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Self-control: An integrative framework

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Abstract

Research on self-control has flourished within the last two decades, with many researchers trying to answer one of the most fundamental questions regarding human behaviour—how do we successfully regulate desires in the pursuit of long-term goals? While recent research has focused on different strategies to enhance self-control success, we still know very little about *how* strategies are implemented or *where* the need for self-control comes from in the first place. Drawing from parallel fields (e.g., emotion regulation, health) and other theories of self-regulation, we propose an integrative framework that describes self-control as a dynamic, multi-stage process that unfolds over time. In this review, we first provide an overview of this framework, which poses three stages of regulation: the identification of the need for self-control, the selection of strategies to regulate temptations, and the implementation of chosen strategies. These regulatory stages are then flexibly monitored over time. We then expand this framework by outlining a series of growth points to guide future research. By bridging across theories and disciplines, the present framework improves our understanding of how self-control unfolds in everyday life.

KEYWORDS

flexibility, goal pursuit, polyregulation, process model, self-control, self-regulation, strategies

1 | SELF-CONTROL: AN INTEGRATIVE FRAMEWORK

Everybody is eager to understand self-control. From Plato's *Phaedrus* to modern-day conceptualizations of willpower, the concept of self-control has been a core interest in understanding the human condition for millennia. This is no surprise given the profound impact of self-control, the process of resolving conflict between conflicting goals (Inzlicht et al., 2021): by being able to master our thoughts, emotions, and behaviours, we are less likely to fall victim to our vices and instead live a happier, healthier life where we thrive in our daily pursuits (Mischel et al., 1988; Moffitt et al., 2011; Roberts et al., 2014; Tangney et al., 2004). However, as anyone who has tried to pursue a goal knows, self-control is not always successful—we eat the cookie despite our goal to lose weight, hit the snooze button on our morning alarm instead of going to the gym, or continue to buy expensive lattes which hinder our ability to save for retirement. While seemingly innocuous in the moment (e.g., "it's just one missed workout" or "it's only five dollars"), self-control failures can be quite costly at the individual and societal levels. For example, our increasingly sedentary lifestyle generates an estimated $117 billion annually in healthcare costs (National Center for Chronic Disease Prevention and Health Promotion, 2019), and Americans are drowning in more consumer debt than ever before, reaching nearly $1 trillion in credit card debt alone (Federal Reserve Bank of New York, 2020). Given the pervasive impact of these behaviours, it is clear why researchers, policymakers, and laypeople alike are all eager to understand how to improve self-control.

While research on self-control has grown dramatically in the last two decades, research has largely focused on explaining self-control failure and promoting the use of willpower (Baumeister, 2002; Baumeister et al., 2007; Mischel et al., 1988, 1989)—that is, if we learn how to just say "no" to temptations, we will be more successful. However, recent theorizing argues that willpower is overrated (Inzlicht & Friese, 2021) and so ill-defined that asking a person to "use willpower" is akin to "telling a person to build a house with a pile of wood" (Fujita et al., 2020, p. 7; see also Werner, Inzlicht, et al., 2022). Fortunately, with increasing recognition of the conceptual and practical limitations of willpower, research has turned to other more tractable strategies that people can use to pursue their goals (Duckworth et al., 2018; Hennecke et al., 2019; Hofmann & Kotabe, 2012). While this shift to moving beyond willpower is certainly encouraging, focusing on the effectiveness of different strategies still only tells part of the story.

Building on these venerable foundations, we propose the field is ready for a new generation of research that fully embraces the complexity of self-control in everyday life. To help push the field forward, our aim is to synthesize recent advances in self-control while also integrating across a range of theoretical perspectives. To achieve this objective, we propose an integrative theoretical framework—the *extended process model of self-control*—that describes self-control as a dynamic, multi-stage process that unfolds over time. To help organize this review, we start by adapting the process model of emotion regulation (Gross, 2015) to self-control. This framework provides a conceptual scaffold that allows us to then integrate across different models of self-regulation (e.g., from social, personality, health, neuroscience, economics) as we describe each stage of the self-control process. Finally, leveraging this framework, we outline a series of exciting growth points to guide future research.

2 | EXPANDING THE PROCESS MODEL OF SELF-CONTROL

The ways in which people can regulate temptations and desires are vast—so much so that the array of existing self-control strategies has been described as "dizzying in both number and variety" (Duckworth, Gendler, et al., 2016, p. 38). This problem inspired researchers to organize these strategies, resulting in different attempts to merge the process model of emotion regulation (Gross, 1998)—which was originally designed to organize the range of emotion regulation strategies—with the study of self-control (e.g., Duckworth, Gendler, et al., 2016; Magen & Gross, 2010; O'Leary et al., 2017). While organizing strategies is essential, so far existing models remain silent on key aspects of the self-control process. Namely, what initiates the need for self-control in the first place? And how do people actually use these different strategies? To answer these questions, we propose an *extended process model of self-control*.

This extended process model of self-control draws inspiration from the process model of emotion regulation (Gross, 2015). Emotion regulation refers to the attempts to influence the types of emotions people experience, when they experience them, and how they are expressed (Gross, 1998). In our view, this is a natural starting point because self-control is an inherently affective process focused on regulating desires that conflict with important personal goals (Hofmann et al., 2012; Hofmann & Van Dillen, 2012; Kotabe & Hofmann, 2015). Because of its affective nature, we propose that self-control is far more similar to emotion regulation than their independent literatures would suggest. The most notable similarity is that both self-control and emotion regulation focus on regulatory processes that promote goal attainment (Inzlicht et al., 2021; Tamir, 2021). The key difference, however, is that the ultimate goal of self-control is most often to regulate a person's behaviour (e.g., to stop oneself from eating a delicious but unhealthy snack) whereas the ultimate goal of emotion regulation is to regulate a person's emotions (e.g., to increase positive emotions when having a bad day). But the conceptual overlap between self-control and emotion regulation is already apparent when one considers that people also regulate emotional *behaviours* through emotion regulation (e.g., to put a smile on one's face), and that people often target *emotion* processes when engaging in self-control (e.g., reducing the emotional desire posed by that delicious snack). Indeed, while most instances of self-control can be considered emotion regulation (e.g., regulating one's behaviour to reduce desire), not all instances of emotion regulation can be considered self-control (e.g., increasing positive emotions because a person doesn't want to feel bad).

The unique contributions of the extended process model of self-control are twofold. First, we build upon previous process models of self-control by providing a more complete account of how self-control unfolds in everyday life, focusing specifically on how people experience self-control in-the-moment. Second, by bridging the self-control and emotion regulation divide, we bring together concepts and methods pioneered in the emotion regulation literature to better understand how people can achieve their goals. Such integration not only facilitates the use of common language across sub-disciplines (a practice that is sorely needed within self-regulation and psychology more broadly; Werner, Inzlicht, et al., 2022), but would also be of great practical utility to researchers, practitioners, and people who are generally interested in regulatory processes.

2.1 | An overview of the extended process model of self-control

In the *extended process model of self-control*, we propose that self-control is a dynamic, multi-stage process (see Figure 1). People first identify the need to regulate a long-term goal (e.g., to eat healthy) or temptation (e.g., wanting a delicious cookie). They then select what strategies they will use and subsequently implement those strategies by transforming them into corresponding tactics (i.e., specific thoughts, behaviours, or actions). Throughout this process, people monitor progress at each stage, deciding when to maintain, switch, or abandon the current process. At each stage, we consider self-control as a cycle whereby the current state of the world (W), like a goal, is perceived (P) and evaluated (V), resulting in an action (A) that may be launched to change the state of the world (e.g., achieving the goal; cf. Gross, 2015; Rangel et al., 2008). Here, we adapt the process model of emotion regulation which provides the necessary structural foundation, and then we further integrate relevant theories of self-regulation that help generate new predictions, therefore enhancing our understanding of how people regulate temptations and desires in their everyday life. Table 1 provides an overview of key terms that we use to describe the different components and processes outlined in this framework.

2.2 | Identification: Choosing which regulation goals to pursue

2.2.1 | Overview of the identification stage

The first stage involves identifying the need for self-control. As demonstrated in Figure 1, the identification stage involves experiencing a desire, which represents the current state of the world (W). The desire is first detected at

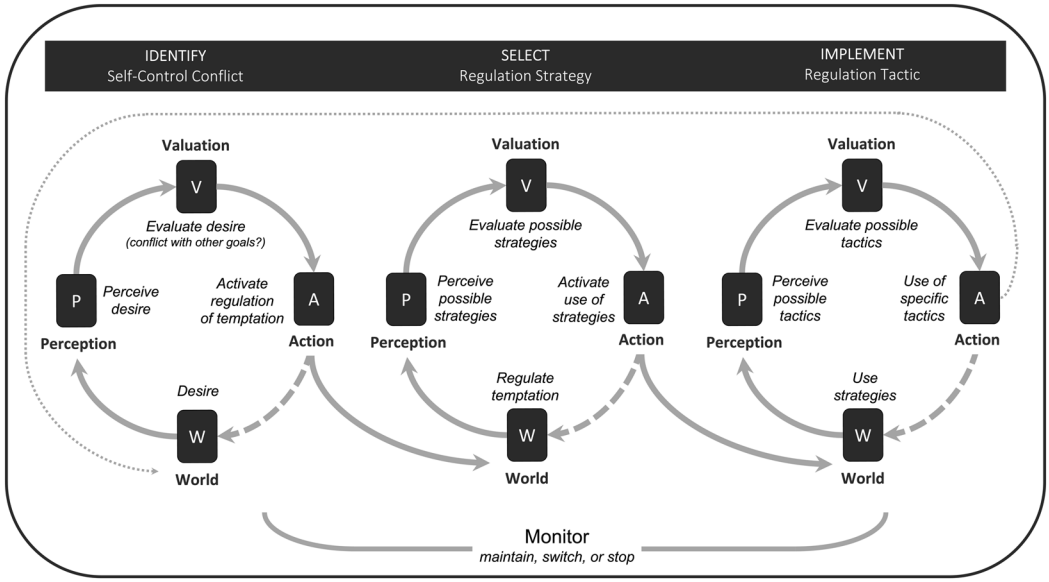

FIGURE 1 The extended process model of self-control inspired by and adapted from Gross (2015). This theoretical model depicts the most common pathway for describing the self-control process (i.e., regulating a temptation). Here, we describe the specific pathway for regulating a temptation (e.g., to avoid unhealthy snacking). However, this same process can be applied to the regulation of the longer-term goal (e.g., to eat healthy) or the simultaneous regulation of both the temptation and the longer-term goal.

the perception step (P), and then its subjective value is evaluated based on its perceived benefits and costs at the valuation step (V). Because the core feature of self-control is the ability to regulate conflict (either consciously or unconsciously) between two competing goals (e.g., wanting to stay in bed vs. needing to exercise), we propose these goals are simultaneously co-evaluated at this valuation step: the subjective value of the desire is weighed against the subjective value of the long-term goal. When sufficient conflict is detected, the desire becomes a *temptation* and the need for self-control is triggered at the action step (A). If a desire does not conflict with any other long-term goals, then the desire is perceived, evaluated, and if determined to be sufficiently positively valued, it will be actively pursued (e.g., hitting the snooze button for an extra 30-min).

2.2.2 | Theoretical integration

To understand the underpinnings of this first stage, we integrate the model of value-based choice (Berkman, 2018; Berkman, Hutcherson, et al., 2017), which provides an important foundation for how people make goal-related decisions. Desires are not inherently problematic (Hofmann et al., 2012, 2014), and so the first step is to identify conflict (Hofmann et al., 2012; Myrseth & Fishbach, 2009). Drawing from work in economics, psychology, and computational neuroscience, the model of value-based choice proposes that options are evaluated through a neurologically-based value accumulation process where (1) subjective value is the weighted sum of choice-relevant attributes (which can vary across people, context, time), and (2) neurons track subjective value in a noisy but probabilistic fashion until a desired threshold of enactment is reached. Value is accumulated across time, where the option with the greatest subjective value is ultimately enacted (Lin et al., 2018). For example, if a person really enjoys exercise and it is an integral part of their identity (Berkman et al., 2017; O'Leary et al., 2017), they will be less tempted to stay in bed on a cold morning—in fact, such a desire may not even cross their mind in the first place. However, as is often the case with self-control, an internal struggle occurs when two or more options have reached the desired threshold and are of similar value (e.g., having the desire to stay in bed when they know they should exercise as planned). Thus, the closer

TABLE 1 Key terms used within the extended process model of self-control.

Construct	Definition	Key citations
Components of Self-Control		
Self-control	The process of resolving conflict between two (or more) competing goals, that are often (but not always) short-term versus long-term in nature	Inzlicht et al. (2021) Duckworth, Gendler, et al., (2016)
Desire	An affectively charged motivation toward a certain object, person, or activity	Hofmann and Van Dillen (2012) Hofmann and Kotabe (2012)
Temptation	A desire that conflicts with a personally important goal or behaviours (i.e., a "problematic" desire)	Hofmann, Förster, Vohs, and Baumeister (2012) Hofmann, Vohs, and Baumeister (2012)
Goal	A cognitive representation of a desired end state that a person is committed to attain	Milyavskaya and Werner (2018, 2021) Elliot and Fryer (2008)
Conflict	Discrepancy between goals, desires, thoughts, emotions, and/or behaviours that are simultaneously active, mutually exclusive, and compete for a single response	Inzlicht et al. (2021) Hofmann and Van Dillen (2012)
Regulating Temptations and Desires		
Strategy	A means to actively alter one's cognitive, motivational, affective, or behavioural reactions to a self-regulatory challenge in order to achieve a goal	Hennecke et al. (2019) Duckworth et al. (2018)
Tactic	Specific regulatory actions that are used to implement a chosen strategy (i.e., how people operationalize strategies)	McRae et al. (2012) Ford et al. (2019)
Repertoire (or regulatory toolbox)	The strategies (or tactics) a person generally has at their disposal in the pursuit of particular goal—the tools a person has in their regulatory toolbox	Bonanno and Burton (2013) Kalokerinos and Koval (2022)
Polyregulation	Using more than one approach to regulate a particular instance of a temptation, desire, or goal. Polyregulation can occur at all stages of regulation, including the pursuit of multiple goals, multiple strategies, and/or multiple tactics.	Ford et al. (2019), Werner and Gross (in-preparation)
Regulatory variability	The variation in the use of one or more regulatory strategies (or tactics) across a number of situations—a necessary but not sufficient condition for flexibility	Aldao et al. (2015) Blanke et al. (2020)
Regulatory flexibility	The ability to implement regulatory strategies and/or tactics in accordance with contextual demands	Aldao et al. (2015) Bonanno and Burton (2013)

in value the different choice options, the more conflict is experienced, therefore activating the need for self-control (which can involve decreasing the value of the temptation, increasing the value of the long-term goal, or both).

2.3 | Selection: Choosing which regulatory strategies to use

2.3.1 | Overview of the selection stage

Once a person identifies the need for self-control, they then choose what strategies to use to help prevent and/or resolve conflict. As demonstrated in Figure 1, potential strategies are detected at the perception step (P) and then evaluated based on their perceived benefits and costs within a given context (e.g., based on domain, the person's motivation) at the valuation step (V). If a strategy is sufficiently positively valued, it is selected at the action step (A). For example, when trying to downregulate the temptation to stay in bed on a cold morning, a person would need to perceive what strategies are available to them (e.g., is there a way to change the environment or their thoughts to minimize the temptation?). They would then evaluate which strategies would be most effective for the situation, and the ones that are determined to be sufficiently positively valued would be chosen.

2.3.2 | Theoretical integration

To understand the types of strategies that people can choose at the selection stage, we integrate the process model of self-control (Duckworth, Gendler, et al., 2016; Magen & Gross, 2010). Researchers have long been studying a myriad of strategies people use to rein in errant impulses—some strategies focus on changing the situation (Duckworth, Gendler, et al., 2016; Hofmann & Kotabe, 2012) while others focus on changing one's own internal perceptions (Fujita et al., 2006; Mischel et al., 1989); some strategies are consciously enacted (Duckworth, White, et al., 2016; Giuiliani et al., 2013) while others are more implicit (Fishbach & Shah, 2006; Papies et al., 2008); strategies may be employed by the self (Milkman et al., 2014; Oettingen et al., 2015) or by others (Benartzi & Thaler, 2013; Goldstein et al., 2008). The primary aim of the process model of self-control was to taxonomize this never-ending range of strategies into four strategy families: Changing or modifying the environment to avoid temptations (situational strategies), directing attention to features of the situation that facilitate self-control (attentional deployment), changing the way they think about the situation (cognitive change), or focusing on directly influencing the experiential, behavioural, or physiological response once the temptation has fully developed (response modulation[1]). While such organization is important, we further propose that strategy selection and effectiveness is largely a function of (1) a person's strategy repertoire (i.e., the strategies a person generally has at their disposal), and (2) contextual features that stem from the person, situation, or broader culture (Aldao et al., 2015; Bonanno & Burton, 2013). In other words, there is no "one strategy to rule them all"—as was originally suggested—instead, strategies can be used flexibly depending on context, either on their own or in a series of blends or sequences.

2.4 | Implementation: Transforming strategies into specific tactics

2.4.1 | Overview of the implementation stage

The task of the implementation stage is to translate strategies into tactics that best match the situation. Strategies and tactics are best thought of as a continuum, such that strategy "families" are broad categories and tactics are the more specific ways that a strategy can be operationalized at a given moment in time (Ford et al., 2019; McRae et al., 2012). As demonstrated in Figure 1, potential tactics are detected in the perception step (P) and are then

evaluated based on their subjective benefits and costs within a given context at the valuation step (V). If a tactic is sufficiently positively valued, the tactic is implemented at the action step (A). For example, if a person chooses cognitive change, they then perceive what tactics are available to them (e.g., thinking about how good they will feel after their workout vs. thinking about the negative consequences of sleeping in) and evaluate which option would be most effective. Chosen tactics are then implemented, resulting in the final behavioural output—if successful, the person gets out of bed; if unsuccessful, they roll over and go back to sleep.

2.4.2 | Theoretical integration

To further understand tactics, we integrate research on approach and avoidance motivation (Davidson, 1998; Elliot & Fryer, 2008; Elliot & Thrash, 2001). While comparing the effectiveness of self-control strategies has generated important insights for self-control, this focus has deemphasized the variability that exists *within* any given strategy

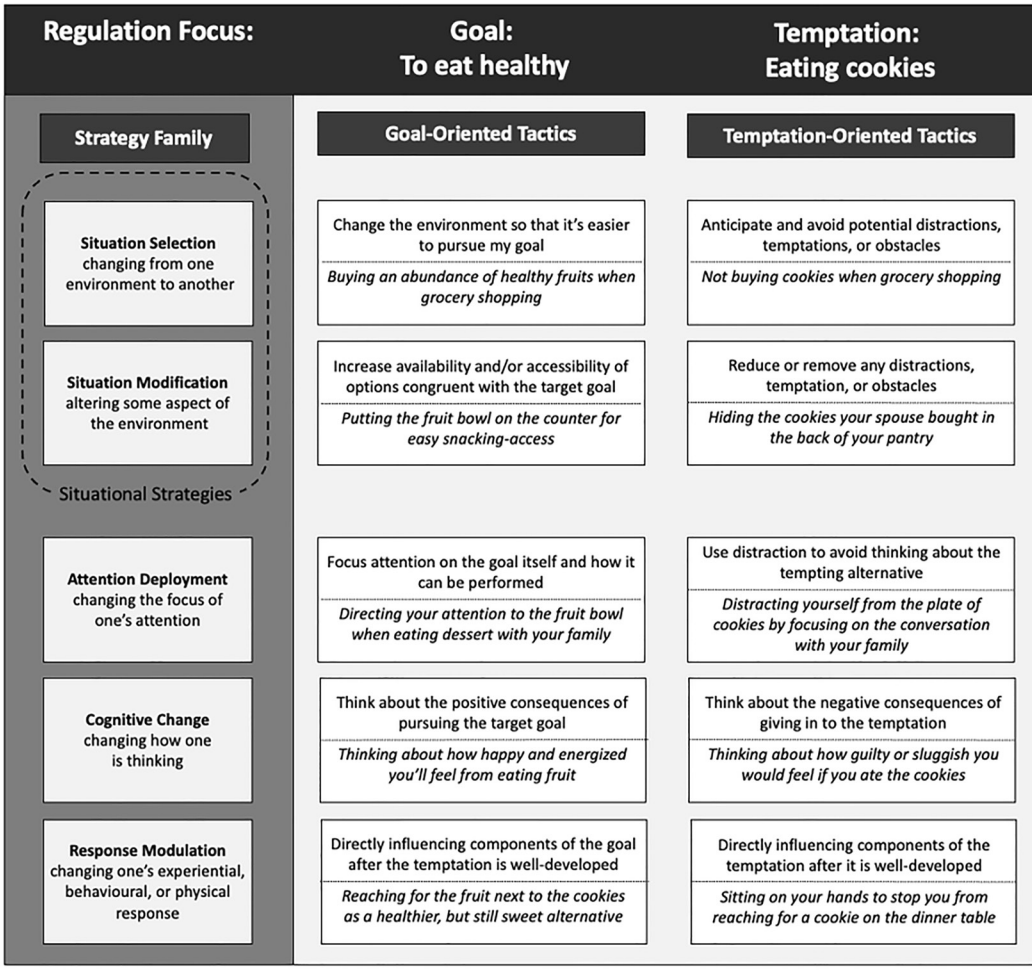

FIGURE 2 Self-control strategies and example tactics (adapted from Ford et al., 2019). Although the present framework combines situation selection and situation modification into one broader family of "situational strategies" to be consistent with the extended process model of emotion regulation (Gross, 2015), we also present them separately to be consistent with previous models of goal pursuit (e.g., Duckworth, Gendler, et al., 2016).

family. To address this gap, we propose that tactics can be conceptualized as goal-oriented (i.e., behaviours focused on *approaching* a long-term goal) or temptation-oriented (i.e., behaviours focused on *avoiding* temptations) (see also Fishbach & Converse, 2010; Stok et al., 2016). Examples of how people may operationalize different strategies are presented in Figure 2. This distinction is critical because avoidance-based tactics can help a person move away from undesired outcomes, however, they do not always provide the means to actively move toward the desired goal. For example, getting out of bed is not sufficient to help a person exercise. To achieve this goal, a person still needs to use approach-based tactics to actively head to the gym. In other words, while avoidance-based tactics can help a person "survive" a self-control dilemma, approach-based tactics are necessary to "thrive" in the pursuit of long-term goals.

2.5 | Monitoring: Knowing when to maintain, switch, or stop a chosen approach

2.5.1 | Overview of monitoring processes

At each stage, monitoring processes determine if the regulatory goals, strategies, or tactics should be maintained, switched, or stopped. Certain strategies or tactics are stopped when the goal is attained. Strategies or tactics are maintained when the goal has not yet been attained, but the strategies or tactics are still a suitable match for the situation. In cases where the chosen strategies or tactics do not help the person make sufficient progress, there are two potential outcomes: switch the regulatory approach or give in to the temptation. If the goal to regulate the temptation is still active (and the person has not yet given in), the process can loop back to the selection stage (choosing a different strategy) or implementation stage (choosing a different tactic without changing strategies) to try again. This process can repeat until an effective approach is used, resulting in the enactment of the target behaviour (exercising) or giving in to the temptation (staying in bed). In the latter case, the regulatory event is over, and the broader goal system gets updated based on the failure feedback (i.e., there is now a greater discrepancy between one's current and desired end states).

2.5.2 | Theoretical integration

To further understand the underpinnings of such monitoring processes, we integrate the cybernetic model (Carver & Scheier, 1982, 2012), which provides an important conceptual foundation for incorporating feedback into one's goal system. Central to the cybernetic model is a comparator function that monitors the current state of the world (e.g., post-regulation) and compares it to the goal to determine how much progress has been made (e.g., was the temptation successfully resisted?). When a person has not made sufficient progress on their goal, action is taken to reduce this discrepancy. Although the comparator function is most salient after implementing a tactic, this comparator function can be triggered at any stage of the process. This is important because knowing how and when to adjust a regulatory process at each stage is essential for successful self-control (Carver & Scheier, 2012; Gross, 2015; Inzlicht et al., 2021; Tamir, 2021; Wilkowski & Ferguson, 2016).

2.6 | Interim summary

The *extended process model of self-control* describes self-control as a dynamic, multi-stage process that unfolds over time. While the previous version of the process model focused exclusively on organizing different strategy types (Duckworth, Gendler, et al., 2016), the extended process model provides a parsimonious description of how self-control unfolds in everyday life from beginning (when the need for self-control is activated) to end (giving into temptation or not). Such expansion is crucial, as research on self-control thus far has predominantly focused on why

people fail (as was the case in the ego depletion era; e.g., Baumeister et al., 2007; Vohs et al., 2021) or contrasting specific strategies to determine their effectiveness (as is the case in the current "beyond willpower" era; e.g., Lopez et al., 2021; Milyavskaya et al., 2021). While important, these perspectives have not yet fully considered processes before (i.e., identifying the need for self-control) and after (i.e., translating strategies into actionable tactics), which we emphasize in the extended process model of self-control. Additionally, by integrating different theories and perspectives to describe the self-control process more fully, this framework helps move the field toward a more unified science of self-control while also setting the stage for a new generation of research.

3 | GROWTH POINTS TO GUIDE FUTURE RESEARCH ON SELF-CONTROL

In addition to its theoretical contributions, the *extended process model of self-control* is intended to facilitate the next generation of research on self-control. Here, we outline four exciting growth points for the field. In some ways, these growth points can be viewed as a translation of key constructs from emotion regulation as they apply to the study of self-control. However, even within emotion regulation there is an overwhelming amount of conceptual ambiguity among key constructs (Gross, 2015), especially at the empirical level (Werner, Wu, et al., 2022). We address these concerns by disentangling different components of the regulatory process (i.e., strategy repertoire, flexibility, polyregulation) and describe each of them as they apply to research on self-control.

3.1 | Considering a "toolbox" approach to self-control

The selection stage highlights how people can use a wide range of self-control strategies. However, a person's capacity to regulate depends on their strategy repertoire, or the strategies a person generally has at their disposal in the pursuit of a particular goal (Bonanno & Burton, 2013; Kalokerinos & Koval, 2022). This concept is best described as a "toolbox" approach to self-control—much like a carpenter needs to have different tools to carry out their work successfully, strategy repertoire represents a person's regulatory "toolbox" and the individual strategies represent the "tools" they use to pursue their goals. To date, self-control research has predominantly focused on contrasting specific strategies to determine their effectiveness (e.g., De Vet et al., 2014; Hennecke et al., 2019; Milyavskaya et al., 2021) and has yet to fully consider individual differences in the range of strategies people can use to overcome temptation in the pursuit of their goals.

While strategy repertoire has been a topic of interest in emotion regulation for the last decade, it is only just emerging in research on self-control. The consensus so far seems to be that having a larger strategy repertoire is beneficial (e.g., Lam & McBride-Chang, 2007; Lougheed & Hollenstein, 2012). However, findings from recent self-control studies suggest that having a larger strategy repertoire can be beneficial in some cases, but not all (Bürgler et al., 2021; Werner, Wu, et al., 2022), which is consistent with emerging work on emotion regulation (Southward et al., 2018). Although most research focuses on repertoire size, it is also important to consider composition. In fact, research suggests that the composition of a person's strategy repertoire likely carries more weight than size alone (Grommisch et al., 2020; see Kalokerinos & Koval, 2022).

As the field expands beyond the study of individual strategies, researchers can explore a series of generative questions that allow us to better understand the complexities of self-control in everyday life. First, is there an ideal strategy repertoire? To answer this question, research can expand beyond the size of a person's repertoire to include the types of strategies people have in their toolbox, and the degree to which those strategies are used. Second, who is more likely to have a well-equipped strategy repertoire? By exploring developmental, socio-cultural, and personality factors that influence repertoire development, we can learn a lot from the people who naturally develop a well-equipped strategy repertoire, while also identifying important points for intervention. Finally, is strategy repertoire general or goal-specific? Self-control is domain-specific (Tsukayama et al., 2012), suggesting that people may use strategies differently for different goals (e.g., health vs. financial goals; see Werner, Wu, et al., 2022). Thus, if we

want to actually help people achieve their goals, research also needs to consider how regulatory processes can be tailored for the different goals people pursue.

3.2 | Moving toward a flexible approach to self-control

While having a well-equipped strategy repertoire is necessary for self-control, it alone is not sufficient for success. Having access to an array of strategies allows for the *possibility* to accommodate a wider range of situations; however, just because a person has the right "tools" does not necessarily mean they know how and when to use them. Building on this toolbox approach, we propose that it is important to know *when* and *how* to use strategies and their corresponding tactics based on context (Aldao et al., 2015; Bonanno & Burton, 2013). The ability to dynamically choose strategies and/or tactics that best match the context, or *regulatory flexibility*, can enhance regulatory success (Aldao et al., 2015; Southward & Cheavens, 2020). Critically, regulatory flexibility is distinct from regulatory *variability*, or the general variation in the use of one or more regulatory strategies (or tactics) across a number of situations (Aldao et al., 2015; English & Eldesouky, 2020). For example, frequently and haphazardly using all strategies (i.e., indicating high variability) without considering context in the hopes that *something* works has the potential to backfire (Dixon-Gordon et al., 2015). Instead, we propose that *context matters*—regulatory flexibility has potential to enhance self-control success, so long as a person has a well-equipped strategy repertoire and the ability to evaluate strategies and tactics in a way that best match the situation.

Although essential for regulatory flexibility, research so far has been rather silent on the role of context. This is likely because measuring regulatory flexibility is incredibly difficult (Kalokerinos & Koval, 2022). Further compounding this issue are individual differences in how researc12738hers operationalize regulatory flexibility, especially at the empirical level. So far, research suggests that people tend to choose strategies based on situational factors (Sheppes et al., 2014). For example, people choose reappraisal in low-intensity situations but disengagement in high-intensity situations (Sheppes et al., 2011). People may also choose strategies depending on specific goals (Greenaway et al., 2021), a finding with preliminary evidence in self-control (Werner & Gross, in-preparation). Second, the success of a strategy also depends on the situation. Research consistently finds that individual strategies can be effective in certain situations, but can backfire in others (see Ford & Troy, 2019 for an overview). For example, reappraisal was associated with lower levels of depression for people with uncontrollable stress, but higher levels of depression for people with controllable stress (Troy et al., 2013). Finally, the ability to switch strategies can be beneficial, especially when an initial strategy attempt has failed. Research suggests that switching strategies (i.e., from reappraisal to distraction) predicted greater well-being when this switch was based on internal feedback, but predicted lower well-being when the switch was made haphazardly (Birk & Bonanno, 2016).

An important first step to studying regulatory flexibility is to start identifying contextual factors that determine when people choose particular goals, strategies, or tactics. Such contextual factors can stem from the person, situation, or broader culture (Greenaway et al., 2018). Here, we identify what we believe are some key contextual factors that can influence self-control strategy use. At the situational level, one of the most relevant factors is conflict intensity. For example, people may choose situational strategies when conflict intensity is high, especially when they can avoid temptation entirely. At the person level, external factors like socioeconomic status (Troy et al., 2013) and internal factors like motivation and personality (e.g., de Vet et al., 2014) can influence peoples' preferences for choosing different strategies, as well as their subsequent effectiveness. To test these ideas, researchers can use experiments to address the causal impact of different contextual factors on strategy selection and success (e.g., Sheppes et al., 2014) and/or intensive longitudinal designs (e.g., experience sampling) to better capture the dynamic nature of strategy use in daily life.

3.3 | Polyregulation occurs at all stages of regulation

Most research on self-control has examined different regulatory processes in isolation, often focusing on a single goal or strategy. We propose that people likely use multiple approaches within the same regulatory event (e.g., pursuing

multiple goals, using multiple strategies, implementing multiple tactics), a concept known as *polyregulation* (Ford et al., 2019). Indeed, regulating a desire is rarely as simple as choosing a single approach, using it, and then disengaging from it—rather, people can regulate using blends (concurrent polyregulation) and/or sequences (sequential polyregulation) of goals, strategies, or tactics.

Although polyregulation has only recently come into the spotlight, the few studies that directly examine polyregulation have focused on strategies. For example, recent studies examining how people regulate desires[2] in everyday life find that, although people only use polyregulation on 25% of occasions, people were more likely to resist desires on occasions where they used polyregulation (Lopez et al., 2021; Milyavskaya et al., 2021). While these studies provide an initial glimpse into strategy polyregulation in the context of self-regulation more broadly, these findings only scratch the surface.

While initial studies provide a glimpse into strategy polyregulation, several key questions remain open for investigation. The most central question being—how common is polyregulation in the context of self-control? Initial studies examined the prevalence of polyregulation when regulating desires, however, future research would benefit from examining how common polyregulation is when faced with actual self-control conflicts. Relatedly, a second key question is—when do people use polyregulation? Depending on the context, people may choose to (or may be required to) use multiple regulatory approaches at the same time, such as when conflict intensity is high (Dorman Ilan et al., 2019; Kalokerinos et al., 2017; Parsafar et al., 2019). A more obvious case where polyregulation may be helpful is when an initial strategy attempt fails—in this case, a person can change strategies (strategy polyregulation) or change tactics (tactic polyregulation). A third key question is—who uses polyregulation? The likely answer is that almost everyone uses polyregulation to some degree, so it would be helpful to know how individual differences (e.g., socioeconomic status, repertoire size) influence polyregulation. Finally, a fourth key question—is polyregulation effective? Polyregulation is neither inherently adaptive nor maladaptive—people can engage in a goal, strategy, and/or tactic combinations that work in concert, cancel each other out, or even backfire. Thus, future research would benefit from identifying the effectiveness of specific combinations of goals, strategies, or tactics across contexts.

3.4 | Self-control interventions

With the rapidly growing interest in understanding how self-control unfolds in everyday life alongside recent theoretical advancements, there is a compelling need to formulate and test interventions that can leverage existing insights and inform real-world behaviour change. While self-control interventions can take on many forms (e.g., Knittle et al., 2020), here we focus on two particularly promising avenues moving forward: (1) teaching people how to use strategies more effectively and (2) shifting a person's motivation to promote lasting behaviour change.

The process model of self-control (Duckworth, Gendler, et al., 2016) has been particularly revolutionary in proposing that using strategies to change one's environment is the key to success—that is, removing temptations from your environment can be more successful compared to strategies people use to cope with temptations that are already present (e.g., cognitive change, attention deployment). While there have been several recent experience sampling studies providing mixed results for this "earlier is better" hypothesis (Hennecke et al., 2019; Lopez et al., 2021; Milyavskaya et al., 2021; Williamson & Wilkowski, 2020), two intervention studies found that situational strategies predict better goal progress compared to willpower (Duckworth, White et al., 2016). Given that we are still at the beginning of this major theoretical shift in research on self-control, future research would benefit from designing interventions to test foundational ideas such as (1) whether and to what degree situational strategies lead to experiencing fewer temptations in everyday life, (2) examining the causal effectiveness of the range of self-control strategies across different domains (especially compared to other strategies that are not willpower; see Werner, Inzlicht, et al., 2022), (3) examining the extent to which different contextual factors (e.g., socioeconomic status, motivation) influence the effectiveness of individual strategies in-the-moment (e.g., are there certain contexts where situational strategies are effective, but others where they backfire?), and (4) whether people can be taught to flexibly use strategies on their own or in specific combinations (e.g., choosing a "back-up" strategy after a first attempt failed).

Strategy interventions are useful in helping people prevent and/or manage temptations, but what if people didn't need self-control in the first place? While such a proposal is quite lofty, there is evidence to suggest that getting people to genuinely *want to* pursue their goals can help bypass the need for self-control and instead facilitate the development of better habits (e.g., Berkman, Livingston, et al., 2017; Fishbach & Woolley, 2022; Leduc-Cummings et al., 2022; Milkman et al., 2008; Milyavskaya et al., 2015; Rozin, 1990; Werner & Milyavskaya, 2018). Indeed, a growing body of research suggests that pursuing *want-to* goals (e.g., goals that are genuinely enjoyable, personally important, and/or and relevant to a person's identity) is associated with greater preference for goal-congruent options (e.g., healthy foods like fruits and vegetables) and less of a preference for more "tempting" goal-incongruent options (e.g., unhealthy snacks) (Dominick & Cole, 2020; Leduc-Cummings et al., 2022; Milyavskaya et al., 2015). This suggests that want-to goals may not need self-control because there is no need to regulate oneself around "temptations," as they are inherently perceived as less desirable. Thus, developing interventions that (1) encourage people to set more want-to goals, or (2) dynamically shift a person's motivation to being more intrinsic can help people make better goal-related decisions that can ultimately promote lasting behaviour change (Berkman, 2018; Gardner & Lally, 2018).

4 | CONCLUDING COMMENT

Research on self-control has reached the point where the field can now more fully consider the complexities of self-control processes as they occur in everyday life. To further support the theoretical and practical recommendations we have made, we also believe it is important to carefully consider further integrating across different fields to enhance the science and practice of self-control.

Self-control is a widely applicable process that plays a key role in nearly all subfields in psychology (e.g., health, education, developmental) and adjacent fields (e.g., neuroscience, economics). However, despite these overlapping interests, researchers often work in their respective siloes which limits valuable crosstalk for people studying the same topics and has led to a largely fragmented field. This fragmentation is understandable—when different subfields publish their findings in different journals and use different terms to refer to the same construct (i.e., jangle fallacy; Kelley, 1927), it can be challenging to find points of commonality. However, as we have demonstrated in the present framework, it is crucial that we as a field continue to build a more comprehensive and cumulative science (e.g., Lin et al., 2021). While we were able to provide a roadmap to guide future research, by no means is this a complete endeavour and so we strongly encourage researchers to continue building empirical bridges across different perspectives, domains, and fields. By working together, we can collectively develop a more cumulative science on the study of self-control that includes strong theories and methods.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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ENDNOTES

[1] Although research typically defines response modulation as largely involving the use of 'willpower' (e.g., Katzir et al., 2021; Milyavskaya et al., 2021), we do not agree with this approach. As we propose elsewhere (Werner, Inzlicht, et al., 2022), willpower is not a strategy that can be 'used' and instead is the target outcome of the self-control process (i.e., the aim is to inhibit unwanted temptations). Instead, we suggest that researchers focus on tractable strategies associated with response modulation (e.g., behavioural modification, expressive suppression; Gross, 1998, 2015).

[2] In their original articles, these two studies assessing polyregulation state that they assess polyregulation in the context of self-control. However, these studies focus specifically on desires and do not take into consideration whether these desires conflict with important personal goals. As discussed in the current framework alongside other self-control research (e.g., Hofmann et al., 2012; Inzlicht et al., 2021), desires are not inherently problematic and thus conflict is essential for studying self-control. It is likely that studying desires more generally (which includes occasions both where people are using self-control and others where they are not) provides a biased (low) estimate of how common polyregulation is, as there is less of a need to use strategies, let alone multiple strategies, when there is no conflict to regulate in the first place. It is important not to conflate self-control (which requires conflict) and self-regulation more broadly (which does not require conflict), as this conflation has contributed to a long-standing lack of conceptual clarity surrounding the distinctions between these important constructs (see Inzlicht et al., 2021 and Milyavskaya et al., 2019 for further conceptual clarification).

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