



Published in final edited form as:

Soc Personal Psychol Compass. 2018 May ; 12(5): . doi:10.1111/spc3.12385.

Another look at impulsivity: Could impulsive behavior be strategic?

Catalina E. Kopetz¹, Jacqueline I. Woerner², Julia L. Briskin¹

¹Wayne State University

²Yale University

Abstract

In the present article, we propose that impulsive behavior may be a response to certain needs or goals that people have in the moment and could therefore be strategic. We review briefly the dominant approaches and findings in the impulsivity literature. We then examine different behaviors that are typically considered impulsive such as delay discounting, risky sexual behavior, risk taking in the context of emotion dysregulation, and adolescent risk behavior and present evidence suggesting that they follow the general principles of goal pursuit. Specifically, they are (a) enacted when perceived as relevant to the individual's motivation; (b) less likely when alternative means to fulfill these goals are available; and (c) supported rather than reduced by sufficient executive control, a hallmark of goal pursuit. We do not argue that there is no impulsive behavior. Rather, we suggest that such behavior may represent individuals' attempts to fulfill current motivations or needs. This approach emphasizes the functionality and dynamism of the behavior, it provides a framework to explain the inconsistencies in the literature, it helps us to move away from pathologizing or moralizing the behavior, and it provides insights about potential strategies to mitigate the negative consequences of acting impulsively.

1 | INTRODUCTION

Since the archetypal story of Adam and Eve, and their lamentable *Fall from Grace*, impulsivity has served as an important construct in the literature, philosophical writings, and different scientific areas including psychology. It has been invoked to explain why Eve ate the apple although she had been warned about the negative consequences, why Dedalus flew too close to the sun although he was told that the sun would melt his wings, and why people use drugs and alcohol, smoke, overeat, drive under the influence, or engage in risky sexual behavior (RSB). Early Christians invoked evil spirits to answer these questions. By the seventeenth century, the term "impulsivity" replaced the evil spirits and was used to describe and predict a consistent pattern of dysfunctional behaviors, indicative of bad character. Although by the end of the nineteenth century, researchers were trying to dissociate impulsivity from its moral and theological consequences, the literature is still dominated by the notion that impulsive behavior is the reflection of a maladaptive tendency, impulsivity, that researchers and practitioners should aim to "fix" to afford better behavioral outcomes.

Despite the scientific interest in impulsivity and the research it garnered, the nature of what we typically call impulsive behavior remains unclear. The literature is dominated by lists of factors and characteristics presumed to define the tendency to behave impulsively rather than by attempts to identify the general process responsible for different manifestations of impulsive behavior. These factors and characteristics vary depending on the domain of investigation and school of thought. They are typically measured using different self-report or behavioral tasks and used to predict behaviors such as drug use, “impulsive” buying, RSB, and overeating. Unsurprisingly, these measures rarely correlate with each other, and there is little agreement (theoretical and empirical) regarding what constitutes impulsive behavior and why (Reynolds, Ortengren, Richards, & de Wit, 2006).

We argue that the lack of clarity and consistency regarding impulsive behavior may be the result of our tendency to overemphasize the individual characteristics and to neglect the *function* of these behaviors. Although they may be associated with negative outcomes (from the observer’s perspective and according to modern societal standards), many of the behaviors that we characterize as impulsive have evolved to allow people to respond quickly and efficiently to the current situational demands. In the present article, we propose that impulsive behavior may be a response to certain needs or goals that people have in the moment. Simply put, we suggest that impulsive behavior represents a means to one’s most salient and important goal in the moment despite the fact that it might interfere or be detrimental to other goals (e.g., safety and health). This perspective (a) emphasizes the dynamic aspect of impulsive behavior rather than attributing it to stable individual characteristics, (b) allows us to move away from pathologizing the behavior and toward understanding its functionality, and (c) suggests specific strategies to prevent the negative consequences associated with impulsive behavior. To make this argument, we will first provide a brief overview of the dominant approaches and findings in the impulsivity literature. We will then examine different behaviors that are typically considered impulsive and present evidence suggesting that they may serve individuals’ goals and may therefore be considered strategic.

2 | HOW HAVE WE LOOKED AT IMPULSIVE BEHAVIOR?

Theorizing and research on impulsivity has developed as an attempt to explain behaviors that appear to be self-defeating or to have negative consequences for the person or for others. Because humans are believed to be rational and act in their best interest, when they do not, it must be because there is something wrong with them, there is a deficiency, or a lack of ability. For instance, in a recent volume of the *Nebraska Symposium on Motivation*, impulsivity was defined as the “factors that regulate the performance of inappropriate or maladaptive behaviors,” whereas impulsive behavior represents “the failure to control unwanted behaviors or the failure of inhibitory processes” (de Wit & Richards, 2004, p. 20). As apparent from this definition, impulsive behavior is equated with maladaptive behavior and attributed to some sort of faulty processes, typically lack of motivation and/or control. Indeed, impulsive behavior has often been defined by juxtaposition with deliberate, goal-directed behavior. For instance, impulsive behavior is believed to result from people’s associations between a stimulus and a behavioral schema, to emerge automatically, and to require very little cognitive resources (Strack & Deutsch, 2003). In line with this notion,

impulsive behavior has been characterized as a primitive hedonic reaction to tempting stimuli (e.g., Loewenstein, 1996; Metcalfe & Mischel, 1999), a tendency to act without forethought and consideration for consequences (Ainslie, 1975; Rachlin & Green, 1972), a reflection of poor executive control (Hoyle, 2006; Romer et al., 2011; Strack & Deutsch, 2003), and the inability to inhibit prepotent responses (Barkley, 1997; Logan, Cowan, & Davis, 1984; Logan, Schachar, & Tannock, 1997). By contrast, deliberate behavior is effortful and controlled, is enacted to fulfill individual's long-term goals, and is supported by higher level mental operations such as the ability to plan, to inhibit impulsive responses, and to flexibly adapt to the situation (Hofmann, Friese, & Strack, 2009).

Whether it represents disregard for consequences, lack of deliberation, or poor executive control, impulsive behavior has been predominantly considered in terms of negative outcomes such as psychopathology (e.g., Feilhauer & Cima, 2013; Poythress & Hall, 2011; Saddichha & Schuetz, 2014), substance abuse (Kirby & Petry, 2004; Wiers & Stacy, 2006), overeating and obesity (Gerlach, Herpertz, & Loeber, 2014; Hofmann, Friese, & Roefs, 2009; Komlos, Smith, & Bogin, 2004), pathological gambling (Odlaug, Schreiber, & Grant, 2013; Petry, 2001), impulse buying (Dittmar, 2001), poor outcomes for smoking cessation (López-Torrecillas, Perales, Nieto-Ruiz, & Verdejo-García, 2014), inappropriate sexual behavior (Hofmann, Gschwendner, Friese, Wiers, & Schmitt, 2008), and poor grade point averages (Kirby, Winston, & Santiesteban, 2005). Conversely, deliberate behavior is associated with positive outcomes. Children's ability to resist the impulse to choose a smaller reward now and to wait for larger rewards later predicts a number of consequential life outcomes such as higher SAT scores, better personal and interpersonal competencies, and greater cognitive control decades later (e.g., Ayduk et al., 2000; Mischel, Shoda, & Rodriguez, 1989). The ability to resist impulses predicts better restraint for food and alcohol consumption, inappropriate sexual behavior, and so on (e.g., Hofmann et al., 2008; Hofmann, Friese, & Roefs, 2009; Hofmann, Friese, & Strack, 2009).

3 | ANOTHER LOOK AT IMPULSIVITY: COULD “IMPULSIVE” BEHAVIOR BE STRATEGIC?

Although the traditional approaches have intuitive appeal, empirical and anecdotal evidence suggests the possibility that impulsive behavior does not necessarily reflect one's rigid response to environmental stimuli, stable individual characteristics, or poor executive control and is not necessarily associated with negative outcomes. For instance, people who appear impulsive in one domain or situation (e.g., impulsive buying) do not necessarily manifest this type of behavior in other domains or situations (Malmberg et al., 2012; Rotenberg et al., 2005; Wingrove & Bond, 1998; Zapolski, Cyders, & Smith, 2009).

Furthermore, while some behaviors could be characterized as unplanned and reckless (e.g., aggressive behavior in response to provocation), other behaviors typically considered impulsive require a lot of planning as well as substantial self-control. For example, using drugs requires finding a dealer while avoiding the police. Self-control is necessary to overcome the bitter taste of alcohol, the pain of injecting drugs, or the fear of death when engaging in self-harm (Kopetz & Orehek, 2015; Rawn & Vohs, 2010).

Finally, people may engage in impulsive behaviors that do not result in negative outcomes (e.g., risky financial investments and saving someone from a burning building). These behaviors are likely to be labeled as “quick thinking” or “luck,” even if they meet the conventional definition of impulsivity. Indeed, Dickman (1990) introduced the notion of *functional impulsivity*, which refers to the tendency to act quickly with positive consequences and has been found to be positively associated with enthusiasm, adventurousness, and extraversion. While most research has linked impulsivity to negative outcomes, such as aggression, deviant behavior, and violence (e.g., Lynam & Miller, 2004), if an individual’s main motivation is to help others, his or her spontaneous actions (impulsivity) will likely result in positive outcomes, such as organizational citizenship behaviors (e.g., Omar, 2009). For example, if a coworker complains of a heavy workload, an impulsive person is more likely to offer assistance even if the additional responsibility hinders his or her own productivity (e.g., Winkel, Wyland, Shaffer, & Clason, 2011).

In light of this evidence, we propose a “new look” into impulsive behavior: We suggest that people’s unwillingness to delay gratification and their willingness to take risks, to act according to situational stimuli and disregard potential negative consequences (forgoing their diet concerns and eating the tempting piece of cake in front of them), may represent their attempts to respond to momentary motivational demands in the most effective way. In other words, impulsive behavior is the best available means to fulfill goals that are salient and important in the moment. A person who is very hungry may be less concerned about the potential negative consequences of eating poorly and might be willing to eat whatever is immediately available (Kopetz, Faber, Fishbach, & Kruglanski, 2011). Similarly, \$10 now is more valuable than \$20 in 2 days for a person on a very tight budget; it would not make motivational sense to wait for the \$20. Finally, grabbing a drink or two or going on a shopping spree makes perfect motivational sense for someone who is experiencing emotional distress and who might not have friends to talk to, or other means to regulate the emotional distress. What these behaviors have in common is a tendency to focus on the immediate benefits and disregard potential negative consequences. However, we believe that this tendency does not necessarily reflect deficiencies, or lack of ability. The fact that the behavior appears unplanned, reckless, or that it may have negative consequences is not necessarily indicative of poor self-regulation. Rather, it reflects the person’s motivational priorities and her willingness to respond to those priorities with the best available means. Thus, we propose that impulsive behavior could be strategic in that it is enacted to achieve a goal and could therefore be understood according to the principles of goal pursuit, even when the goal that it serves is not immediately accessible to the person or the outside observers.

4 | IMPULSIVE BEHAVIOR AS GOAL PURSUIT

The notion of impulsive behavior as goal directed is not necessarily new. The term “impulsivity” came into use in the sixteenth century and derives from the Latin *impulsus*, the stem of which is “impellere” meaning “to move.” Several philosophers and scientists described impulsive behavior as a response to needs and goals. For instance, Dewey (1936) considered that impulsive behaviors achieve a purpose, even if the actor initiates it without being consciously aware of this purpose. Gray suggested that impulsivity (and its

neurological substrate) predisposes individuals to engage in goal-directed efforts and to experience positive feelings when exposed to cues of impending reward (Gray, 1972, 1981). Dickman introduced the notion of “functional impulsivity” according to which people may act quickly, in an error-prone, nondeliberative manner, as a beneficial strategy (Dickman, 1990). Simon’s concept of “satisficing” also emphasizes the idea that people’s quick, seemingly impulsive reactions represent their attempt to choose the first object that satisfies their current need(s). Finally, Strack and Deutsch (2003) point out that certain behaviors might be “impulsively” enacted to satisfy current needs, and Baumeister, Heatherton, and Tice (1994) suggest that impulses exist at the intersection of ongoing motivational states and specific situational circumstances.

These ideas hint at the possibility that impulsive behaviors may in fact represent people’s attempts to fulfill goals that are either chronically active, or become accessible in the moment. Such approach implies that impulsive behavior may be dynamic and vary across and within individuals according to general principles of goal pursuit. Specifically, impulsive behavior should be more likely if it is relevant to individuals’ current goals. This may explain why someone could be impulsive in one domain, but not in another, or in one moment but not another. For instance, when emotionally distressed, one may grab a drink or two to help alleviate negative emotions but would not necessarily also buy a pair or two of shoes, or prefer to eat one marshmallow now rather than wait for two later. Secondly, if the goal (i.e., to feel better) is fulfilled through alternative means, impulsive behavior loses its instrumentality and may therefore become less likely. Finally, goal-directed, impulsive behavior may require mobilization of executive control, rather than being the *result* of poor executive control. Executive control allows the person to focus the attention on the most important goal and to find the best means to achieve it while disregarding or inhibiting alternative goals (e.g., Bélanger, Lafreniere, Vallerand, & Kruglanski, 2013). This may explain people’s willingness to disregard potential consequences even when such consequences could be serious.

In what follows, we will provide evidence to support these notions. Specifically we will show that (a) impulsive behavior is more likely when it is relevant for one’s current needs, (b) its likelihood decreases when alternative behaviors that fulfill those needs are available, and (c) it may be enhanced rather than reduced by effective executive control. To illustrate these principles, we will focus on several types of behaviors that have been characterized as impulsive because they reflect a tendency to focus on the immediate benefits at the expense of potential consequences: delay discounting, sexual risk taking, risk taking in the context of emotional distress, and adolescent risk taking.

4.1 | Impulsive behavior is enacted when it serves one’s current goals

4.1.1 | Delay discounting as a function of goals—One of the core aspects of impulsive behavior is disregard for potential consequences. Although it has been studied under different names such as delay of gratification or delay discounting, this aspect of impulsivity refers to people’s preference for immediate outcomes (Ainslie, 1975; Madden & Bickel, 2015). For example, people prefer a small amount of money immediately rather than a larger sum in the future (Thaler, 1981), purchase cheaper appliances with higher future

operating costs instead of expensive ones that are less costly over time, underestimate the effort it takes to complete future tasks, and downplay the future costs/consequences of engaging in different behaviors such as smoking and overeating (e.g., Ainslie & Haslam, 1992). People's preference for immediate smaller outcomes has been explained in terms of a loss in value of an outcome as a function of its delay. In other words, future outcomes are discounted (or undervalued) relative to immediate outcomes. The rate with which people devalue future outcomes or rewards as a function of the delay to obtain them is known as a "discount rate" (Ainslie, 1975; Rachlin, 1989; Rachlin & Green, 1972) and has been used as an indicator of impulsivity. Accordingly, impulsive individuals are characterized by steeper (higher) discount rates, suggesting a disregard for the future consequences of their behavior. Higher discount rates have been associated with substance use, obesity, HIV risk behavior, pathological gambling, and so on (Bickel, Jarmolowicz, Mueller, Koffarnus, & Gatchalian, 2012).

Delay discounting literature has focused primarily on discount rates as stable, individual characteristics. However, within-individual fluctuations in discount rates have been reported as a function of various manipulations (Koffarnus, Jarmolowicz, Mueller, & Bickel, 2013; Amlung, Gray, & MacKillop, 2016), presumably as a function of individuals' momentary needs.

For instance, pathological gamblers discount monetary rewards more steeply when tested in a gambling situation, which presumably increases the saliency and importance of their financial desires compared with a neutral situation (Dixon, Jacobs, & Sanders, 2006). Delay discounting increases during drug withdrawal (e.g., Yi & Landes, 2012), which is, by definition, a motivational state. This pattern of findings suggests that people's preference for smaller immediate rewards over a larger delayed reward may be a response to their chronic or momentarily activated goals. If this is the case, they will discount a reward to a greater extent if the reward is relevant or instrumental to their goals.

In several studies, we tested these assumptions directly by measuring and manipulating different goals, including financial goals. Money is a powerful universal reward; it activates the reward neuro-circuitry (Elliott, Agnew, & Deakin, 2009; Knutson, Fong, Bennett, Adams, & Hommer, 2003; O'Doherty & Dolan, 2006) and energizes behavior as a function of the value of the reward (e.g., Bijleveld, Custers, & Aarts, 2012). It is thus possible that people may prefer immediate smaller rewards over larger but delayed rewards as a function of their chronic or temporary need for money. In addition, delay discounting may vary as a function of people's cognitive motivations that determine information processing and judgment, such as the need for cognitive closure (NFC). NFC reflects the motivation to have closure immediately and maintain it permanently (Kruglanski & Webster, 1996). High NFC people prefer stability and may therefore not pay attention to fluctuations in time (e.g., delay of a reward). However, if alternative motivations (e.g., need for money) become relevant and important, high NFC people's behavior would reflect their need to attain that motivation immediately. In this case, they may prefer immediate rewards that are relevant to their motivation (i.e., money), even when those immediate rewards are smaller.

In two studies, we explored participants' discount rates for monetary rewards as a function of their NFC (measured) as well as their need for money (measured and manipulated respectively). The results show that participants did discount monetary rewards more as a function of their need for money, both measured and manipulated. This effect was particularly strong among those with high NFC, whose preference for smaller immediate rewards (higher discount rates) reflected their need for money, but also their desire to fulfill this need quickly (Kopetz & Briskin, in preparation).

These results suggest that preference for immediate smaller rewards over larger delayed rewards may indeed vary as a function of people's current goals. One important implication of this argument is that people will discount future larger rewards only to the extent that it is relevant to their current motivation. Indeed, findings from the delay discounting literature suggest that discounting is more pronounced for commodities that are relevant to the person's current motivational state. For instance, among opioid-dependent individuals, degree of discounting varies as a function of opioid deprivation; furthermore, discount rates are higher for heroin than for money (Giordano, Cernkovich, & Rudolph, 2002; Madden, Petry, Badger, & Bickel, 1997). Similarly, stress increases preference for immediate alcohol but not for money (Amlung & MacKillop, 2014; Rousseau, Irons, & Correia, 2011) presumably because alcohol is perceived as a more instrumental means than money to alleviate negative affect.

To test this implication directly, we invited participants to the lab during lunchtime and measured their hunger (eating goal) as well as their discount rates for both food, a commodity relevant to their goal, and money, which was presumably not immediately relevant to their goal. The results show that participants' motivation (i.e., hunger) significantly predicted their discount rates for food, but not for money, above and beyond other measures of impulsivity (e.g., industriousness, self-control, and procrastination). These findings offer additional support for the notion that people may strategically engage in impulsive behavior to the extent that it serves a motivational state (Kopetz & Briskin, in preparation).

4.1.2 | Risky sexual behavior as a function of goals—People do not only discount the value of positive outcomes as a function of their delay. Future negative outcomes (e. g., time or effort, health consequences) also appear “smaller” when viewed in the present. Engagement in RSB including sex with multiple partners, with casual and commercial partners, and unprotected sex appears to perfectly exemplify disregard for future negative health consequences. Not surprisingly, RSB has often been attributed to impulsive tendencies. For instance, in the context of substance use, RSB has been attributed to the pharmacological effects of drugs, which are presumed to increase arousal, desire, stamina, performance, and/or enjoyment, as well as impulsivity (Lejuez, Bornovalova, Reynolds, Daughters, & Curtin, 2007; Volkow, Fowler, Wang, Swanson, & Telang, 2007). However, there is empirical evidence suggesting that impulsivity may have lesser predictive value than typically assumed. Across studies, there is a consistent but modest relationship between impulsivity as a personality trait and engagement in RSB (Dir, Coskunpinar, & Cyders, 2014; Hoyle, Fejfar, & Miller, 2000), suggesting that RSB may not solely reflect an impulsive choice.

Cocaine users report engaging in RSB in the context of drug use despite experiencing deleterious effects of drug use on sexual desire and performance (Kopetz, Reynolds, Hart, Kruglanski, & Lejuez, 2010). This may be the case because RSB is enacted to fulfill specific goals such as drug obtainment and need for intimacy and communion (Cooper, 2010; Kopetz et al., 2014; Kopetz, Collado, & Lejuez, 2015) rather than as an impulsive reaction following drug use.

In one study, we explored engagement in RSB as a means to drug obtainment. Increased accessibility of the drug obtainment goal (through cocaine-related primes) resulted in faster approach tendencies toward sex exchange words (crack babe, hooker, prostitute, rock star, turn a trick) in a joystick task. Notably, this effect emerged only among participants for whom sex exchange represented an instrumental means to drug obtainment, despite their self-reported intentions to avoid such behavior (Kopetz et al., 2015).

In another line of research, we explored engagement in RSB as a means to intimacy and communion goals. In several studies, across community samples, college students, and substance users, we found that women who have experienced interpersonal violence were more likely to engage in RSB (Woerner, Kopetz, & Arriaga, in preparation; Woerner, Kopetz, Lechner, & Lejuez, 2016). This may be the case because interpersonal violence potentially disrupts individuals' expectations of secure relationships and may result in discomfort with closeness (i.e., avoidance). In such cases, RSB may become a convenient means to interpersonal connection without closeness or emotional intimacy. In line with these notions, we found that avoidant attachment mediates the relationship between interpersonal victimization and RSB. Interestingly, these effects did not extend to other behaviors typically considered impulsive (i.e., substance use), supporting the notion that RSB may indeed represent a means to interpersonal connection rather than reflecting impulsive tendencies.

4.2 | Availability of alternative means to one's current goals reduces the likelihood of impulsive behavior

A second important implication of the notion of impulsive behavior as goal pursuit is that impulsive behavior could be reduced if the goal or the need that it serves is fulfilled through other means. In the goal pursuit literature, this principle is known as substitution (Kruglanski et al., 2002). In the impulsivity literature, this principle is supported by research on contingency management. For instance, substance users who were financially rewarded for abstinence reported lower discount rates of monetary rewards compared with those who were not financially rewarded (e.g., Yi et al., 2008). This may occur because the money received as a reward for abstinence may fulfill their financial needs momentarily.

To test this possibility directly, we manipulated participants' need for money. In addition, we manipulated the extent to which participants perceived their need for money to be fulfilled by completing a task either for money (need fulfilled) or for points (need unfulfilled). The results revealed that participants preferred smaller, immediate over larger, delayed monetary rewards only when their need for money was both amplified and unfulfilled. However, participants whose need for money was fulfilled by completing the task for money (vs. points) discounted larger delayed monetary rewards to a lesser extent (Kopetz & Briskin, in

preparation). These results suggest that preference for immediate smaller rewards over larger but delayed rewards may reflect people's attempt to satisfy an activated goal only when alternative means to fulfill the goal are unavailable. The implication is that providing alternative means to one's current goals may decrease discounting of delayed rewards and may help mitigate the negative outcomes associated with impulsive behavior.

We applied the substitution principle and attempted to reduce smoking behavior in participants with depressive symptoms. Substance use in general and smoking in particular have been considered as the prototypical impulsive behavior (e.g., de Wit & Richards, 2004). This is because substance use (including smoking) reflects a preference for relatively brief, but immediately available bouts of intoxication or relief of negative affect at the expense of other activities that may have long-term benefits. Smoking has been approached as a maladaptive strategy to regulate negative affect (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004; Kassel, Stroud, & Paronis, 2003; Shiffman & Waters 2004). According to the principle of substitution, strengthening the association between alternative behaviors to smoking (alternative means) and negative affect should increase the accessibility of these activities and therefore the likelihood that the person engages in them while detracting from smoking. To do so, we recruited smokers with depressive symptoms and randomly assigned them to a training condition versus a control condition. Negative affect was induced in both conditions. Subsequently, in the experimental condition, participants used a joystick and were trained to avoid (push away) smoking-related targets and to approach (push toward) alternative rewarding activities that were ideographically selected during a baseline assessment. In the control condition, participants pushed and pulled an equal amount of smoking and alternative activity-related targets. Compared with the participants in the control condition, those in the experimental condition showed an increase in the accessibility of the alternative activity relative to smoking and a decrease in depressive symptoms. Furthermore, participants in the experimental condition smoked less over the same period of time and took longer to relapse to smoking than did participants in the control condition; however, the differences were not statistically significant (Kopetz, MacPherson, Mitchell, Huston-Ludlam, & Wiers, 2017).

4.3 | Impulsive behavior is enhanced (rather than reduced) by executive control

Numerous theoretical models suggest that impulsive behaviors are automatic responses to cues in the environment that require little or no executive control (Hofmann, Friese, & Roefs, 2009; Strack & Deutsch, 2003). In line with this notion, researchers have shown that when individuals' ability for executive control is low due to fatigue, cognitive depletion, distraction, emotional dysregulation, or disinhibition following alcohol consumption (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Everitt & Robbins, 2005; Hofmann et al., 2008; Muraven, Tice, & Baumeister, 1998; Steinberg, 2007; Vohs & Heatherton, 2000; Ward & Mann, 2000), behaviors typically considered to be impulsive (e.g., substance use, overeating, adolescent risk behavior, inappropriate sexual behavior, and aggressive behavior) are more likely to occur.

Several neuroscientific models echo this perspective. Accordingly, people's choice reflects the relative balance in activation between two interacting neurobiological systems. The

impulsive system consisting of portions of the limbic, paralimbic regions responds to immediate rewards. By contrast, the more recently evolved executive system consisting of areas of the prefrontal cortex represents the reflective system, which is needed to inhibit the impulsive system. Behaviors that are often characterized as impulsive such as adolescent risk taking or substance use are believed to be the result of a stronger impulsive system compared with the reflective or control system (Bechara, 2005; Bickel et al., 2007; Steinberg, 2007).

Interestingly, in most theoretical accounts and studies, the so-called impulsive behavior is always the easy choice (e.g., the cookie is always in front of the person) that does not require resource mobilization and executive control. However, using the example of substance use, a person who decides to use drugs requires a significant amount of executive control to overcome the obstacles associated with procuring and using the drugs (e.g., finding a drug dealer, avoiding the police, and overcoming the pain associated with sticking a needle in one's arm). Similarly, the person who decides to engage in self-harm requires a tremendous amount of self-control to overcome the aversive aspects of engaging in such behaviors and going against his or her survival instinct (Rawn & Vohs, 2010).

This is in line with the motivation literature, which suggests that goal pursuit is dependent on resource mobilization and executive control that support implementation of appropriate means, persistence in the face of obstacles, and inhibition of alternative goals and information that may thwart goal pursuit (Bijleveld, Custers, & Aarts, 2009; Botvinick & Braver, 2015; Brehm & Self, 1989; Dijksterhuis & Aarts, 2010; Kruglanski et al., 2012; Wright, Contrada, & Patane, 1986). Thus, acting "impulsively" to achieve different goals may in fact be supported by executive control. We examined this possibility in two cases: (a) risk-taking behavior under emotional distress and (b) adolescent risk behavior.

4.3.1 | Risk taking under emotional distress—Overeating (Heatherton & Baumeister, 1991; Tice, Bratslavsky, & Baumeister, 2001), substance use (Baker et al., 2004), RSB (Bousman et al., 2009), and self-injury (Selby & Joiner Jr, 2013) have often been studied in the context of negative affect. Emotional distress presumably leads individuals to prioritize emotion regulation. This may result in depletion of the resources necessary to consider potential negative consequences and to control immediate gratification, increasing the likelihood of impulsive behavior. However, according to our analysis, if the behavior is actively implemented as a strategy to regulate emotional distress, the presence of cognitive resources should *increase* rather than decrease the likelihood of engaging in this kind of behavior.

Heightened negative emotionality and poor executive control, or impulsivity, are considered some of the most important factors of self-harm (e.g., cutting, burning, and biting), which is a symptom of borderline personality disorder (BPD; APA, 2013) but occurs in nonclinical populations as well (Briere & Gil, 1998; Whitlock, Eckenrode, & Silverman, 2006). In two studies, we tested the possibility that self-harm may be a strategic response to meet emotion regulation goals. The results showed that BPD participants were riskier when the goal of emotion regulation became important (i. e., under distress) and when the expectancy of goal attainment was high. In contrast to previous approaches, which assumed that emotional

distress impairs executive control and results in impulsive behavior, these findings show that risk behavior under emotional distress, even among participants traditionally characterized by high rates of impulsivity (with BPD diagnosis), happens when cognitive resources are ample (Matusiewicz, Kopetz, Weaverling, Elis, & Lejuez, 2015).

4.3.2 | Adolescent risk taking—Adolescent risk taking is often considered impulsive and is typically attributed to a developmentally normative gap between motivational-affective processes on the one hand and executive control on the other hand (Somerville & Casey, 2010; Steinberg, 2007). Early psychosocial deprivation is often believed to heighten adolescents' vulnerability to risk taking due to its deleterious effects on different processes critical for executive function such as working memory and inhibitory control (Hostinar, Stellern, Schaefer, Carlson, & Gunnar, 2012; Lovallo, 2013; Lovallo et al., 2013; McDermott et al., 2013). However, recent findings from a randomized control trial of foster care present a different picture. In this study, children institutionalized at or soon after birth were randomly assigned either to be removed from institutions and placed into a family/foster care intervention or to remain in institutions receiving care as usual. These children were subsequently followed up through 12 years of age and compared with a sample of children who had never been institutionalized on risk-taking behavior, motivation (i.e., sensation seeking), and executive control (i.e., planning). The findings suggest that early psychosocial deprivation did indeed have deleterious effects on executive control; children who were raised in institutions performed significantly worse on planning than did their foster care and never institutionalized counterparts. Interestingly, deprivation did not increase risk taking—on the contrary: Institutionalized children showed significantly less risk taking than did foster care children and children who were never institutionalized despite their significantly lower levels of executive control. What is even more relevant for the current discussion is that this effect was mediated by sensation seeking, an important developmental motivation (Zuckerman, 1979, p. 10) and moderated by executive control. In other words, psychosocial deprivation decreased engagement in risk taking among adolescents by reducing the motivation to do so. Interestingly, higher levels of risk taking were observed among adolescents who were higher not only on sensation seeking (the motivation) but also on executive control, supporting the notion that the person may sometime recruit executive control to engage in impulsive behavior as means to relevant motivations. (Kopetz et al., 2017).

The results discussed above suggest that impulsive behavior could be *facilitated* (rather than reduced) by executive control. We believe that this is the case because executive control allows the individual to inhibit alternative goals (e.g., health and safety) and/or to distort the information in line with his or her current motivation (Bélanger et al., 2013; Bélanger, Kruglanski, Chen, & Orehek, 2014; Kirchner & Sayette, 2007; Kunda, 1990; Windschitl, 2002). This may explain why people disregard the potential negative consequences of their actions: In the moment, the person focuses on the most salient and important goals (e.g., alleviating negative affect) resulting in the inhibition of alternative goals (e.g., health; Kopetz et al., 2011) and reducing the relevance of the potential negative consequences.

5 | CONCLUSIONS

The present paper proposes a “new look” into impulsivity, according to which impulsive behavior may sometimes be strategic or enacted as a means to people’s goals. Impulsivity has been typically approached as a dysfunctional tendency to act in response to immediate stimuli without consideration for future consequences. Not surprisingly, impulsivity has been examined extensively as a predictor of negative outcomes such as substance use or overeating. To explain impulsive behavior, researchers have invoked deficits in one’s ability to control immediate reactions and to act in line with long-term, important goals. The consequence of this approach is a negative, moralistic perspective of impulsive behavior that confounds the outcomes with the processes. “Bad” outcomes and choices (according to normative societal standards) are attributed to impulsivity and believed to be caused by people’s inability to control their automatic reactions to stimuli. By contrast, “good” outcomes or choices are believed to be the result of higher order processes and people’s ability to act according to their goals.

We argue that this approach fails to consider the function of the behavior and has eschewed our understanding of the nature of impulsive behavior. We propose an alternative approach that considers impulsive behavior as goal directed. We do not argue that there is no impulsive behavior. People do act spontaneously, in response to situational stimuli without any apparent conscious plan. Their behavior may appear reckless and may reflect disregard for future consequences. We also do not argue that there is no “impulsivity,” as an individual characteristic. Certain people may have a stronger tendency to focus on the immediate benefits of a behavior and/or may have a lower tolerance to uncertainty and ambiguity. Under certain circumstances, they may be more likely to attempt to respond quickly to their immediate concerns. In the process, they appear to disregard other concerns (e.g., their own or others’ health and safety) and the extent to which their momentary actions may interfere with them. What we argue is that this type of behavior and individual tendency may not necessarily reflect lack of ability, deficiencies, or poor self-regulation (misregulation) Rather, it represents individuals’ attempts to fulfill the most important and salient goals in the moment with the best available means. Therefore, impulsive behavior may be understood, prevented, and changed by applying the principles of goal pursuit. In line with this argument, we discussed how delay discounting, RSB, risk taking in the context of emotion dysregulation, and adolescent risk behavior are enacted when they are perceived as relevant to the individual’s goals. Furthermore, they become less likely when alternative means to fulfill these goals are available. Finally, these behaviors could be supported rather than reduced by sufficient executive control, a hallmark of goal pursuit.

This approach allows us to identify the general principles underlying different manifestations of impulsive behavior and to move away from attempts to understand it through lists of characteristics and dimensions. It provides a framework to explain the inconsistencies in the literature regarding the within-individual variability in impulsive behaviors across situations and measures, as well as to integrate instances of impulsive behavior that do not necessarily result in negative outcomes. In doing so, it helps us to move away from pathologizing or moralizing the behavior and provides insights about potential strategies to mitigate the negative consequences of acting impulsively.

Biography

Catalina E. Kopetz (PhD, University of Maryland, 2007) is Assistant Professor of Psychology at Wayne State University. Her research focuses on the mechanisms that underlie multiple goal pursuit and management of goal conflict and their implications for risk taking (i.e., overeating, substance use, risky sexual behavior, and drunk driving). She published in prestigious journals spanning social and clinical psychology, prevention sciences, psychopharmacology, and behavioral and brain sciences, as well as journals appealing to a broader audience such as *Perspectives in Psychological Science*, *Current Directions in Psychological Science*, and *Psychological Review*. Her research has been funded by the National Institutes of Health (including NIDA and NIAAA).

Jacqueline I. Woerner (PhD, Wayne State University, 2017) is currently a Postdoctoral Fellow at Yale University. The overarching goal of her research is to understand why people engage in behavior that may be detrimental to themselves or to others, such as risk taking and aggression. She is specifically interested in the self-regulatory and social processes that underlie the associations between women's experience of victimization and subsequent engagement in risky sex and substance use. Additionally, she is interested in the etiology of violence perpetration, and the ways in which alcohol intoxication and normative influences facilitate aggression.

Julia L. Briskin (MA, Wayne State University, 2017) received her BA in Psychology from the University of Michigan in 2012 (Ann Arbor) and her MA in Psychology from Wayne State University in 2017. She is currently a doctoral candidate at Wayne State University. Her research focuses on the question of why people engage in behavior that seemingly disrupts their close relationships and undermines their long-term goals. Specifically, her research investigates why people engage with technology devices across consequential contexts (i.e., during interpersonal interactions and while driving), as well as the intrapersonal and interpersonal consequences of such behavior.

REFERENCES

- Ainslie G (1975). Specious reward: A behavioral theory of impulsiveness and impulse control. *Psychological Bulletin*, 82(4), 463–496. [PubMed: 1099599]
- Ainslie G, & Haslam N (1992). Hyperbolic Discounting. In Loewenstein G, & Elster J (Eds.), *Choice over Time* (pp. 57–92). New York: Russell Sage Foundation.
- American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (5th ed.). Arlington, VA: American Psychiatric Association.
- Amlung M, Gray JC, & MacKillop J (2016). Delay discounting and addictive behavior: Review of the literature and identification of emerging priorities. In Kopetz CE, Lejuez CW, Kopetz CE, & Lejuez CW (Eds.), *Addictions: A social psychological perspective* (pp. 15–46). New York, NY, US: Routledge/Taylor & Francis Group.
- Amlung M, & MacKillop J (2014). Understanding the effects of stress and alcohol cues on motivation for alcohol via behavioral economics. *Alcoholism: Clinical and Experimental Research*, 38(6), 1780–1789. 10.1111/acer.12423
- Ayduk O, Mendoza-Denton R, Mischel W, Downey G, Peake PK, & Rodriguez M (2000). Regulating the interpersonal self: Strategic self-regulation for coping with rejection sensitivity. *Journal of Personality and Social Psychology*, 79(5), 776–792. 10.1037/0022-3514.79.5.776 [PubMed: 11079241]

- Baker TB, Piper ME, McCarthy DE, Majeskie MR, & Fiore MC (2004). Addiction motivation reformulated: An affective processing model of negative reinforcement. *Psychological Review*, 111(1), 33–51. 10.1037/0033-295X.111.1.33 [PubMed: 14756584]
- Barkley RA (1997). Behavioral inhibition, sustained attention, and executive functions: Constructing a unifying theory of ADHD. *Psychological Bulletin*, 121(1), 65–94. [PubMed: 9000892]
- Baumeister RF, Bratslavsky E, Muraven M, & Tice DM (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*, 74(5), 1252–1265. 10.1037/0022-3514.74.5.1252 [PubMed: 9599441]
- Baumeister RF, Heatherton TF, & Tice DM (1994). Impulses and appetites. In Baumeister RF, Heatherton TF, & Tice DM (Eds.), *Losing control: How and why people fail at self-regulation* (pp. 132–142). San-Diego, CA: Academic Press.
- Bechara A (2005). Decision making, impulse control and loss of willpower to resist drugs: A neurocognitive perspective. *Nature Neuroscience*, 8(11), 1458–1463. 10.1038/nn1584 [PubMed: 16251988]
- Bélanger JJ, Kruglanski AW, Chen X, & Orehek E (2014). Bending perception to desire: Effects of task demands, motivation, and cognitive resources. *Motivation and Emotion*, 38(6), 802–814. 10.1007/s11031-014-9436-z
- Bélanger JJ, Lafreniere MAK, Vallerand RJ, & Kruglanski AW (2013). When passion makes the heart grow colder: The role of passion in alternative goal suppression. *Journal of Personality and Social Psychology*, 104(1), 126–147. 10.1037/a0029679 [PubMed: 22905768]
- Bickel WK, Jarmolowicz DP, Mueller ET, Koffarnus MN, & Gatchalian KM (2012). Excessive discounting of delayed reinforcers as a trans-disease process contributing to addiction and other disease-related vulnerabilities: Emerging evidence. *Pharmacology & Therapeutics*, 134(3), 287–297. 10.1016/j.pharmthera.2012.02.004 [PubMed: 22387232]
- Bickel WK, Miller ML, Yi R, Kowal BP, Lindquist DM, & Pitcock JA (2007). Behavioral and neuroeconomics of drug addiction: Competing neural systems and temporal discounting processes. *Drug and Alcohol Dependence*, 90, S85–S91. 10.1016/j.drugalcdep.2006.09.016 [PubMed: 17101239]
- Bijleveld E, Custers R, & Aarts H (2009). The unconscious eye opener: Pupil dilation reveals strategic recruitment of resources upon presentation of subliminal reward cues. *Psychological Science*, 20(11), 1313–1315. 10.1111/j.1467-9280.2009.02443.x [PubMed: 19788532]
- Bijleveld E, Custers R, & Aarts H (2012). Human reward pursuit. *Current Directions in Psychological Science*, 21(3), 194–199. 10.1177/0963721412438463
- Botvinick M, & Braver T (2015). Motivation and cognitive control: From behavior to neural mechanism. *Annual Review of Psychology*, 66, 83–113. 10.1146/annurev-psych-010814-015044
- Bousman CA, Cherner M, Ake C, Letendre S, Atkinson JH, Patterson TL, ... HNRC Group (2009). Negative mood and sexual behavior among non-monogamous men who have sex with men in the context of methamphetamine and HIV. *Journal of Affective Disorders*, 119(1), 84–91. 10.1016/j.jad.2009.04.006 [PubMed: 19419773]
- Brehm JW, & Self EA (1989). The intensity of motivation. *Annual Review of Psychology*, 40(1), 109–131.
- Briere J, & Gil E (1998). Self-mutilation in clinical and general population samples: Prevalence, correlates, and functions. *American Journal of Orthopsychiatry*, 68(4), 609–620. 10.1037/h0080369
- Cooper ML (2010). Toward a person x situation model of sexual risk-taking behaviors: Illuminating the conditional effects of traits across sexual situations and relationship contexts. *Journal of Personality and Social Psychology*, 98(2), 319–341. [PubMed: 20085403]
- de Wit H, & Richards JB (2004). Dual determinants of drug use in humans: Reward and impulsivity. In Bevens RA, Bardo MT, Bevens RA, & Bardo MT (Eds.), *Motivational factors in the etiology of drug abuse*. Volume 50 of the Nebraska Symposium on Motivation (pp. 19–55). Lincoln, NE, US: University of Nebraska Press.
- Dewey J (1936). *Human nature and conduct: An introduction to social psychology*. New York: Random House.

- Dickman SJ (1990). Functional and dysfunctional impulsivity: Personality and cognitive correlates. *Journal of Personality and Social Psychology*, 58(1), 95–102. 10.1037//0022-3514.58.1.95 [PubMed: 2308076]
- Dijksterhuis A, & Aarts H (2010). Goals, attention, and (un)consciousness. *Annual Review of Psychology*, 61, 467–490. 10.1146/annurev.psych.093008.100445
- Dir AL, Coskunpinar A, & Cyders MA (2014). A meta-analytic review of the relationship between adolescent risky sexual behavior and impulsivity across gender, age, and race. *Clinical Psychology Review*, 34(7), 551–562. 10.1016/j.cpr.2014.08.004 [PubMed: 25261740]
- Dittmar H (2001). Impulse buying in ordinary and “compulsive” consumers. In Weber EU, Baron J, & Loomes G (Eds.), *Conflicts and tradeoffs in decision making*. Cambridge series on judgment and decision making (pp. 110–135). New York: Cambridge University Press. ISBN: 9780521772389.
- Dixon MR, Jacobs EA, & Sanders S (2006). Contextual control of delay discounting by pathological gamblers. *Journal of Applied Behavior Analysis*, 39(4), 413–422. 10.1901/jaba.2006.173-05 [PubMed: 17236338]
- Elliott R, Agnew Z, & Deakin J (2009). Hedonic and informational functions of the human orbitofrontal cortex. *Cerebral Cortex*, 20(1), 198–204. 10.1093/cercor/bhp092
- Everitt BJ, & Robbins TW (2005). Neural systems of reinforcement for drug addiction: From actions to habits to compulsion. *Nature Neuroscience*, 8(11), 1481–1489. 10.1038/nn1579 [PubMed: 16251991]
- Feilhauer J, & Cima M (2013). Youth psychopathy: Differential correlates of callous-unemotional traits, narcissism, and impulsivity. *Forensic Science International*, 224(1–3), 1–7. 10.1016/j.forsciint.2012.10.016 [PubMed: 23149319]
- Gerlach G, Herpertz S, & Loeber S (2014). Personality traits and obesity: A systematic review. *Obesity Reviews*, 16(1), 32–63. 10.1111/obr.12235 [PubMed: 25470329]
- Giordano PC, Cernkovich SA, & Rudolph JL (2002). Gender, crime, and desistance: Toward a theory of cognitive transformation. *American Journal of Sociology*, 107(4), 990–1064. 10.1086/343191
- Gray JA (1972). Learning theory, the conceptual nervous system, and personality. In Nebylitsyn VD, & Gray JA (Eds.), *Biological bases of individual behavior* (pp. 182–205). New York: Academic Press.
- Gray JA (1981). A critique of Eysenck’s theory of personality. In Eysenck HJ (Ed.), *A model for personality* (pp. 246–276). New York: Springer-Verlag.
- Heatherton TF, & Baumeister RF (1991). Binge eating as escape from self-awareness. *Psychological Bulletin*, 110(1), 86–108. 10.1037/0033-2909.110.1.86 [PubMed: 1891520]
- Hofmann W, Friese M, & Roefs A (2009). Three ways to resist temptation: The independent contributions of executive attention, inhibitory control, and affect regulation to the impulse control of eating behavior. *Journal of Experimental Social Psychology*, 45(2), 431–435. 10.1016/j.jesp.2008.09.013
- Hofmann W, Friese M, & Strack F (2009). Impulse and self-control from a dual-systems perspective. *Perspectives on Psychological Science*, 4(2), 162–176. 10.1111/j.1745-6924.2009.01116.x [PubMed: 26158943]
- Hofmann W, Gschwendner T, Friese M, Wiers RW, & Schmitt M (2008). Working memory capacity and self-regulatory behavior: Toward an individual differences perspective on behavior determination by automatic versus controlled processes. *Journal of Personality and Social Psychology*, 95(4), 962–977. 10.1037/a0012705 [PubMed: 18808271]
- Hostinar CE, Stellern SA, Schaefer C, Carlson SM, & Gunnar MR (2012). Associations between early life adversity and executive function in children adopted internationally from orphanages. *Proceedings of the National Academy of Sciences*, 109(Supplement 2), 17208–17212. 10.1073/pnas.1121246109
- Hoyle RH (2006). Personality and self-regulation: Trait and information-processing perspectives. *Journal of Personality*, 74(6), 1507–1526. 10.1111/j.1467-6494.2006.00418.x [PubMed: 17083656]
- Hoyle RH, Fejfar MC, & Miller JD (2000). Personality and sexual risk taking: A quantitative review. *Journal of Personality*, 68(6), 1203–1231. 10.1111/1467-6494.00132 [PubMed: 11130738]

- Kassel JD, Stroud LR, & Paronis CA (2003). Smoking, Stress, and Negative Affect: Correlation, Causation, and Context across Stages of Smoking. *Psychological Bulletin*, 129, 270–304. 10.1037/0033-2909.129.2.270 [PubMed: 12696841]
- Kirby KN, & Petry NM (2004). Heroin and cocaine abusers have higher discount rates for delayed rewards than alcoholics or non-drug-using controls. *Addiction*, 99(4), 461–471. 10.1111/j.1360-0443.2003.00669.x [PubMed: 15049746]
- Kirby KN, Winston GC, & Santiesteban M (2005). Impatience and grades: Delay-discount rates correlate negatively with college GPA. *Learning and Individual Differences*, 15(3), 213–222. 10.1016/j.lindif.2005.01.003
- Kirchner TR, & Sayette MA (2007). Effects of smoking abstinence and alcohol consumption on smoking-related outcome expectancies in heavy smokers and tobacco chippers. *Nicotine & Tobacco Research*, 9(3), 365–376. 10.1080/14622200701188893 [PubMed: 17365768]
- Knutson B, Fong GW, Bennett SM, Adams CM, & Hommer D (2003). A region of mesial prefrontal cortex tracks monetarily rewarding outcomes: Characterization with rapid event-related fMRI. *NeuroImage*, 18(2), 263–272. 10.1016/s1053-8119(02)00057-5 [PubMed: 12595181]
- Koffarnus MN, Jarmolowicz DP, Mueller ET, & Bickel WK (2013). Changing delay discounting in the light of the competing neurobehavioral decision systems theory: A review. *Journal of the Experimental Analysis of Behavior*, 99(1), 32–57. 10.1002/jeab.2 [PubMed: 23344987]
- Komlos J, Smith PK, & Bogin B (2004). Obesity and the rate of time preference: Is there a connection? *Journal of Biosocial Science*, 36(2), 209–219. 10.1017/s0021932003006205 [PubMed: 15030016]
- Kopetz C & Briskin JL (in preparation). Delay discounting as motivated choice.
- Kopetz C, Faber T, Fishbach A, & Kruglanski AW (2011). The multifinality constraints effect: How goal multiplicity narrows the means set to a focal end. *Journal of Personality and Social Psychology*, 100, 810–826. [PubMed: 21381854]
- Kopetz C, MacPherson L, Mitchell AD, Huston-Ludlam A, & Wiers RWHJ (2017). A novel alternative behavior approach bias modification intervention for smoking cessation: The relevance of implicit mechanisms. *Experimental and Clinical Psychopharmacology*, 25, 50–60. [PubMed: 28150972]
- Kopetz C, & Orehek E (2015). When the end justifies the means. *Current Directions in Psychological Science*, 24(5), 386–391. 10.1177/0963721415589329
- Kopetz C, Pickover A, Magidson JF, Richards JM, Iwamoto D, & Lejuez CW (2014). Gender and social rejection as risk factors for engaging in risky sexual behavior among crack/cocaine users. *Prevention Science*, 15(3), 376–384. 10.1007/s11121-013-0406-6 [PubMed: 23761179]
- Kopetz CE, Collado A, & Lejuez CW (2015). When the end (automatically) justifies the means: Automatic tendency toward sex exchange for crack cocaine. *Motivation Science*, 1(4), 233–244. 10.1037/mot0000025 [PubMed: 27747262]
- Kopetz CE, Reynolds EK, Hart CL, Kruglanski AW, & Lejuez CW (2010). Social context and perceived effects of drugs on sexual behavior among individuals who use both heroin and cocaine. *Experimental and Clinical Psychopharmacology*, 18(3), 214–220. 10.1037/a0019635 [PubMed: 20545385]
- Kopetz CE, Woerner J, MacPherson L, Lejuez CW, Nelson CA, Zeanah CH, & Fox NA (2017). Early psychosocial deprivation and adolescent risk-taking: The role of motivation and executive control. Under review at *Journal of Experimental Psychology: General*
- Kruglanski AW, Bélanger JJ, Chen X, Köpetz C, Pierro A, & Mannetti L (2012). The energetics of motivated cognition: A force-field analysis. *Psychological Review*, 119(1), 1–20. 10.1037/a0025488 [PubMed: 21967165]
- Kruglanski AW, Shah JY, Fishbach A, Friedman R, Chun WY, & Sleeth-Keppler D (2002). A theory of goal systems. *Advances in Experimental Social Psychology*, 331–378. 10.1016/s0065-2601(02)80008-9
- Kruglanski AW, & Webster DM (1996). Motivated closing of the mind: “Seizing” and “freezing”. *Psychological Review*, 103(2), 263–283. 10.1037//0033-295x.103.2.263 [PubMed: 8637961]
- Kunda Z (1990). The case for motivated reasoning. *Psychological Bulletin*, 108(3), 480–498. 10.1037/0033-2909.108.3.480 [PubMed: 2270237]

- Lejuez CW, Bornovalova MA, Reynolds EK, Daughters SB, & Curtin JJ (2007). Risk factors in the relationship between gender and crack/cocaine. *Experimental and Clinical Psychopharmacology*, 15(2), 165–175. [PubMed: 17469940]
- Loewenstein RJ (1996). Dissociative amnesia and dissociative fugue. *Handbook of Dissociation*, 307–336. 10.1007/978-1-4899-0310-5_15
- Logan GD, Cowan WB, & Davis KA (1984). On the ability to inhibit simple and choice reaction time responses: A model and a method. *Journal of Experimental Psychology: Human Perception and Performance*, 10(2), 276–291. [PubMed: 6232345]
- Logan GD, Schachar RJ, & Tannock R (1997). Impulsivity and inhibitory control. *Psychological Science*, 8(1), 60–64.
- López-Torrecillas F, Perales JC, Nieto-Ruiz A, & Verdejo-García A (2014). Temperament and impulsivity predictors of smoking cessation outcomes. *PLoS One*, 9(12), e112440. doi:10.1371/journal.pone.0112440 [PubMed: 25474540]
- Lovallo WR (2013). Early life adversity reduces stress reactivity and enhances impulsive behavior: Implications for health behaviors. *International Journal of Psychophysiology*, 90(1), 8–16. 10.1016/j.ijpsycho.2012.10.006 [PubMed: 23085387]
- Lovallo WR, Farag NH, Sorocco KH, Acheson A, Cohoon AJ, & Vincent AS (2013). Early life adversity contributes to impaired cognition and impulsive behavior: Studies from the Oklahoma Family Health Patterns Project. *Alcoholism: Clinical and Experimental Research*, 37(4), 616–623. 10.1111/acer.12016
- Lynam DR, & Miller JD (2004). Personality pathways to impulsive behavior and their relations to deviance: Results from three samples. *Journal of Quantitative Criminology*, 20(4), 319–341. 10.1007/s10940-004-5867-0
- Madden GJ, & Bickel WK (2015). *Impulsivity: The behavioral and neurological science of discounting*. Washington, DC: American Psychological Association.
- Madden GJ, Petry NM, Badger GJ, & Bickel WK (1997). Impulsive and self-control choices in opioid-dependent patients and non-drug-using control patients: Drug and monetary rewards. *Experimental and Clinical Psychopharmacology*, 5(3), 256–262. 10.1037//1064-1297.5.3.256 [PubMed: 9260073]
- Malmberg M, Kleinjan M, Vermulst AA, Overbeek G, Monshouwer K, Lammers J, & Engels RC (2012). Do substance use risk personality dimensions predict the onset of substance use in early adolescence? A variable- and person-centered approach. *Journal of Youth and Adolescence*, 41(11), 1512–1525. 10.1007/s10964-012-9775-6 [PubMed: 22623315]
- Matusiewicz A, Kopetz C, Weaverling G, Elis J, & Lejuez CW (2015). Distress and risk behavior in borderline personality disorder: A self-regulatory perspective. Under review at *Personality Disorders: Theory, Research, and Treatment*.
- McDermott JM, Troller-Renfree S, Vanderwert R, Nelson CA, Zeanah CH, & Fox NA (2013). Psychosocial deprivation, executive functions, and the emergence of socio-emotional behavior problems. *Frontiers in Human Beuroscience*, 7, 1–11. 10.3389/fnhum.2013.00167
- Metcalfe JJ, & Mischel W (1999). A hot/cool-system analysis of delay of gratification: Dynamics of willpower. *Psychological Review*, 106(1), 3–19. 10.1037//0033-295x.106.1.3 [PubMed: 10197361]
- Mischel W, Shoda Y, & Rodriguez M (1989). Delay of gratification in children. *Science*, 244(4907), 933–938. 10.1126/science.2658056 [PubMed: 2658056]
- Muraven M, Tice DM, & Baumeister RF (1998). Self-control as a limited resource: Regulatory depletion patterns. *Journal of Personality and Social Psychology*, 74(3), 774–789. 10.1037/0022-3514.74.3.774 [PubMed: 9523419]
- Odlaug BL, Schreiber LRN, & Grant JE (2013). Personality dimensions and disorders in pathological gambling. *Current Opinion in Psychiatry*, 26(1), 107–112. 10.1097/YCO.0b013e32835997df [PubMed: 23041794]
- O’Doherty JP, & Dolan RJ (2006). The role of human orbitofrontal cortex in reward prediction and behavioral choice: insights from neuroimaging. *The Orbitofrontal Cortex*, 265–284. 10.1093/acprof:oso/9780198565741.003.0010
- Omar A (2009). The moderating role of interpersonal justice on the relationship between Eysenckian personality dimensions and employee voice and employee silence. In Antoniou A-SG, Cooper CL,

Chrousos GP, Spielberger CD, Eysenck MW, Antoniou A-SG, et al. (Eds.), *Handbook of managerial behavior and occupational health* (pp. 143–156). Northampton, MA, US: Edward Elgar Publishing.

- Petry NM (2001). Substance abuse, pathological gambling, and impulsiveness. *Drug and Alcohol Dependence*, 63(1), 29–38. 10.1016/s0376-8716(00)00188-5 [PubMed: 11297829]
- Poythress NG, & Hall JR (2011). Psychopathy and impulsivity reconsidered. *Aggression and Violent Behavior*, 16(2), 120–134. 10.1016/j.avb.2011.02.003
- Rachlin H (1989). *Judgment, decision, and choice: A cognitive/behavioral synthesis*. New York, NY, US: W H Freeman/Times Books/Henry Holt & Co.
- Rachlin H, & Green L (1972). Commitment, choice and self-control. *Journal of the Experimental Analysis of Behavior*, 17(1), 15–22. [PubMed: 16811561]
- Rawn CD, & Vohs KD (2010). People use self-control to risk personal harm: An intra-interpersonal dilemma. *Personality and Social Psychology Review*, 15(3), 267–289. 10.1177/1088868310381084 [PubMed: 20807858]
- Reynolds B, Ortengren A, Richards JB, & de Wit H (2006). Dimensions of impulsive behavior: Personality and behavioral measures. *Personality and Individual Differences*, 40(2), 305–315.
- Romer D, Betancourt LM, Brodsky NL, Giannetta JM, Yang W, & Hurt H (2011). Does adolescent risk taking imply weak executive function? A prospective study of relations between working memory performance, impulsivity, and risk taking in early adolescence. *Developmental Science*, 14(5), 1119–1133. 10.1111/j.1467-7687.2011.01061.x [PubMed: 21884327]
- Rotenberg KJ, Fox C, Green S, Ruderman L, Slater K, Stevens K, & Carlo G (2005). Construction and validation of a children’s interpersonal trust belief scale. *British Journal of Developmental Psychology*, 23(2), 271–293. 10.1348/026151005x26192
- Rousseau GS, Irons JG, & Correia CJ (2011). The reinforcing value of alcohol in a drinking to cope paradigm. *Drug and Alcohol Dependence*, 118(1), 1–4. 10.1016/j.drugalcdep.2011.02.010 [PubMed: 21414732]
- Saddichha S, & Schuetz C (2014). Impulsivity in remitted depression: A meta-analytical review. *Asian Journal of Psychiatry*, 9, 13–16. 10.1016/j.ajp.2014.02.003 [PubMed: 24813029]
- Selby EA, & Joiner TE Jr. (2013). Emotional cascades as prospective predictors of dysregulated behaviors in borderline personality disorder. *Personality disorders: Theory, Research, and Treatment*, 4(2), 168–174. 10.1037/a0029933
- Shiffman S, & Waters AJ (2004). Negative Affect and Smoking Lapses: A Prospective Analysis. *Journal of Consulting and Clinical Psychology*, 72(2), 192–201. 10.1037/0022-006X.72.2.192 [PubMed: 15065954]
- Somerville LH, & Casey BJ (2010). Developmental neurobiology of cognitive control and motivational systems. *Current Opinion in Neurobiology*, 20(2), 236–241. 10.1016/j.conb.2010.01.006 [PubMed: 20167473]
- Steinberg L (2007). Risk taking in adolescence: New perspectives from brain and behavioral science. *Current Directions in Psychological Science*, 16(2), 55–59. 10.1111/j.1467-8721.2007.00475.x
- Strack F, & Deutsch R (2003). The two sides of social behavior: Modern classics and overlooked gems on the interplay of automatic and controlled processes. *Psychological Inquiry*, 14(3), 209–215. 10.1207/s15327965pli1403&4_5
- Thaler RH (1981). Some empirical evidence on dynamic inconsistency. *Economic Letters*, 8, 201–207.
- Tice DM, Bratslavsky E, & Baumeister RF (2001). Emotional distress regulation takes precedence over impulse control: If you feel bad, do it! *Journal of Personality and Social Psychology*, 80(1), 53–67. 10.1037/0022-3514.80.1.53 [PubMed: 11195891]
- Vohs KD, & Heatherton TF (2000). Self-regulatory failure: A resource-depletion approach. *Psychological Science*, 11(3), 249–254. 10.1111/1467-9280.00250 [PubMed: 11273412]
- Volkow ND, Fowler JS, Wang GJ, Swanson JM, & Telang F (2007). Dopamine in drug abuse and addiction: Results of imaging studies and treatment implications. *Archives of Neurology*, 64(11), 1575–1579. 10.1001/archneur.64.11.1575 [PubMed: 17998440]
- Ward A, & Mann T (2000). Don’t mind if I do: Disinhibited eating under cognitive load. *Journal of Personality and Social Psychology*, 78(4), 753–763. 10.1037/0022-3514.78.4.753 [PubMed: 10794378]

- Whitlock J, Eckenrode J, & Silverman D (2006). Self-injurious behaviors in a college population. *Pediatrics*, 117(6), 1939–1948. 10.1542/peds.2005-2543 [PubMed: 16740834]
- Wiers RW, & Stacy AW (2006). Implicit cognition and addiction. *Current Directions in Psychological Science*, 15(6), 292–296. 10.1111/j.1467-8721.2006.00455.x
- Windschitl PD (2002). Judging the accuracy of a likelihood judgment: The case of smoking risk. *Journal of Behavioral Decision Making*, 15, 19–35.
- Wingrove J, & Bond AJ (1998). Angry reactions to failure on a cooperative computer game: The effect of trait hostility, behavioural inhibition, and behavioural activation. *Aggressive Behavior*, 24(1), 27–36. 10.1002/(sici)1098-2337(1998)24:1<27::aid-ab3>3.0.co;2-p
- Winkel DE, Wyland RL, Shaffer MA, & Clason P (2011). A new perspective on psychological resources: Unanticipated consequences of impulsivity and emotional intelligence. *Journal of Occupational and Organizational Psychology*, 84(1), 78–94. 10.1348/2044-8325.002001
- Woerner J, Kopetz C, Lechner WV, & Lejuez C (2016). History of abuse and risky sex among substance users: The role of rejection sensitivity and the need to belong. *Addictive Behaviors*, 62, 73–78. 10.1016/j.addbeh.2016.06.006 [PubMed: 27344009]
- Woerner JI, Kopetz C, & Arriaga X (in preparation). Interpersonal victimization and sexual risk-taking among women: The role of attachment style and regulatory focus.
- Wright RA, Contrada RJ, & Patane MJ (1986). Task difficulty, cardiovascular response, and the magnitude of goal valence. *Journal of Personality and Social Psychology*, 51(4), 837–843. 10.1037/0022-3514.51.4.837 [PubMed: 3783427]
- Yi R, Johnson MW, Giordano LA, Landes RD, Badger GJ, & Bickel WK (2008). The effects of reduced cigarette smoking on discounting future rewards: An initial evaluation. *The Psychological Record*, 58(2), 163–174. 10.1007/bf03395609 [PubMed: 23825867]
- Yi R, & Landes RD (2012). Temporal and probability discounting by cigarette smokers following acute smoking abstinence. *Nicotine & Tobacco Research*, 14(5), 547–558. 10.1093/ntr/ntr252 [PubMed: 22311959]
- Zapolski TC, Cyders MA, & Smith GT (2009). Positive urgency predicts illegal drug use and risky sexual behavior. *Psychology of Addictive Behaviors*, 23(2), 348–354. 10.1037/a0014684 [PubMed: 19586152]
- Zuckerman M (1979). *Sensation seeking*. John Wiley & Sons, Inc.