However, the more typical route is that desire gains access to consciousness and deeply affects our thinking and planning. As spelled out by the elaborated-intrusion theory of desire (Kavanagh et al., 2005), desire-related processing can be subject to a vicious circle of reprocessing and rumination that, in turn, increases the feeling of wanting and the

motivational power of desire. As desire becomes more cognitively elaborated in working memory, so does its potential to instigate concrete action plans and behavioral intentions to consume the object of desire. Most important, elaborated desires may predispose the organism toward (sometimes problematic) consumption via two important mechanisms. First, elaborated desires may crowd out (i.e., temporarily deactivate) other representations from working memory, leading to a preoccupation with the desire at the expense of everything else, including self-regulatory goals and values (Hofmann et al., 2011; Kemps, Tiggemann, & Grigg, 2008b). Second, elaborated desires may instigate processes of motivated reasoning that license and justify indulgence (e.g., “I deserve a special treat today”; “others are having their share of cake, too”; “this is definitely going to be my last cigarette before I quit!”) (de Ridder, de Witt Huberts, & Evers, Chapter 10, this volume; Hofmann & Van Dillen, 2012). In the case of problematic desire, desires can thus hijack the very mechanisms that otherwise support “reasoned” action, resulting in “passionate” behavior that people may later regret.

Sources of Conflict: What Renders Desires Problematic?

It is important to note that desires and temptations are not synonyms. That is, temptations are a special subset of desires. To say that somebody is “tempted” by something means that the person has a desire to do *X* on one hand *and simultaneously* has reason not to do *X* (Mele, 2001). Whether a person has reason not to do *X* will depend on whether the behavior implied by the desire *conflicts* with that person’s set of endorsed self-regulatory goals, values, or otherwise activated competing motivations (Hofmann et al., 2012a). For example, the desire for sexual intimacy with a new acquaintance seems harmless unless one is already in an exclusive relationship. In modern society, it seems that intrapsychic conflict often accompanies desire because although desire is so “straightforwardly” connected to what promises immediate pleasure or relief from discomfort, its behavioral implications are often at odds with what is regarded as optimal, proper, or moral. In the Everyday Temptations Study, we found that 53.2% of desires were rated as not conflicting at all, 14.7% as mildly conflicting, 12.4% as somewhat conflicting, 10.9% as quite conflicting, and 8.8% as highly conflicting (Hofmann et al., 2012a). Thus, a nontrivial portion of desires was experienced as problematic. Accordingly, people indicated that they had attempted to resist their desire on a full 42% of occasions. They were successful about 83% of the time on average, with a lower likelihood of success for strong rather than weak desires (Hofmann et al., 2012a).

We also assessed information on the goals people reported as conflicting with their desire and proposed a taxonomy of five broad types of

conflicting goals (Hofmann et al., 2012c): (1) *health-protection goals* (23% of reported goals; e.g., the goal to eat healthily, to increase one's bodily fitness, to reduce the risk of infections); (2) *abstinence/restraint goals* (9%; e.g., the goal to save money, to end a dependency, to remain faithful); (3) *achievement-related goals* (28%; e.g., academic and work-related goals); (4) *time-use goals* (29%; e.g., the goal to use one's time efficiently, to not delay things, to get things done); (5) *social goals* (11%; e.g., the goal to improve or maintain one's social recognition, to conform to moral values and beliefs). Health-protection and abstinence/restraint goals reflect people's knowledge that the unrestrained enactment of certain desires carries health risks such as coronary heart disease from consuming too many unhealthy foods, lung cancer from smoking, or premature death from sexually transmitted diseases such as HIV. Achievement-related and time-use goals reflect people's knowledge that desire enactment may get in the way of important long-term projects, academic and work goals, or sport aspirations. For instance, surfing social media too often may interfere with one's study goals, giving in to the desire to rest and relax too often may hinder progress on the latest sales report, and so forth. Finally, social goals reflect people's knowledge that desire enactment may impact one's social reputation and/or interfere with one's internalized moral values and beliefs.

According to moral foundations theory (Graham et al., 2013), morality is based on several core moral principles: care ("don't harm other people"); fairness ("don't pursue your own advantage in disproportionate ways"); loyalty ("don't betray your in-group"); authority ("don't disrespect laws, rules, and authority figures"); and sanctity ("don't do something 'impure' or 'indecent'"). Another core moral principle may be honesty ("don't manipulate the truth"; Hofmann, Wisneski, Brandt, & Skitka, 2014). Each of these principles can, to various degrees, be violated by the enactment of a given desire. Take, for example, a typical case of adultery, brought about by strong sexual desire. It may result in harm (e.g., the emotional harm felt by the partner upon finding out), fairness violations (one partner unfairly pursuing his or her self-interest), betrayal (breaking the trust of the in-group partner), subversion of moral authority (e.g., religious norms related to monogamy), degradation (doing something "impure"), and dishonesty (the lying typically involved). People may be motivated to regulate their desires to the extent that they endorse these moral principles and anticipate their desire enactment will violate them.

Although there were some prominent connections between specific desires and specific opposing goals in the database (e.g., desire for tobacco vs. reducing health damage; spending desire vs. saving expenses), desire-goal conflicts came in many different combinations (see Hofmann et al., 2012c, Supplementary Figure 2). Thus, one and the same desire can be experienced as a temptation for many different reasons. Moreover, many desires were seen as conflicting with more than just one goal.

Interestingly, the amount of conflict experienced was not only a function of the importance assigned to these goals, but also of the number of goals with which a given desire was perceived to be in conflict. This suggests that a person's motivation to regulate a certain desire increases as that desire challenges the overall configuration of goals that the person holds. Taken together, a considerable portion of human desire is experienced as conflicting, due to a large number of possible reasons. We next turn to the various ways people may deal with such problematic desires through various mechanisms and strategies of desire regulation.

How Does Desire Regulation Work?

Given that desires and cravings may sometimes be experienced as conflicting with one's set of self-regulatory goals and values, the question emerges how tempting desires can be effectively controlled. In the remainder of this chapter, we focus on three general routes through which desire may be successfully regulated (in the sense that the behavior driven by the desire is not enacted): constraining the emergence of desire, desire down-regulation, and inhibition/overriding. These three routes are illustrated in Figure 3.2 in the context of a random person, Bill, who wants to get a better grip on his frequent desire for alcohol.

Constraining the Emergence of Desire

The first route, which has been the focus of more recent self-control research, encompasses those early-stage strategies that may lead an individual to not experience desire to begin with. As humans, we can play a quite active role with regard to the types of situations and stimuli we encounter in our day-to-day lives. These preventive strategies (Hofmann & Kotabe, 2012) require considerable foresight and experience as to which situations and stimuli are more likely to trigger problematic desire than others. As people extract evaluative lessons from their past behavior (Baumeister, Vohs, DeWall, & Zhang, 2007), however, they may become increasingly better at avoiding problematic desire. In the drinking example, when arranging meetings with his best friend, Bill may learn to avoid those places that typically trigger a strong desire for alcoholic drinks (bar) and suggest meeting in places that largely prevent the desire and/or opportunity for alcohol (spa) (see Figure 3.2, illustration on the left).

Situation and Stimulus Control

One common motto of all sorts of prevention is "the sooner the better." The same applies to desire prevention. Arguably the most effective strategy to prevent desire is to avoid exposure to tempting situations or stimuli

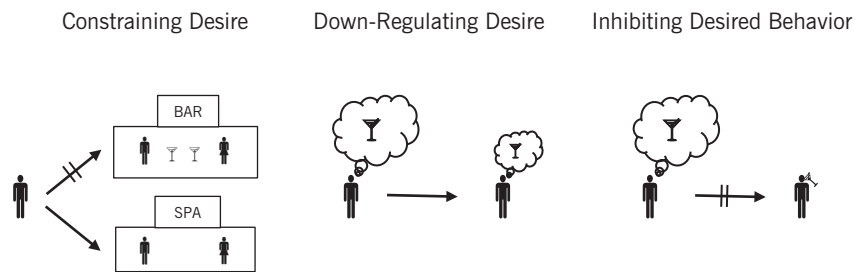


FIGURE 3.2. Illustration of three general routes to desire regulation with a drinking example. *Constraining desire*: putting oneself into a situation that has a low (spa) rather than high (bar) potential of triggering a desire for alcohol. *Down-regulating desire*: employing mental strategies such as reappraisal or acceptance that reduce the strength of the desire for alcohol. *Inhibiting desired behavior*: employing self-control capacities (i.e., executive functions) to inhibit or override the desire to consume alcohol.

altogether via strategies of situation and stimulus control (Mahoney & Thoresen, 1972). These strategies rest on the earlier notion that external stimuli play a seminal role in the emergence of desire. As they interact with a person’s learning history and current need states, such “impellers” can greatly alter the odds that people will experience temptation to begin with (Finkel, 2014; Hofmann & Van Dillen, 2012). Situation and stimulus control techniques can either be learned and applied by a person directly (e.g., keeping one’s home free of unhealthy but tempting foods), or they can be imposed by public policy makers and other choice architects through so-called “nudges” (Thaler & Sunstein, 2009). The use of situation and stimulus control in public policy can be seen, for example, in “no smoking” policies at restaurants and in school cafeterias that primarily offer healthy options. Because situation and stimulus control are not always feasible (e.g., when one cannot avoid or escape a temptation-rich environment), however, these strategies clearly cannot be the sole solution.

Are some people better at anticipating problematic situations in their daily lives? One intriguing finding of the Everyday Temptations Study was that individuals high in trait self-control (TSC) showed signs of higher situation and stimulus control (rather than more effective late-stage inhibition): they reported lower average desire strength, lower average conflict, and less need to use active resistance to control desire (Hofmann et al., 2012a). We believe this pattern of findings to—at least partially—reflect the impact of preventive strategies. High-TSC individuals may be better at constraining their desire landscape in a way that reduces the need for effortful control. In support, independent raters rated the desires reported by high-TSC participants as less problematic for the “average person” than the desires reported by low-TSC participants (Hofmann et al., 2012a).

Furthermore, we believe that individuals high in TSC should be distinct from individuals with high values on what has been called the restraint bias (Nordgren, van Harreveld, & van der Pligt, 2009). The restraint bias stands for overoptimistic beliefs about one's capacity for self-control. Because of their overconfidence, people high in the restraint bias tend to overexpose themselves to tempting situations, which typically results in more frequent self-control failures (Nordgren et al., 2009; see also Ruttan & Nordgren, Chapter 11, this volume). We therefore predict that individuals high in TSC harbor more realistic impulse control beliefs than individuals high in the restraint bias. Their more realistic willpower self-assessment (and more realistic appreciation of the power of the situation) may guide high-TSC individuals in avoiding risky situations and in removing tempting stimuli from their environment when such strategies are feasible.

Early-Stage Distraction

Another, more proximal mechanism than situation and stimulus control that appears to constrain the potential for desire experience is early-stage distraction upon stimulus encounter. The underlying idea is that, sometimes, people may be so focused on a given current goal or activity (e.g., reading a very engaging novel) that tempting stimuli in their environment do not capture the amount of attention that would otherwise lead to the conscious representation (and reprocessing) of desire in working memory. Indeed, recent research has shown that cognitively demanding tasks unrelated to the temptation at hand may prevent the emergence of desire (Kemps et al., 2008a; Van Dillen, Papies, & Hofmann, 2013). For instance, Van Dillen and colleagues (Van Dillen et al., 2013, Study 1) asked participants to categorize pictures of tempting (e.g., brownies) versus nontempting (e.g., radishes) food stimuli according to spatial location while imposing either a low or high mental load during each trial of the task due to a secondary task. Participants in the low cognitive load condition made slower spatial categorizations of attractive food pictures compared to neutral food pictures. This suggests that they may have allocated more attention to tempting as compared to neutral stimuli. Participants under high cognitive load, however, were equally fast to respond to tasty and neutral food items, suggesting that they did not process the hedonic relevance of the attractive food. Accordingly, participants in the high load condition reported lower snack cravings following the categorization task. The upside is that powerful early-stage distraction may sometimes constrain or eliminate the experience of desire, which has clear potential for craving interventions (Florsheim, Heavin, Tiffany, Colvin, & Hiraoka, 2008). However, this strategy will only work to the extent that such powerful distractors can be easily found and are applied *before* strong cravings emerge, as some research suggests possible detrimental

effects of distraction at later stages (Frieze, Hofmann, & Wänke, 2008; Shiv & Fedorikhin, 1999). Also note that cognitive load and prior self-control exertion do not appear to be functionally equivalent, as recent work by Vohs et al. (2012) suggests that prior self-control exertion intensifies desire experiences (see also Wagner, Altman, Boswell, Kelley, & Heatherton, 2013).

Down-Regulation

The second route, implied by our view of desire as emotion, encompasses those emotion-regulatory strategies that lead to the effective *down-regulation* of desire (see also Hofmann, Koningsbruggen, Stroebe, Ramanathan, & Aarts, 2010). In this case, desire is experienced and a prepotent action tendency may be activated, but the focus of regulation is on the desire experience rather than on the prepotent action tendency. The idea is that certain regulatory strategies may be more or less effective at reducing the intensity of the experienced desire. Just as a glaring fire can be reduced in its power through the right strategy (e.g., repeatedly pouring buckets of water over it), and eventually extinguished, desire may be reduced below a critical level and eventually fade as the individual employs the right mental strategy to deal with it. This implies that there may also be dysfunctional strategies in dealing with desire (e.g., suppression).¹ In the drinking example, suppose that Bill has learned to mentally accept his desire for alcohol as a transient state (see acceptance strategy below), resulting in a decrease of desire intensity over time (Figure 3.2, middle illustration).

Reappraisal

One means of desire down-regulation can be brought about through strategies that modify how a tempting stimulus is appraised. Pioneering work by Walter Mischel on delay of gratification has shown that schoolchildren are better able to resist immediate rewards, such as marshmallows, if they learn to cognitively reappraise these rewards in nonconsummatory ways (e.g., imagining the marshmallows as white puffy clouds) (Mischel & Baker, 1975). Recent research applying this idea in adults has demonstrated that cognitive reappraisal can have a profound impact on affective reactions to tempting stimuli. For instance, bringing people into an abstract rather than concrete mindset (Fujita & Han, 2009) or having people imagine tempting stimuli in nonconsummatory ways (Hofmann,

¹Further, note that there may be certain situations where the regulatory goal of the individual consists of up-regulating desire, but the key difference is that these are typically situations in which the desire experience is “wanted” rather than “unwanted” (e.g., trying to up-regulate one’s sexual desire to satisfy one’s partner).

Deutsch, Lancaster, & Banaji, 2010b) appears to interfere with the early reward processing of these stimuli.

Another potential way to shape the initial, automatic appraisal of tempting stimuli is through evaluative conditioning (Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010a). That is, pairing a tempting stimulus (e.g., alcohol) repeatedly with a negative unconditioned stimulus (e.g., a picture of a severe physical injury) can decrease desire for alcohol among problematic drinkers, as recent research has shown (Houben, Havermans, & Wiers, 2010; Van Gucht, Baeyens, Vansteenwegen, Hermans, & Beckers, 2010). A second promising method is avoidance training, in which people are trained to respond to tempting stimuli with avoidance responses (Wiers, Eberl, Rinck, Becker, & Lindenmeyer, 2011; Wiers, Rinck, Kordts, Houben, & Strack, 2010). In one intervention, inpatients with alcoholism underwent cognitive-behavioral therapy and four 15-minute training sessions to help them avoid alcohol stimuli. Compared with a control group that only received cognitive-behavioral therapy, the treatment group showed reduced cravings after the avoidance treatment as well as reduced relapse a year after treatment (Wiers et al., 2011).

Acceptance and Disidentification

Two related promising strategies high in their potential to down-regulate problematic desires are acceptance and disidentification. Both strategies are often said to be at the heart of the concept of *mindfulness*—which has been inspired by Buddhist thinking—even though additional components such as awareness may contribute to the broad phenomenon of mindfulness as well (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Acceptance refers to the ability to refrain from judging and controlling (i.e., suppressing) inner experiences such as desires and cravings (Forman et al., 2007; Lacaille et al., 2014). With acceptance, the individual “may be encouraged to simply observe their feelings, and accept their presence, rather than try to control or eliminate them. As such, the individual is encouraged to build up a degree of tolerance for uncomfortable feelings” (Jenkins & Tapper, 2014, p. 510). Disidentification (or “cognitive defusion”) refers to the ability to mentally distance oneself from one’s own thoughts and emotions by learning to view them as “transient” mental events, rather than experiencing them as statements of facts.

Accepting desires and cravings in a nonjudgmental way and seeing them as fleeting mental states instead of trying to suppress them may make it easier for people to mentally decouple themselves from the maladaptive vicious circle of reprocessing and rumination (Kavanagh et al., 2005). The overall evidence suggests that both acceptance (Alberts, Mulkens, Smeets, & Thewissen, 2010; Westbrook et al., 2013) and disidentification (Jenkins & Tapper, 2014; Lacaille et al., 2014; Moffitt, Brinkworth, Noakes, &

Mohr, 2012), as well as interventions combining the two strategies (Forman et al., 2007), may help people to better regulate their cravings and desires across a number of domains such as smoking and eating, although effects were not always consistent across studies or were dependent on moderators (e.g., Jenkins & Tapper, 2014; Moffitt et al., 2012).

Suppression

As noted above, accepting a desire may facilitate desire regulation. How does the opposite strategy fare? Is the willful suppression or negation of desire experiences an effective regulatory strategy? Most of the literature on appetitive thought suppression suggests otherwise (Barnes & Tantleff-Dunn, 2010; Erskine, 2008; Johnston, Bulik, & Anstiss, 1999; Mann & Ward, 2001). The problem with the forced suppression of desire is that, even though suppression may provide some short-term relief, it may often backfire, leading to so-called ironic rebound effects (Wegner, 1994). According to the work by Daniel Wegner, when we try to actively suppress something, attention may be redirected toward the very mental content we try to suppress. The “boomerang” effect of suppression may result in the hyper-accessibility of desire-related thoughts, and may thus, ironically, contribute to the escalation of desire by advancing the elaboration of desire-related content in working memory (Kavanagh et al., 2005).

The generally maladaptive effect of suppression leaves open the possibility that some people may suffer less (or more) from ironic rebound effects. For instance, there is some evidence that suppression may well be effective for those individuals who are particularly skilled at directing their attention in a top-down manner (Brewin & Smart, 2005). Further, the Everyday Temptations Study showed that a measure of perfectionism tapping primarily into negative, dysfunctional perfectionism was associated with stronger desire intensity in daily life (Hofmann et al., 2012a), as well as more intense feelings of conflict, and more frequent desire resistance. Although speculative, this finding could indicate that people high in dysfunctional perfectionism may become overly preoccupied with regulating their desires, making too much use of counterproductive strategies such as suppression. Such an interpretation would also be consistent with work linking dysfunctional perfectionism to an over-reliance on emotion suppression (vs. reappraisal) strategies (Bergman, Nyland, & Burns, 2007).

Inhibition and Overriding

The third route, implied by traditional self-control research, encompasses those abilities and strategies that enable the effective *inhibition* or *overriding* of the prepotent, desire-related behavior. In this case, a problematic desire is experienced, and a prepotent action tendency is activated. The

focus of this (late-stage) strategy is on preventing or limiting the impact of the prepotent action tendency on actual behavior (rather than on down-regulating the desire). In the drinking example, this route would correspond to Bill feeling a strong urge to order a drink in a bar but preventing himself from calling out to the waiter (inhibition), or ordering a glass of water instead (overriding) (Figure 3.2, right illustration). Note that desire inhibition, due to its focus on the nonenactment of the behavior implied by the desire, is thus conceptually distinct from desire suppression, where the focus is on the suppression of the desire experience—an emotion-regulation strategy. The basic assumption is that desire processing may activate motor schemas that, unless inhibited, may be expressed in overt behavior once a certain threshold of activation is reached (Norman & Shallice, 1986; Strack & Deutsch, 2004). Inhibition implies that the individual manages to keep that prepotent action tendency from influencing behavior (by deactivating it) for as long as the tempting episode lasts (i.e., until another potent stream of motivation takes precedence, or until other mechanisms lead to a disengagement from the desire). Inhibition can thus be linked to a “do not” self-regulatory mindset or goal. Overriding goes one step further in that the individual attempts to replace the problematic desire-related behavior with a more acceptable substitute behavior (i.e., deactivation of the prepotent action tendency *and* selection of an alternative scheme of action). It can thus be linked to a “do instead” self-regulatory mindset or goal. In our example, Bill may either have a “do not” goal to not drink any alcohol, or he may have a “do instead” goal to order a nonalcoholic cocktail or beer whenever he has a strong desire for an alcoholic drink.²

A plethora of cognitive experimental research has linked the concept of inhibition and response overriding to executive functioning (for a review, see Hofmann, Schmeichel, & Baddeley, 2012b). Poor executive functioning, especially poor inhibitory control capacity (Miyake, Friedman, Emerson, Witzki, & Howerter, 2000), has been implicated in a large number of further impulse-control problems ranging from drug (ab) use (Berkman, Falk, & Lieberman, 2011; Nigg et al., 2006) to inadequate social responding (von Hippel & Gonsalkorale, 2005) to sexual cheating in romantic relationships (Pronk, Karremans, & Wigboldus, 2011). A number of studies across diverse domains have demonstrated that people low in behavioral inhibition are more strongly influenced by prepotent action tendencies than those high in inhibition (e.g., Hofmann, Friese, & Roefs, 2009a; Houben & Wiers, 2009; Nederkoorn, Houben, Hofmann, Roefs, & Jansen, 2010; Payne, 2005). Further, a range of situational factors such as cognitive load (Friese et al., 2008), prior self-control exertion (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Hofmann et al., 2012c;

²In this chapter, we will not discuss further a third option, which could be labelled as *moderation*, that is, the regulatory goal to satisfy a given desire only up to a certain point but no further (e.g., so-called “controlled” drinking).

Vohs & Heatherton, 2000), environmental or social stressors (Inzlicht, McKay, & Aronson, 2006), and alcohol intoxication have been linked to state reductions in inhibitory control (Hagger, Wood, Stiff, & Chatzisarantis, 2010; Lavie, Hirst, de Fockert, & Viding, 2004; Richeson et al., 2003; Schoofs, Preuss, & Wolf, 2008), as measured, for example, via performance on a Stroop task. Hence, temporary reductions in executive functioning may be one of several possible underlying mechanisms mediating the effects of these situational “risk” factors on desire regulation (Hofmann et al., 2012b).

A recent close-up analysis of more than 2,200 food desires contained in the Everyday Temptations Study serves as a good illustration of how behavioral inhibition (as measured with the Stroop task) affects everyday desire regulation in interaction with dietary restraint goals (Herman & Polivy, 1980). Among those high in dietary restraint (but not those low in dietary restraint), behavioral inhibition had a large effect on the successful inhibition of unhealthy food desires, such that those low in inhibitory control reported failing to resist unhealthy foods about three times more often than those high in inhibitory control (Hofmann, Adriaanse, Vohs, & Baumeister, 2013). Moreover, only people who were high in both dietary restraint and inhibitory control reported weight loss on average over the following 4 months whereas people high in dietary restraint but low in inhibitory control reported some weight *gain* on average. In other words, these analyses suggest that the combination of high dietary restraint and low inhibitory control is particularly problematic with regard to day-to-day food intake and long-term weight gain. Supporting the distinction between desire regulation and inhibition of desire-related behavior, inhibitory control was unrelated to the reported strength of food desires. In sum, these results suggest that inhibitory control plays an important role in determining successful versus failed inhibition of desires for tempting but unhealthy foods among people who hold a “do not” goal to abstain from such foods.

Because executive functions such as behavioral inhibition can be trained, at least to some extent (for a discussion, see Shipstead, Redick, & Engle, 2012), there is a large potential for intervention research aimed at finding ways to improve the management of unwanted desires and cravings (see also Lopez, Wagner, & Heatherton, Chapter 7, this volume). One way this might work is by training executive functions in general, hoping that people will then inhibit problematic desire-related behavior more effectively when needed. However, this strategy hinges on people’s motivation to actually recruit executive functions in such situations. A second, perhaps even more promising way may be to tighten the link between desire-related cues in the environment and inhibitory processes, with the goal of making response inhibition the dominant, habitual response upon stimulus encounter. For instance, Houben, Nederkoorn, Wiers, and Jansen (2011) found that participants trained to inhibit responses toward alcohol stimuli in a modified go/no-go task showed a subsequent

reduction in weekly alcohol intake, whereas those trained to react to alcohol stimuli with go-responses showed a relative increase. Similar results have been obtained in the eating domain (Houben & Jansen, 2010), and with different variations of response inhibition cueing (Veling, Aarts, & Stroebe, 2013).

Summary and Conclusion

Desire experiences are immensely common in our day-to-day lives. This is hardly surprising, as appetitive desires are deeply connected to those needs that have secured our species' survival over the millennia. New types of desires, such as those for addictive substances or those for social media, have managed to attach themselves to the basic mechanism of wanting. However, as Freud already noted so prominently (Freud, 1930, 1949), with desire comes the potential for mental conflict and the need to regulate desire in accordance with individual, social, and societal constraints on its enactment—and sometimes even its experience. We have proposed some of these reasons for conflict in more detail here, but more systematic research is clearly needed toward an exhaustive taxonomy of desire-related conflicts.

Wherever such conflict stems from, there is no denying that humans are remarkably effective desire regulators. However, this capacity is far from perfect, as a quick look into contemporary societal problems with overeating, all sorts of addictions, and sexual abuse will so readily attest. Our review of the available literature suggests that, just as with emotion regulation (Gross, 1998), effective desire regulation can take place at various stages of desire processing. Desire regulation strategies can be roughly divided into (1) those early-stage strategies that constrain desire experiences by preventing exposure to situations or stimuli that elicit desire or through early-stage distraction that prevents the emergence of desire, (2) those strategies that support the effective down-regulation of consciously-experienced desire, such as reappraisal, acceptance, and disidentification, and (3) those late-stage strategies that involve the inhibition or overriding of desire-related behavior.³

One exciting issue for future research will be to disentangle how these general desire regulation strategies interact with each other. Our review suggests that these different strategies may not be employed to the same extent by everybody nor effective to the same extent for everybody;

³Even though we have treated down-regulation and inhibition as conceptually separate mechanisms, it is often possible, of course, for both mechanisms to be empirically associated with each other. For instance, (1) successful inhibition may lead to an eventual reduction of desire, (2) effective down-regulation may make inhibitory activity more effective, and (3) some strategies, such as mindful attention, may aid both down-regulation of desire experiences *and* the inhibition of prepotent action tendencies.

however, we still need to find out much more about how they interact with features of the person, situation, and the specific content domain of interest. Finally, as psychological insights into desire and desire regulation continue to stimulate new treatment methods and technologies, we predict that applied research is likely to make exciting progress in the years to come regarding how to help people deal with troubling desires.

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