

Struggling to Let Go: The Role of Prior Investment in Goal Disengagement

by

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### **Author's Declaration**

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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## Abstract

Prior research on goal disengagement has established that being able to let go of unattainable goals is positively related to well-being. While the benefits of goal disengagement have been well-established, relatively little is known about what influences the likelihood of disengagement from personal goals. I propose that prior investment directly reduces the likelihood of disengagement and can reduce responsiveness to signals that disengagement is adaptive. I report five studies (total  $N = 1217$ ) that examined whether prior investment (previously invested resources) negatively relates to goal disengagement. Study 1 demonstrates that prior investment is negatively associated with disengagement from personal goals. Study 2 replicates Study 1 and also demonstrates that prior investment reduces the effect of unattainability on disengagement, suggesting that prior investment is associated with reduced responsiveness to unattainability. Studies 3 and 4 replicate Studies 1 and 2 in experimental contexts. In Study 3, participants were less responsive (i.e., disengaged less) from an unattainable lab task when perceived prior investment was manipulated to be higher (vs. lower). In Study 4, participants were less responsive to lower perceptions of goal attainability when perceived prior investment was manipulated to be higher (vs. lower) on a personal goal. Finally, Study 5 generally replicated these patterns in a longitudinal design: prior investment predicted greater goal commitment one month later and reduced the effect of attainability on goal commitment and goal disengagement one month later. I position these studies within a broader framework of “hooks” that can reduce the likelihood of goal disengagement. Implications for understanding goal disengagement discernment and the sunk costs fallacy are discussed.

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## Introduction

*“It’s been a gift to me, to know when to move on.”*

– January Jones as Betty Draper in *Mad Men* (Weiner et al., 2015, 41:12)

“Never give up” is a popular message, ubiquitous in North American culture. Indeed, people frequently seek help to become *more* motivated, *more* persistent, and *more* committed in their goals (see the motivation and self-help industry; [Amelia, 2021](#)). Furthermore, being identified as a quitter is something people typically want to avoid (Brandstätter & Bernecker, 2022; Scholer et al., 2024; Wrosch et al., 2003a), consistent with the cultural adage that “winners never quit and quitters never win” (attributed to American Football coach Vince Lombardi; O’Keefe, 2019). These cultural norms are also reflected in the ways that motivation researchers have tended to focus on goal engagement versus disengagement (for a review, see Brandstätter & Bernecker, 2022). Increased effort, commitment, persistence, and grit are often treated as the epitome of success, across many areas of life (e.g., [Duckworth et al., 2007](#); [Duckworth & Quinn, 2009](#); [Hom et al., 2012](#); [Locke & Latham, 2002](#); [Salmela-Aro & Read, 2017](#)).

It is true that goal engagement is an important part of life. By fostering meaningful activities, personal goals can promote subjective well-being (Carver & Scheier, 1981, 1998; Emmons, 1986). But while goal engagement has many benefits, it has significant costs if the goal being pursued is unattainable. Over the last two decades, a growing body of research has revealed that being engaged in unattainable goals harms well-being (e.g., [Boudrenghien et al., 2012](#); [Hubley & Scholer, 2022](#); [Miller & Wrosch, 2007](#); [Salmela-Aro & Suikkari, 2008](#); [Wrosch et al., 2007](#)). Futility, as experienced when pursuing an unattainable goal, is aversive (White, 1959; Wrosch et al., 2003a). Additionally, the difficulty associated with an unattainable goal can induce feelings of personal failure and inadequacy that are distressing (Ryan & Deci, 2017; Wrosch et al., 2003a). These recent advances in motivation research suggest that while goal

engagement is an important part of life, so too is goal disengagement: when a goal is doing more harm than good, it is beneficial to give it up.

Previous research has focused on the consequences of goal disengagement: the negative well-being consequences of staying engaged in unattainable goals (e.g., Boudrenghien et al., 2012; Hubley & Scholer, 2022; Miller & Wrosch, 2007; Salmela-Aro & Suikkari, 2008; Wrosch et al., 2007) and the positive well-being consequences of disengaging from these goals (e.g., Boudrenghien et al., 2012; Dunne et al., 2011; Kraaij et al., 2009; Wrosch & Sabiston, 2013; Wrosch et al., 2003b). However, the *antecedents* of disengagement are not yet well understood: when and why do people move towards disengagement? What are the factors that facilitate or hinder disengagement from unattainable goals? The current dissertation begins to address these questions, with a particular focus on personal goals—long-term goals of high personal relevance<sup>1</sup>—and introduces a *hooks* framework for investigating these questions.

### **What Is Goal Disengagement?**

Empirical research on goal disengagement has tended to use the conceptualization of goal disengagement put forward by Wrosch et al. (2003a) in their seminal paper on goal disengagement, which reflects goal abandonment. Drawing from earlier work by Klinger (1975), Wrosch et al. (2003a) conceptualized complete goal disengagement as the relinquishment of both goal effort and goal commitment. In particular, Wrosch et al. (2003a) emphasized the importance of reduced goal commitment<sup>2</sup> as a sign of goal abandonment: goal commitment is what

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<sup>1</sup> Recently, Brandstätter and Bernecker (2022) provided a definition of personal goals that is similar: “desired states of high personal relevance that are typically pursued over a longer period of time” (p. 2).

<sup>2</sup> Earlier work by Klinger (1987) discusses the construct of commitment at length. Klinger (1987) suggested that commitment is *intention* (i.e., intention towards a goal, or what Klinger refers to as a *current concern*). Another more recent model by Klein (2014) uses Locke and Latham (1990)’s conceptualization that commitment is *determination* (i.e., determination to reach a goal). Other definitions have made finer conceptualizations, such as Tubbs and Ekeberg (1991) who distinguished between the initial interest in the goal (*acceptance*), intentions to attain the goal (*commitment*), and the maintenance of these intentions over time (*determination*). According to Klein

determines whether the goal exists or not. However, effort and commitment withdrawal do not always travel together, and it is possible to have instances of partial goal disengagement; for example, relinquishing effort but not giving up commitment (Wrosch et al., 2003a). In this situation, the goal could be considered “frozen” or “shelved” (Davydenko et al., 2019; Hubley & Scholer, 2022; Mayer & Freund, 2022; Scholer et al., 2024)—the person still has the goal (as there is commitment), but there is little or no effort being put in. However, other than a few studies (Davydenko et al., 2019; Hubley & Scholer, 2022; Mayer & Freund, 2022), research has not used this conceptualization of disengagement. Thus, consistent with the majority of prior work, in my studies, disengagement is operationalized as the withdrawal of effort and commitment. In the General Discussion, I return to the issue of different types of goal disengagement, and important questions for future work.

### **When and Why Disengaging is Beneficial: Theory and Evidence**

In 2003, Wrosch et al. challenged the typical view in motivation research, arguing that giving up is adaptive in certain situations, with a particular focus on unattainable goals. Wrosch et al. argued that goal disengagement is a critical part of life because life inevitably involves uncontrollable situations: “No one goes through a lifetime without confronting an insoluble problem. Indeed, we take the position here that disengagement is a necessity—a natural and indispensable aspect of personal development and effective self-regulation” (Wrosch et al., 2003a; p. 2). Further, drawing from work in lifespan development, Wrosch et al. (2003a) argued that given the finite nature of human lives, the limited time to pursue goals and make life feel meaningful, and diminishing mental and physical resources as people age, the resources people allocate to goals are precious (also see Burkeman, 2021). In situations where a goal is

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(2014), these finer distinctions have not been empirically useful (e.g., acceptance, commitment, and determination seem to have the same antecedents).

unattainable, the most logical response is to give the goal up.<sup>3</sup> Doing so will free up resources and allow the individual to pursue goals that *are* attainable (Carver & Scheier, 2005; Seligman, 1975). Thus, Wrosch et al. argued that disengaging from unattainable goals is adaptive by allowing individuals to use their resources more effectively (i.e., by allowing the individual to pursue more beneficial goals, fostering well-being): “Sometimes an activity is begun that proves not to be worth sustaining, given the multiple constraints on the person’s life, or the changing nature of the person’s socio-structural environment. In such cases, the activity—the goal—must be abandoned. This lets the person expend the resources to good effect in other domains of life” (Wrosch et al., 2003a; p. 3).

Additionally, Wrosch et al. (2003a) argued that in addition to resource constraints, pursuing unattainable goals has emotional costs. Therefore, in addition to facilitating reengagement in other goals, disengagement can directly alleviate negative emotions. The lack of progress and achievement that comes from pursuing an unattainable goal could cause feelings of helplessness, which can cause depression and anxiety (Seligman, 1975). Indeed, Wrosch et al. (2003a) argued that when a goal is perceived as unattainable, an individual who remains committed to that goal will experience psychological distress.

Wrosch et al.’s (2003a) theory on adaptive goal disengagement has been supported by several empirical studies, typically taking an individual difference approach. This approach assesses people’s general tendency to disengage from goals and reengage in new goals, called *disengagement capacity* and *reengagement capacity*, respectively (Wrosch et al., 2003b). The disengagement capacity scale includes items such as “*When I need to stop pursuing a goal, it’s*

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<sup>3</sup> An argument could be made that goals should be given up not only when the goal is unattainable, but also when “the cost of attaining it turns out to be unacceptably high” (Klinger, 1987; p. 345), or in other words, the goal is too difficult or costly to pursue.

*easy for me to stop thinking about the goal and let it go,”* whereas the reengagement capacity scale includes items such as *“When I need to stop pursuing a goal, I seek other meaningful goals.”*

Most commonly, studies measure disengagement capacity among specific populations who are assumed to be dealing with unattainable goals, assessing the relationship between disengagement capacity and well-being. These studies reveal that disengagement capacity is positively related to subjective well-being (e.g., purpose in life) and/or negatively related to distress (e.g., perceived stress) among multiple samples, including parents who have children with cancer (Wrosch et al., 2003b), older adults (Dunne et al., 2011; Wrosch et al., 2003b), participants diagnosed with multiple sclerosis (Neter et al., 2009), university students who perceive their career goals as unattainable (Boudrenghien et al., 2012), and people navigating the challenges of the early COVID-19 pandemic (Hubley & Scholer, 2022). Disengagement capacity in adolescents is also negatively related to systemic inflammation—a physiological indicator of stress (Miller & Wrosch, 2007).

A recent meta-analysis of the goal disengagement literature ( $N = 7,241$ ; 421 effect sizes) adds further support for the relationships between disengagement capacity and well-being, finding that disengagement capacity is negatively related to indicators of poor well-being (e.g., depression; Barlow et al., 2020). However, disengagement capacity more strongly predicted well-being for older adults (a population typically dealing with goal unattainability). Notably, Barlow et al. (2020) found that disengagement capacity was not significantly correlated with *positive* indicators of well-being in their meta-analysis ( $r = .02, p = .37$ ). By contrast, *reengagement capacity*—the tendency to reengage in alternative goals was significantly correlated with both negative and positive indicators. However, there is some recent evidence

that disengagement capacity is related to positive indicators of well-being (e.g., in the context of the COVID-19 pandemic; Hubley & Scholer, 2022). Overall, there is substantial evidence that goal disengagement can benefit well-being, particularly in the context of unattainable goals.

Thus far, the goal disengagement literature has been focused on demonstrating the positive consequences of goal disengagement. However, little is known about the factors that hinder or facilitate disengagement—the antecedents of goal disengagement. In particular, given that goal disengagement is adaptive in the context of unattainability, it could be important to address what facilitates or hinders the discernment of goal unattainability, which has not yet been addressed in prior work (Brandstätter & Bernecker, 2022).

### **Antecedents of Goal Disengagement**

Prior work on the antecedents of goal disengagement has found that individuals who report greater disengagement capacity on the corresponding individual difference scale (Wrosch et al., 2003b) are more likely to experience well-being benefits when facing unattainable goals. Notably, these studies use disengagement capacity as a proxy for goal disengagement itself: these studies assume that those who reported greater ease of disengagement in general were in fact disengaging more from their concrete unattainable goals. However, studies have not shown the direct connection between disengagement capacity (general ease of disengagement) and disengagement from unattainable goals themselves (actual disengagement), nor have studies examined what factors predict disengagement from a given goal (aside from some notable exceptions that I review below). Therefore, research is generally lacking on the antecedents of goal disengagement (Brandstätter & Bernecker, 2022).

Furthermore, the existing literature suggests that responsiveness to goal unattainability may be critical in making adaptive decisions between goal persistence versus disengagement;

that is, being responsive to perceptions that a goal is unlikely to be attained. However, research has not yet investigated how much people exhibit this responsiveness, nor what influences it. In the following section, I introduce a framework focused on factors that could reduce responsiveness to unattainability—what I refer to as *hooks*. I propose that investigating hooks can help us understand antecedents of goal disengagement in a particularly valuable way: it can illuminate what influences responsiveness to unattainability and what holds people back from disengaging *when doing so would be adaptive*.

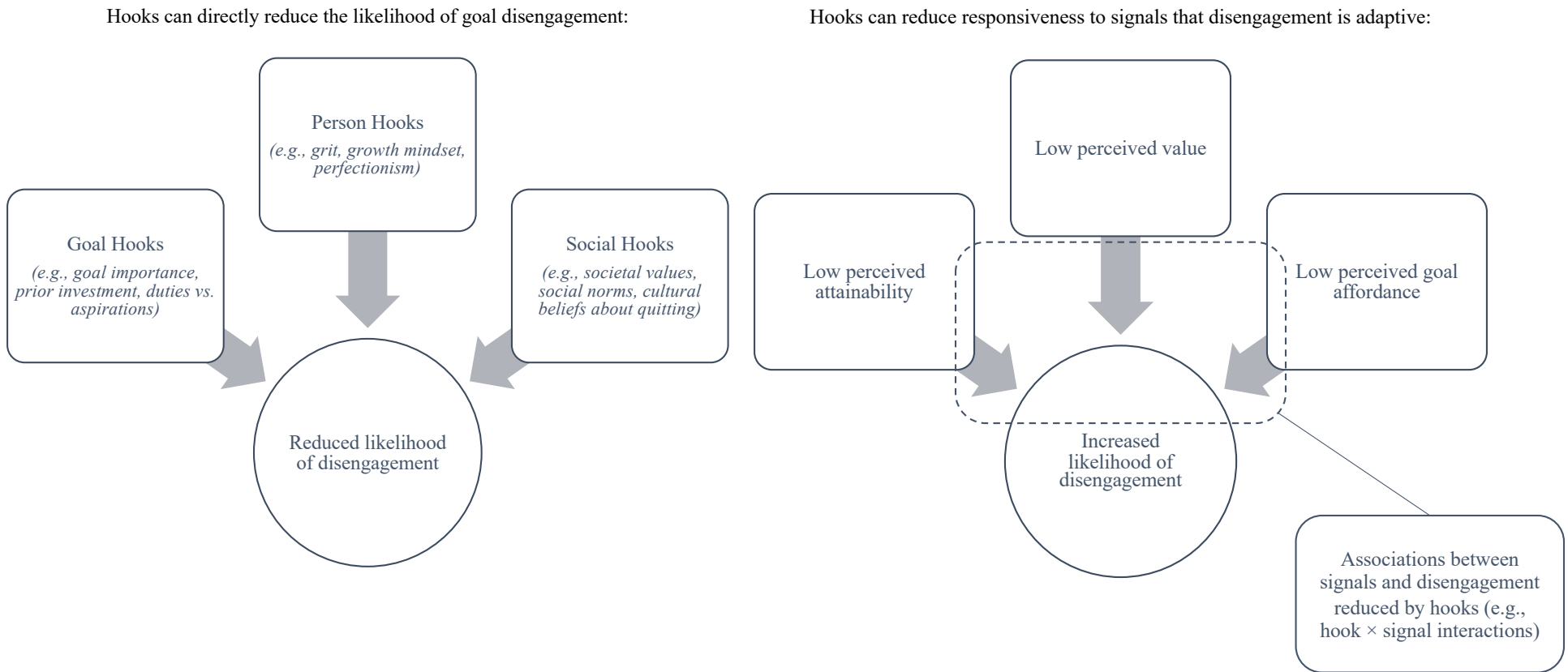
### ***Hooks: A Framework for Exploring Goal Disengagement's Antecedents***

Hooks are a way to conceptualize the factors that tend to keep people engaged in goals: generally, when these factors are present, they reduce the likelihood of disengagement. I propose that there are different categories of hooks: goal hooks, person hooks, and social hooks. *Goal hooks* are features of the goal itself that make the individual stay committed to the goal. *Person-related hooks* are features of the person—their personality—that make them more likely to stay committed to any goal. *Social hooks* are features of the social situation (e.g., social norms) that make the individual stay committed to any goal. Hooks are not necessarily problematic; however, I argue that some hooks may be maladaptive in that they reduce the likelihood that people walk away from goals when doing so would be optimal. One of the ways this may operate is via reduced responsiveness to meaningful signals of the adaptiveness of goal disengagement. For example, previous work suggests that unattainability is a signal that goal disengagement would be adaptive; thus, I propose that maladaptive hooks include those that reduce responsiveness to signals that disengagement is adaptive, such as unattainability (see Figure 1). A hook might also be considered a maladaptive hook if it reduces responsiveness to other signals that goal disengagement is adaptive, such as low value or low situational affordance

(Brandstätter & Bernecker, 2022; Scholer et al., 2024; see Figure 1). The current work focuses on unattainability because this is the signal that has received the most attention in the goal disengagement literature so far.

**Figure 1.**

*The hooks framework: Two pathways to reduced likelihood of goal disengagement (from Scholer et al., 2024).*



The concept of hooks and how they operate has not been articulated until now. However, some previous research has examined personality traits that prevent disengagement from unattainable goals. In other words, previous research has illuminated some *person hooks*. Trait self-esteem (Rosenberg, 1965), grit (Duckworth et al., 2007), rumination (Nolen-Hoeksema, 1991), need for closure (Kruglanski, 1989), and perfectionism (Hewitt et al., 1991) have all been linked to reduced likelihood of disengagement from unattainable goals (Di Paula & Campbell, 2002; Eddington, 2014; Lucas et al., 2015; McFarlin et al., 1984; Szwed et al., 2021; van Randenborgh et al., 2010). For instance, grit is the tendency to have passion and to be persistent towards long-term goals. While grit can have upsides, Lucas et al. (2015) found that this personality trait also involves persistence in the face of unattainability: participants higher (vs. lower) in trait grit persisted longer on unsolvable problems in a lab task.

On the other hand, there has been more limited work exploring goal hooks. Certain goal factors that prevent disengagement have been postulated, such as goal importance (conceptualized in various ways; Miceli & Castelfranchi, 2017; Wrosch et al., 2003a) and have-to (vs. want-to) motivation for the goal (Davydenko et al., 2019). However, these ideas have not been empirically tested. There is some evidence that controlled motivation (reporting pursuing a goal out of obligation) prevents disengagement (Holding et al., 2020). Yet, controlled motivation also increases the likelihood of experiencing the state of motivational conflict that precedes disengagement (what is called an *action crisis*; Holding et al., 2021), so its overall impact on goal disengagement remains a bit unclear. Overall, goal hooks—the aspects of the goal itself that can prevent disengagement and reduce responsiveness to unattainability—have been understudied.

In the current dissertation, building on and integrating work in relationship science (Kelley & Thibaut, 1978; Rusbult, 1980), motivation science (Steele, 1988), and behavioural decision making (Arkes & Blumer, 1985), I investigate prior investment as a goal hook. When pursuing a personal goal, investment (of time, energy, and other resources) is often relatively salient. I propose that prior investments might reduce the likelihood of goal disengagement and reduce responsiveness to unattainability.

### **Prior Investment as a Goal Hook**

The idea of investment as a hook is consistent with findings from several literatures, most notably the relationship investment model (Rusbult, 1980) and decision-making research on the sunk costs fallacy (Arkes & Blumer, 1985). Both literatures also offer explanations for why prior investment would operate as a hook. I also discuss work on self-threats and self-affirmation (Steele, 1988), which provides further insights into possible dynamics underlying resistance to disengagement.

The investment model—a model for predicting relationship commitment, based on principles of interdependence theory (Kelley & Thibaut, 1978)—supports the idea that prior investment is a goal hook in the context of close relationships. The investment model states that relationship commitment is significantly influenced by *investment size*, in addition to the outcome value of the relationship (the perceived subjective value of the relationship) and comparison level (the perceived outcome value the individual has come to expect on average). Rusbult stated that as investments in a relationship increase, the costs of withdrawing from the relationship increase; thus, with greater investment, comes greater commitment (i.e., reduced likelihood of leaving the relationship; Rusbult, 1980). This model has been supported empirically (e.g., Le & Agnew, 2003; Rusbult, 1980; Rusbult et al., 1982; Rusbult & Martz, 1995). The

model focuses on the investment of *the self* into a relationship and thus, interdependence as the mechanism for investment's effect on commitment. This focus on the self is consistent with the context in which in the model exists, close relationships. Rusbult et al. (1998) developed the investment size scale (Rusbult et al., 1998) to assess the investment of the self and personal identity (i.e., interdependence) in a relationship with items such as "*My sense of personal identity (who I am) is linked to my partner and our relationship.*" Higher scores on this scale are associated with greater relationship commitment in general (Rusbult, 1980), but also greater loyalty in response to relationship dissatisfaction (Rusbult et al., 1982), and a higher likelihood of remaining in an abusive relationship (Rusbult & Martz, 1995).

Although the investment model was developed to understand dynamics in interpersonal relationships, there are significant parallels between investments in relationships and investments in goals. The investment model focuses on the role of interdependence—the extent to which the individual is dependent on the partner. Interdependence is also one potential mechanism for effects of investment on engagement/disengagement in the context of personal goals more broadly. To the extent that an individual feels dependent on holding a particular goal (which could be due to investment of their sense of self, in particular, e.g., the goal represents a part of *who I am*), an individual may have a harder time disengaging.

In addition to interdependence, self-integrity could make it difficult for people to disengage from goals in which they have invested. According to self-affirmation theory, people have a strong motivation to maintain the integrity of the self (Steele, 1988; see Jonas et al., 2014 for a review). Investing in a goal and continuing to do so, even in the face of challenges, could be a signal of integrity. Indeed, the behavioural economics literature on *the sunk costs fallacy* (Arkes & Blumer, 1985) suggests that giving up after investing can signal low integrity to other

people (Dorison et al., 2021; also see Schoorman & Holahan, 1996; Zhang & Baumeister, 2006). There could be situations in which the individual is especially likely to feel this way, such as when their investments in the goal were apparent to other people or when the individual made the independent decision to invest in the goal (i.e., prior investment was public or autonomous, respectively); in these situations, self-integrity is more “at risk.” Indeed, there is evidence that public (vs. private) settings increase *entrapment* (Brockner et al., 1978; Rubin et al., 1980)—resistance to changing course. Furthermore, personal responsibility is an explanatory variable for another related concept, *escalation of commitment* (Staw, 1976)—increased commitment to a failing course of action.

Particularly relevant evidence for prior investment as a hook comes from the literature on the sunk costs fallacy, which focuses on investment in short-term courses of action or tasks. The sunk costs fallacy is a common bias in human decision-making in which people base their engagement on how much they have already invested (i.e., based on sunk costs) despite anticipated negative outcomes. According to behavioural economics, people should not base their engagement on the past, but on future outcomes (Brendl et al., 1998; Laughunn & Payne, 1984; Thaler & Johnson, 1990), hence why the sunk costs tendency is called a *fallacy*. There are multiple potential mechanisms for the sunk costs fallacy that have been suggested, including fear of waste (Arkes & Blumer, 1985), the desire to maintain self-esteem or integrity (Dorison et al., 2021; Schoorman & Holahan, 1996; Zhang & Baumeister, 2006), and rumination about irrevocable losses (Bruine de Bruin et al., 2014).

The sunk costs fallacy has been demonstrated using hypothetical scenarios (Arkes & Blumer, 1985; Arkes & Hutzel, 2000; Bruine de Bruin et al., 2014; Coleman, 2009; Garland, 1990; Lee et al., 2021; Tan & Yates, 1995) or tasks (Avila et al., 2013; Cunha, Jr & Caldieraro,

2009; Dorison et al., 2021; Kazinka et al., 2021; Nash et al., 2019; Navarro & Fantino, 2009; Rubin et al., 1980; Rubin & Brockner, 1975; Soman, 2001; Staw & Hoang, 1995; Wong et al., 2006; Zhang & Baumeister, 2006) that involve investment in a short-term course of action. For example, a commonly used hypothetical scenario (Arkes & Blumer, 1985) asks participants to imagine they are staying the night in a hotel room and paid to watch a movie on pay TV, but then discover that there is a movie they would rather watch on cable TV. Participants are then asked whether they would watch the movie on pay TV or free cable TV. Most people indicate they would watch the movie they had paid for (i.e., already invested in), even though it does not make rational sense (they can't recoup the money they paid, and they will enjoy the free movie more). The sunk costs fallacy is common and robust (Magalhães & White, 2016), but it is less clear whether and how this fallacy manifests outside of these scenarios and tasks (Nash et al., 2019), for example, in the context of higher relevance, longer term personal goals. I argue that exploring the relation of prior investment to disengagement in a personal goal context highlights several new insights, both about how the sunk costs fallacy manifests in this distinct context and how we can better understand factors that influence disengagement.

First, I argue that in the personal goal context, it is particularly relevant to examine how sunk costs interact with attainability, which has not yet been examined in prior work on the sunk costs fallacy. Goal unattainability is a clear signal to disengage. However, I predict that prior investments could be so potent that they reduce responsiveness to this signal. Second, prior work on sunk costs has focused on a relatively narrow range of different types of investment: money, time, and effort, with most work focusing on money (Coleman, 2009; Cunha, Jr & Caldieraro, 2009; Navarro & Fantino, 2009). I argue that the study of personal goals makes apparent other forms of investment that could hook people into goal pursuit. For instance, when pursuing a

personal goal, an individual might invest their sense of self (as shown in the context of close relationships; Rusbult, 1980) and psychological resources such as attention, emotions, and identity. In addition to general investment, my dissertation examines various types of investment (effort, time, financial, attention, emotional, and identity investment) to help illuminate the specific perceptions of prior investment that could be targeted in interventions.

## The Present Studies

My dissertation integrates the literature on goal disengagement with the literature on sunk costs to extend both in valuable ways. First, and perhaps most prominently, I am building on work demonstrating the importance of goal disengagement to examine what leads people to persist when disengagement is adaptive due to unattainability. Second, I am building on the sunk costs literature to demonstrate whether and how the fallacy manifests in the context of personal goals and when disengagement is critical due to unattainability. Broadly, I pursued the following research questions: 1) is prior investment a hook (i.e., is prior investment negatively related to goal disengagement)? 2) is prior investment a *maladaptive* hook (i.e., does prior investment reduce the effect of attainability on goal disengagement)?, and 3) what forms of investment act as hooks, and which are particularly strong (i.e., what types of investment negatively relate to goal disengagement, and what types of investment negatively relate to goal disengagement when accounting for all types?; summarized in Table 1).

Five studies were conducted (summarized in Table 2). These studies used correlational, experimental, and longitudinal research methods to provide converging evidence on my research questions.

### Table 1.

#### *Research questions.*

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<i>Research Question 1:</i>	<i>Is prior investment a hook?:</i> Is prior investment negatively related to goal disengagement
<i>Research Question 2:</i>	<i>Is prior investment a maladaptive hook?:</i> Does prior investment reduce the effect of attainability on goal disengagement?
<i>Research Question 3:</i>	<i>What forms of investment act as hooks, and which are particularly strong?:</i> What types of investment negatively relate to goal disengagement, and what types of investment negatively relate to goal disengagement when accounting for all types?

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**Table 2.***Overview of the present studies.*

<b>Study</b>	<b><i>N</i></b>	<b>Sample</b>	<b>Design</b>	<b>Context</b>	<b>Research Questions</b>
1	83	Undergraduates	Correlational	Personal goals	1, 2
2	201	Undergraduates	Correlational	Personal goals	1, 2, 3
3	525	MTurkers	Experimental	Anagram task	1, 2
4	301	MTurkers	Experimental	Personal goals	1, 2
5	107	Undergraduates	Longitudinal	Personal goals	1, 2, 3

**Statistical Power, Data Quality, and Open Science**

Power analyses are reported in the methods section for each study, and some consistent strategies were used to maximize data quality. No participants were excluded in any study; however, in each study (all online), participants were given an attention check question immediately after the information consent letter (Oppenheimer et al., 2009) to help maximize data quality. Participants were given a large block of text to read that described irrelevant information about decision-making but included instructions for an open-ended question that followed. Specifically, participants read the following passage: *“Recent research on decision making shows that choices are affected by context. Differences in how people feel, their previous knowledge and experience, and their environment can affect choices. To help us understand how people make decisions, we are interested in information about you. Specifically, we are interested in whether you actually take the time to read the instructions; if not, some results may not tell us very much about decision making in the real world. To show that you have read the instructions, please ignore the question below about how you are feeling and instead type in “I read the instructions.” You must answer this question correctly in order to participate in this study,”* which was followed by the open-ended question *“Please briefly describe how you are feeling right now.”* Participants needed to notice the alternate instructions found in the passage and answer this question with “I read the instructions” to be able to continue with the rest of the

study (see Oppenheimer et al., 2009). By getting participants to carefully read the passage and notice the alternate instructions, the question helps to ensure participants read the instructions carefully throughout the rest of the study. Because participants needed to answer the question correctly before proceeding to the materials of the study, this question did not lead to the exclusion of any participants. Two of the reported studies were conducted through Amazon's Mechanical Turk (MTurk, hosted by CloudResearch). For these studies, some additional strategies were used to help ensure data quality, using built-in features of the platform. First, participants were required to be "CloudResearch approved," to have 100+ HITs approved, and to have a HIT approval rate of 95% or higher.

Analysis plans for Studies 3 and Study 5 were pre-registered on The Open Science Framework (OSF), which can be accessed with the following links: [https://osf.io/pwrjh/?view\\_only=8af7bed00fcf42a1abb7f508dc712001](https://osf.io/pwrjh/?view_only=8af7bed00fcf42a1abb7f508dc712001) for Study 3, and [https://osf.io/3ju7h/?view\\_only=15ca399211c64f3b8dcc0910c0663fea](https://osf.io/3ju7h/?view_only=15ca399211c64f3b8dcc0910c0663fea) for Study 5. These plans were pre-registered after data collection but prior to any data analysis. For all studies, the materials, data files, and syntax are available on OSF, which can be accessed with this link: [https://osf.io/ky9n2/?view\\_only=ca99898e3495430ca14df154d98a2cd7](https://osf.io/ky9n2/?view_only=ca99898e3495430ca14df154d98a2cd7). Additional measures administered (i.e., all measures not reported in the main text) are presented in the appendices (Appendices A through E). These additional measures include individual differences, additional goal measures, additional investment measures, and additional disengagement measures. Exploratory analyses have been conducted with some of these measures, which are presented in Appendices J through M.

## Study 1

Study 1 was a correlational study that examined whether prior investment is a hook (i.e., whether prior investment is negatively correlated with goal disengagement) and whether prior investment may operate as a maladaptive hook by reducing responsiveness to attainability (i.e., whether there is an investment  $\times$  attainability interaction such that investment reduces the effect of attainability).

This study and others made use of research approaches that classify people's goals based on different "stages" or "phases" (e.g., Gollwitzer, 1990; Little & Gee, 2007). One such classification tool (Little & Gee, 2007) classifies long-term goals based on different stages along a timeline; for example, a goal in the "action stage" is one that is actively being pursued and balanced with other goals, resources, and time commitments, whereas a goal in a "transition stage" is one that is being evaluated in terms of one's motivation to continue with it or bring to completion/disengage from it. In this study and others, participants nominated personal goals in this latter "transition stage," or in other words, "transition goals." Transition goals was a particularly useful goal classification for my work because it captures goals for which participants may have been contemplating disengagement, or goals for which disengagement could be particularly relevant.

After nominating two transition goals and two active goals, participants completed measures of prior investment in the goal and attainability. Participants were then asked questions about the extent to which they would continue to engage in the goal, based on a standard measure (Wrosch et al., 2003b), reverse-scored to represent disengagement. I expected prior investment to be negatively associated with disengagement, supporting the idea that prior investment is a hook. Given prior theorizing about the role of attainability in disengagement

(e.g., Klinger, 1975) and expectancy-value theories of motivation (e.g., Atkinson, 1957; Eccles, 1983) which posit that individuals' motivation for a goal is determined by their expectancies of achievement (along with the value of achievement), I also expected attainability to be negatively associated with disengagement. Further, I expected prior investment to interact with attainability to predict disengagement. Specifically, I expected that the effect of attainability on disengagement would be reduced at high (vs. low) levels of prior investment, supporting the idea that prior investment reduces responsiveness to unattainability.

## **Method**

**Participants and design.** I recruited participants (83 undergraduates) from a large Canadian university to participate in an online study for partial course credit ( $M_{\text{age}} = 21.6$  years,  $SD_{\text{age}} = 5.9$  years; 66 identifying as woman/transwoman, 12 identifying as man/transman, 1 identifying as two-spirited, and 4 unspecified; 20.5% White, 12.0% Asian, 4.8% other/not listed, 2.4% East Indian, 2.4% Middle Eastern, 1.8% Black, 1.8% Mixed Race, 1.2% Hispanic). A target sample size of 100 was set for the study, based on an a priori power analysis conducted in G\*power (Faul et al., 2007). To detect the average effect size in social psychology (Cohen's  $f^2 = 0.21$ ; Lovakov & Agadullina, 2021) with 90% power, a sample size of 72 was needed. The study was part of a larger exploration that included an initial session. In total, 136 participants were recruited; however, only 83 participants completed the measures in Session 2 (the part that included the measures for this study). According to a sensitivity power analysis conducted in G\*power, my sample size (83) provided 90% power for a medium-sized effect (Cohen's  $f^2$  of 0.18).

**Procedure and materials.** Participants were told that the study was investigating “personality and long-term goals.” Individual differences were measured in the initial session of the study.<sup>4</sup>

**Personal goal nominations.** Participants were asked to nominate four personal goals in total: two active goals and two transition goals. The procedure and instructions for these goal nominations were based on established work on personal projects (Little & Gee, 2007). First, participants were told “*We’d like you to tell us about some of your current personal goals. These goals can be related to any aspect of your daily life; university, work, home, leisure, and community, among others.*” Therefore, participants could nominate goals from any area of life. However, participants were then told that we wanted them to focus only on certain types of goals for the study. They were told “*First, we would like you to only select goals that you are working towards, not things you are trying to avoid*” and “*Second, we would like you to select goals that are only in certain stages of goal-pursuit.*” Participants were then presented with an image of a timeline with names for different goal stages along this timeline. They were asked to nominate two goals that were in an “action” stage: “*You are actively working on the goal and trying to balance it with your other goals, resources and time commitments*” and two goals that were in a “transition” stage: “*You are evaluating the goal and your motivation to continue with it, or bring it to completion/disengage from it.*” For analyses, I focused only on the first transition goal that participants listed.<sup>5</sup> After nominating all of their goals, participants were then asked various questions for each goal (in random order). Some of these questions were exploratory and were

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<sup>4</sup> Part 1 of the study included individual difference measures (see Appendix A).

<sup>5</sup> The results presented here only involve participants’ transition goals because these goals are most relevant to disengagement. The results also only involve the first transition goal that participants listed, not the second, because these are the goals that were likely most salient/important. Indeed, participants’ first transition goal that they listed tended to be more important, although not statistically significant ( $M = 7.67$ ,  $SD = 2.13$ ) than their second transition goal that they listed ( $M = 7.12$ ,  $SD = 1.88$ ),  $t(74) = 2.00$ ,  $p = .050$ . However, results with participants’ second transition goal can be found in Appendix E.

not related to the primary aims of my dissertation.<sup>6</sup> The questions pertaining to my dissertation were those asking about prior investment, attainability, and disengagement.

**Prior investment.** To measure prior investment, participants completed a version of the investment size scale (Rusbult et al., 1998) that I adapted to the context of personal goals. This scale consisted of 4 items that were rated on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*): “*I have invested a great deal into this goal that I would lose if it were abandoned,*” “*Many aspects of my life have become linked to this goal, and I would lose it all if it were abandoned,*” “*I feel very involved in this goal—like I have put a great deal into it,*” and “*My relationships with friends and family members would be affected if this goal were abandoned*” ( $\alpha = .81$ ). A composite variable was created to represent prior investment by averaging scores on these 4 items.

**Attainability.** Attainability was measured with one item rated on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*): “*Successfully pursuing this goal seems difficult to me*” (Herrmann & Brandstätter, 2015), which was reverse-scored.

**Disengagement.** Finally, to measure disengagement participants completed a version of the disengagement capacity scale (Wrosch et al., 2003b) that I adapted to fit the context of this study.<sup>7</sup> This scale consisted of 4 items that were rated on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*): “*I will keep putting in effort toward this goal,*” “*I will keep trying to achieve this goal,*” “*I will stay committed to this goal,*” and “*I will continue to think*

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<sup>6</sup> These measures are presented in Appendix B.

<sup>7</sup> In its original form, the disengagement capacity scale asks “*If I need to stop pursuing a goal...*” followed by the 4 items: “*It’s easy for me to reduce my effort toward the goal,*” “*I find it difficult to stop trying to achieve the goal*” (reverse-scored), “*I stay committed to the goal for a long time; I can’t let it go*” (reverse-scored), and “*It’s easy for me to stop thinking about the goal and let go.*”

about this goal and I won't let it go" ( $\alpha = .94$ ). All 4 items were reverse-scored and then averaged to create a composite disengagement variable.

**Demographics and survey experience.** After the personal goal questions, participants were asked some basic demographic questions (age, gender, race), some questions about their experience with the study,<sup>8</sup> then were fully debriefed and compensated.

## Results

**Is prior investment a hook?** First, I examined correlations between all primary variables: prior investment, attainability, and disengagement (correlations and descriptives are presented in Table 3). As expected, there was a significant negative correlation between prior investment and disengagement,  $r(74) = -.43, p < .001$ , providing evidence that prior investment may operate as a hook.<sup>9</sup> The correlation between attainability and disengagement was negative but non-significant,  $r(74) = -.21, p = .072$ .

**Table 3.**

*Zero-order correlations between prior investment, attainability, and disengagement (Study 1).*

Variable	<i>M (SD)</i>	1	2
1. Prior investment	3.90 (1.43)	--	
2. Attainability	4.92 (1.47)	-.03	--
3. Disengagement	2.44 (1.15)	-.43***	-.21 <sup>†</sup>

*Note.* \*\*\* $p < .001$ , <sup>†</sup> $p > .05$  and  $< .10$ ;  $df = 74$  for each correlation.

**Is prior investment a maladaptive hook?** Next, I regressed disengagement on prior investment, attainability, and their interaction, to test whether prior investment reduced the effect

<sup>8</sup> These questions are part of a standard lab procedure, and they were included in all my studies. These questions ask: "What do you think this study is about?", "Did any part of the study seem strange to you, or were you wondering about anything," "Sometimes people are skeptical of research studies in general. Were you suspicious about any aspects of this study?," "How distracted were you during the study?," and "How seriously did you take the study?." These questions are presented here for transparency; they have not been analyzed in any study.

<sup>9</sup> This relationship holds when controlling for how important the goal was in a multiple regression analysis,  $b = -0.13, SE = .07, t(72) = 2.05, p = .044$ .

of attainability on disengagement (i.e., reduced responsiveness to unattainability). There was a main effect of investment,  $b = -0.35$ ,  $SE = .09$ ,  $t(71) = 4.05$ ,  $p < .001$ , 95% CI [-0.52, -0.18].

There was a non-significant effect of attainability,  $b = 0.15$ ,  $SE = .08$ ,  $t(71) = 1.77$ ,  $p = .081$ , 95% CI [-0.02, 0.32], and, contrary to predictions, no significant investment  $\times$  attainability interaction,  $b = 0.01$ ,  $SE = .06$ ,  $t(71) = 0.23$ ,  $p = .816$ , 95% CI [-0.11, 0.13].

## **Discussion**

The results of Study 1 support the idea of prior investment as a hook, given the negative correlation between prior investment and goal disengagement. Contrary to predictions, however, there was no evidence in this study that prior investment interacts with attainability. Therefore, I did not find support for the prediction that prior investment reduces responsiveness to unattainability as a signal to disengage. It is possible that this non-significant interaction effect was an issue of statistical power, as the sample was relatively small. Study 2 addressed these same questions with a larger sample. Interestingly, attainability itself was not significantly related to disengagement, although the negative non-significant correlation between attainability and disengagement suggests that participants were at least partly using attainability as a relevant factor for disengagement.

In addition to a limited sample size, Study 1 may have been limited by the measures that were used. While investment size (Rusbult et al., 1998) is a well-established measure for assessing investments in relationships, I modified it for the broader goal domain. Furthermore, these items may capture interdependence more than amount of investment (time, effort, etc.) put into a given goal, which is how investment is typically conceptualized in the sunk costs literature (Arkes & Blumer, 1985; Cunha & Caldieraro, 2009; Navaro & Fantino, 2009) and what I aimed to capture in relation to people's goals. In addition, the measure of attainability in Study 1 was

not ideal, although it has been used in previous research for this purpose (Herrmann & Brandstätter, 2015). The item “successfully pursuing this goal seems difficult to me,” may not be clearly capturing unattainability per se; it is unclear whether participants would interpret this item to mean *attaining* the goal seems difficult or the act of pursuing the goal (not necessarily attaining it) seems difficult. Therefore, in Study 2 I used different measures of investment and attainability.

## Study 2

Study 2 aimed to replicate the relationship between prior investment and disengagement found in Study 1 and to test the predicted investment  $\times$  attainability interaction again with better measures and a larger sample size. Study 2 also started to investigate how the *type* of investment influences relationships with disengagement. That is, Study 2 took initial steps to test my third research question: what forms of investment act as hooks and which are particularly strong?

As in Study 1, participants nominated personal goals in a transition stage (goals for which they could be contemplating disengagement) and completed measures of prior investment in the goal and attainability (the extent to which they had already invested in the goal and how attainable the goal felt). However, different measures of prior investment and attainability were used. In contrast to Study 1, Study 2 used measures of these constructs that were more face valid and directly related to goal pursuit. Participants were then asked questions about the extent to which they would continue to engage in the goal, which were reverse-scored to represent disengagement.

Study 2 measured general prior investment (overall, how much they had invested so far) as in Study 1, but also measured different forms of investment individually in order to test my third research question: what forms of investment act as hooks and which are particularly strong? The sunk costs literature has looked at investment in terms of time (Avila et al., 2013; Navarro & Fantino, 2009; Soman, 2001), effort (conceptualized as behavioural investment; Cunha & Caldieraro, 2008; Nash et al., 2018; Rubin et al., 1980), and money (Arkes & Blumer, 1985; Coleman, 2009; Staw & Hoang, 1995; Tan & Yates, 1995; Zhang & Baumeister, 2006), but these have typically been examined separately in different studies. By contrast, in Study 2, I looked at these different forms of investment in the same goal. Furthermore, my focus on personal goals,

in contrast to short-term scenarios or tasks of less personal relevance, led me to investigate additional forms of investment that have not been examined previously.

Specifically, Study 2 included investment in terms of one’s attention, emotions, and one’s sense of identity. I label these “attention investment,” “emotional investment,” and “identity investment,” respectively. Pursuing a goal entails attention towards the goal. This attention might involve planning, considering means to achieve the goal, or thinking about what will come next (Gollwitzer & Oettingen, 2011). Regardless of the specific thoughts, however, there should be variability in the extent to which an individual feels they have dedicated their attention to a goal. Another investment we make towards our goals is our emotions. For example, we might experience worry or excitement as we anticipate goal success, or engage in goal pursuit (Carver & Scheier, 1998; Higgins et al., 1996a). Regardless of the specific emotions, however, there should be variability in the extent to which an individual feels they have emotionally invested in the goal. Finally, we might put our identity into personal goals. One might incorporate the goal into who they are as a person (e.g., “I am a runner;” Bruner, 1990; Dominick & Cole, 2020; Sheldon & Elliot, 1999). I did not have strong a priori predictions about which forms of investment would be most closely (negatively) related to goal disengagement. However, I argued that each of these additional forms of investment—attention, emotional, and identity—exist, at least for personal goals, and I expected them to be negatively associated with goal disengagement.<sup>10</sup>

## **Method**

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<sup>10</sup> A preliminary version of this study was conducted (Study S1), which is presented in detail in Appendix F. Study S1 followed the same general procedure, and it tested the same research questions, however, it did not include the same types of investment as Study 2 and these items had some limitations. Study S1 largely replicates the main results from Study 2. I discuss how results for different types of investment diverged in Appendix F.

**Participants and design.** I recruited participants (201 undergraduates) from a large Canadian university to participate in an online study for partial course credit ( $M_{\text{age}} = 20.2$  years,  $SD_{\text{age}} = 5.5$  years; 154 identifying as woman/transwoman, 39 identifying as man/transman, 1 identifying as non-binary, 7 unspecified; 34.8% White, 32.3% Asian, 10.4% other/not listed, 7.0% Black, 4.5% East Indian, 3.5% Middle Eastern, 3.5% Mixed Race, 2.0% Hispanic, 0.5% Aboriginal/Native). According to an a priori power analysis conducted in G\*power, a sample size of 95 was required to detect the average effect size in social psychology with 90% power (Cohen's  $f^2$  of 0.21; [Lovakov & Agadullina, 2021](#)) in a linear multiple regression with seven predictors (my analysis with the highest number of predictors), but because I wanted to ensure I was powered for even a smaller effect, a target sample size of 200 was set. According to a sensitivity power analysis conducted in G\*power, my sample size (201) provided 90% power for a small effect (Cohen's  $f^2$  of 0.09).

**Procedure and materials.** Participants were told that the study was about “personality and personal goals.” The procedure was generally the same as Study 1; however, participants only nominated one (transition) goal in this study (as opposed to two in Study 1).

**Personal goal nomination.** Participants received the same instructions for nominating their personal goal as the participants in Study 1 did. However, they were only asked to nominate one goal—a transition goal (“*You are evaluating the goal and your motivation to continue with it, or bring it to completion/disengage from it*”). After nominating their goal, participants answered various questions about that goal, including questions about prior investment, attainability, and disengagement.<sup>11</sup>

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<sup>11</sup> Participants also completed some additional measures (see Appendices). The prior investment measure used in Study 1 (adapted from the investment size scale; Rusbult, 1998) was also included as a secondary measure which revealed parallel results to my primary investment measure. Participants were asked to indicate the domain of their

**Prior investment (various types).** Participants were asked about their *general* investment (“Overall, how much would you say you’ve invested in this goal so far?;” “How much overall have you put into this goal so far?;”  $\alpha = .92$ ), *effort* investment (“How much effort have you put into this goal so far?;” “In terms of effort, how much have you invested in this goal so far?;”  $\alpha = .87$ ), *time* investment (“How much time have you put into this goal so far?;” “In terms of time, how much have you invested in this goal so far?;”  $\alpha = .91$ ), *financial* investment (“How much financial investment have you put into this goal so far?;” “In terms of financial investment, how much have you invested in this goal so far?;”  $\alpha = .97$ ), *attention* investment (“How much of your thoughts and attention been dedicated to this goal so far?;” “In terms of your thoughts and attention, how much have you invested in this goal so far?;”  $\alpha = .83$ ), *emotional* investment (“How much have you invested emotionally into this goal so far; how much have your feelings been attached to it?;” “In terms of emotional investment, how much have you invested in this goal so far?;”  $\alpha = .88$ ), and *identity* investment (“How much of aspects of yourself [e.g., your identity] have you put into this goal so far?;” “In terms of identity, how much have you invested in this goal so far?;”  $\alpha = .89$ ). All items were rated on a 5-point Likert scale from 1 (*none or very little*) to 5 (*a lot*).

**Attainability.** To measure the attainability of participants’ goals, participants were asked “How likely do you think it is that you will attain the goal to [their goal]?” which they rated on a 7-point Likert scale from 1 (*not at all likely*) to 7 (*extremely likely*).

**Disengagement.** Disengagement was measured in the same way that it was in Study 1. Participants completed the same adapted version of the disengagement capacity scale (Wrosch et

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goal: whether the goal was “social,” “academic/career,” “health,” or “other.” Most participants’ goals were academic/career (64.7%), followed by health (21.4%), social (7.0%), and other (6.5%). Participants who indicated “other” specified that their goal was either in the domain of sports, finances, travel, a hobby, or “all of the above.”

al., 2003b). This scale consisted of 4 items that were rated on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*): “I will keep putting in effort toward this goal,” “I will keep trying to achieve this goal,” “I will stay committed to this goal,” and “I will continue to think about this goal and I won’t let it go” ( $\alpha = .97$ ). All 4 items were reverse-scored and then averaged to create a composite disengagement variable.

**Demographics and survey experience.** After the personal goal questions, participants were asked some basic demographic questions (age, gender, race), some questions about their experience with the study, then were fully debriefed and compensated.

## Results

**Is prior investment a hook?** As in Study 1, I first examined zero-order correlations between prior investment, attainability, and disengagement (correlations and descriptives are presented in Table 4). As expected, and replicating Study 1, there was a significant negative correlation between prior investment and disengagement,  $r(198) = -.52, p < .001$ . In contrast to Study 1, attainability also was significantly negatively correlated with disengagement in this study,  $r(198) = -.61, p < .001$ , suggesting that people might use unattainability as a signal to disengage.

**Table 4.**

*Zero-order correlations between prior investment, attainability, and disengagement (Study 2).*

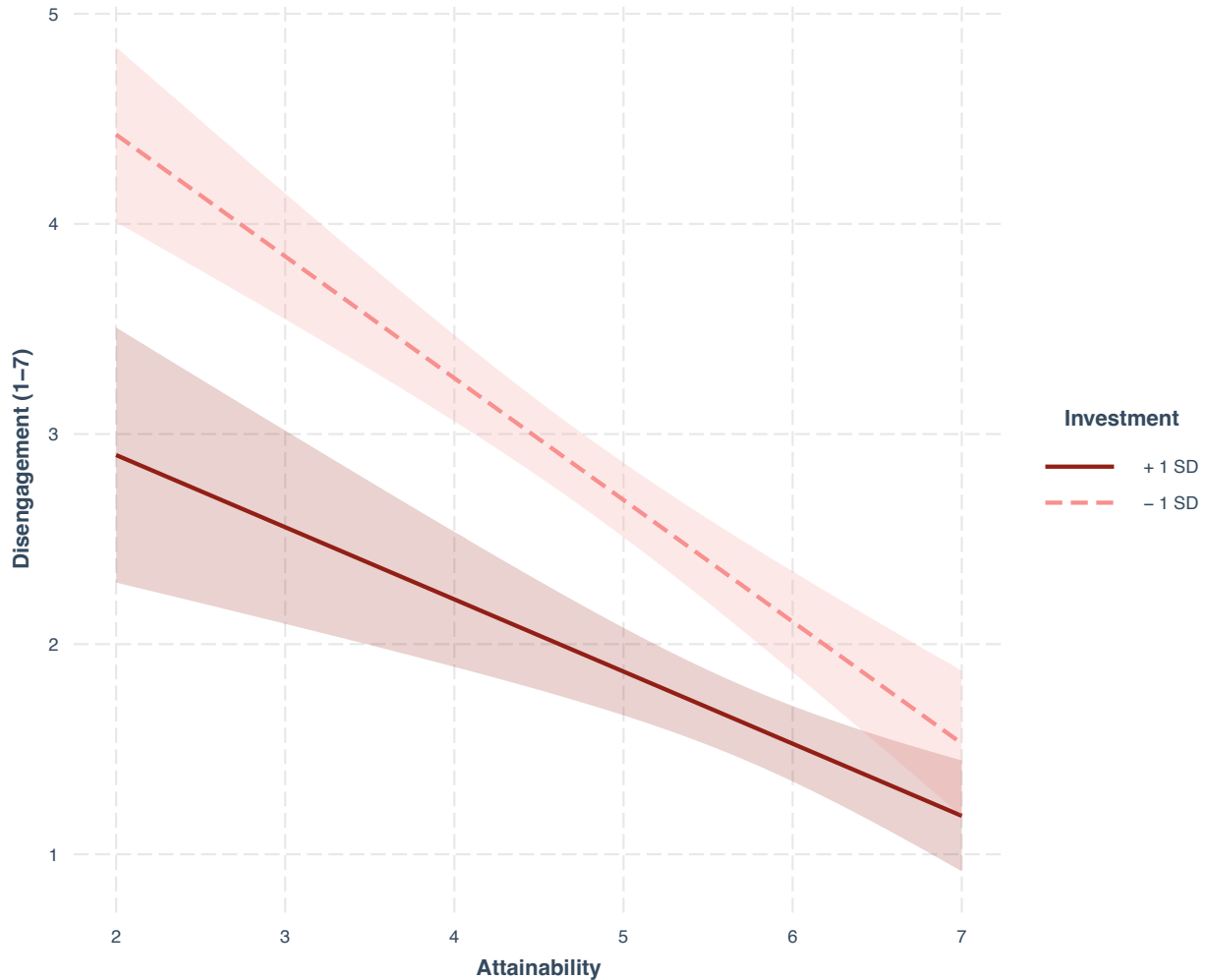
Variable	<i>M (SD)</i>	1	2
1. Prior investment	3.66 (1.00)	--	
2. Attainability	5.39 (1.19)	.40***	--
3. Disengagement	2.15 (1.20)	-.52***	-.61***

*Note.* \*\*\* $p < .001$ ;  $df = 198$  for each correlation.

*Is prior investment a maladaptive hook?* Next, disengagement was regressed on attainability, general prior investment, and their interaction. This analysis revealed a main effect of prior investment,  $b = -0.29$ ,  $SE = .06$ ,  $t(191) = 5.00$ ,  $p < .001$ , 95% CI [-0.40, -0.18], and a main effect of attainability,  $b = -0.43$ ,  $SE = .05$ ,  $t(191) = 8.56$ ,  $p < .001$ , 95% CI [-0.53, -0.33], qualified by the predicted prior investment  $\times$  attainability interaction,  $b = 0.20$ ,  $SE = .04$ ,  $t(191) = 5.01$ ,  $p < .001$ , 95% CI [0.12, 0.27] (see Figure 2). This interaction shows that the effect of attainability on disengagement was weaker at high (+1 *SD*) levels of investment,  $b = -0.23$ ,  $SE = .07$ ,  $t(191) = 3.51$ ,  $p < .001$ , 95% CI [-0.36, -0.10], than at low (-1 *SD*) levels of investment,  $b = -0.62$ ,  $SE = .06$ ,  $t(191) = 10.17$ ,  $p < .001$ , 95% CI [-0.74, -0.50], suggesting that prior investment is associated with a reduced responsiveness to unattainability. Additionally, the effect of investment on disengagement was significant at low attainability,  $b = -0.51$ ,  $SE = .07$ ,  $t(191) = 5.00$ ,  $p < .001$ , 95% CI [-0.40, -0.18], but not at high attainability,  $b = -0.06$ ,  $SE = .08$ ,  $t(191) = 0.81$ ,  $p = .417$ , 95% CI [-0.22, 0.09].

**Figure 2.**

*Goal disengagement as a function of prior investment and attainability (Study 2).*



***What forms of investment act as hooks, and which are particularly strong?*** In the following analyses, I examined the various individual types of investment I included in Study 2, to see what forms of investment act as hooks and which are particularly strong. Each type of investment was significantly negatively correlated with disengagement (summarized in Table 5). Effort and attention investment had the largest correlations (both  $r_s = -.52$ ), and financial investment had the smallest correlation ( $r = -.24$ ).

**Table 5.**

*Zero-order correlations between each type of prior investment, attainability, and disengagement (Study 2).*

Variable	<i>M (SD)</i>	1	2	3	4	5	6	7
1. Effort investment	3.69 (.96)	--						
2. Time investment	3.69 (1.04)	.85***	--					
3. Financial investment	2.89 (1.44)	.45***	.43***	--				
4. Attention investment	3.80 (0.87)	.65***	.65***	.30***	--			
5. Emotional investment	3.60 (1.05)	.55***	.59***	.42***	.65***	--		
6. Identity investment	3.17 (1.17)	.58***	.57***	.49***	.54***	.66***	--	
7. Attainability	5.39 (1.19)	.41***	.30***	.23**	.38***	.27***	.27***	--
8. Disengagement	2.15 (1.20)	-.52***	-.42***	-.24**	-.52***	-.44***	-.34***	-.61***

*Note.* \*\*\* $p < .001$ ; \*\* $p < .05$ ;  $df = 198$  for each correlation.

Next, I examined which forms of investment are particularly strong. I regressed disengagement on each specific form of investment simultaneously in a linear multiple regression. Effort investment and attention investment were the only significant predictors in this model. Both forms of investment negatively predicted disengagement (see Table 6).<sup>12</sup>

<sup>12</sup> Collinearity diagnostics indicated that tolerance and variance inflation factors (VIFs) were within an acceptable range to infer a lack of multicollinearity; Tolerance  $> .2$  and VIFs  $< 5$  for all variables.

**Table 6.***Multiple regression results (Study 2).*

<b>Variable</b>	<b><i>b</i></b>	<b><i>SE</i></b>	<b><math>\beta</math></b>	<b><i>t</i></b>	<b><i>p</i></b>	<b>95% CI</b>
Intercept	5.35	.33		16.17	<.001	[4.70, 6.01]
Effort investment	-0.57	.14	-0.46	3.96	<.001	[-0.86, -0.29]
Time investment	0.25	.13	0.21	1.83	.069	[-0.02, 0.51]
Financial investment	-0.00	.06	-0.00	0.05	.959	[-0.12, 0.11]
Attention investment	-0.40	.12	-0.29	3.31	.001	[-0.64, -0.16]
Emotional investment	-0.18	.10	-0.16	1.77	.078	[-0.38, 0.02]
Identity investment	0.07	.09	0.06	0.74	.460	[-0.11, 0.24]

*Note.* Outcome variable is goal disengagement.

I also examined the effect of each of these investment variables when controlling for attainability, to better understand what forms of investment, if any, predict disengagement even when accounting for attainability. When considering all these potential antecedents of disengagement simultaneously, I found that attainability, effort investment, attention investment, and emotional investment were significant negative predictors of disengagement (all effects summarized in Table 7).

**Table 7.***Multiple regression results including attainability (Study 2).*

<b>Variable</b>	<b><i>b</i></b>	<b><i>SE</i></b>	<b><math>\beta</math></b>	<b><i>t</i></b>	<b><i>p</i></b>	<b>95% CI</b>
Intercept	6.69	.34		19.69	<.001	[6.02, 7.37]
Attainability	-0.44	.06	-0.44	7.60	<.001	[-0.56, -0.33]
Effort investment	-0.34	.13	-0.27	2.57	.011	[-0.60, -0.08]
Time investment	0.12	.12	0.10	0.99	.325	[-0.12, 0.35]
Financial investment	0.02	.05	0.03	0.44	.663	[-0.08, 0.01]
Attention investment	-0.25	.11	-0.18	2.31	.022	[-0.47, -0.01]
Emotional investment	-0.19	.09	-0.16	2.06	.041	[-0.36, -0.01]
Identity investment	0.07	.08	0.06	0.85	.398	[-0.09, 0.22]

*Note.* Outcome variable is goal disengagement.

I also explored whether each type of investment interacted with attainability. There was a significant investment  $\times$  attainability interaction for effort, time, and attention investment; there was a marginally significant investment  $\times$  attainability interaction for emotional investment, but

the interactions for financial investment and identity investment were not significant (all interactions summarized in Table 8). The effect of attainability on disengagement was weaker at high (vs. low) levels of effort, time, attention, and emotional investment (simple effects in Table 9). Therefore, these results suggest that prior investment, particularly in the form of effort, time, and attention, is associated with reduced responsiveness to unattainability.

**Table 8.**

*Moderation results for each investment variable (Study 2).*

<b>Investment Variable</b>	<b>Effect</b>	<b><i>b</i></b>	<b><i>SE</i></b>	<b><i>t</i></b>	<b><i>p</i></b>	<b>95% CI</b>
Effort investment	Attainability	-0.85	.18	4.65	<.001	[-1.21, -0.49]
	Effort investment	-0.93	.25	3.67	<.001	[-1.43, -0.43]
	Attainability × effort investment	0.10	.05	2.15	.033	[0.01, 0.20]
Time investment	Attainability	-1.07	.19	5.67	<.001	[-1.44, -0.70]
	Time investment	-1.10	.27	4.02	<.001	[-1.64, -0.56]
	Attainability × time investment	0.15	.05	2.99	.003	[0.05, 0.25]
Financial investment	Attainability	-0.58	.11	5.18	<.001	[-0.80, -0.36]
	Financial investment	-0.07	.22	0.31	.758	[-0.49, 0.36]
	Attainability × financial investment	-0.00	.04	0.11	.910	[-0.08, 0.08]
Attention investment	Attainability	-1.00	.21	4.80	<.001	[-1.41, -0.59]
	Attention investment	-1.18	.29	4.11	<.001	[-1.75, -0.61]
	Attainability × attention investment	0.14	.06	2.58	.010	[0.03, 0.25]
Emotional investment	Attainability	-0.84	.19	4.43	<.001	[-1.22, -0.47]
	Emotional investment	-0.80	.28	2.83	.005	[-1.36, -0.24]
	Attainability × emotional investment	0.09	.05	1.70	.091	[-0.01, 0.19]
Identity investment	Attainability	-0.72	.15	4.89	<.001	[-1.02, -0.43]
	Identity investment	-0.49	.25	1.96	.052	[-0.99, 0.00]
	Attainability × identity investment	0.06	.05	1.20	.230	[-0.04, 0.15]

*Note.* Outcome variable is goal disengagement in each model; *df* = 194 for each effect.

**Table 9.**

*Conditional effects of attainability at high/low effort, time, attention, and emotional investment (Study 2).*

<b>Investment Variable</b>	<b>Effect of Attainability at:</b>	<b><i>b</i></b>	<b><i>SE</i></b>	<b><i>t</i></b>	<b><i>p</i></b>	<b>95% CI</b>
Effort investment	Low (-1 <i>SD</i> ) investment	-0.57	.07	8.00	<.001	[-0.71, -0.43]
	High (+1 <i>SD</i> ) investment	-0.37	.07	4.78	<.001	[-0.52, -0.22]
Time investment	Low (-1 <i>SD</i> ) investment	-0.67	.07	9.27	<.001	[-0.81, -0.53]
	High (+1 <i>SD</i> ) investment	-0.36	.08	4.38	<.001	[-0.52, -0.20]
Attention investment	Low (-1 <i>SD</i> ) investment	-0.58	.07	8.51	<.001	[-0.72, -0.45]
	High (+1 <i>SD</i> ) investment	-0.34	.08	4.27	<.001	[-0.49, -0.18]
Emotional investment	Low (-1 <i>SD</i> ) investment	-0.61	.07	8.37	<.001	[-0.76, -0.47]
	High (+1 <i>SD</i> ) investment	-0.43	.08	5.20	<.001	[-0.59, -0.27]

*Note.* Outcome variable is goal disengagement.

***Exploratory analyses with reduced investment types.*** To understand different types of investment more fully in this personal goal context, I conducted an exploratory factor analysis of my investment items and follow-up analyses with a reduced number of investment types. The factor analysis was likely limited in terms of statistical power given the sample size and should be interpreted with caution (see Kyriazos, 2018). The principal components factor analysis extracted three components, which I refer to as effort investment, financial investment, and self investment. Effort investment includes the effort investment and time investment items; financial investment includes the two financial investment items, and self investment includes the attention investment, emotional investment, and identity investment items.<sup>13</sup> Following the factor analysis, three new variables were created to reflect these components by averaging scores on the respective items.

<sup>13</sup> For self investment, one of the attention investment items was not included when creating the variable (“*In terms of your thoughts and attention, how much have you invested in this goal so far?*”) because this item had a stronger correlation with the effort component than the self investment component (.50 vs. .47, respectively).

The correlations between effort investment, financial investment, and self investment are presented in Table 10. All three types of investment were negatively correlated with disengagement; effort investment had the largest correlation and financial investment had the smallest correlation.

**Table 10.**

*Zero-order correlations between investment (reduced types) and disengagement (Study 2).*

Variable	<i>M (SD)</i>	1	2	3
1. Effort investment	3.69 (0.96)	--		
2. Financial investment	2.89 (1.45)	.46***	--	
3. Self investment	3.46 (0.93)	.69***	.49***	--
4. Disengagement	2.15 (1.20)	-.49***	-.24**	-.46***

*Note.* *df* = 198.

Next, I regressed disengagement on effort investment, financial investment, and self investment simultaneously in a linear multiple regression. Effort investment and self investment were both significant predictors in this model, but financial investment was not (see Table 11).<sup>14</sup> This pattern of results remains the same when including attainability in the model (see Table 12).

<sup>14</sup> t-tests comparing the coefficients in this model revealed that the effect of effort investment was not significantly larger than the effect of self investment,  $p = .288$ , but the effect of effort investment and the effect of self investment were both significantly larger than the effect of financial investment ( $p < .001$  and  $p = .003$ , respectively).

**Table 11.***Multiple regression results with reduced investment types (Study 2).*

Variable	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>	95% CI
Intercept	4.73	.31		15.15	<.001	[4.11, 5.34]
Effort investment	-0.42	.11	-0.33	3.90	<.001	[-0.63, -0.21]
Financial investment	0.03	.06	0.04	0.49	.625	[-0.09, 0.15]
Self investment	-0.32	.11	-0.25	2.85	.005	[-0.54, -0.10]

*Note.* Outcome variable is goal disengagement.**Table 12.***Multiple regression results with reduced investment types and attainability (Study 2).*

Variable	<i>b</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>	95% CI
Intercept	6.44	.33		19.25	<.001	[5.78, 7.10]
Attainability	-0.49	.06	-0.48	8.49	<.001	[-0.60, -0.37]
Effort investment	-0.26	.09	-0.21	2.81	.005	[-0.45, -0.08]
Financial investment	0.05	.05	0.06	0.91	.363	[-0.05, 0.15]
Self investment	-0.24	.10	-0.19	2.46	.015	[-0.43, -0.05]

*Note.* Outcome variable is goal disengagement.

Additionally, I examined interactions between these reduced types of investment and attainability, again to see whether these factors were associated with reduced responsiveness to unattainability. There was a significant investment  $\times$  attainability interaction for effort investment and there was a marginally significant investment  $\times$  attainability interaction for self investment. Financial investment did not moderate the effect of attainability (all interactions summarized in Table 13). The effect of attainability on disengagement was weaker at high (vs. low) levels of both effort investment and self investment (simple effects in Table 14). Overall, these results suggest that prior investment, particularly in the form of effort and time, is associated with reduced responsiveness to unattainability.

**Table 13.***Moderation results for each investment variable with reduced types (Study 2).*

Investment Variable	Effect	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI
Effort investment	Attainability	-0.99	.19	5.18	<.001	[-1.36, -.061]
	Effort investment	-1.08	.27	4.00	<.001	[-1.62, -.55]
	Attainability × effort investment	0.14	.05	2.68	.008	[0.04, 0.25]
Financial investment	Attainability	-0.58	.11	5.18	<.001	[-0.80, -0.36]
	Financial investment	-0.07	.22	0.31	.758	[-0.49, 0.36]
	Attainability × financial investment	-0.00	.04	0.11	.910	[-0.08, 0.08]
Self investment	Attainability	-0.82	.19	4.32	<.001	[-1.19, -0.45]
	Self investment	-0.86	.30	2.90	.004	[-1.44, -0.27]
	Attainability × self investment	0.09	.06	1.68	.095	[-0.02, 0.20]

*Note.* Outcome variable is goal disengagement in each model; *df* = 194 for each effect.

**Table 14.***Conditional effects of attainability at high/low effort and self investment (Study 2).*

Investment Variable	Effect of Attainability at:	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI
Effort investment	Low (-1 <i>SD</i> ) investment	-0.61	.07	8.66	<.001	[-0.75, -0.47]
	High (+1 <i>SD</i> ) investment	-0.35	.08	4.48	<.001	[-0.51, -0.20]
Self investment	Low (-1 <i>SD</i> ) investment	-0.59	.07	8.32	<.001	[-0.73, -0.45]
	High (+1 <i>SD</i> ) investment	-0.41	.08	4.98	<.001	[-0.58, -0.25]

*Note.* Outcome variable is goal disengagement.

## Discussion

Study 2 replicated the negative correlation between prior investment and disengagement found in Study 1, using a measure of prior investment more apt to the context, which again supported the idea that prior investment may operate as a hook, something that reduces the likelihood that people give up on goals. Unlike Study 1, however, there was a significant negative correlation between attainability and disengagement as well, indicating that attainability is something that people pay attention to when it comes to disengagement (i.e., people are at

least partly sensitive to unattainability as a “signal;” Atkinson, 1957; Eccles, 1983). In contrast to Study 1, there was also a significant interaction between attainability and prior investment in Study 2, such that prior investment was associated with reduced responsiveness to unattainability, as the effect of attainability on disengagement was reduced at high (vs. low) levels of prior investment. This finding supports the idea that prior investment may not only operate as a hook, but a maladaptive hook—something that keeps people from giving up on goals even when giving up could be adaptive. This finding also adds support to my ideas about how hooks might operate. Studies 1 and 2 show that hooks can directly reduce the likelihood of disengagement; Study 2 shows that hooks can also reduce responsiveness to signals that disengagement is adaptive (see Figure 1 in the Introduction).

Study 2 also represented first steps at examining what forms of investment are particularly strong hooks. Study 2 represents the first evidence that, at least for this university student sample, financial investment might be of the least concern. Effort investment and attention investment were particularly robust predictors of disengagement. It is possible that effort and attention are more “precious” in the sense that they are salient indicators of how people are spending their limited time (Burkeman, 2021). Exploratory analyses also revealed that self investment (including attention, emotion, and identity) was negatively related to disengagement, consistent with the ideas that self-threat could be a mechanism (Steele, 1988). I discuss the implications of these findings further in the General Discussion. It is also important to recognize that these patterns of results might look different across populations. For example, the younger ( $M_{age} = 20$ ) individuals in this sample might care more about self-image (e.g., due to more online presence and “personal branding;” Vițelar, 2019) than older individuals. It could be important for future work to examine types of investment—which act as hooks and which are

particularly robust—as a function of demographic factors (e.g., age, status, culture) and within more representative samples, as I discuss further in the General Discussion.

In sum, Studies 1 and 2 provide correlational evidence that prior investment is a hook and that it is associated with reduced responsiveness to unattainability. In the following two studies, I sought to obtain *causal* evidence. Correlational designs leave open the possibility that associations between investment and disengagement could arise via other pathways. For instance, greater disengagement might lead to less investment (or lower perceptions of attainability). Through measuring self-reported prior investment and attainability, Studies 1 and 2 had the advantage of ecological validity: they captured participants' perceptions of important, self-relevant goals. However, these studies also left open the possibility that individuals' perceptions were influenced by other factors. Given the disadvantages of correlational designs mentioned here, Studies 3 and 4 were conceptual replications using experimental designs.

### Study 3

Study 3 aimed to replicate Studies 1 and 2 with an experimental design. Instead of measuring self-reported investment and attainability, Study 3 experimentally manipulated perceived prior investment and attainability in the context of an anagram task in a 2 (investment)  $\times$  2 (attainability) between-participants design. These manipulations allowed me to test my predictions in a context in which attainability had an objective status. Attainability was manipulated by assigning participants to either complete an anagram task with difficult but solvable problems *or* completely unsolvable problems. To be clear, subjective perceptions of attainability may be what matters most for well-being. Disengagement is adaptive even when the subjective perception of a goal indicates it is unattainable; indeed, engagement is related to distress for goals self-reported as highly unattainable; Hubley & Scholer, 2022). However, because Study 3 used an objectively unattainable goal, it more clearly examined whether prior investment is a maladaptive hook—whether it predicts a reduced likelihood of disengagement when goal attainability is not possible.

The experimental paradigm involved three parts, each involving a “language skills” task. In Section 1, all participants completed the same set of easy, solvable anagrams for a set amount of time. Then, in Section 2, participants were randomly assigned to either complete an anagram task containing solvable, but difficult anagrams (attainable condition) or an anagram task containing unsolvable anagrams (unattainable condition). Participants could spend as little or as much time as they wanted on Section 2. Participants were also randomly assigned to either be told that Section 1 and Section 2 were two parts of the same task (investment condition) or two separate tasks (control condition). Participants were given the incentive that they would receive a bonus (additional money on top of their compensation) if they performed well on the anagrams

(in reality, everyone received the bonus). Section 3 included a different kind of “language skills” task (a Remote Associations Test; Mednick, 1962). This was included to promote variability in persistence on Section 2. Participants who spent longer on Section 2 had less time to spend on Section 3 (i.e., an opportunity cost for persisting on Section 2). The dependent variable in this study was persistence on Section 2, operationalized as the amount of time spent on the section. The idea was that participants in the investment condition would be more motivated to persist on Section 2 than those in the control condition, even if working on unsolvable anagrams, because of the time and effort they had ostensibly put into what they perceived as the same task.

A pre-registered analysis plan for Study 3 can be found here:

[https://osf.io/pwrjh/?view\\_only=8af7bed00fcf42a1abb7f508dc712001](https://osf.io/pwrjh/?view_only=8af7bed00fcf42a1abb7f508dc712001). I expected to replicate the correlational results of Studies 1 and 2 but in this experimental context. I predicted main effects of both the investment condition and the attainability condition. I predicted that those in the prior investment condition would spend more time on the anagram task than those in the control condition. I also expected those in the attainable condition to spend more time on the anagram task than those in the unattainable condition. I also expected an investment  $\times$  attainability interaction, such that the effect of attainability condition would be reduced or non-significant within the investment condition but that it would remain significant and/or be larger in the control condition.

## **Method**

**Participants and design.** I recruited participants (525 U.S. residents) from MTurk (hosted by CloudResearch) in exchange for \$5.00 USD in addition to a guaranteed \$0.50 USD bonus ( $M_{\text{age}} = 40.4$  years,  $SD_{\text{age}} = 11.1$  years; 222 identifying as woman/transwoman, 290 identifying as man/transman, 4 identifying as non-binary, 4 unspecified; 75.8% White, 10.5%

Black, 5.9% Asian, 3.2% Hispanic, 2.7% Mixed Race, 0.6% East Indian, 0.4%

Aboriginal/Native, 0.4% other/not listed). A target sample size of 300 was set based on an a priori power analysis conducted in G\*power. The sample size required to detect the average effect size in social psychology (Cohen's  $f^2 = 0.21$ ; [Lovakov & Agadullina, 2021](#); see [pre-registered analysis plan](#)) in the two-way interaction being tested with 95% power was 297.

However, Study 3 combines data from two studies that used the exact same design as an approach to maximize statistical power (per my pre-registered analysis plan), which resulted in a sample size of 525. The results presented control for the effect of the sample, and the results for each individual study are presented in Appendix G. According to a sensitivity power analysis conducted in G\*power, for the two-way interaction being tested, my sample size (525) provided 90% power for a medium-sized effect (Cohen's  $f^2$  of 0.14).

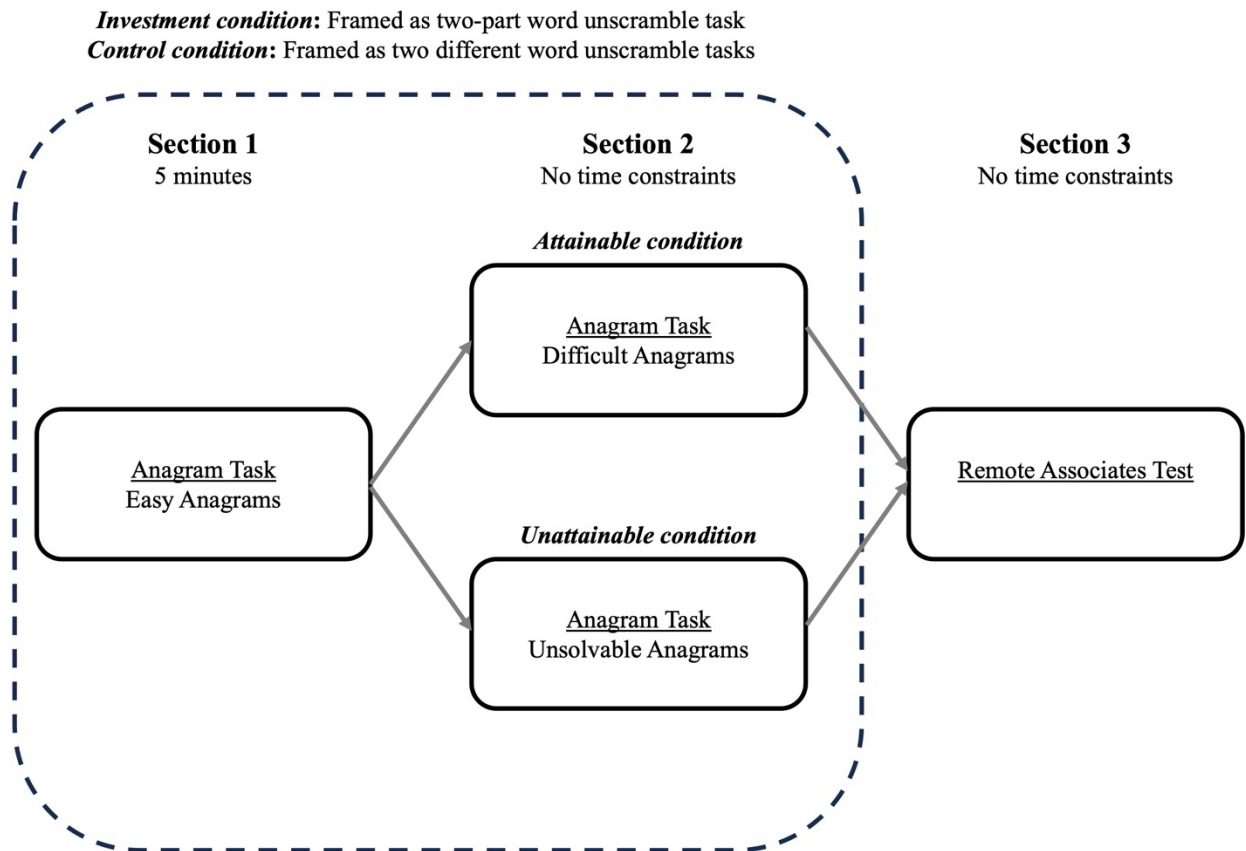
**Procedure and materials.** Participants were told that the study was about “personality and language skills tasks.”<sup>15</sup> The main part of the study was the “language skills” tasks. An overview of the procedure for this part of the study is in Figure 3.

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<sup>15</sup> The individual difference measures included in Study 3 are presented in Appendix A. These were only included in Study 3a (the first sample).

**Figure 3.**

*Overview of Study 3 main procedure.*



**Prior investment manipulation.** When it came to the “language skills” tasks part of the study, participants were told “*This part of the study has 3 sections. Each section involves a language skills task.*” Then, if participants were assigned to the investment condition, they were told “*In Section 1 and Section 2, you will work on a two-part word unscramble task. You will work on the first half of the word unscramble task in Section 1 and the second half in Section 2,*” and if they were assigned to the control condition, they were told “*In Section 1, you will work on one word unscramble task. In Section 2, you will work on a different word unscramble task.*” What participants were told were “word unscramble” tasks were anagram tasks. Anagrams involve rearranging scrambled letters into a word. For example, when presented with

“NIACUSEOT,” to solve the anagram, you would answer “TENACIOUS.” The anagrams used in this study have been used in previous research (e.g., Lucas et al., 2015). Regardless of experimental conditions, participants were told they would receive a \$0.50 USD MTurk bonus if they performed well in the first two sections (this bonus was included as an incentive; in reality, everyone received the bonus).

***Attainability manipulation.*** Section 2 of the anagram task was where attainability was manipulated. In Section 1, participants all completed the same anagrams, and they worked on the task for 5 minutes. All these anagrams were solvable. In Section 2, however, half of the participants were assigned to complete unsolvable anagrams (*unattainable condition*) and the other half were assigned to complete solvable anagrams (*attainable condition*).<sup>16</sup> The beginning of Section 2 also included some fake quotes from “previous participants” that signaled the difficulty of the task. For example, those in the *unattainable task condition* saw a quote in which a previous participant reported that the anagrams “*seemed almost impossible,*” whereas those in the *attainable task condition* saw one quote in which a previous participant reported that the anagrams “*weren’t too hard.*”

Importantly, in Section 2, participants could spend as little or as much time on the task as they wanted. Therefore, the amount of time participants spent on Section 2 was used as a measure of persistence.

Regardless of experimental conditions, participants were told that in the third section they would work on a different language skills task. This third section was not part of the analyses,

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<sup>16</sup> Manipulation checks showed that participants in the unattainable (vs. control) condition perceived the anagrams to be more difficult, they were more likely to say there were anagrams they were unable to solve, and they were more likely to think those anagrams were impossible for them to solve. Manipulation checks for the investment manipulation failed to find significant differences between conditions; however, means for perceived investment were descriptively higher for those in the investment (vs. control) condition.

and it was included to present an opportunity cost to participants and thus, to promote variability in persistence on the anagram task. The task used to present an opportunity cost was the Remote Associates Test (Mednick, 1962) and it was the same for all participants. Participants could spend as little or as much time as they wanted on Section 3.

***Demographics and survey experience.*** Finally, participants completed basic demographic questions (age, race, gender, occupation, income, and education) and questions about their experience with the survey, then were fully debriefed and compensated. This study was approved as a deception study through the university's research ethics research board. Due to the deception, after being debriefed, participants were asked if they consented to their data being used (all participants consented).

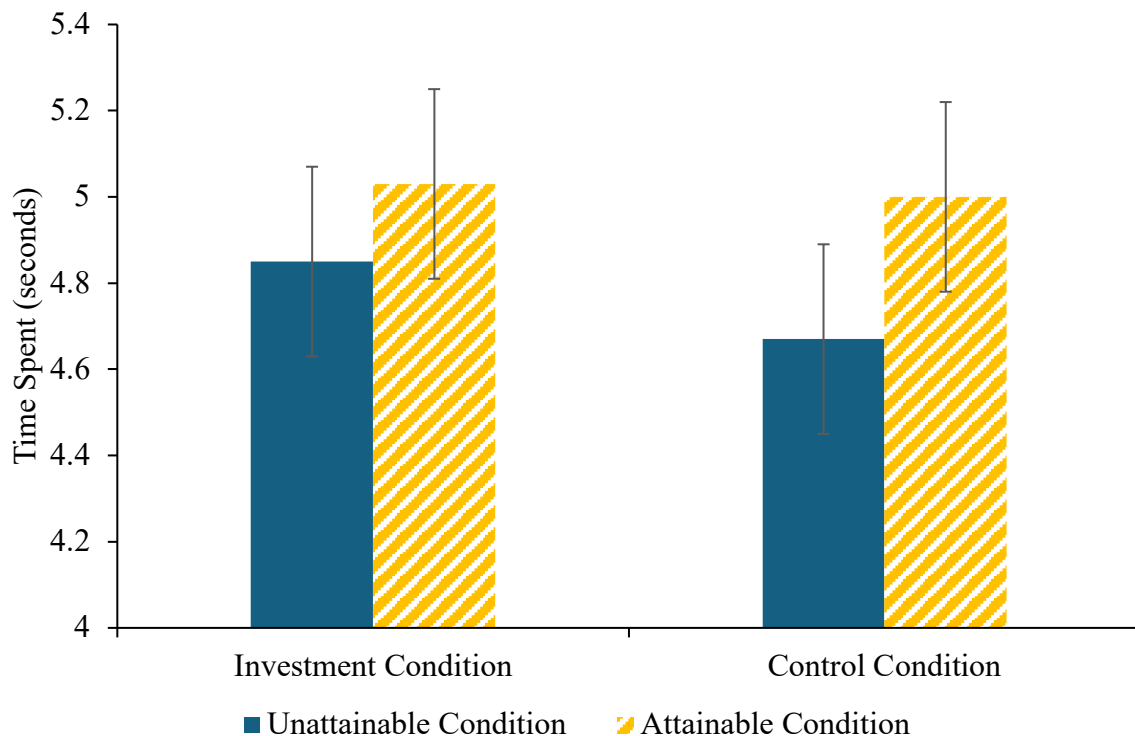
## **Results**

Skewness on the amount of time spent on the anagrams was greater than 3 (5.50), and thus considered non-normal (Kline, 1998). Therefore, as pre-registered, I conducted my analyses using a log-transformed variable, which reduced skew to a normal level (*skewness* = -0.81; *kurtosis* = 1.35). A 2 (investment condition: investment vs. control) × 2 (attainability condition: unattainable task vs. attainable task) factorial ANOVA, controlling for sample, revealed a non-significant main effect of investment condition,  $F(1, 466) = 2.40, p = .122, \eta_p^2 = .01$ , a significant main effect of attainability condition,  $F(1, 466) = 9.93, p = .002, \eta_p^2 = .02$ , and a non-significant investment condition × attainability condition interaction,  $F(1, 466) = 1.67, p = .197, \eta_p^2 = .004$ . I continued to examine this two-way interaction, consistent with my pre-registered analysis plan, although it was not statistically significant (see Figure 4). The effect of attainability condition was not significant for those in the investment condition,  $F(1, 231) = 1.67, p = .198, \eta_p^2 = .01$ , but it was for those in the control condition,  $F(1, 235) = 10.21, p = .002, \eta_p^2 = .04$ .

= .04. Participants in the control condition spent significantly more time on Section 2 if they were working on solvable anagrams than if they were working on unsolvable anagrams. However, attainability did not make a significant difference for participants in the investment condition, suggesting that prior investment reduced responsiveness to unattainability.

**Figure 4.**

*Persistence as a function of investment and attainability conditions (Study 3).*



## Discussion

Study 3 was an initial attempt to experimentally manipulate perceived prior investment and to examine its effects on disengagement. Study 3 did so in the context of an anagram task and found some evidence that perceiving higher (vs. lower) prior investment reduces responsiveness to unattainability as a signal to disengage. This finding suggests that, as found in the correlational Study 2, prior investment is a maladaptive hook. However, it is important to recognize that in the case of Study 3, the interaction on which this finding was based was not

statistically significant; although the simple slopes of the interaction were consistent with my theoretical framework, they must be interpreted with caution. It is possible that this non-significant interaction effect was due to the nature of the paradigm. It is possible that the decision of sticking with (or not sticking with) the anagram task in Section 2 did not feel consequential enough to participants and was not an effective analogue for the personal decisions in Studies 1 and 2. First, the opportunity costs for continued engagement in the Section 2 anagram task might not have been high enough to make people care. In previous research that used a similar paradigm, conducted by Lucas et al. (2015), participants were given the choice to exit the task (and get a guaranteed \$1 bonus) or to continue and take a chance on getting a \$2 bonus if they were successful or no bonus if they failed. With these elements of the design used by Lucas et al. (2015), the benefits of performing well, and thus disengaging from the unsolvable task, is more obvious (in this case, one would receive more money). Second, the manipulation of prior investment might not have been strong enough to make people care about sticking with the task because it only manipulated whether participants felt like they had already invested in the task (vs. not). Manipulating investment itself as high versus low (e.g., by varying time spent, degree of effort, financial investment, emotional investment) might produce stronger effects on persistence because the investment would be tangible and of greater influence on the individual. At the same time, the non-significant interaction could have theoretical implications. Perhaps the more objectively unattainable goal used in Study 3 made the decision of whether to disengage easier for participants; I return to this possibility in the General Discussion.

Overall, Study 3 had both advantages and limitations. Study 3 was useful because it provided some causal evidence of my ideas, and in the context of an objectively unattainable goal. However, this causal and behavioural evidence of my ideas was tested in the context of a

short-term task. By using the anagram task, Study 3 was able to directly manipulate unattainability and perceived investment. Therefore, it provided a useful proxy for unattainable goals more broadly. However, while Study 3 was useful in these ways, it was removed from the personal goals context in which my dissertation is based. In Study 4, therefore, I developed manipulations of prior investment and attainability in the context of personal goals.

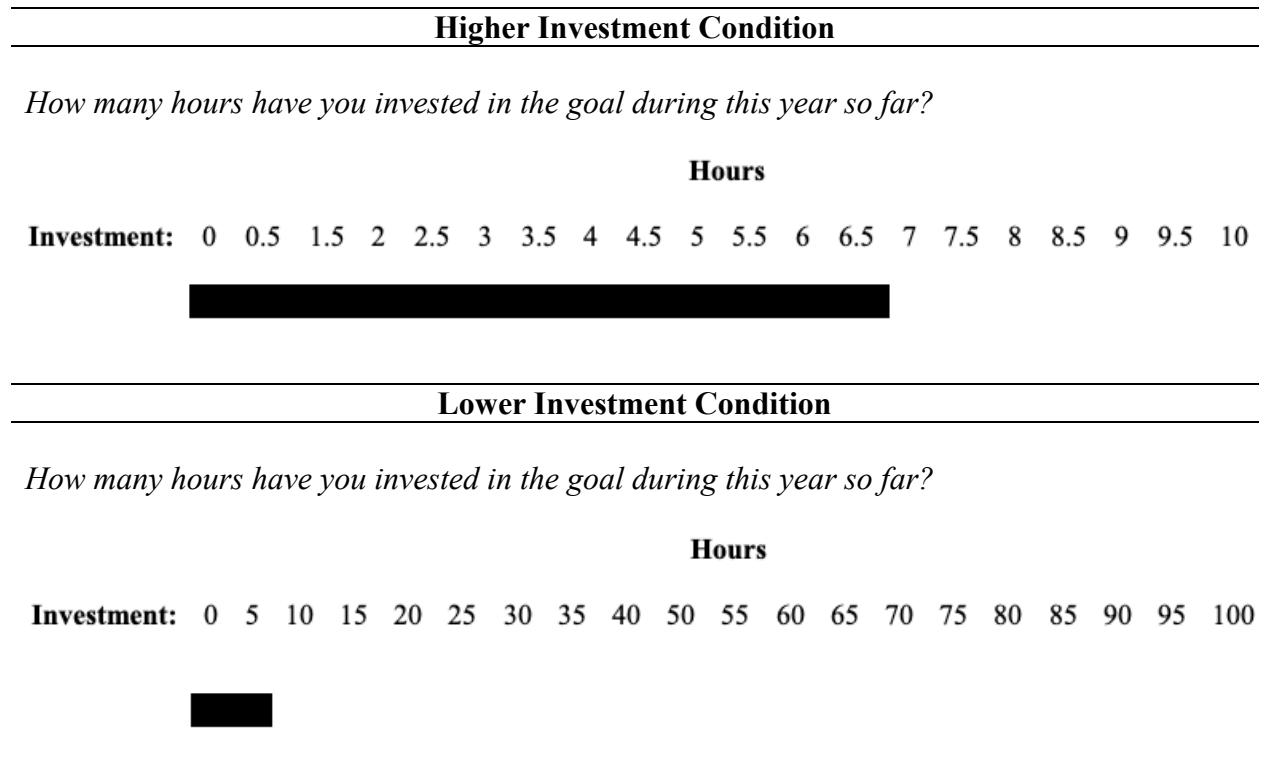
## Study 4

Study 4 aimed to replicate Studies 1 and 2 with an experimental design, as Study 3 did, but it returned to the personal goal context of these studies. Thus, Study 4 aimed to obtain causal evidence that during personal goal pursuit, prior investment is a hook and reduces responsiveness to unattainability as a signal to disengage.

Study 4 experimentally manipulated perceived prior investment and perceived attainability in the context of a personal goal using a 2 (prior investment)  $\times$  2 (attainability) between-participants design. Participants were randomly assigned to either a higher investment condition or a lower investment condition designed to induce relatively higher or lower perceived investment in their personal goal, respectively. The prior investment manipulation used a biased response scale manipulation (see Fishbach & Dhar, 2005 for a similar manipulation) wherein participants either reported the amount of time spent on their personal goal where the scale end-point was 100 (lower investment condition) or 10 (higher investment condition), represented visually on a bar. Therefore, reported investment would be visually represented as relatively low or high investment depending on condition. For example, if someone had invested 7 hours into the goal, this would be represented as quite high on the progress bar if they were in the higher investment condition (where the end-point was 10), or quite low if they were in the lower investment condition (where the end-point was 100; see Table 15).

**Table 15.**

*Visual of prior investment manipulation in Study 4.*



They were also assigned to either a higher attainability condition or a lower attainability condition designed to induce relatively higher or lower perceptions that their goal was attainable, respectively. The attainability manipulation involved either writing about the things that could facilitate attaining the goal (higher attainability condition) or work against attaining the goal (lower attainability condition). After completing both manipulations, participants completed measures of goal commitment and goal disengagement.

Both manipulations were piloted. The pilot study for the prior investment manipulation ( $N = 150$ ) showed that the higher investment condition led to higher reported prior investment in participants' personal goals ( $M = 5.80$ ,  $SD = 1.43$ ) than the lower investment condition ( $M = 5.14$ ,  $SD = 1.61$ ),  $t(148) = 2.66$ ,  $p = .009$ . The pilot study for the attainability manipulation ( $N =$

151) showed that the lower attainability condition led to lower perceived attainability of participants' personal goals ( $M = 5.23$ ,  $SD = 1.11$ ) compared to the higher attainability condition ( $M = 5.62$ ,  $SD = 1.04$ ),  $t(149) = 2.25$ ,  $p = .026$ . Thus, both manipulations were found to work as intended. The details for these pilot studies are presented in Appendix H.

In contrast to Studies 1 and 2, I did not ask participants to focus on a goal in a transition stage. I took a more general approach in this study because it was the first use of the attainability and investment manipulations. This design decision meant that participants were likely to nominate goals for which they were not necessarily considering active disengagement. Therefore, I examined goal disengagement (measured the same way as in Studies 1 and 2) but also goal commitment, as a less direct measure of goal disengagement. I anticipated that goal commitment would be more sensitive to the experimental manipulations.

I expected main effects of both the investment condition and the attainability condition. I expected those in the higher investment condition to indicate greater engagement than those in the lower investment condition. I also expected those in the higher attainability condition to indicate greater engagement than those in the lower attainability condition. However, I also expected an investment  $\times$  attainability interaction, such that the effect of attainability condition would be reduced or non-significant within the higher investment condition but that it would remain significant in the lower investment condition.

## **Method**

**Participants and design.** I recruited participants (301 U.S. residents) from MTurk (hosted by CloudResearch) in exchange for \$5.00 USD ( $M_{\text{age}} = 39.7$  years,  $SD_{\text{age}} = 11.0$  years; 133 identifying as woman/transwoman, 160 identifying as man/transman, 3 identifying as non-binary, 5 unspecified; 76.1% White, 8.6% Black, 6.0% Hispanic, 5.0% Asian, 3.0% Mixed Race,

0.3% Aboriginal/Native, 0.3% East Indian). A target sample size of 300 was set based on an a priori power analysis conducted in G\*power. The sample size required to detect the average effect size in social psychology (Cohen's  $f^2 = 0.21$ ; [Lovakov & Agadullina, 2021](#); see [pre-registered analysis plan](#)) in the two-way interaction being tested with 95% power was 297. According to a sensitivity power analysis conducted in G\*power, for the two-way interaction being tested my sample size (301) provided 90% power for a medium-sized effect (Cohen's  $f^2$  of 0.19).

**Procedure and materials.** Participants were told that the study investigated how people think about goals. Participants completed some individual difference measures<sup>17</sup> and were randomly assigned to condition in a 2 (investment: lower vs. higher)  $\times$  2 (attainability: lower vs. higher) design.

**Personal goal nomination.** Participants were asked to nominate one personal goal: “Now, we’d like you to tell us about one of your current personal goals. We would like you to tell us about an important goal that you have.” As in Studies 1-3, they were asked to only nominate goals for which attainability is relevant: “First, we would like you to only select goals that you are working towards, not things you are trying to avoid, and we would only like you to select a goal for which you are trying to reach a clear endpoint.”

After nominating their goal, participants were randomly assigned to either the *lower investment* condition or *higher investment* condition and to either the *lower attainability* condition or *higher attainability* condition. Each manipulation was completed in counterbalanced order (participants either completed the investment manipulation first or the attainability manipulation first).

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<sup>17</sup> The individual difference measures included in Study 4 are presented in Appendix A (also see Appendices B through D for additional measures).

**Prior investment manipulation.** The prior investment manipulation was intended to manipulate participants' perceived degree of prior investment in their personal goal. The *higher investment* condition was intended to induce relatively higher perceived investment, and the *lower investment* condition was intended to induce relatively lower perceived investment. Regardless of condition, participants were asked "*How many hours have you invested in the goal to [their goal] during this year so far?*," but the scale that participants answered on varied by condition. For those in the *lower investment* condition, the scale's end-point was 100 hours, whereas for those in the *higher attainability* condition, the scale's end-point was 10 hours. Therefore, participants' answers would feel relatively low versus high for those in the lower and higher investment conditions, respectively.<sup>18</sup>

**Attainability manipulation.** The attainability manipulation was intended to manipulate the perception that participants' personal goals were attainable. The *lower attainability* condition was intended to induce the perception that the goal was relatively less attainable, whereas the *higher attainability* condition was intended to induce the perception that the goal was relatively more attainable. In each condition, participants completed a writing task, but the instructions varied by condition (see Table 16).<sup>19</sup>

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<sup>18</sup> The means in both conditions were found to be relatively high in the pilot study that was conducted. Perceived prior investment was measured on a 1-7 Likert scale and the mean was 5.80 ( $SD = 1.43$ ) for those in the higher investment condition and 5.14 ( $SD = 1.61$ ) for those in the lower investment condition.

<sup>19</sup> The means in both conditions were found to be relatively high in the pilot study that was conducted. Perceived attainability was measured on a 1-7 Likert scale and the mean was 5.23 ( $SD = 1.11$ ) for those in the lower attainability condition and 5.62 ( $SD = 1.04$ ) for those in the higher attainability condition.

**Table 16.**

*Attainability manipulation (Study 4).*

Lower Attainability Condition	Higher Attainability Condition
<i>Please take a moment to think about what is going on in your life currently. In the space below, please write about ways in which aspects of your life (other goals, responsibilities, events) or the nature of the goal itself could <b>work against</b> the goal to [their goal] and make it <b>less likely</b> that you will attain it.</i>	<i>Please take a moment to think about what is going on in your life currently. In the space below, please write about ways in which aspects of your life (other goals, responsibilities, events) or the nature of the goal itself could <b>facilitate</b> your goal to [their goal] and make it <b>more likely</b> that you will attain it.</i>

Note. Key differences in instructions are bolded, but nothing was bolded for participants.

**Goal commitment and disengagement.** After completing both manipulations, participants completed a goal commitment scale (Klein et al., 2014), which includes 4 items rated on a Likert scale from 1 (*not at all*) to 7 (*completely*): “How committed are you to this goal?,” “To what extent do you care about this goal?,” “How dedicated are you to this goal?,” and “To what extent have you chosen to be committed to this goal?” ( $\alpha = .88$ ). Participants also completed the same disengagement measure used in Studies 1-3, which includes 4 items rated on a Likert scale from 1-7 (e.g., “To what extent will you keep putting in effort toward the goal to [their goal]?” ( $\alpha = .89$ ).

**Demographics and survey experience.** Finally, participants completed basic demographic questions (age, race, gender, occupation, income, and education) and questions about their experience with the survey, then were fully debriefed and compensated.

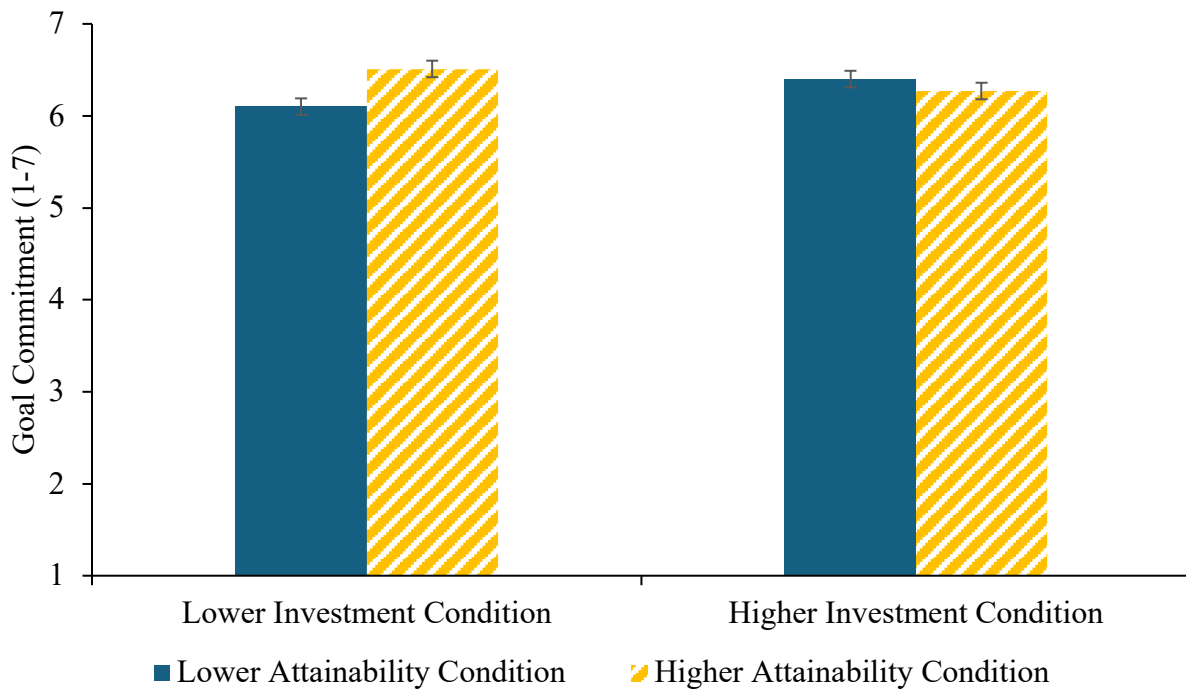
## Results

A 2 (prior investment condition: higher investment, lower investment)  $\times$  2 (attainability condition: lower attainability, higher attainability) factorial ANOVA with goal commitment as the outcome revealed no significant effect of prior investment,  $F(1, 295) = 2.34, p = .128, \eta^2 = .01$  or attainability,  $F(1, 295) = 0.13, p = .717, \eta^2 < .001$ . However, the predicted investment  $\times$

attainability interaction was significant,  $F(1, 295) = 8.77, p = .003, \eta_p^2 = .03$  (see Figure 5). The effect of attainability on commitment was significant within the lower investment condition,  $F(1, 147) = 9.50, p = .002, \eta_p^2 = .06$ , but not within the higher investment condition,  $F(1, 148) = 1.09, p = .298, \eta_p^2 = .01$ . Therefore, the pattern of this interaction was parallel to the pattern of the interaction in Study 3, and it suggests that prior investment reduced responsiveness to unattainability. Participants were equally committed to their goals regardless of perceived attainability if they were in the higher investment condition, whereas those in the lower investment condition reported less commitment to their goals when made to feel that the goal was lower (vs. higher) in attainability.

**Figure 5.**

*Goal commitment as a function of investment and attainability conditions (Study 4).*



A 2 (prior investment condition: higher investment, lower investment)  $\times$  2 (attainability condition: lower attainability, higher attainability) factorial ANOVA was also conducted with

goal *disengagement* as the outcome.<sup>20</sup> This analysis revealed no significant effect of investment  $F(1, 295) = 0.26, p = .613, \eta_p^2 = .001$ , nor attainability,  $F(1, 295) = 0.56, p = .457, \eta_p^2 = .002$ . There was a non-significant but trending investment  $\times$  attainability interaction,  $F(1, 295) = 3.39, p = .067, \eta_p^2 = .01$ . The effect of attainability was not significant within either the higher investment condition,  $F(1, 148) = 0.66, p = .416, \eta_p^2 = .004$ , or lower investment condition,  $F(1, 147) = 3.05, p = .083, \eta_p^2 = .02$ . However, there was trending evidence, consistent with the pattern observed for goal commitment, that the effect of attainability condition was reduced within the higher investment condition.

## Discussion

Study 4 found that higher perceived investment in a personal goal reduces responsiveness to unattainability as a signal to disengage. When made to feel that their goal was lower in attainability, participants reported lower goal commitment (compared to participants made to feel that their goal as higher in attainability). However, this effect only occurred when participants were made to feel that prior investment was relatively low; perceived attainability did not influence goal commitment when participants were made to feel that prior investment was relatively high. Notably, the pattern of results for goal disengagement were analogous to these results for goal commitment, but they were not statistically significant.

In this study, I asked participants about an important personal goal, rather than a personal goal that was a “transition goal” (as I did in the correlational studies on personal goals; Studies 1 and 2). Therefore, it is possible that when asked questions about disengagement specifically, Study 4 participants’ answers were not as easily moved around. In other words, goal disengagement might have been a less sensitive dependent measure than goal commitment was

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<sup>20</sup> Goal commitment and goal disengagement were highly correlated,  $r(299) = -.84, p < .001$ .

in Study 4. As discussed previously, transition goals (Little & Gee, 2007) should be goals for which disengagement is particularly relevant. Without asking participants to nominate transition goals, questions regarding disengagement were likely less relevant to participants as they were less likely to have been contemplating disengagement.

This study is the first to show that prior investment in a personal goal causes less responsiveness to unattainability. This study extends the sunk costs literature by showing a new way that sunk costs operate: sunk costs reduce responsiveness to unattainability. Not only does prior investment negatively relate to disengagement—it might influence how people respond to other factors, such as the perception that their goals are unattainable. Study 4 supports my claim that prior investment, and perhaps hooks more broadly, can “blind” people to signs that disengagement might be adaptive. It is important to recognize, however, that unlike in Study 3, Study 4 did not capture an objectively unattainable goal. Therefore, more research needs to be done before concluding that the effects of prior investment found in Study 4 are maladaptive *per se*. I return to this issue in the General Discussion.

Studies 1-4 all used cross-sectional data. Yet, I also wanted to understand whether and how prior investment shapes disengagement over time. Therefore, Study 5 used a longitudinal design to see whether prior investment at an initial time point predicts reduced likelihood of disengagement one month later. I also examined which types of investment predicted disengagement one month later. Because Study 5 had repeated measures, I was also able to extend my previous studies by examining change in investment. Therefore, Study 5 investigated whether increased investment over a month reduces responsiveness to unattainability.

## Study 5

Study 5 aimed to replicate and extend my previous studies with a longitudinal design. I wanted to gather further evidence of prior investment's effects in the context of personal goals; specifically, I wanted to investigate whether prior investment predicts disengagement over time. Therefore, Study 5 asked about prior investment, attainability, and engagement at two time points, one month apart.

As in Studies 1 and 2, participants nominated a personal goal in a transition stage and were asked how much they had invested already and how attainable the goal felt. Study 5, like Study 2, measured different forms of investment individually as well. Study 5 included effort investment, time investment, financial investment, attention investment, and emotional investment.<sup>21</sup> Participants then indicated their commitment to the goal using the same goal commitment scale used in Study 4. However, in contrast to the previous studies, Study 5 had two time points: participants were asked to complete the measures twice, one month apart. This longitudinal design allowed me to test whether investment at Time 1 predicted disengagement at Time 2 and how increases in investment over time were related to disengagement at Time 2. The analysis plan for Study 5 was pre-registered on OSF after data collection but before analyses were conducted ([https://osf.io/3ju7h/?view\\_only=4b06dd780c70415da2be3d67424978f3](https://osf.io/3ju7h/?view_only=4b06dd780c70415da2be3d67424978f3)).<sup>22</sup>

### Method

**Participants and design.** I recruited participants (107 undergraduates) from a large Canadian university to participate in an online study for partial course credit ( $M_{\text{age}} = 20.2$  years,

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<sup>21</sup> These types of investment were measured in the same way as Study S1 (with single items; described in the Methods section) and did not include identity investment because this study was conducted before I had decided to include this type of investment (i.e., before I conducted Study 2).

<sup>22</sup> Study 5, at both time points, also represent replications of my previous correlational studies. Therefore, I also tested my predictions using only the Time 1 data ( $N = 177$ ); these analyses are presented in Appendix I. I did not do analyses using only the Time 2 data because the Time 2 sample was smaller and therefore provided less statistical power.

$SD_{\text{age}} = 2.7$  years; 74 identifying as woman/transwoman, 27 identifying as man/transman, 1 identifying as non-binary, 3 unspecified; 36.4% Asian, 35.5% White, 6.5% Other/Not listed, 5.7% Mixed Race, 4.7% East Indian, 3.8% Middle Eastern, 2.8% Black, 1.9% Aboriginal/Native, 1.9% Hispanic). An a priori power analysis was conducted in G\*power (see pre-registered analysis plan), which estimated the sample size needed to detect the average effect size in social psychology (Cohen's  $f^2 = 0.21$ ; Lovakov & Agadullina, 2021). To detect an effect of this size in a linear multiple regression with two predictors (my main analysis) with 90% power, a sample size of 53 was required. However, I also wanted to be adequately powered to test the same two-way interaction tested in Study 2. Therefore, I aimed to recruit 200 participants. Recruitment for the study, perhaps due to the two-part nature, was lacking, and only 107 participants completed both parts. According to a sensitivity power analysis conducted in G\*power for a linear multiple regression with two predictors (my main analysis), my sample size (107) provided 90% power for a small-to-medium-sized effect (Cohen's  $f^2$  of 0.10).

**Procedure and materials.** Participants were told that the study investigated “goals over time.” First, at Time 1, participants nominated a personal (transition) goal, in the same way as in Studies 1 and 2, and then answered various questions about it, including those about investment, attainability, and disengagement.<sup>23</sup>

**Prior investment (various types).** Participants were asked about their *general* investment (“Overall, how much would you say you’ve invested in this goal so far?”), *effort* investment (“How much effort have you put into this goal so far?”), *time* investment (“How much time have

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<sup>23</sup> See Appendices A through D for additional measures. As in Study 2, participants were asked to indicate the domain of their goal. This question had the same options, except with an additional “leisure/hobby” option. Most of participants’ goals were in the academic/career domain (67.2%), followed by health (13.0%), social (5.1%), leisure/hobby (5.1%), and other (4.0%). Participants who chose “other” specified that the goal was in multiple domains (e.g., “all of the above and more,” “both academic and leisure”).

*you put into this goal so far?”), financial investment (“How much financial investment have you put into this goal so far?”), attention investment (“How much of your thoughts and attention been dedicated to this goal so far?”), and emotional investment (“How much have you invested emotionally in this goal so far; how much have your feelings been attached to it?”). Each of these items were rated on a 5-point Likert scale from 1 (*none or very little*) to 5 (*a lot*).*

**Attainability.** To measure attainability, participants were asked “*To what extent is the goal to [their goal] attainable for you?*” (Gabrielsen et al., 2012) which was rated on a Likert scale from 1 (*not attainable*) to 5 (*very attainable*).

**Goal commitment and disengagement.** Participants completed the same goal disengagement scale used in my previous studies. All 4 items were reverse-scored and then averaged to create a composite disengagement variable ( $\alpha = .96$ ). Participants also completed the same goal commitment scale (Klein et al., 2014) as in Study 4. All 4 items were averaged to create a composite commitment variable ( $\alpha = .92$ ).

**Demographics and survey experience.** Participants concluded Time 1 by answering some basic demographic questions (age, gender, race) and some questions about their experience with the survey, and then they were debriefed and compensated.<sup>24</sup>

Approximately one month after completing Time 1, participants completed Time 2. First, at Time 2, participants reviewed the information-consent form and were asked whether they were still pursuing the goal that they nominated at Time 1: “*Are you still pursuing the goal to [their*

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<sup>24</sup> Participants were not fully debriefed until after completing Time 2, as approved by the university’s ethics research board.

goal]?” (yes, no). If participants answered “no,” they were then asked a few follow-up questions.<sup>25</sup> If participants answered “yes,” they were asked the same questions as in Time 1.

Participants concluded the study by answering some questions about their experience with the survey; they were then fully debriefed and compensated.

## Results

Given the repeated measures design, the following analyses all used multi-level modelling to control for the effect of the individual. In each model, participant was included as a level-2 predictor. Participant was modeled as the only random effect and all other variables were included as fixed effects. These analyses controlled for the effect of baseline levels of the outcome variable (i.e., levels at Time 1).<sup>26</sup> As pre-registered in the analysis plan, I examined my research questions using both goal disengagement and commitment as outcomes; I present results for both. Goal disengagement has been used most frequently in my work; however, Study 4 found greater variation in goal commitment versus disengagement. Therefore, these two goal engagement/disengagement variables were both treated as primary. I discuss any discrepancies between the results of the two variables in the study discussion.

***Is prior investment a hook?*** First, I examined whether initial prior investment at Time 1 predicted commitment and disengagement at Time 2. Prior investment at Time 1 positively predicted commitment at Time 2,  $b = 0.26$ ,  $SE = .10$ ,  $t(98) = 2.66$ ,  $p = .009$ , providing further

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<sup>25</sup> Those who indicated they quit their goal were asked “*Please explain why you stopped pursuing the goal*” in an open-ended question, at what point they stopped pursuing the goal (relative to Time 1), whether they reengaged in an alternative goal, whether they think they will reengage in the original goal again in the future, and they were asked about the strategies they used when/after they decided to quit. Analyses with these exploratory measures are in Appendix N.

<sup>26</sup> There were errors in these multi-level modelling analyses when first uploaded to OSF. First, the original analyses did not allow the predictor variables (investment/attainability) to vary over time, as interactions with time (Time 1 vs. Time 2) were not included. Second, the variable representing time was not properly coded. Originally, the time variable was coded as Time 1 = 0, Time 2 = 1; however, the appropriate coding is Time 1 = -1, Time 2 = 0. The analyses were corrected, and the reported results correspond to these corrected analyses. The corrected analyses are available on OSF. Thank you to Dr. Meaghan Barlow for noticing these errors and helping to correct them.

evidence that prior investment is a hook. However, prior investment at Time 1 did not significantly predict *disengagement* at Time 2,  $b = -0.14$ ,  $SE = .10$ ,  $t(98) = 1.40$ ,  $p = .165$ . I also examined whether *attainability* at Time 1 predicted greater commitment and disengagement at Time 2. Attainability at Time 1 positively predicted commitment at Time 2 but this effect was only marginal,  $b = 0.29$ ,  $SE = .15$ ,  $t(108) = 1.94$ ,  $p = .054$ . Attainability at Time 1 did not significantly predict disengagement at Time 2,  $b = -0.14$ ,  $SE = .15$ ,  $t(105) = 1.01$ ,  $p = .313$ .

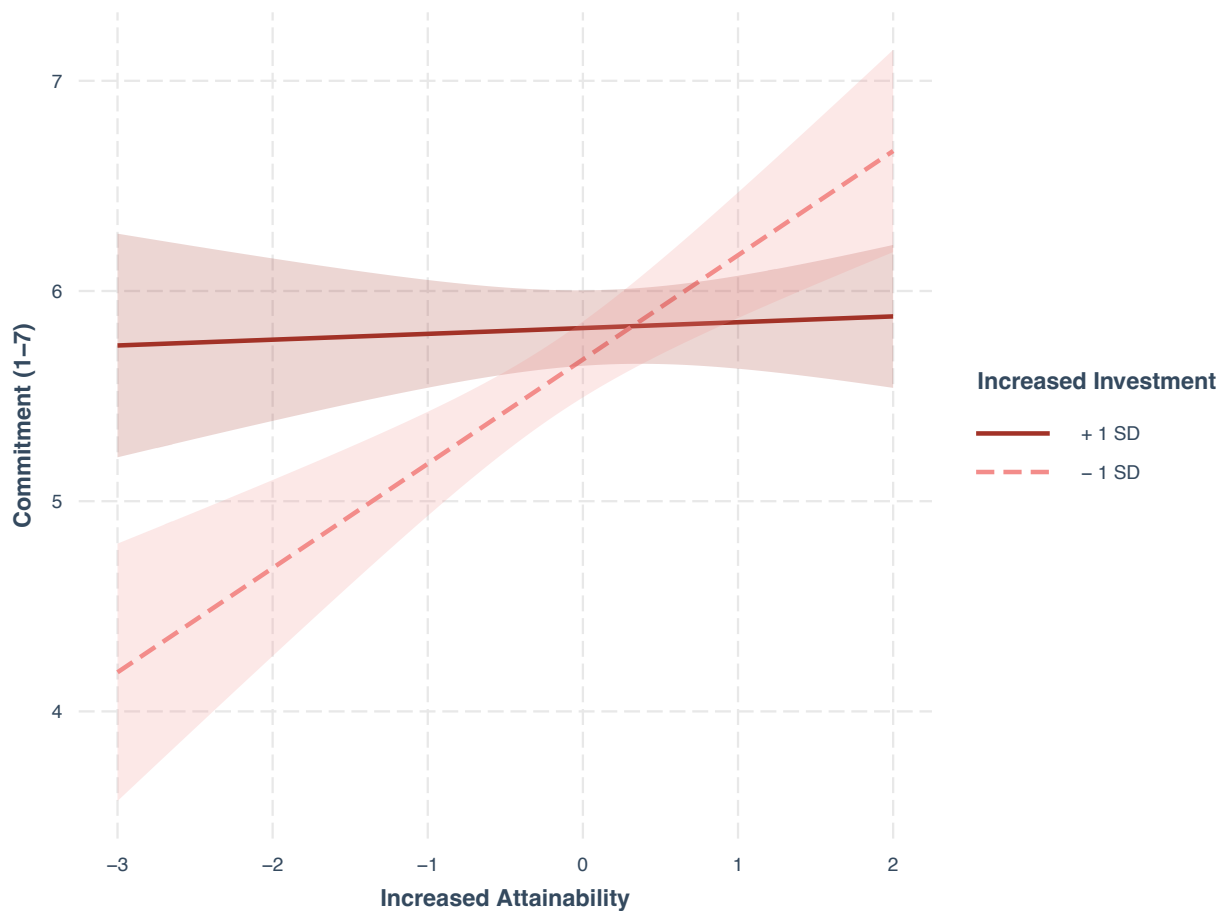
I also examined whether *changes* in investment and attainability predicted commitment and disengagement at Time 2. Difference scores were created by subtracting Time 1 levels from Time 2 levels for each variable (thus greater scores reflect greater increases in investment/attainability over time). There was a significant effect of change in investment on commitment at Time 2,  $b = 0.26$ ,  $SE = .11$ ,  $t(91) = 2.28$ ,  $p = .024$ . Increases in investment were associated with greater commitment. There was also a significant effect of change in investment on disengagement at Time 2,  $b = -0.43$ ,  $SE = .11$ ,  $t(91) = 4.11$ ,  $p < .001$ . Increases in investment predicted less disengagement at Time 2. Additionally, there were significant effects of changes in attainability on commitment and disengagement: increased attainability predicted greater commitment,  $b = 0.33$ ,  $SE = .11$ ,  $t(89) = 2.89$ ,  $p = .004$ , and less disengagement,  $b = -0.39$ ,  $SE = .11$ ,  $t(89) = 3.67$ ,  $p < .001$ .

***Is prior investment a maladaptive hook?*** Next, I examined whether prior investment reduces responsiveness to unattainability. To examine this question, I first examined whether change in investment interacted with change in attainability to predict commitment and disengagement at Time 2. There was a significant interaction between these two variables on commitment,  $b = -0.32$ ,  $SE = .11$ ,  $t(87) = 2.81$ ,  $p = .006$  (see Figure 6). Simple effects revealed that, consistent with what I found in Study 2 with cross-sectional data, the effect of increased

attainability on commitment was significant at low (-1 *SD*) increased investment,  $b = 0.50$ ,  $SE = .16$ ,  $t(87) = 3.09$ ,  $p < .001$ , but not at high (+1 *SD*) increased investment,  $b = 0.03$ ,  $SE = .12$ ,  $t(87) = 0.22$ ,  $p = .820$ .

**Figure 6.**

*Goal commitment at Time 2 as a function of increased investment over time  $\times$  increased attainability over time (Study 5).*

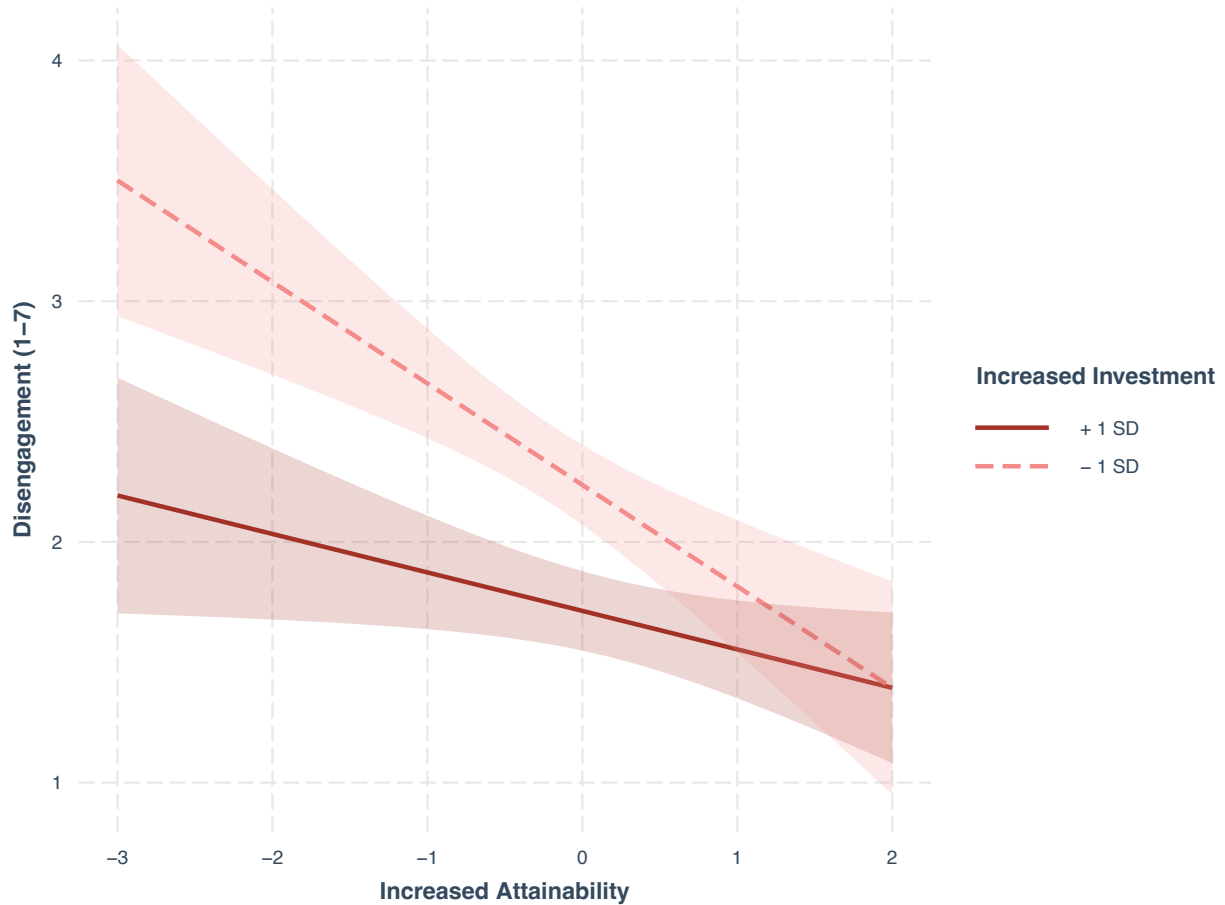


These two variables also interacted to predict disengagement,  $b = 0.26$ ,  $SE = .10$ ,  $t(87) = 2.50$ ,  $p = .014$  (see Figure 7). Simple effects revealed that, again, the effect of increased attainability was significant at low (-1 *SD*) increased investment,  $b = -0.42$ ,  $SE = .15$ ,  $t(87) = 2.85$ ,  $p = .010$ , but not at high (+1 *SD*) increased investment,  $b = -0.16$ ,  $SE = .11$ ,  $t(87) = 1.41$ ,  $p = .160$ . Thus, I found evidence of reduced responsiveness to unattainability for both goal

commitment and disengagement in this study, in contrast to Study 4 which only found evidence for goal commitment (discussed further in the study discussion).

**Figure 7.**

*Goal disengagement at Time 2 as a function of increased investment over time  $\times$  increased attainability over time (Study 5).*



*What forms of investment are particularly strong?* Finally, I examined what forms of investment are particularly strong in this longitudinal context. First, I regressed commitment at Time 2 on each type of investment at Time 1. In this model, effort and emotional investment were the only significant predictors; each form of investment predicted greater commitment (see Table 17). I also conducted this model while including attainability as a predictor as well. In this

model, effort and emotional investment were again significant predictors; each of these variables predicted greater commitment (see Table 18).

**Table 17.**

*Multiple regression results with longitudinal data on commitment (Study 5).*

Variable	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI
Intercept	3.28	.48	7.35	<.001	[2.43, 4.13]
Time 1 effort investment	0.43	.15	2.87	.005	[0.14, 0.71]
Time 1 time investment	-0.14	.13	1.08	.280	[-0.38, 0.11]
Time 1 financial investment	0.05	.07	0.69	.492	[-0.08, 0.17]
Time 1 attention investment	-0.03	.12	0.22	.827	[-0.26, 0.21]
Time 1 emotional investment	0.35	.11	3.28	.001	[0.15, 0.56]

*Note.* Outcome variable is goal commitment at Time 2.

**Table 18.**

*Multiple regression results with longitudinal data on commitment including attainability (Study 5).*

Variable	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI
Intercept	2.48	.65	3.84	<.001	[1.25, 3.71]
Time 1 attainability	0.22	.13	1.70	.091	[-0.03, 0.47]
Time 1 effort investment	0.39	.15	2.65	.009	[0.11, 0.67]
Time 1 time investment	-0.12	.12	0.97	.332	[-0.36, 0.11]
Time 1 financial investment	0.05	.06	0.80	.425	[-0.07, 0.18]
Time 1 attention investment	-0.04	.12	0.35	.726	[-0.27, 0.18]
Time 1 emotional investment	0.36	.10	3.49	<.001	[0.16, 0.56]

*Note.* Outcome variable is goal commitment at Time 2.

Next, I repeated these analyses with goal disengagement at Time 2 as the outcome variable, which yielded parallel results.<sup>27</sup> When regressing each type of investment on disengagement at Time 2, effort and emotional investment were again the only significant predictors; each form of investment predicted less disengagement (see Table 19). Likewise, when regressing each type of investment in a model including attainability on disengagement at Time

<sup>27</sup> Goal commitment and goal disengagement were highly correlated,  $r(93) = -.81, p < .001$ .

2, effort and emotional investment were again the only significant predictors; each of these variables predicted less disengagement (see Table 20).

**Table 19.**

*Multiple regression results with longitudinal data on disengagement (Study 5).*

Variable	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI
Intercept	4.01	.47	8.45	<.001	[3.10, 4.92]
Time 1 effort investment	-0.37	.16	2.34	.021	[-0.67, -0.07]
Time 1 time investment	0.21	.14	1.53	.128	[-0.05, 0.47]
Time 1 financial investment	0.00	.07	0.04	.971	[-0.14, 0.13]
Time 1 attention investment	-0.09	.13	0.65	.515	[-0.33, 0.16]
Time 1 emotional investment	-0.30	.11	2.60	.010	[-0.51, -0.08]

*Note.* Outcome variable is goal disengagement at Time 2.

**Table 20.**

*Multiple regression results with longitudinal data on disengagement including attainability (Study 5).*

Variable	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI
Intercept	4.29	.70	6.14	<.001	[2.96, 5.62]
Time 1 attainability	-0.08	.14	0.58	.562	[-0.35, 0.18]
Time 1 effort investment	-0.34	.16	2.14	.034	[-0.64, -0.04]
Time 1 time investment	0.19	.14	1.43	.156	[-0.06, 0.45]
Time 1 financial investment	0.00	.07	0.04	.971	[-0.14, 0.13]
Time 1 attention investment	-0.08	.13	0.64	.520	[-0.33, 0.16]
Time 1 emotional investment	-0.30	.11	2.66	.009	[-0.51, -0.09]

*Note.* Outcome variable is goal disengagement at Time 2.

## Discussion

Study 5 extends my previous studies by showing that prior investment is a goal hook that can influence goal engagement over time. Participants reported more commitment (but not less disengagement) to their goals to the extent that they reported investing more in the goal one month prior. Additionally, increases in investment between Time 1 and Time 2 were related to greater commitment at Time 2 and less disengagement at Time 2. Furthermore, conceptually replicating patterns observed in prior studies, increases in investment during the month reduced

the effect of increased attainability on commitment (i.e., a change in investment  $\times$  change in attainability interaction). Participants reported less commitment to their goals and less disengagement to the extent that the goal had become less attainable over the month, but this effect was non-significant when the degree that investment had increased was relatively high. This finding indicates reduced responsiveness to unattainability as a function of increased investment over time.

Although the nature of the patterns for the goal commitment and goal disengagement variables were similar, the predicted effects were at times stronger for goal commitment. For example, the effect of investment at Time 1 was significantly related to goal commitment at Time 2, but not goal disengagement. This pattern is consistent with what I observed in Study 4. However, in Study 5 participants were asked to focus on transition goals, thus, my speculation in Study 4 that goal disengagement was a less sensitive measure because I did not ask about transition goals might not be accurate. It is possible that goal commitment is a more sensitive measure because is less likely to be influenced by social desirability effects relative to goal disengagement. Further, although goal disengagement is characterized by withdrawal of goal commitment (and thus, a measure of goal commitment clearly reveals something about level of goal engagement), it is important to consider whether these measures are tapping into opposite ends of the same continuum, or qualitatively distinct states. I return to this issue in the General Discussion.

Study 5 also added further evidence of the types of investment that act as hooks and that are particularly strong. This study did not include identity investment, as Study 2 did; however, this study found similar results to Study 2 when it comes to investment types. The extent to which one perceives they have invested effort into a goal seems to be particularly relevant to

people, as in both Studies 2 and 5 this was a type of investment that had significant relationships with goal disengagement/commitment when accounting for other types. Both studies also found that financial investment had the smallest relationship with goal disengagement/commitment. While Study 2 found evidence that the investment of one's attention seemed to be meaningful to participants, Study 5 did not find such evidence. In contrast, Study 5 found evidence that emotional investment plays a meaningful role, as in addition to effort investment, emotional investment had significant relationships with goal disengagement/commitment when accounting for other types. Furthermore, emotional investment had the largest associations with goal disengagement/commitment in terms of effect sizes in Study 5. Future studies will need to further investigate different types of investment and their relative role as hooks (as I discuss further in the General Discussion).

## **General Discussion**

Five studies provide evidence for prior investment as a goal hook—an aspect of a goal that reduces the likelihood of goal disengagement. Across studies, I observed evidence that prior investment is both directly related to reduced likelihood of goal disengagement (Studies 1, 2, and 5) and, in multiple studies (Studies 2-5), that it reduces responsiveness to unattainability as a signal to disengage. Both correlational evidence in the context of personal goals in a transition stage (Studies 1, 2, and 5) and experimental evidence in which both investment and attainability were manipulated (Studies 3 and 4) provided converging evidence for the role of investment in reducing the likelihood of disengagement (and increasing goal commitment). Finally, Study 5 provided longitudinal evidence: self-reported prior investment at an initial time point (Time 1) predicted greater goal commitment one month later and lower goal disengagement one month later (Time 2), and also that increased investment over time predicted lower goal disengagement at Time 2 and greater goal commitment at Time 2. These studies also provided an opportunity to explore the types of investment (e.g., time, effort, money, attention, emotional, and identity investment) that were most strongly related to disengagement in the context of a personal transition goal. Preliminary evidence suggested that prior investment in the form of effort and attention (Study 2) and emotional investment (Study 5) may be particularly strong hooks.

### **Broadening the Understanding of Sunk Costs**

Prior work on the sunk costs fallacy (e.g., Arkes & Blumer, 1985; Avila et al., 2013; Cunha & Caldieraro, 2008; Rubin et al., 1980; Soman, 2001) has explored the role of a limited range of investments, often for short-term goals, in perseverance. In particular, the focus in much of the earlier work has been on monetary investments (e.g., Arkes & Blumer, 1985; Arkes &

Hutzel, 2000), and, to a lesser extent, time and effort (e.g., Navarro & Fantino, 2009; Soman, 2001). However, when pursuing important personal goals over time, individuals invest in several ways, including the investment of their attention, emotions, and identity. The current work thus expands the understanding of sunk costs to a broader array of investments. The current results suggest that invested attention, emotions, and identity also function as sunk costs and it is important to consider their role in behaviour and decision-making. Furthermore, in the context of personal goals, these other forms of investment—typically not relevant in classic sunk costs decision-making paradigms—may actually be more central in influencing goal commitment and disengagement. As I discuss in more depth later, part of the value of expanding the types of investments one considers in the context of personal goals is that the dynamics may differ across different forms of investment. For instance, while monetary investments cannot typically be recouped (once you have spent it, it is gone), investments of effort and the self may not only serve a focal goal, but other related goals in a hierarchy.

Furthermore, to my knowledge, prior research has not examined the relative contributions of different types of investment for a single goal. Although I speculate about these patterns, it is important to acknowledge up front that the patterns observed in these studies may not generalize beyond samples of undergraduate university students. For instance, university students might value money less or have fewer financial responsibilities that make them care less about losing it. University students might have different relations than older adults to identity investment because core aspects of identity may still be developing (Erikson, 1968). In addition, participants in these samples might have nominated goals that are specific to this life-stage (e.g., academic goals) and distinct from goals that an older, more diverse sample may generate. It is also important to acknowledge up front that my approach to studying types of investment had

limitations as I developed my own items. Moving forward, it will be useful to develop these scales further and determine the best way to capture and measure the investment of various forms of resources in goals. It is possible that I have missed important forms of investment, or that better measures would reveal different relations among the forms of investment and disengagement. For instance, a qualitative study that asks people about investments in a personal goal could reveal additional types of investment. Despite these limitations, these studies provide an initial opportunity to consider the relative strength of relations between investment types and disengagement.

Perhaps surprisingly, I observed that effort investment had a larger negative association (in terms of effect size) with disengagement than self investment did (both identity investment on its own, and the composite created in Study 2). Further, in the current studies, financial investment did not have particularly strong associations with goal commitment and disengagement. One might predict that identity investment would make disengagement feel especially self-threatening (Slotter et al., 2010; Steele, 1988). Given the lengths that people will often go to protect and enhance the self (Jonas et al., 2014)—and the role of self-identity in promoting goal pursuit (Bryan et al., 2011)—it is therefore a bit puzzling that it was not more strongly associated with reduced disengagement. One possibility is that effort investment is a more proximal or salient form of investment than identity investment. It may also be that the current ways of assessing investment types can be strengthened. It is also possible that individuals associate identity at particularly high levels of a self-regulatory hierarchy (e.g., “be goals;” Carver & Scheier, 1998), and that disengagement from goals lower in the hierarchy (“do goals”)—which may be more represented in the current studies—is less influenced by this form of investment. These will all be interesting and important possibilities to consider in future work.

Finally, in bridging the sunk costs literature with the goal disengagement literature, the current studies suggest that investments not only have direct effects on goal commitment and goal disengagement, but also via responsiveness to unattainability. In many of the classic sunk costs paradigms, predictions were focused on direct effects of investment and attainability was typically not mentioned in the scenarios, though one can infer that it was usually high. For instance, attainability is unlikely to be a concern in scenarios that involve decisions about whether to change channels on the TV, eat a dessert, or watch a movie. Yet in the classic goal disengagement literature, attainability is postulated to be critical signal of whether the pursuit of a given goal is adaptive or not (Klinger, 1975; Wrosch, 2011). The current studies reveal that prior investment can reduce the effect of unattainability—an often adaptive reason to disengage—on goal commitment and disengagement. Notably, the current research does not directly speak to people’s ability to *detect* whether a goal is attainable or not, but does suggest conditions that reduce *responsiveness* to this signal. As I develop further in the next section, this interaction thus represents an interesting direction for future work to better understand the dynamics of adaptive and maladaptive goal disengagement.

### **Broadening the Study of Goal Disengagement**

The current studies focused solely on unattainability as a signal to disengage, building on the broader goal disengagement literature that has emphasized unattainability as a key factor determining the adaptiveness of goal disengagement (Klinger, 1975; Wrosch, 2011). However, as indicated in Figure 1 and argued by Scholer et al. (2024), other signals also play a role in determining the adaptiveness of goal pursuit, such as the desirability of a goal or the extent to which a goal is afforded by a given situation. Indeed, investing resources into something you do not personally value can lead to burnout (Amofo et al., 2014; Bakker & Sanz-Vergel, 2020) and

feeling a lack of meaning in life (King & Hicks, 2020; Schlegel et al., 2011). Given that the current studies find that prior investments moderate the relationship between attainability and disengagement, it suggests the value of exploring when and if investments modulate other signals such as goal desirability or affordance in affecting goal disengagement.

Furthermore, the broader framework summarized in Figure 1 highlights the utility more broadly of understanding factors (and the dynamics among them) that influence goal disengagement discernment. The current work focused on one type of goal hook (investment) and one type of signal (unattainability), an illustrative case of the value of doing work on the signals that goal disengagement might be adaptive, and the factors that reduce responsiveness to those signals. In addition, the current work assessed attainability of the focal goal in isolation: participants responded to items like *“How likely do you think it is that you will attain this goal?”* Yet, individuals are always pursuing multiple goals, and one of the challenges of goal disengagement discernment is determining how to distribute limited resources among goals, even if all of those goals are relatively high in attainability when considered separately (Scholer et al., 2024). Future work exploring how individuals navigate these challenges in a multiple goal system will be important. For example, people might make disengagement decisions based on *relative* attainability, value, and affordance (e.g., I should disengage from my goal to X because my goal to Y is more valuable to me; Scholer et al., 2024).

### **Limitations and Future Directions**

The current work has many implications, broadening the understanding of sunk costs and the study of goal disengagement. However, the current work also has limitations that need to be considered. Therefore, to conclude, I discuss some of the key limitations and future directions (organized by topic).

### *The Operationalization of Unattainability*

With the exception of Study 3—which exposed participants to an objectively unattainable goal (to complete unsolvable anagrams)—unattainability was always operationalized as a subjective perception. In Studies 1, 2, and 5, participants self-reported the attainability of their goal on a continuous scale. In Study 4, participants were made to feel that their goal was relatively lower (vs. higher) in attainability. Thus, even goals relatively high in unattainability were not necessarily perceived as definitively *unattainable* (in Studies 1 and 2, for example, low attainability [-1 *SD*] still tended to be around 4 on a 1-7 scale). I focused more on a relative conceptualization of unattainability and on subjective perceptions. This conceptualization reflects the information that people typically have access to in the real world. Because people cannot see the future, they rarely know with absolute certainty whether a goal is truly unattainable. Further, disengagement has been shown to be adaptive when a goal is subjectively perceived as relatively high in unattainability (Boudrenghien et al., 2012; Hubley & Scholer, 2022) and in contexts where the goal is *likely* unattainable yet unattainability is not directly measured (Dunne et al., 2011; Kraaij et al., 2009; Miller & Wrosch, 2007; Salmela-Aro & Suikkari, 2008; Wrosch et al., 2003b; Wrosch et al., 2007; Wrosch & Sabiston, 2013). In other words, a goal does not have to be objectively unattainable for disengagement to be beneficial. However, it could be worth investigating whether people have an easier time disengaging when unattainability is absolute versus probable or objective versus subjective. The results of Study 3 suggest that similar patterns are observed even under conditions in which goal success was impossible (i.e., objective unattainability), though notably the results of that study were weaker than the others. Given the number of distinct features of Study 3 (short-term, lab-induced goal rather than a personal goal, different manipulations of both investment and attainability), it is

hard to know which factor or factors might have driven the weaker effects. Thus, it remains an important question to understand potential boundary conditions for the investment × attainability interaction.

Another interesting direction for future work is to get a better grasp on how people perceive unattainability. Although the current work captures perceptions of unattainability, it is not clear how people pick up on this aspect of a goal in the first place. Returning to unattainability as a relative concept, at what point do people deem a goal *unattainable* or what thresholds do people use for deeming a goal *too unattainable* to continue? When are different thresholds and conceptions more versus less adaptive? There is also a need for future work to understand the cues that people use to infer attainability. For instance, feelings of fatigue or self-efficacy might signal potential unattainability, and these cues might be more or less veridical in different situations (see Scholer et al., 2024). Furthermore, only single items were used to assess attainability in the current work, such as “*How likely do you think it is that you will attain this goal?*.” While these items were well-aligned with the kinds of goals participants were asked to focus on, it is not yet clear how people perceive and judge attainability for goals that do not have a clear end point. For example, for goals that are “be goals” (Carver & Scheier, 1998), or for “maintenance goals” (Stamatogiannakis et al., 2018), attainability may be perceived differently and associated with different cues.

An important limitation of Studies 1 and 2 was the uncertainty regarding directionality (i.e., uncertainty about whether investment/attainability leads to less subsequent disengagement). With Studies 3 and 4, I addressed this limitation by manipulating perceptions of investment and attainability. However, a limitation of Studies 3 and 4 is their artificial and short-term nature. In Study 5, I addressed the short-term limitation by looking at effects over a month-long period.

However, to more fully address the issue of directionality, a study could use a longitudinal procedure that manipulates perceptions of investment and attainability for a personal goal at an initial time point, then takes follow-up measurements of disengagement and repeats this process multiple times.

### ***The Operationalization of Goal Disengagement***

As discussed in the Introduction, consistent with previous work, I measured goal disengagement with items capturing both effort withdrawal and commitment withdrawal (using the Goal Adjustment Scale; Wrosch et al., 2003b) and I did not differentiate between these two types of disengagement (the withdrawal of effort vs. commitment). In other words, the current work was focused primarily on signs of goal abandonment. However, research has shown that sometimes people withdraw effort without withdrawing commitment for some extended period (Davydenko et al., 2019; Hubley & Scholer, 2022; Mayer & Freund, 2022), a phenomenon referred to as “goal freezing” (Davydenko et al., 2019) or “goal shelving” (Mayer & Freund, 2022). It is not known how or if investment play a role in this type of disengagement (reductions of effort while maintaining commitment). As discussed next, investment might have a weaker effect on effort; hence, it might also have a relatively weak relationship with goal freezing/shelving. Although beyond the scope of the current research, future studies could examine this important question.

In addition, Studies 4 and 5 revealed that results sometimes diverged for goal commitment dependent measures versus goal disengagement dependent measures. The patterns between these two measures were generally similar (and they were highly correlated), but sometimes the patterns were significant only for goal commitment, and this occurred for both a community sample (Study 4) and university students (Study 5), as well as for both an active goal

(Study 4) and a transition goal (Study 5). Therefore, it is important to consider how these two constructs might differ in the context of personal goals. The goal disengagement scale includes items that ask about effort and commitment, while the goal commitment scale only asks about commitment; thus, goal disengagement as operationalized here has multiple dimensions. Exploratory analyses revealed that in Study 4, the investment condition had markedly weak effects on the effort items from the goal disengagement scale ( $p = .967$ ). The effect on the commitment items from that scale was still of non-significance, but greater ( $p = .324$ ). It will be important for future research to investigate the underlying mechanisms. Perhaps investment in a personal goal triggers goal commitment more than effort because of mechanisms involving emotional attachment. Future studies can also aim to validate the goal disengagement scale for the goal-specific context or consider adapting the scale to reflect individual types of engagement more precisely.

### ***Utilizing Goal Hierarchies for Intervention***

The current studies lay the groundwork for goal disengagement interventions and highlight the importance of addressing sunk costs. Past work on the sunk costs fallacy in short-term decisions and goals has shown that certain motivational orientations are less likely to get lured by prior investments (Molden & Hui, 2011) and that distraction can reduce susceptibility (Kazinka et al., 2021). Here, I propose an intervention that does not intend to distract or reduce the importance placed on investment, but instead works *with* the tendency to be lured by investment. I propose that personal goals present a unique opportunity for doing so, which involves re-thinking investments as “transferable.”

Personal goals are represented in a multiple goal system (Kruglanski et al., 2000). One way in which multiple goals can be imagined is in the form of a hierarchy (Carver & Scheier,

1998; Kruglanski et al., 2000)—that is, a structure made of different levels, with each goal connected to higher-order goals. For example, the higher-order goal for the goal to “run a marathon” could be “to be athletic.” But individuals may often fail to recognize that investments can often “transfer” to other goals that are also linked to the same higher-order goal. For example, prior investments for a goal of running a marathon (e.g., the effort put into building endurance) could transfer to other athletic goals (e.g., the goal to kayak). Re-thinking investment this way could help the individual (if, for example, running a marathon is impossible due to an injury) think of an alternate athletic goal that is benefited by the same investments. By reducing a sense that investments are lost or wasted, individuals may be less resistant to disengagement. This kind of intervention is also consistent with the idea that goal disengagement is most adaptive when accompanied by goal reengagement (Wrosch et al., 2003a). Indeed, the dispositional tendency to reengage in alternatives is reliably associated with well-being (Barlow et al., 2020). Therefore, I believe that helping individuals recognize how goal investments transfer within a goal hierarchy is a promising avenue for goal disengagement interventions that builds on the current work.

## **Conclusion**

It is not always easy to move on from our goals. Even when we know something is futile, it can be difficult to ignore factors that keep us hooked, such as the concern of having invested one's effort, attention, and emotions. Gaining a better understanding of what these concerns are and how they work can help us understand when, why, and how people can quit effectively. The current research opens doors for these kinds of investigations and sheds new light on understanding how prior investments may get in the way of adaptive goal disengagement.

## References

- Amelia, A. L. (2021, September 3). *Motivation as the new industry for capitalists—Global Comment*. <https://globalcomment.com/motivation-as-the-new-industry-for-capitalists/>
- Arkes, H. R., & Blumer, C. (1985). The psychology of sunk cost. *Organizational Behavior and Human Decision Processes*, 35(1), 124–140. [https://doi.org/10.1016/0749-5978\(85\)90049-4](https://doi.org/10.1016/0749-5978(85)90049-4)
- Arkes, H. R., & Hutzel, L. (2000). The role of probability of success estimates in the sunk cost effect. *Journal of Behavioral Decision Making*, 13(3), 295–306. [https://doi.org/10.1002/1099-0771\(200007/09\)13:3<295::AID-BDM353>3.0.CO;2-6](https://doi.org/10.1002/1099-0771(200007/09)13:3<295::AID-BDM353>3.0.CO;2-6)
- Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review*, 64(6, Pt.1), 359–372. <https://doi.org/10.1037/h0043445>
- Avila, R., Yankelevitz, R. L., Gonzalez, J. C., & Hackenberg, T. D. (2013). Varying the costs of sunk costs: Optimal and non-optimal choices in a sunk-cost task with humans: Varying the costs of sunk costs: optimal and non-optimal. *Journal of the Experimental Analysis of Behavior*, 100(2), 165–173. <https://doi.org/10.1002/jeab.42>
- Bakker, A. B., & Sanz-Vergel, A. I. (2020). Burnout. In *The Wiley Encyclopedia of Personality and Individual Differences* (pp. 411–415). John Wiley & Sons, Ltd. <https://doi.org/10.1002/9781118970843.ch333>
- Barlow, M. A., Wrosch, C., & McGrath, J. J. (2020). Goal adjustment capacities and quality of life: A meta-analytic review. *Journal of Personality*, 88(2), 307–323. <https://doi.org/10.1111/jopy.12492>
- Boudrenghien, G., Frenay, M., & Bourgeois, É. (2012). Unattainable educational goals: Disengagement, reengagement with alternative goals, and consequences for subjective

- well-being. *European Review of Applied Psychology*, 62(3), 147–159.  
<https://doi.org/10.1016/j.erap.2012.04.002>
- Brandstätter, V., & Bernecker, K. (2022). Persistence and disengagement in personal goal pursuit. *Annual Review of Psychology*, 73(1), 271–299. <https://doi.org/10.1146/annurev-psych-020821-110710>
- Brandstätter, V., & Schüler, J. (2013). Action crisis and cost–benefit thinking: A cognitive analysis of a goal-disengagement phase. *Journal of Experimental Social Psychology*, 49(3), 543–553. <https://doi.org/10.1016/j.jesp.2012.10.004>
- Brandstädter, J., & Renner, G. (1990). Tenacious goal pursuit and flexible goal adjustment: Explication and age-related analysis of assimilative and accommodative strategies of coping. *Psychology and Aging*, 5(1), 58–67. <https://doi.org/10.1037//0882-7974.5.1.58>
- Brehm, J. W., & Self, E. A. (1989). The intensity of motivation. *Annual Review of Psychology*, 40, 109–131. <https://doi.org/10.1146/annurev.ps.40.020189.000545>
- Brendl, C. M., Markman, A. B., & Higgins, E. T. (1998). Mental accounting as self-regulation: Representativeness to goal-derived categories. *Zeitschrift für Sozialpsychologie*, 29(2), 89-104.
- Bruine de Bruin, W., Parker, A. M., & Fischhoff, B. (2007). Individual differences in adult decision-making competence. *Journal of Personality and Social Psychology*, 92(5), 938–956. <https://doi.org/10.1037/0022-3514.92.5.938>
- Bruine de Bruin, W., Strough, J., & Parker, A. M. (2014). Getting older isn't all that bad: Better decisions and coping when facing “sunk costs”. *Psychology and Aging*, 29(3), 642–647. <https://doi.org/10.1037/a0036308>
- Bruner, J. (1990). *Acts of meaning* (pp. xvii, 179). Harvard University Press.

- Bryan, C. J., Walton, G. M., Rogers, T., & Dweck, C. S. (2011). Motivating voter turnout by invoking the self. *Proceedings of the National Academy of Sciences*, *108*(31), 12653–12656. <https://doi.org/10.1073/pnas.1103343108>
- Burkeman, O. (2021). *Four Thousand Weeks: Time Management for Mortals*. Farrar, Straus and Giroux. <https://www.goodreads.com/book/show/54785515-four-thousand-weeks>
- Carver, C. S., & Scheier, M. F. (1981). *Attention and Self-Regulation*. Springer New York. <https://doi.org/10.1007/978-1-4612-5887-2>
- Carver, C. S., & Scheier, M. F. (1998). *On the self-regulation of behavior*. Cambridge University Press. <https://doi.org/10.1017/CBO9781139174794>
- Carver, C. S., & Scheier, M. F. (2005). Engagement, Disengagement, Coping, and Catastrophe. In *Handbook of competence and motivation* (pp. 527–547). Guilford Publications.
- Cohen, G. L., & Sherman, D. K. (2014). The psychology of change: Self-affirmation and social psychological intervention. *Annual Review of Psychology*, *65*(1), 333–371. <https://doi.org/10.1146/annurev-psych-010213-115137>
- Coleman, M. D. (2009). Sunk cost and commitment to dates arranged online. *Current Psychology*, *28*(1), 45–54. <https://doi.org/10.1007/s12144-009-9042-5>
- Cunha, Jr, M., & Caldieraro, F. (2009). Sunk-cost effects on purely behavioral investments. *Cognitive Science*, *33*(1), 105–113. <https://doi.org/10.1111/j.1551-6709.2008.01005.x>
- Davydenko, M., Werner, K. M., & Milyavskaya, M. (2019). Frozen goals: Identifying and defining a new type of goal. *Collabra: Psychology*, *5*(1), 17. <https://doi.org/10.1525/collabra.194>

- Di Paula, A., & Campbell, J. D. (2002). Self-esteem and persistence in the face of failure. *Journal of Personality and Social Psychology*, 83(3), 711–724.  
<https://doi.org/10.1037/0022-3514.83.3.711>
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, 49(1), 71–75.  
[https://doi.org/10.1207/s15327752jpa4901\\_13](https://doi.org/10.1207/s15327752jpa4901_13)
- Dominick, J. K., & Cole, S. (2020). Goals as identities: Boosting perceptions of healthy-eater identity for easier goal pursuit. *Motivation and Emotion*, 44(3), 410–426.  
<https://doi.org/10.1007/s11031-020-09824-8>
- Dorison, C. A., Umphres, C. K., & Lerner, J. S. (2021). Staying the course: Decision makers who escalate commitment are trusted and trustworthy. *Journal of Experimental Psychology: General*. <https://doi.org/10.1037/xge0001101>
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelley, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92, 1087–1101. <https://doi.org/10.1037/0022-3514.92.6.1087>
- Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the short grit scale (Grit-S). *Journal of Personality Assessment*, 91(2), 166–174.  
<https://doi.org/10.1080/00223890802634290>
- Dunne, E., Wrosch, C., & Miller, G. E. (2011). Goal disengagement, functional disability, and depressive symptoms in old age. *Health Psychology*, 30(6), 763–770.  
<https://doi.org/10.1037/a0024019>
- Dweck, C. S. (2006). *Mindset: The new psychology of success*. Random house.

- Eddington, K. M. (2014). Perfectionism, goal adjustment, and self-regulation: A short-term follow-up study of distress and coping. *Self and Identity, 13*(2), 197–213.  
<https://doi.org/10.1080/15298868.2013.781740>
- Emmons, R. A. (1986). Personal strivings: An approach to personality and subjective well-being. *Journal of Personality and Social Psychology, 51*, 1058–1068.  
<https://doi.org/10.1037/0022-3514.51.5.1058>
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G\*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175–191. <https://doi.org/10.3758/BF03193146>
- Flett, G. L., Nepon, T., Hewitt, P. L., Zaki-Azat, J., Rose, A. L., & Swiderski, K. (2020). The Mistake Rumination Scale: Development, Validation, and Utility of a Measure of Cognitive Perfectionism. *Journal of Psychoeducational Assessment, 38*(1), 84–98.  
<https://doi.org/10.1177/0734282919879538>
- Fishbach, A., & Dhar, R. (2005). Goals as excuses or guides: The liberating effect of perceived goal progress on choice. *Journal of Consumer Research, 32*(3), 370–377.  
<https://doi.org/10.1086/497548>
- Förster, J., Liberman, N., & Friedman, R. S. (2007). Seven principles of goal activation: A systematic approach to distinguishing goal priming from priming of non-goal constructs. *Personality and Social Psychology Review, 11*(3), 211–233. <https://doi.org/10.1177/1088868307303029>
- Gagné, M. (2003). The role of autonomy support and autonomy orientation in prosocial behavior engagement. *Motivation and Emotion, 27*(3), 199–223.  
<https://doi.org/10.1023/A:1025007614869>

- Garland, H. (1990). Throwing good money after bad: The effect of sunk costs on the decision to escalate commitment to an ongoing project. *Journal of Applied Psychology*, 75(6), 728–731. <https://doi.org/10.1037/0021-9010.75.6.728>
- Garland, H., & Conlon, D. E. (1998). Too close to quit: The role of project completion in maintaining commitment. *Journal of Applied Social Psychology*, 28(22), 2025–2048. <https://doi.org/10.1111/j.1559-1816.1998.tb01359.x>
- Garland, H., & Newport, S. (1991). Effects of absolute and relative sunk costs on the decision to persist with a course of action. *Organizational Behavior and Human Decision Processes*, 48(1), 55–69. [https://doi.org/10.1016/0749-5978\(91\)90005-E](https://doi.org/10.1016/0749-5978(91)90005-E)
- Gollwitzer, P. M. (1990). Action phases and mind-sets. In *Handbook of motivation and cognition: Foundations of social behavior, Vol. 2.* (pp. 53–92). The Guilford Press.
- Gollwitzer, P. M., & Oettingen, G. (2011). Planning promotes goal striving. In *Handbook of self-regulation: Research, theory, and applications, 2nd ed* (pp. 162–185). The Guilford Press.
- Gosling, S. D., Rentfrow, P. J., & Swann Jr., W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality*, 37(6), 504–528. [https://doi.org/10.1016/S0092-6566\(03\)00046-1](https://doi.org/10.1016/S0092-6566(03)00046-1)
- Haimovitz, K., & Dweck, C. S. (2016). Parents' Views of Failure Predict Children's Fixed and Growth Intelligence Mind-Sets. *Psychological Science*, 27(6), 859–869. <https://doi.org/10.1177/0956797616639727>
- Heath, C. (1995). Escalation and de-escalation of commitment in response to sunk costs: The role of budgeting in mental accounting. *Organizational Behavior and Human Decision Processes*, 62(1), 38–54. <https://doi.org/10.1006/obhd.1995.1029>

- Herrmann, M., & Brandstätter, V. (2015). Action crises and goal disengagement: Longitudinal evidence on the predictive validity of a motivational phase in goal striving. *Motivation Science, 1*(2), 121–136. <https://doi.org/10.1037/mot0000016>
- Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology, 60*(3), 456–470. <https://doi.org/10.1037/0022-3514.60.3.456>
- Hewitt, P. L., Flett, G. L., Turnbull-Donovan, W., & Mikail, S. F. (1991). The Multidimensional Perfectionism Scale: Reliability, validity, and psychometric properties in psychiatric samples. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 3*(3), 464–468. <https://doi.org/10.1037/1040-3590.3.3.464>
- Higgins, E. T. (1996). Emotional experiences: The pains and pleasures of distinct regulatory systems. In *Emotion: Interdisciplinary perspectives* (pp. 203–241). Lawrence Erlbaum Associates, Inc.
- Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist, 52*(12), 1280–1300. <https://doi.org/10.1037/0003-066X.52.12.1280>
- Higgins, E. T., Friedman, R. S., Harlow, R. E., Idson, L. C., Ayduk, O. N., & Taylor, A. (2001). Achievement orientations from subjective histories of success: Promotion pride versus prevention pride. *European Journal of Social Psychology, 31*(1), 3-23. <http://dx.doi.org/10.1002/ejsp.27>
- Holding, A. C., Hope, N. H., Harvey, B., Marion Jetten, A. S., & Koestner, R. (2017). Stuck in limbo: motivational antecedents and consequences of experiencing action crises in

personal goal pursuit. *Journal of Personality*, 85(6), 893–905.

<https://doi.org/10.1111/jopy.12296>

Holding, A. C., Moore, E., Moore, A., Verner-Filion, J., Ouellet-Morin, I., & Koestner, R.

(2021). When goal pursuit gets hairy: A longitudinal goal study examining the role of controlled motivation and action crises in predicting changes in hair cortisol, perceived stress, health, and depression symptoms. *Clinical Psychological Science*, 9(6), 1214–

1221. <https://doi.org/10.1177/2167702621995214>

Holding, A., Fortin, J.-A., Carpentier, J., Hope, N., & Koestner, R. (2020). Letting go of gold:

Examining the role of autonomy in elite athletes' disengagement from their athletic careers and well-being in retirement. *Journal of Clinical Sport Psychology*, 14(1), 88–

108. <https://doi.org/10.1123/jcsp.2018-0029>

Hom, P. W., Mitchell, T. R., Lee, T. W., & Griffeth, R. W. (2012). Reviewing employee turnover:

Focusing on proximal withdrawal states and an expanded criterion. *Psychological Bulletin*, 138(5), 831–858. <https://doi.org/10.1037/a0027983>

Hubley, C., & Scholer, A. A. (2022). Melting COVID-frozen goals: How goal disengagement supports well-being during the COVID-19 pandemic. *Motivation and Emotion*, 46(6),

752–768. <https://doi.org/10.1007/s11031-022-09959-w>

Jonas, E., McGregor, I., Klackl, J., Agroskin, D., Fritsche, I., Holbrook, C., Nash, K., Proulx, T., & Quirin, M. (2014). Threat and Defense. In *Advances in Experimental Social*

*Psychology* (Vol. 49, pp. 219–286). Elsevier. <https://doi.org/10.1016/B978-0-12-800052-6.00004-4>

- Kazinka, R., MacDonald, A. W., & Redish, A. D. (2021). Sensitivity to sunk costs depends on attention to the delay. *Frontiers in Psychology, 12*, 604843.  
<https://doi.org/10.3389/fpsyg.2021.604843>
- Kelley, & Thibaut, J. (1978). *Interpersonal relations: A theory of interdependence*. New York: Wiley. <https://www.semanticscholar.org/paper/Interpersonal-relations%3A-A-theory-of-Kelley-Thibaut/a508f6733497cbeebcaf7671446c56315580f963>
- King, L. A., & Hicks, J. A. (2021). The science of meaning in life. *Annual Review of Psychology, 72*, 561–584. <https://doi.org/10.1146/annurev-psych-072420-122921>
- Klein, H. J., Cooper, J. T., Molloy, J. C., & Swanson, J. A. (2014). The assessment of commitment: Advantages of a unidimensional, target-free approach. *Journal of Applied Psychology, 99*(2), 222–238. <https://doi.org/10.1037/a0034751>
- Klein, H. J., Wesson, M. J., Hollenbeck, J. R., Wright, P. M., & DeShon, R. P. (2001). The assessment of goal commitment: A measurement model meta-analysis. *Organizational Behavior and Human Decision Processes, 85*(1), 32–55.  
<https://doi.org/10.1006/obhd.2000.2931>
- Klinger, E. (1975). Consequences of commitment to and disengagement from incentives. *Psychological Review, 82*(1), 1–25. <https://doi.org/10.1037/h0076171>
- Kraaij, V., Garnefski, N., & Schroevers, M. J. (2009). Coping, goal adjustment, and positive and negative affect in definitive infertility. *Journal of Health Psychology, 14*(1), 18–26.  
<https://doi.org/10.1177/1359105308097939>
- Kruglanski, A. W. (1989). *Lay epistemics and human knowledge: Cognitive and motivational bases* (pp. xvii, 281). Plenum Press.

- Kruglanski, A. W., & Fishman, S. (2009). The need for cognitive closure. In *Handbook of individual differences in social behavior* (pp. 343–353). The Guilford Press.
- Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., & Sleeth-Keppler, D. (2002). A theory of goal systems. In *Advances in experimental social psychology, Vol. 34* (pp. 331–378). Academic Press. [https://doi.org/10.1016/S0065-2601\(02\)80008-9](https://doi.org/10.1016/S0065-2601(02)80008-9)
- Kruglanski, A. W., Thompson, E. P., Higgins, E. T., Atash, M. N., Pierro, A., Shah, J. Y., & Spiegel, S. (2000). To “do the right thing” or to “just do it”: Locomotion and assessment as distinct self-regulatory imperatives. *Journal of Personality and Social Psychology, 79*(5), 793–815. <https://doi.org/10.1037/0022-3514.79.5.793>
- Kung, F. Y. H., & Scholer, A. A. (2021). Moving beyond two goals: An integrative review and framework for the study of multiple goals. *Personality and Social Psychology Review, 25*(2), 130–158. <https://doi.org/10.1177/1088868320985810>
- Kyriazos, T. A. (2018). Applied psychometrics: Sample size and sample power considerations in factor analysis (EFA, CFA) and SEM in general. *Psychology, 9*(8). <https://doi.org/10.4236/psych.2018.98126>
- Latham, G. P., & Locke, E. A. (2006). Enhancing the benefits and overcoming the pitfalls of goal setting. *Organizational Dynamics, 35*, 332–340. <https://doi.org/10.1016/j.orgdyn.2006.08.008>
- Laughunn, D., & Payne, J. (1984). The impact of sunk outcomes on risky choice behaviour. *Information Systems and Operational Research, 22*(2), 155–181.
- Le, B., & Agnew, C. R. (2003). Commitment and its theorized determinants: A meta-analysis of the investment model. *Personal Relationships, 10*(1), 37–57. <https://doi.org/10.1111/1475-6811.00035>

- Lee, J. S., Keil, M., & Wong, K. F. E. (2021). When a growth mindset can backfire and cause escalation of commitment to a troubled information technology project. *Information Systems Journal*, 31(1), 7–32. <https://doi.org/10.1111/isj.12287>
- Little, B. R., & Gee, T. L. (2007). The methodology of personal projects analysis: Four modules and a funnel. In *Personal project pursuit: Goals, action, and human flourishing* (pp. 51–94). Lawrence Erlbaum Associates Publishers.
- Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting & task performance* (pp. xviii, 413). Prentice-Hall, Inc.
- Lovakov, A., & Agadullina, E. R. (2021). Empirically derived guidelines for effect size interpretation in social psychology. *European Journal of Social Psychology*, 51(3), 485–504. <https://doi.org/10.1002/ejsp.2752>
- Lucas, G. M., Gratch, J., Cheng, L., & Marsella, S. (2015). When the going gets tough: Grit predicts costly perseverance. *Journal of Research in Personality*, 59, 15–22. <https://doi.org/10.1016/j.jrp.2015.08.004>
- “*Mad Men*” *Lost Horizon* (TV Episode 2015)—IMDb. (n.d.). Retrieved April 4, 2024, from <https://www.imdb.com/title/tt3908436/>
- Maddi, S. R., Matthews, M. D., Kelley, D. R., Villarreal, B., & White, M. (2012). The role of hardiness and grit in predicting performance and retention of usma cadets. *Military Psychology*, 24(1), 19–28. <https://doi.org/10.1080/08995605.2012.639672>
- Magalhães, P., & Geoffrey White, K. (2016). The sunk cost effect across species: A review of persistence in a course of action due to prior investment. *Journal of the Experimental Analysis of Behavior*, 105(3), 339–361. <https://doi.org/10.1002/jeab.202>

- Mayer, Z., & Freund, A. M. (2022). Better off without? benefits and costs of resolving goal conflict through goal shelving and goal disengagement. *Motivation and Emotion, 46*(6), 790–805. <https://doi.org/10.1007/s11031-022-09966-x>
- McFarlin, D. B., Baumeister, R. F., & Blascovich, J. (1984). On knowing when to quit: Task failure, self-esteem, advice, and nonproductive persistence. *Journal of Personality, 52*(2), 138–155. <https://doi.org/10.1111/j.1467-6494.1984.tb00349.x>
- Mednick, S. (1962). The associative basis of the creative process. *Psychological Review, 69*(3), 220–232. <https://doi.org/10.1037/h0048850>
- Miceli, M., & Castelfranchi, C. (2017). Irrevocable Goals. *Review of General Psychology, 21*(1), 69–81. <https://doi.org/10.1037/gpr0000094>
- Miller, G. E., & Wrosch, C. (2007). You’ve gotta know when to fold ’em: Goal disengagement and systemic inflammation in adolescence. *Psychological Science, 18*(9), 773–777. <https://doi.org/10.1111/j.1467-9280.2007.01977.x>
- Molden, D. C., & Hui, C. M. (2011). Promoting de-escalation of commitment: A regulatory-focus perspective on sunk costs. *Psychological Science, 22*(1), 8–12. <https://doi.org/10.1177/0956797610390386>
- Nash, J. S., Imuta, K., & Nielsen, M. (2019). Behavioral investments in the short term fail to produce a sunk cost effect. *Psychological Reports, 122*(5), 1766–1793. <https://doi.org/10.1177/0033294118790908>
- Navarro, A. D., & Fantino, E. (2009). The sunk-time effect: An exploration. *Journal of Behavioral Decision Making, 22*(3), 252–270. <https://doi.org/10.1002/bdm.624>

- Neter, E., Litvak, A., & Miller, A. (2009). Goal disengagement and goal re-engagement among multiple sclerosis patients: Relationship to well-being and illness representation. *Psychology & Health, 24*(2), 175–186. <https://doi.org/10.1080/08870440701668665>
- Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*(4), 569–582. <https://doi.org/10.1037/0021-843X.100.4.569>
- O’Keefe, M. M. (2020, June 27). Lombardi: A Winner who Quit. *Ascent Publication*. <https://medium.com/the-ascent/https-theascent-pub-vince-lombardi-disproved-winners-never-quit-1cc264f9aa99>
- Oppenheimer, D. M., Meyvis, T., & Davidenko, N. (2009). Instructional manipulation checks: Detecting satisficing to increase statistical power. *Journal of Experimental Social Psychology, 45*(4), 867–872. <https://doi.org/10.1016/j.jesp.2009.03.009>
- Park, D., Tsukayama, E., Yu, A., & Duckworth, A. L. (2020). The development of grit and growth mindset during adolescence. *Journal of Experimental Child Psychology, 198*, 104889. <https://doi.org/10.1016/j.jecp.2020.104889>
- Roets, A., & Van Hiel, A. (2011). Item selection and validation of a brief, 15-item version of the Need for Closure Scale. *Personality and Individual Differences, 50*(1), 90–94. <https://doi.org/10.1016/j.paid.2010.09.004>
- Rosenberg, M. (2015). *Society and the Adolescent Self-Image*. Princeton University Press.
- Rosenberg, M. (2011). *Rosenberg Self-Esteem Scale*. <https://doi.org/10.1037/t01038-000>
- Rubin, J. Z., & Brockner, J. (1975). Factors affecting entrapment in waiting situations: The Rosencrantz and Guildenstern effect. *Journal of Personality and Social Psychology, 31*(6), 1054–1063. <https://doi.org/10.1037/h0076937>

- Rubin, J. Z., Brockner, J., Small-Weil, S., & Nathanson, S. (1980). Factors affecting entry into psychological traps. *Journal of Conflict Resolution*, 24(3), 405–426.  
<https://doi.org/10.1177/002200278002400302>
- Rusbult, C. E. (1980). Commitment and satisfaction in romantic associations: A test of the investment model. *Journal of Experimental Social Psychology*, 16(2), 172–186.  
[https://doi.org/10.1016/0022-1031\(80\)90007-4](https://doi.org/10.1016/0022-1031(80)90007-4)
- Rusbult, C. E., & Martz, J. M. (1995). Remaining in an abusive relationship: An investment model analysis of nonvoluntary dependence. *Personality and Social Psychology Bulletin*, 21(6), 558–571. <https://doi.org/10.1177/0146167295216002>
- Rusbult, C. E., Martz, J. M., & Agnew, C. R. (1998). The investment model scale: Measuring commitment level, satisfaction level, quality of alternatives, and investment size. *Personal Relationships*, 5(4), 357–391. <https://doi.org/10.1111/j.1475-6811.1998.tb00177.x>
- Rusbult, C. E., Zembrodt, I. M., & Gunn, L. K. (1982). Exit, voice, loyalty, and neglect: Responses to dissatisfaction in romantic involvements. *Journal of Personality and Social Psychology*, 43(6), 1230–1242. <https://doi.org/10.1037/0022-3514.43.6.1230>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68–78.  
<https://doi.org/10.1037/0003-066X.55.1.68>
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness* (pp. xii, 756). The Guilford Press.  
<https://doi.org/10.1521/978.14625/28806>

- Salmela-Aro, K., & Read, S. (2017). Study engagement and burnout profiles among Finnish higher education students. *Burnout Research*, 7, 21–28.  
<https://doi.org/10.1016/j.burn.2017.11.001>
- Salmela-Aro, K., & Suikkari, A.-M. (2008). Letting go of your dreams—Adjustment of child-related goal appraisals and depressive symptoms during infertility treatment. *Journal of Research in Personality*, 42, 988–1003. <https://doi.org/10.1016/j.jrp.2008.02.007>
- Schlegel, R. J., Hicks, J. A., King, L. A., & Arndt, J. (2011). Feeling like you know who you are: perceived true self-knowledge and meaning in life. *Personality and Social Psychology Bulletin*, 37(6), 745–756. <https://doi.org/10.1177/0146167211400424>
- Scholer, A. A., Hubley, C., & Fujita, K. (2024). A multiple goal framework for exploring goal disengagement. *Under review*.
- Schoorman, F. D., & Holahan, P. J. (n.d.). *Psychological Antecedents of Escalation Behavior: Effects of Choice, Responsibility, and Decision Consequences*. 9.
- Schultheiss, O. C., Jones, N. M., Davis, A. Q., & Kley, C. (2008). The role of implicit motivation in hot and cold goal pursuit: Effects on goal progress, goal rumination, and emotional well-being. *Journal of Research in Personality*, 42(4), 971–987.  
<https://doi.org/10.1016/j.jrp.2007.12.009>
- Seligman, M. E. P. (1975). *Helplessness: On depression, development, and death* (pp. xv, 250). W H Freeman/Times Books/ Henry Holt & Co.
- Seo, E., Patall, E. A., Henderson, M. D., & Steingut, R. R. (2018). The Effects of Goal Origin and Implementation Intentions on Goal Commitment, Effort, and Performance. *The Journal of Experimental Education*, 86(3), 386–401.  
<https://doi.org/10.1080/00220973.2016.1277334>

- Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction, and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology*, 76(3), 482–497. <https://doi.org/10.1037/0022-3514.76.3.482>
- Slotter, E. B., Gardner, W. L., & Finkel, E. J. (2010). Who am i without you? The influence of romantic breakup on the self-concept. *Personality and Social Psychology Bulletin*, 36(2), 147–160. <https://doi.org/10.1177/0146167209352250>
- Soman, D. (2001). The mental accounting of sunk time costs: Why time is not like money. *Journal of Behavioral Decision Making*, 14(3), 169–185. <https://doi.org/10.1002/bdm.370>
- Stamatogiannakis, A., Chattopadhyay, A., & Chakravarti, D. (2018). Attainment versus maintenance goals: Perceived difficulty and impact on goal choice. *Organizational Behavior and Human Decision Processes*, 149, 17–34. <https://doi.org/10.1016/j.obhdp.2018.09.002>
- Staw, B. M. (1976). Knee-deep in the big muddy: A study of escalating commitment to a chosen course of action. *Organizational Behavior and Human Performance*, 16(1), 27–44. [https://doi.org/10.1016/0030-5073\(76\)90005-2](https://doi.org/10.1016/0030-5073(76)90005-2)
- Staw, B. M., & Hoang, H. (1995). Sunk costs in the NBA: Why draft order affects playing time and survival in professional basketball. *Administrative Science Quarterly*, 40(3), 474. <https://doi.org/10.2307/2393794>
- Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of the self. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology* (Vol. 21, pp. 261–302). Academic Press. [https://doi.org/10.1016/S0065-2601\(08\)60229-4](https://doi.org/10.1016/S0065-2601(08)60229-4)

- Steele, C. M., Spencer, S. J., & Lynch, M. (1993). Self-image resilience and dissonance: The role of affirmational resources. *Journal of Personality and Social Psychology*, 64(6), 885–896. <https://doi.org/10.1037/0022-3514.64.6.885>
- Steger, M. F. (2009). Meaning in life. In Oxford handbook of positive psychology, 2nd ed (pp. 679–687). Oxford University Press.
- Szwed, P., Kossowska, M., & Bukowski, M. (2021). Effort investment in uncontrollable situations: The moderating role of motivation toward closure. *Motivation and Emotion*, 45(2), 186–196. <https://doi.org/10.1007/s11031-021-09868-4>
- Tan, H.-T., & Yates, J. F. (1995). Sunk cost effects: The influences of instruction and future return estimates. *Organizational Behavior and Human Decision Processes*, 63(3), 311–319. <https://doi.org/10.1006/obhd.1995.1082>
- Thaler, R. H., & Johnson, E. J. (1990). Gambling with the house money and trying to break even: the effects of prior outcomes on risky choice. *Management Science*, 36(6), 643–660.
- Triandis, H. C. (1989). The self and social behavior in differing cultural contexts. *Psychological Review*, 96(3), 506–520. <https://doi.org/10.1037/0033-295X.96.3.506>
- Vallerand, R. J., Blanchard, C., Mageau, G. A., Koestner, R., Ratelle, C., Leonard, M., Gagne, M., & Marsolais, J. (2003). Les passions de l'ame: On obsessive and harmonious passion. *Journal of Personality and Social Psychology*, 85(4), 756–767. <https://doi.org/10.1037/0022-3514.85.4.756>
- van Randenborgh, A., Hüffmeier, J., LeMoult, J., & Joormann, J. (2010). Letting go of unmet goals: Does self-focused rumination impair goal disengagement? *Motivation and Emotion*, 34(4), 325–332. <https://doi.org/10.1007/s11031-010-9190-9>

- Vițelar, A. (2019). Like Me: Generation Z and the use of social media for personal branding. *Management Dynamics in the Knowledge Economy*, 7(2), 257–268.
- Vohs, K. D., & Baumeister, R. F. (2011). *Handbook of Self-Regulation, Second Edition: Research, Theory, and Applications*. Guilford Press.
- White, R. W. (1959). Motivation reconsidered: The concept of competence. *Psychological Review*, 66, 297–333. <https://doi.org/10.1037/h0040934>
- Wong, K. F. E., Yik, M., & Kwong, J. Y. Y. (2006). Understanding the emotional aspects of escalation of commitment: The role of negative affect. *Journal of Applied Psychology*, 91(2), 282–297. <https://doi.org/10.1037/0021-9010.91.2.282>
- Wrosch, C., Miller, G. E., Scheier, M. F., & de Pontet, S. B. (2007). Giving up on unattainable goals: benefits for health? *Personality and Social Psychology Bulletin*, 33(2), 251–265. <https://doi.org/10.1177/0146167206294905>
- Wrosch, C., & Sabiston, C. M. (2013). Goal adjustment, physical and sedentary activity, and well-being and health among breast cancer survivors. *Psycho-Oncology*, 22(3), 581–589. <https://doi.org/10.1002/pon.3037>
- Wrosch, C., & Scheier, M. F. (2020). Adaptive self-regulation, subjective well-being, and physical health: The importance of goal adjustment capacities. In *Advances in Motivation Science* (Vol. 7, pp. 199–238). Elsevier. <https://doi.org/10.1016/bs.adms.2019.07.001>
- Wrosch, C., Scheier, M. F., Carver, C. S., & Schulz, R. (2003). The importance of goal disengagement in adaptive self-regulation: When giving up is beneficial. *Self and Identity*, 2(1), 1–20. <https://doi.org/10.1080/15298860309021>
- Wrosch, C., Scheier, M. F., Miller, G. E., Schulz, R., & Carver, C. S. (2003). Adaptive self-regulation of unattainable goals: Goal disengagement, goal reengagement, and subjective

well-being. *Personality and Social Psychology Bulletin*, 29(12), 1494–1508.

<https://doi.org/10.1177/0146167203256921>

Zhang, L., & Baumeister, R. F. (2006). Your money or your self-esteem: Threatened egotism promotes costly entrapment in losing endeavors. *Personality and Social Psychology Bulletin*, 32(7), 881–893. <https://doi.org/10.1177/0146167206287120>

## Appendix A

### Individual Difference Measures

**Table A.**

*Summary of individual difference measures in all studies.*

	Study 1	Study 2	Study 3	Study 4	Study 5
Sunk costs resistance	x	x	x	x	x
Goal adjustment capacities	x	x	x	x	x
Disengagement strategies	x				x
Disengagement beliefs	x				
Grit	x				
Tenacious/flexible goal pursuit	x				
Need for closure	x				
Regulatory focus	x				x
Regulatory mode	x				x
Big 5					x
Self-consciousness					x
Growth mindset					x
Failure-is-debilitating mindset					x
Perfectionism	x				x
Action crisis	x				
Obsessive/harmonious passion	x				
Mistake rumination					x
Self-esteem					x
Life satisfaction					x
Meaning in life					x
Needs satisfaction					x

*Note.* “x” means the measure was administered.

***Sunk costs resistance.*** Participants completed a measure of sunk costs resistance, a component of the adult decision-making competence battery (A-DMC) created by Bruine de Bruin et al. (2007). The sunk costs resistance component of the A-DMC measures “the ability to ignore prior investments when making decisions (Arkes & Blumer, 1985)” (Bruine de Bruin, 2007, p. 942). Consistent with Bruine de Bruin et al. (2007), participants were presented with 10 sunk costs scenarios (adapted from the sunk costs literature, e.g., Arkes & Blumer, 1985) and were asked how likely they would be to either disengage on a 6-point Likert scale. Each scenario involved a short-term course of action in which there was prior investment and a reason to disengage. For example, one scenario asks “*After a large meal at a restaurant, you order a big dessert with chocolate and ice cream. After a few bites, you find you are full and you would rather not eat any more of it. Would you be more likely to eat more or to stop eating it?*” Participants provide a rating from 1 (*most likely to eat more*) to 6 (*most likely to stop eating*). In the current research, following the rating participants provided for each scenario, participants were also asked to make a binary choice between the two options. These choices provide a secondary measure of sunk costs resistance. For analyses, a composite variable was created for each participant by averaging their ratings across all scenarios to represent overall sunk costs resistance. A second composite variable was also created by adding the choices made in each scenario (where 1 = the choice to disengage and 0 = the choice to continue).

***Goal adjustment capacities.*** Participants completed the Goal Adjustment Scale (GAS; Wrosch et al., 2003b) which measures the general tendencies to disengage from goals when needed (disengagement capacity) and to reengage in alternatives when needed (reengagement capacity). Participants were asked “*If I have to stop pursuing an important goal in my life...*” and were asked to rate each statement on a 5-point Likert scale from 1 (*almost never true*) to 5

(*almost always true*). The scale has 10 items in total: 4 that measure disengagement capacity (e.g., *“It’s easy for me to reduce my effort toward the goal”*) and 6 that measure reengagement capacity (e.g., *“I think about other new goals to pursue”*).

**Goal disengagement strategies.** Participants completed an internally-developed scale measuring the use of various goal disengagement strategies. Participants were asked “When it is clear that I need to give up on one of my goals, I...” and rated their agreement with 11 items on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The 12 items can be divided into 6 different subscales with 2 items each: re-prioritizing (e.g., *“Reassess what is important to me”*), alternative means looking “down” (e.g., *“Think about alternative ways that I could still achieve it”*), alternative means looking “up” (e.g., *“Start thinking about new goals I could pursue that have the same deeper purpose”*), goal switching (e.g., *“Switch my focus to one of my other goals”*), downgrading (e.g., *“Think about pursuing a similar goal, but that is easier to achieve”*), and goal abandonment (e.g., *“Completely abandon any desire I had for the goal”*). For analyses, composite variables were created for each of these subscales. Three open-ended questions were also asked related to goal disengagement strategies: *“When it is clear that you have to give up on one of your goals, are there any other strategies that you use that weren’t listed above? If so, what are they?”*, *“What strategies do you use most frequently?”*, and *“What strategies do you find most effective?.”*

**Goal disengagement beliefs.** Participants completed an internally-developed measure of goal disengagement beliefs. The measure presents participants with various hypothetical scenarios and asks what they would do in each scenario. Participants were presented with 10 scenarios in a within-participant design. Within the 10 scenarios, 5 involved unattainable goals and 5 involved goals that were not unattainable. The scenarios were also divided into 3 domains:

relationship, achievement, and health. Participants were told to “Please rate how likely you would be to engage in the following behaviours in this scenario” and provided ratings on a 7-point Likert scale from 1 (*not at all likely*) to 7 (*very likely*) for 4 items adapted from the disengagement capacity subscale of the Goal Adjustment Scale (GAS; Wrosch et al., 2003b). These four items were: “*Reduce my effort toward the goal,*” “*Stop trying to achieve the goal,*” “*Stay committed to the goal*” (reverse-scored), and “*Stop thinking about the goal and let it go.*” For analyses, composite disengagement variables were created for each scenario by averaging participants’ ratings across all 4 items. For each scenario, participants were also asked 3 binary (yes/no) questions: “*In this situation, would you give up on the goal?,*” “*In this situation, would you reduce your effort toward the goal?,*” and “*In this situation, would you reduce your commitment toward the goal?.*”

**Grit.** Participants completed the Short Grit Scale (Grit-S; Duckworth & Quinn, 2009), which includes 8 items that assess the individual’s level of grit (Duckworth et al., 2007; e.g., “*I finish whatever I begin*”). Participants were told that there are no right or wrong answers and to answer honestly. Participants provided ratings on each item on a 5-point Likert scale from 1 (*very much not like me*) to 5 (*very much like me*). For analyses, a composite variable was created for each participant by averaging their ratings across all items.

**Tenacious and flexible goal pursuit.** Participants completed the Tenacious Goal Pursuit and Flexible Goal Adjustment (TGP/FGA) scales created by Brandstädter and Renner (1990) which measures individuals’ tendency to be tenacious and flexible during goal pursuit respectively. Participants were asked to rate their agreement with each statement and provided ratings on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The TGP scale has 15 items (e.g., “*When faced with obstacles, I usually double my efforts*”) and the FGA scale

has 15 items (e.g., “*When I have tried hard but cannot solve a problem, I find it easy to leave it unsolved*”). For analyses, a composite TGP variable was created for each participant by averaging their ratings across all TGP items and a composite FGA variable was created for each participant by averaging their ratings across all FGA items.

***Need for closure.*** Participants completed the brief Need for Closure scale (NFC scale; Roets & Van Hiel, 2011), which is a short and revised version of the Need for Closure Scale (NFCS) created by Kruglanski et al. (1993) to measure individuals’ desire for cognitive closure. The brief NFC scale has 15 items (e.g., “*I don’t like situations that are uncertain*”). Participants were asked to rate their agreement with each statement and provided ratings on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). For analyses, a composite NFC variable was created for each participant by averaging their ratings across all items.

***Regulatory focus.*** Participants completed the Regulatory Focus Scale (RFQ; Higgins et al., 2001) which measures trait prevention focus and promotion focus, two different motivational orientations (Higgins, 1997), with 11 items (6 prevention focus and 5 promotion focus). Participants were asked to read each statement and to rate the extent to which they agreed that it generally described them. For example, one prevention focus item is “*I often obeyed rules and regulations that were established by my parents*” and one promotion focus item is “*I feel like I have made progress toward being successful in my life.*” Participants provided ratings on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). For analyses, a composite prevention focus variable was created for each participant by averaging their ratings across all prevention focus items and a composite promotion focus variable was created for each participant by averaging their ratings across all promotion focus items.

**Regulatory mode.** Participants completed the Regulatory Mode Questionnaire (RMQ; Kruglanski et al., 2000), which measures trait locomotion and assessment, two different motivational orientations (Kruglanski et al., 2000) with 24 items. Participants were asked to read each of the statements and decide how much they agreed with each according to their beliefs and experiences. For example, one locomotion item is *“I don't mind doing things even if they involve extra effort”* and one assessment item is *“I spend a great deal of time taking inventory of my positive and negative characteristics.”* Participants provided ratings on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). For analyses, a composite locomotion variable was created for each participant by averaging their ratings across all locomotion items and a composite assessment variable was created for each participant by averaging their ratings across all assessment items.

**Big 5.** Participants completed the TIPI (Ten Item Personality Inventory; Gosling et al., 2003), a brief measure of the Big 5 dimensions of personality. Participants were told: *“Here are a number of personality traits that may or may not apply to you. Please indicate the extent to which you agree or disagree with that statement. You should rate the extent to which the pair of traits applies to you, even if one characteristic applies more strongly than the other.”*

Participants read *“I see myself as:”* and then rated the 10 items on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). In the TIPI, there are 2 items for openness (*“open to new experiences, complex,”* *“conventional, uncreative”* [reverse-scored]), 2 items for conscientiousness (*“dependable, self-disciplined,”* *“disorganized, careless”* [reverse-scored]), 2 items for extraversion (*“extraverted, enthusiastic,”* *“reserved, quiet”* [reverse-scored]), 2 items for agreeableness (*“sympathetic, warm,”* *“critical, quarrelsome”* [reverse-scored]), and 2 items for neuroticism (*“anxious, easily upset,”* *“calm, emotionally stable”* [reverse-scored]). For

analyses, composite variables were created for each personality dimension by averaging ratings across the respective 2 items.

***Self-consciousness.*** Participants completed the private and public self-consciousness subscales within the Self-Consciousness Scale developed by Scheier and Carver (1985). The private self-consciousness scale has 9 items (e.g., *“I generally pay attention to my inner feelings”*) and the public self-consciousness scale has 7 items (e.g., *“I care a lot about how I present myself to others”*). Participants were asked to indicate the extent to which each statement is like them on a 4-point Likert scale from 0 (*not at all like me*) to 3 (*a lot like me*). For analyses, composite variables were created for private and public self-consciousness by averaging ratings across the items in each respective subscale.

***Growth mindset.*** Participants completed an adapted version of the Growth Mindset Quiz (Dweck, 2006), written about abilities in general. The measure had 8 items (e.g., *“No matter who you are, you can significantly change your abilities, “You can always substantially change how able you are”*) that were rated on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). For analyses, a composite growth mindset variable was created by averaging ratings across all 8 items.

***Failure-is-debilitating mindset.*** Participants completed the Failure Mindset Scale (Haimovitz & Dweck, 2016) to assess beliefs about failure. This scale contains 6 items; 3 assess the mindset that failure is beneficial and are reverse-scored (e.g., *“The effects of failure are positive and should be utilized”*), whereas the other 3 assess a failure-is-debilitating mindset directly (e.g., *“The effects of failure are negative and should be avoided”*). Participants rated each item on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). For analyses, a composite failure-is-debilitating mindset was created by averaging ratings across all 6 items.

**Perfectionism.** Participants completed items from a measure of perfectionism created by Hewitt et al. (1991), called the Multidimensional Perfectionism Scale (MPS). The subscales for self-oriented perfectionism (SOP; e.g., *“One of my goals is to be perfect in everything I do”*) and socially-prescribed (SPP; e.g., *“My family expects me to be perfect”*) perfectionism were administered. Participants were told: *“Listed below are a number of statements concerning personal characteristics and traits. Read each item and decide whether you agree or disagree and to what extent.”* Participants provided ratings on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). For analyses, a composite SOP variable was created for each participant by averaging their ratings across all SOP items and a composite SPP variable was created for each participant by averaging their ratings across all SPP items.

**Action crisis tendency.** Participants completed the Action Crisis Scale (ACRISS; Brandstätter & Schüler, 2013). The ACRISS has six items (e.g., *“I doubt whether I should continue striving for my goal or disengage from it”*). Participants were asked to answer the questions in terms of their experiences when pursuing a goal, generally, and they rated the items on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). For analyses, a composite action crisis variable was created by averaging ratings across all six items.

**Obsessive/harmonious passion.** Participants completed The Passion Scale (Vallerand et al., 2003), which consists of 14 items: 6 items that measure obsessive passion (e.g., *“I am emotionally dependent on this activity”*) and 8 items that measure harmonious passion (e.g., *“For me it is a passion, that I still manage to control”*). The items are rated in reference to a specific passion that participants described. Participants were asked: *“Please think about an activity that is “dear to your heart” and write it below. Please refer to this activity when answering the questions below.”* For analyses, a composite obsessive passion variable was

created by averaging ratings across the obsessive passion items and a composite harmonious passion variable was created by averaging ratings across the harmonious passion items.

**Mistake rumination.** Participants completed the Mistake Rumination Scale (MRS; Flett et al., 2020), a measure of cognitive perfectionism. Participants were told “*Some people can’t seem to stop thinking about mistakes they have made, whereas some people stop thinking about it soon after the mistake has happened. Please think about the last time you made an important mistake.*” Participants were then asked to briefly describe the mistake in an open-ended text box. Regarding their mistake, they were asked to provide ratings for 7 items (e.g., “*To what extent do you still think about the mistake and wish it had gone better?*”) on a 4-point Likert scale from 1 (*not at all*) to 4 (*very much*).

**Self-esteem.** Participants completed the Rosenberg Self-Esteem Scale (Rosenberg, 1965), a 10-item measure of global self-worth (e.g., “*I feel that I have a number of good qualities*”). The items were rated on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). For analyses, a composite self-esteem variable was created by averaging ratings on all 10 items.

**Life satisfaction.** Participants completed the Satisfaction with Life Scale (Diener et al., 1985), a 5-item measure of global cognitive judgments of one’s satisfaction with their life (e.g., “*In most ways my life is close to my ideal*”). The items were rated on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). For analyses, a composite life satisfaction variable was created by averaging ratings on all 5 items.

**Meaning in life.** Participants completed the Meaning in Life Questionnaire (Steger et al., 2006), a 10-item measure that assesses two dimensions of meaning in life: meaning presence (e.g., “*My life has a clear sense of purpose*”) and meaning seeking (e.g., “*I am looking for something that makes my life feel meaningful*”). The items were rated on a 7-point Likert scale

from 1 (*strongly disagree*) to 7 (*strongly agree*). For analyses, composite meaning presence and meaning seeking variables were created by averaging scores across all subscale items.

***Needs satisfaction.*** Participants completed a measure of basic psychological needs satisfaction, assessing the needs for competence, autonomy, and relatedness (Deci & Ryan, 2000; Gagné, 2003). This scale has 21 items (e.g., “*Often, I do not feel very competent*” [reverse-scored] for competence, “*I feel pressured in my life*” for autonomy, and “*I really like the people I interact with*” for relatedness). Participants were told “*Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you*” and rated the items on a 7-point Likert scale from 1 (*not at all true*) to 7 (*very true*).

## Appendix B

### Additional Goal Measures

**Table B.**

*Summary of additional goal measures in all studies.*

	Study 1	Study 2	Study 3	Study 4	Study 5
Domain		x			x
Progress – single item		x			x
Progress – scale	x	x			x
Importance	x	x		x	x
Length		x		x	x
Difficulty	x				
Sense of duty	x				
Likelihood of success	x	x			
Others' view of importance	x				
Value congruency	x				
Moralization	x				
Want-to vs. have-to				x	x

*Note.* “x” means the measure was administered.

**Domain.** Participants were asked which areas of life their goal falls into and chose between “social,” “academic/career,” “health,” and “other (please specify).” In Study 5, there was an additional category: “leisure/hobby.”

**Progress – single item.** Participants completed a 1-item measure of progress which asked: “To date, how much progress have you made towards achieving the goal?.” Participants indicated their progress on a sliding scale from 0 (*no progress*) to 100 (*achieved*).

**Progress – scale.** Participants completed the Brunstein (1993) measure of goal progress. The scale has 6 items in total with 2 items to make up 3 subscales: advancement (e.g., “I have

*made a great deal of progress concerning this goal*”), outcomes (e.g., *“I have had quite a lot of success in pursuing this goal”*), and obstacles (e.g., *“Many things have happened that have obstructed this goal”* [reverse-scored]). Participants provided ratings for each item on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). For analyses, composite advancement, outcomes, and obstacles variables were created by averaging the 2 items in each subscale.

**Importance.** Participants were asked *“How important is the goal to you?”* Participants answered on a 5-point Likert scale from 1 (*not at all important*) to 5 (*extremely important*).<sup>28</sup>

**Length.** Participants were asked: *“How long have you had the goal, overall?”* Participants answered on a 5-point Likert scale from 1 (*1-6 months*) to 5 (*over 3 years*).

Consistent with Little and Gee (2007), participants were asked various 1-item questions about their goals to measure other aspects. Consistent with Little and Gee (2007), each item was answered on a 10-point Likert scale from 0 to 10. Each item is presented below. Apart from the moralization item (adapted from Mooijman et al., 2017) and sense of duty item (internally developed), all the items were developed by Little and Gee (2007).

**Difficulty.** *“How difficult do you find it to carry out the goal?”*

**Sense of duty.** *“To what extent do you feel a sense of duty towards this goal?”*

**Likelihood of success.** *“How successful do you think this goal will be?”*

**Others’ view of importance.** *“How important is this goal seen to be by those people who are close to you?”*

**Value congruency.** *“To what extent is this goal consistent with the values that guide your life?”*

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<sup>28</sup> This item was rated on a 10-point scale in Study 1.

**Moralization.** *“How much do you consider the goal to be morally relevant?”*

**Want-to vs. have-to motivation.** Participants completed a measure of want-to vs. have-to motivation about their goal. This measure (used by Davydenko et al., 2019) has 5 items: 2 items assess have-to motivation and 3 assess want-to motivation. Participants are told *“Below, there are various reasons for why you might be pursuing the goal. Please rate the extent to which each applies to your goal.”* The 2 items for have-to motivation are: *“Because somebody else wants me to”* and *“Because I would feel ashamed or guilty if I did not pursue it.”* The 3 items for want-to motivation are: *“Because I believe it is an important goal to have,”* *“Because the experience of pursuing the goal is fun,”* and *“Because it represents my identity and values.”* Each item was rated on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

## Appendix C

### Additional Investment Measures

**Table C.**

*Summary of additional investment measures in all studies.*

Measures	Study 1	Study 2	Study 3	Study 4	Study 5
Investment size	x	x			
Investment transferability		x			x
Others' investment		x			
Features of investment		x			x
Effort difficulty					x

*Note.* “x” means the measure was administered.

**Investment size.** As a secondary measure of general investment in their goal,<sup>29</sup> participants completed the same measure of investment used in Study 1: the version of the investment size scale (Rusbult et al., 1998) that I adapted to the context of personal goals. This scale consisted of 4 items that were rated on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*): “I have invested a great deal into this goal that I would lose if it were abandoned,” “Many aspects of my life have become linked to this goal, and I would lose it all if it were abandoned,” “I feel very involved in this goal—like I have put a great deal into it,” and “My relationships with friends and family members would be affected if this goal were abandoned.” A composite variable was created to represent prior investment by averaging scores on these 4 items.

**Investment transferability.** Participants were asked two questions to assess the degree to which their investment in their goal could be transferred to other goals. Participants were given

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<sup>29</sup> This measure was the primary (and only) measure of investment in Study 1.

the following preface: *“Sometimes the time/effort/energy/money we put into a goal can also benefit other goals. For example, the time you put into getting a good grade in a course could give you studying skills that will help you achieve a good grade in another course. In these cases, the investment we make would not be completely lost if we gave up on the goal or if the goal was not achieved.”* Participants were then asked: *“To what extent could your investment in the goal be transferred to other goals—goals that you already have?”* and *“To what extent could your investment in the goal be transferred to other goals—goals that you are not currently pursuing but that you could in the future?”* For both questions, participants answered on a 7-point Likert scale from 1 (*not at all [investment would be completely lost]*) to 7 (*totally [investment could be completely transferred]*).

***Others’ investment.*** Participants were asked to rate the extent that other people in their life had invested in their goal on a 7-point scale from 1 (*not at all*) to 7 (*a great deal*).

***Features of investment.*** Participants completed measures of how costly their prior investment has been, how autonomous it has been, and how public. There were 3 items for each measure. For how costly, the items were: *“My investment in the goal has used a significant amount of the resources I have,”* *My investment in the goal took away resources from other goals,”* and *“My investment in the goal affected my life (e.g., led to life changes).”* For how autonomous, the items were: *“I invested in the goal because thought it was a good idea,”* *“The investment I’ve made into the goal was influenced by someone else”* (reverse-scored), and *“The investment I’ve made in the goal (e.g., effort, time, money) so far has been totally my own.”* Finally, for how public, the items were: *“Other people are aware of my goal,”* *“There are people in my life who know I am committed to the goal,”* and *“When I started pursuing the goal, I told other people about it.”* All items were rated on a 7-point Likert scale from 1 (*strongly disagree*)

to 7 (*strongly agree*). For analyses, composite costly, autonomous, and public variables were created by averaging the 3 items in each subscale.

***Effort difficulty.*** After reporting how much effort they had put into the goal so far (effort investment), participants were asked “*How difficult was the effort you put in?*” and rated this item on a 5-point Likert scale from 1 (*not at all*) to 5 (*very*).

## Appendix D

### Additional Disengagement Measures

**Table D.**

*Summary of additional disengagement measures in all studies.*

Measures	Study 1	Study 2	Study 3	Study 4	Study 5
Effort					x
Rumination					x
Thought frequency					x
Binary items	x	x		x	x
Quitting questions					x

*Note.* “x” means the measure was administered.

**Effort.** Participants completed adapted items from previous work (Seo et al., 2018) to measure effort: “*I am putting a lot of effort into meeting the goal,*” “*I am trying very hard on the goal,*” and “*I am not putting in much energy to meet the goal*” (reverse-scored). These items were answered on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). A composite goal effort variable was created by averaging ratings across the 3 items.

**Rumination.** Participants completed the goal rumination scale (Schultheiss et al., 2008) which consists of 7 items (e.g., “*I find it hard to shut off thoughts about this goal*”) rated on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). For analyses, a composite goal rumination variable was created by averaging ratings across all items.

**Thought frequency.** Participants were asked how often they think about the goal (Davydenko et al., 2019) on a 5-point Likert scale from 1 (*never*) to 5 (*very often*).

**Binary items.** Participants were asked 3 binary (yes/no) questions about disengagement: “*Would you consider giving up on this goal now or in the near future?*,” “*Would you consider*

*reducing your effort towards this goal now or in the near future?,” and “Would you consider reducing your commitment towards this goal now or in the near future?”*

**Quitting questions.** If participants indicated at the beginning of Part 2 of Study 5 that they had quit their goal, they were asked some additional questions about their disengagement. Participants were asked an open-ended question about why they quit (*“Please explain why you stopped pursuing the goal”*). Participants were asked when they quit (*“At what point did you stop pursuing the goal?”*): *less than 1 week after Part 1 of the study, about 1 week after Part 1 of the study, about 2 weeks after Part 1 of the study, about 3 weeks after Part 1 of the study, about 4 weeks after Part 1 of the study, or more recently*. Participants were asked if they started pursuing an alternative goal in place of their goal (yes, no) and if they thought they would start pursuing the goal again in the future (yes, no).

Participants who quit also rated their use of various disengagement strategies (the same as those described in Appendix A). Participants were told *“Please rate the extent to which you used the following strategies when/after deciding to stop pursuing the goal”* and rated their agreement with 11 items on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The 12 items can be divided into 6 different subscales with 2 items each: re-prioritizing (e.g., *“Reassessed what is important to me”*), alternative means looking “down” (e.g., *“Thought about alternative ways that I could still achieve it”*), alternative means looking “up” (e.g., *“Started thinking about new goals I could pursue that have the same deeper purpose”*), goal switching (e.g., *“Switched my focus to one of my other goals”*), downgrading (e.g., *“Thought about pursuing a similar goal, but that is easier to achieve”*), and goal abandonment (e.g., *“Completely abandoned any desire I had for the goal”*). For analyses, composite variables were created for each of these subscales.

## Appendix E

### Study 1 Supplemental Analyses

#### *Results with second transition goal*

Participants in Study 1 nominated two transition goals. I chose to focus on the goals that participants nominated first in my primary analyses because I reasoned these were of the highest salience and importance to participants (also see Förster et al., 2007). Here, I present results for the goals that participants nominated second. These results are organized by research question.

***Is prior investment a hook?*** First, I examined zero-order correlations between prior investment, attainability, and disengagement (see Table E). Replicating the results for participants' first transition goals, prior investment was negatively correlated with disengagement, supporting the idea that prior investment is a hook. Attainability was also negatively correlated with disengagement for participants' second transition goals; for participants' first transition goals, this correlation was only marginally significant.

#### **Table E.**

*Zero-order correlations between prior investment, attainability, and disengagement for second transition goal listed in Study 1.*

Variable	<i>M (SD)</i>	1	2
4. Prior investment	3.57 (1.30)	--	
5. Attainability	4.53 (1.49)	-.01	--
6. Disengagement	2.66 (1.15)	-.51***	-.31**

*Note.* \*\*\* $p < .001$ ; \*\* $p < .05$ ;  $df = 74$  for each correlation.

***Is prior investment a maladaptive hook?*** Next, I regressed disengagement on prior investment, attainability, and their interaction, to test whether prior investment reduced the effect of attainability on disengagement (i.e., reduced sensitivity to unattainability). There was a main

effect of attainability,  $b = 0.56$ ,  $SE = .19$ ,  $t(70) = 2.91$ ,  $p = .005$ , 95% CI [-0.18, 0.94]. There was a non-significant effect of investment,  $b = -0.07$ ,  $SE = .26$ ,  $t(70) = 0.30$ ,  $p = .756$ , 95% CI [-0.52, 0.38], and, contrary to predictions and consistent with the pattern observed for the first goal listed, no significant investment  $\times$  attainability interaction,  $b = -0.10$ ,  $SE = .05$ ,  $t(70) = 1.81$ ,  $p = .075$ , 95% CI [-0.19, 0.01].

## Appendix F

### Study S1: Preliminary Version of Study 2

Study S1 was conducted after Study 1 but before Study 2. This study was a preliminary version of Study 2, as it followed the same general procedure, and it tested the same research questions. Building on Study 1, prior investment, attainability, and disengagement were measured in the context of participants' (undergraduates) personal goals, including various types of investment. In addition to general investment, Study S1 measured time, effort, financial, and emotional investment. My thinking regarding the types of investment that could be involved in personal goals and the types of investment that might matter when it comes to disengagement evolved since conducting this study. Moreover, there are some limitations to the items used to measure the various types of investment in this study. Specifically, the current study used single items to measure each type of investment, making reliability uncertain (see Allen et al., 2022), and the emotional investment item was lacking precision. Study 2 used multiple items for each type of investment, included more types of investment (namely, attention and identity investment), and used items that were generally created with more precision. Therefore, Study 2 was included in the main text. However, Study S1 is included here for transparency.

#### Method

**Participants and design.** I recruited participants (204 undergraduates) from a large Canadian university to participate in an online study for partial course credit ( $M_{\text{age}} = 20.0$  years,  $SD_{\text{age}} = 3.7$  years; 151 identifying as woman/transwoman, 36 identifying as man/transman, 1 identifying as two-spirited, 3 identifying as non-binary, 13 unspecified; 36.3% White, 30.4% Asian, 9.8% other/not listed, 4.4% Black, 2.4% 4.4% East Indian, 4.4% Middle Eastern, 3.4% Mixed Race, 1.5% Hispanic, 0.5% Aboriginal/Native). According to an a priori power analysis

conducted in G\*power, a sample size of 85 was required to detect the average effect size in social psychology (Cohen's  $f^2$  of 0.21; [Lovakov & Agadullina, 2021](#)) in a linear multiple regression with five predictors (my analysis with the highest number of predictors), but because I wanted to ensure I was powered for even a smaller effect, a target sample size of 200 was set. According to a sensitivity power analysis conducted in G\*power, my sample size (204) provided 90% power for a small effect (Cohen's  $f^2$  of 0.08).

**Procedure and materials.** Participants were told that the study was about “personality and personal goals.”<sup>30</sup> The procedure was generally the same as Study 1; however, participants only nominated one (transition) goal in this study (as opposed to four in Study 1).

**Personal goal nomination.** Participants received the same instructions for nominating their personal goal as the participants in Study 1 did. However, they were only asked to nominate one goal—a transition goal (“*You are evaluating the goal and your motivation to continue with it, or bring it to completion/disengage from it*”). After nominating their goal, participants answered various questions about that goal, including questions about prior investment, attainability, and disengagement.<sup>31</sup>

**Prior investment (various types).** Participants were asked about their *general investment* (“*Overall, how much would you say you’ve invested in this goal so far?*”), *effort investment* (“*How much effort have you put into this goal so far?*”), *time investment* (“*How much time have*

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<sup>30</sup> The following individual difference measures were included in Study S1: sunk-costs resistance (Bruine de Bruin et al., 2014), goal adjustment capacities (disengagement capacity and reengagement capacity; Wrosch et al., 2003b), and an internally-developed measure of goal disengagement beliefs. These measures were presented in counterbalanced order with the goal measures (i.e., participants either completed the individual differences first or the goal measures first).

<sup>31</sup> Participants were also asked about goal importance, progress, domain, and length, as well as the extent to which their prior investments were transferable to other goals (i.e., investment transferability), the extent to which their commitment to the goal was public (i.e., public commitment), and the extent to which other people in their life had invested in the goal (i.e., others’ investment). The prior investment measure used in Study 1 (adapted from the investment size scale; Rusbult, 1998) was also included as a secondary measure.

*you put into this goal so far?”), financial investment (“How much financial investment have you put into this goal so far?”), and emotional investment (“How much have you invested emotionally and mentally into this goal so far; how much of your thought, feelings, and attention been dedicated to this goal?”). Each of these items were rated on a 5-point Likert scale from 1 (none or very little) to 5 (a lot).*

**Attainability.** To measure the attainability of participants’ goals, participants were asked “How likely do you think it is that you will attain the goal to [their goal]?” which they rated on a 7-point Likert scale from 1 (*not at all likely*) to 7 (*extremely likely*).

**Disengagement.** Disengagement was measured in the same way that it was in Study 1. Participants completed the same adapted version of the disengagement capacity scale (Wrosch et al., 2003b). This scale consisted of 4 items that were rated on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*): “I will keep putting in effort toward this goal,” “I will keep trying to achieve this goal,” “I will stay committed to this goal,” and “I will continue to think about this goal and I won’t let it go” ( $\alpha = .96$ ). All 4 items were reverse-scored and then averaged to create a composite disengagement variable.

**Demographics and survey experience.** After the personal goal questions, participants were asked some basic demographic questions (age, gender, race), some questions about their experience with the study, then were fully debriefed and compensated.

## **Results**

**Is prior investment a hook?** As in Studies 1 and 2, I first examined bivariate correlations between prior investment, attainability, and disengagement (correlations and descriptives presented in Table F1). As expected, and replicating Studies 1 and 2, there was a significant negative correlation between prior investment (general) and disengagement,  $r(203) = -.50, p <$

.001. There was also a significant negative correlation between each individual form of investment: effort,  $r(203) = -.52, p < .001$ , time,  $r(203) = -.52, p < .001$ , financial,  $r(203) = -.21, p = .003$ , and emotional,  $r(203) = -.57, p < .001$ , with emotional investment having the largest correlation. In contrast to Study 1, attainability also was significantly negatively correlated with disengagement in this study,  $r(203) = -.60, p < .001$ , suggesting that people might use unattainability at least partly as a signal to disengage.

**Table F1.**

*Bivariate correlations between prior investment, attainability, and disengagement (Study 2).*

Variable	<i>M (SD)</i>	1	2	3	4	5	6
1. General investment	3.98 (1.00)	--					
2. Effort investment	4.10 (.93)	.74***	--				
3. Time investment	4.13 (0.98)	.71***	.74***	--			
4. Financial investment	3.47 (1.51)	.57***	.49***	.44***	--		
5. Emotional investment	4.25 (0.95)	.65***	.60***	.64***	.43***	--	
6. Attainability	5.56 (1.14)	.34***	.39***	.38***	.12	.38***	--
7. Disengagement	1.85 (1.05)	-.50***	-.52***	-.52***	-.21**	-.57***	-.60***

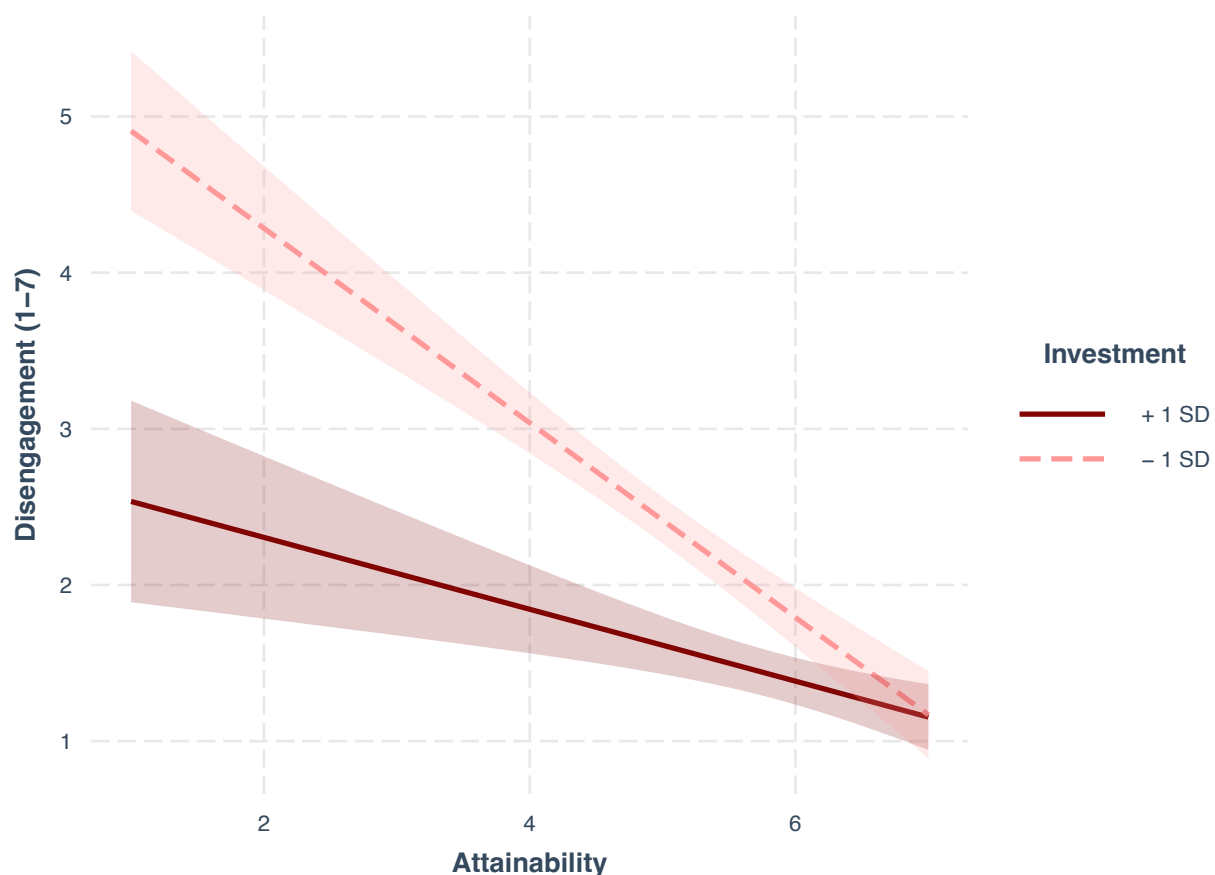
*Note.* \*\*\* $p < .001$ , \*\* $p < .05$ ;  $df = 203$ .

***Does prior investment reduce sensitivity to unattainability?*** Disengagement was regressed on attainability, overall prior investment, and their interaction. This analysis revealed a main effect of prior investment,  $b = -.29, SE = .06, t(191) = 5.00, p < .001, 95\% CI [-.404, -.176]$ , and a main effect of attainability,  $b = -.43, SE = .05, t(191) = 8.56, p < .001, 95\% CI [-.525, -.328]$ , qualified by the predicted prior investment  $\times$  attainability interaction,  $b = .20, SE = .04, t(191) = 5.01, p < .001, 95\% CI [.119, .274]$  (see Figure F). This interaction shows that the effect

of attainability on disengagement was weaker at high (+1 *SD*) levels of investment,  $b = -.23$ ,  $SE = .07$ ,  $t(191) = 3.51$ ,  $p < .001$ , 95% CI [-.360, -.101], than at low (-1 *SD*) levels of investment,  $b = -.62$ ,  $SE = .06$ ,  $t(191) = 10.17$ ,  $p < .001$ , 95% CI [-.744, -.502], suggesting that prior investment reduces sensitivity to unattainability as a signal to disengage. The effect of investment on disengagement was significant at low attainability,  $b = -.51$ ,  $SE = .07$ ,  $t(191) = 5.00$ ,  $p < .001$ , 95% CI [-.404, -.175], but not at high attainability,  $b = -.06$ ,  $SE = .08$ ,  $t(191) = 0.81$ ,  $p = .417$ , 95% CI [-.221, .092].

**Figure F.**

*Goal disengagement as a function of prior investment and attainability (Study S1).*



I also conducted this analysis for each type of investment individually: effort investment, time investment, financial investment, and emotional investment. In each case, there was a significant investment × attainability interaction (summarized in Table F2), and in each case, the effect of attainability on disengagement was weaker at high (vs. low) levels of investment (simple effects in Table F3). Therefore, these results suggest that prior investment, in various forms, reduces sensitivity to unattainability as a signal to disengage.

**Table F2.**

*Moderation results for each investment variable (Study S1).*

Investment Variable	Effect	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI
General investment	Attainability	-.43	.05	8.56	<.001	[-.525, -.328]
	General investment	-.29	.06	5.00	<.001	[-.404, -.175]
	Attainability × general investment	.20	.04	5.01	<.001	[.119, .274]
Effort investment	Attainability	-.40	.05	7.81	<.001	[-.506, -.302]
	Effort investment	-.33	.06	5.15	<.001	[-.462, -.206]
	Attainability × effort investment	.17	.05	3.76	<.001	[.081, .260]
Time investment	Attainability	-.40	.05	7.79	<.001	[-.498, -.297]
	Time investment	-.32	.06	5.43	<.001	[-.442, -.207]
	Attainability × time investment	.20	.04	4.50	<.001	[.111, .284]
Financial investment	Attainability	-.53	.05	10.26	<.001	[-.626, -.424]
	Financial investment	-.10	.04	2.65	.009	[-.179, -.026]
	Attainability × financial investment	.12	.03	3.68	<.001	[.058, .190]
Emotional investment	Attainability	-.40	.05	8.19	<.001	[-.500, -.306]
	Emotional investment	-.32	.06	4.50	<.001	[-.448, -.193]
	Attainability × emotional investment	.17	.04	4.31	<.001	[.094, .254]

*Note.* Outcome variable is goal disengagement in each model; *df* = 191 for each effect.

**Table F3.***Conditional effects of attainability at high/low prior investment (Study S1).*

<b>Investment Variable</b>	<b>Effect of Attainability at:</b>	<b><i>b</i></b>	<b><i>SE</i></b>	<b><i>t</i></b>	<b><i>p</i></b>	<b>95% CI</b>
General investment	Low (-1 <i>SD</i> ) investment	-.62	.06	10.17	<.001	[-.744, -.502]
	High (+1 <i>SD</i> ) investment	-.23	.07	3.51	<.001	[-.360, -.101]
Effort investment	Low (-1 <i>SD</i> ) investment	-.56	.06	9.03	<.001	[-.685, -.439]
	High (+1 <i>SD</i> ) investment	-.25	.07	3.56	.001	[-.388, -.112]
Time investment	Low (-1 <i>SD</i> ) investment	-.59	.06	9.56	<.001	[-.714, -.470]
	High (+1 <i>SD</i> ) investment	-.23	.07	3.33	.001	[-.360, -.092]
Financial investment	Low (-1 <i>SD</i> ) investment	-.71	.07	10.15	<.001	[-.851, -.574]
	High (+1 <i>SD</i> ) investment	-.39	.07	4.56	<.001	[-.484, -.192]
Emotional investment	Low (-1 <i>SD</i> ) investment	-.57	.06	9.29	<.001	[-.690, -.448]
	High (+1 <i>SD</i> ) investment	-.27	.06	4.64	<.001	[-.389, -.157]

*Note.* Outcome variable is goal disengagement in each model; *df* = 191 for each effect.

***What forms of investment are particularly strong?*** In the following analysis, I wanted to examine my third research question: what forms of investment are particularly strong? I regressed disengagement on effort investment, time investment, financial investment, and emotional investment simultaneously in a linear multiple regression. Results revealed that in the multiple regression, effort investment, financial investment, and emotional investment were all significant predictors. Emotional investment was the predictor with the largest effect size,  $b = -.41$ ,  $SE = .09$ ,  $t(190) = 4.87$ ,  $p < .001$ , 95% CI [-.580, -.246] (see Table F4).<sup>32</sup>

<sup>32</sup> Collinearity diagnostics indicated that tolerance and variance inflation factors (VIFs) were within an acceptable range to infer a lack of multicollinearity; Tolerance > .2 and VIFs < 5 for all variables.

**Table F4.***Multiple regression results (Study S1).*

Variable	<i>b</i>	<i>SE</i>	<i>b</i>	<i>t</i>	<i>p</i>	95% CI
Intercept	5.13	.30		16.90	<.001	[4.53, 5.73]
Effort investment	-0.28	.10	-0.25	2.82	.005	[-0.48, -0.09]
Time investment	-0.17	.10	-0.16	1.73	.085	[-0.36, 0.02]
Financial investment	0.10	.05	0.14	2.10	.037	[0.01, 0.19]
Emotional investment	-0.41	.09	-0.37	4.87	<.001	[-0.58, -0.25]

I also wanted to examine the effect of each of these investment variables when controlling for attainability, to better understand what forms of investment, if any, predict disengagement even in the presence of unattainability. Previous results showed that each of these types of investment reduced sensitivity to unattainability. But when considering all these antecedents of disengagement simultaneously, attainability and emotional investment were the only significant predictors (all effects summarized in Table F5).

**Table F5.***Multiple regression results including attainability (Study S1).*

Variable	<i>b</i>	<i>SE</i>	<i>b</i>	<i>t</i>	<i>p</i>	95% CI
Intercept	6.24	.31		19.88	<.001	[5.62, 6.86]
Attainability	-0.37	.05	-0.40	7.01	<.001	[-0.47, -0.26]
Effort investment	-0.19	.09	-0.17	2.07	.040	[-0.37, -0.01]
Time investment	-0.11	.09	-0.10	1.21	.227	[-0.28, 0.07]
Financial investment	0.06	.04	0.08	1.35	.178	[-0.03, 0.14]
Emotional investment	-0.32	.08	-0.29	4.08	<.001	[-0.47, -0.16]

## Discussion

Study S1 replicated the negative correlation between prior investment and disengagement found in Studies 1 and 2. There was also a significant negative correlation between attainability and disengagement as well, as in Study 2, indicating that attainability is something that people pay attention to when it comes to disengagement. Additionally, there was a significant interaction

between attainability and prior investment in Study S1, such that prior investment reduced sensitivity to unattainability as a signal to disengage as the effect of attainability was reduced at high (vs. low) levels of prior investment, which was also found in Study 2. This finding supports the idea that prior investment may not only operate as a hook, but a maladaptive hook.

Study S1 also examined what forms of investment are the strongest in terms of preventing disengagement from personal goals. This aspect of the study was exploratory, and I did not have a priori predictions about what forms of investment might be particularly strong. However, this study found indications that emotional investment—the degree to which the individual has expended their emotional and mental capacity on the goal—had a larger effect on disengagement than effort, time, and money. I continued to examine this question in Study 2, which built on Study S1’s limitations. Study S1 did not include attention investment, nor identity investment—two factors I propose are relevant in the context of personal goals. Study S1 also used a double-barreled item to measure emotional investment—by touching on emotions and attention—which makes it difficult to interpret. Study 2 separated emotional and attention investment and it also included identity investment.

## Appendix G

### Studies 3a and 3b

As mentioned in the main text, Study 3 combines data from two different studies that used the exact same design (Study 3a and Study 3b). This plan was pre-registered along with an analysis plan for Study 3b:

[https://osf.io/pwrjh/?view\\_only=8af7bed00fcf42a1abb7f508dc712001](https://osf.io/pwrjh/?view_only=8af7bed00fcf42a1abb7f508dc712001). Here, for transparency, I present the results for each study individually. Data from the two samples were collected three months apart (May 2022 and August 2022). Study 3a was the first use of the experimental paradigm designed to manipulate both prior investment and attainability on a lab task and there was not an associated pre-registered analysis plan. Participants were randomly assigned to an investment condition (investment vs. control) and an attainability condition (attainable task condition vs. unattainable task condition) in a 2 (investment) × 2 (attainability) design.

### Study 3a

#### Method

**Participants and design.** I recruited participants (223 U.S. residents) from MTurk (hosted by CloudResearch) in exchange for \$5.00 USD in addition to a guaranteed \$0.50 USD bonus ( $M_{\text{age}} = 40.0$  years,  $SD_{\text{age}} = 11.0$  years; 132 identifying as man/transman, 89 identifying as woman/transwoman, 1 identifying as non-binary, 1 unspecified; 80.8% White, 8.9% Black, 5.4% Asian, 2.2% Hispanic, 2.2% Mixed Race, 0.4% unspecified). According to a sensitivity power analysis conducted in G\*power, for the two-way interaction being tested, the sample size (223) provided 90% power for a medium-sized effect (Cohen's  $f^2$  of 0.22).

**Procedure and materials.** The procedure and materials were the same as those described in the methods section of Study 3 within the main text. The only distinct feature of this sample

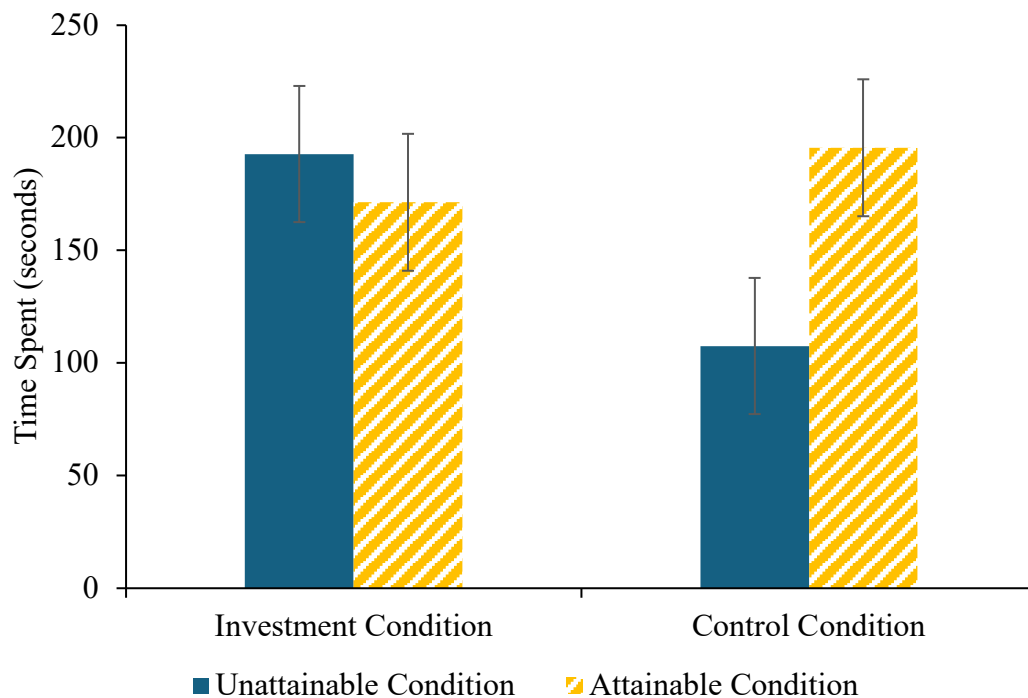
was that participants completed two individual difference measures, while those in Study 3b did not. These measures were sunk-costs resistance (Bruine de Bruin et al., 2014) and goal adjustment capacities (Wrosch et al., 2003b).

## Results

A 2 (investment condition: investment vs. control) × 2 (attainability condition: unattainable task vs. attainable task) factorial ANOVA revealed non-significant main effects of both investment condition,  $F(1, 169) = 2.03, p = .156, \eta^2 = .01$ , and attainability condition,  $F(1, 169) = 2.41, p = .122, \eta^2 = .01$ , and a significant investment condition × attainability condition interaction,  $F(1, 169) = 6.52, p = .012, \eta^2 = .04$ , on the amount of time spent on Part 2 of the anagram task (see Figure G). The effect of attainability condition was significant within the control condition,  $p = .004$ , but not within the investment condition,  $p = .480$ . The effect of investment condition was significant within the unattainable task condition,  $p = .006$ , but not within the attainable task condition,  $p = .424$ .

**Figure G.**

*Persistence as a function of investment and attainability conditions (Study 3a).*



## **Discussion**

The results from Study 3a provided support for my ideas; particularly, that prior investment reduces responsiveness to unattainability as a signal to disengage. The attainability of the task seemed to influence behaviour adaptively for those in the control condition—participants in the control condition spent less time if working on unsolvable anagrams than if working on solvable ones—but participants in the investment condition continued to persist regardless of the attainability of the task.

### **Study 3b**

Following the results from Study 3a, I wanted to conduct a pre-registered replication. Study 3b was another sample of MTurk participants; these participants completed the same experimental paradigm as Study 3a. Participants were randomly assigned to an investment

condition (investment vs. control) and an attainability condition (attainable task condition vs. unattainable task condition) in a 2 (investment) × 2 (attainability) design.

## Method

**Participants and design.** I recruited participants (301 U.S. residents) from MTurk (hosted by CloudResearch) in exchange for \$5.00 USD in addition to a guaranteed \$0.50 USD bonus ( $M_{\text{age}} = 40.7$  years,  $SD_{\text{age}} = 11.1$  years; 158 identifying as man/transman, 133 identifying as woman/transwoman, 3 identifying as non-binary, 7 unspecified; 72.1% White, 11.6% Black, 6.3% Asian, 4.0% Hispanic, 3.0% Mixed Race, 1.0% East Indian, 0.7% Aboriginal/Native, 0.7% other/not listed, 0.7% unspecified). According to a responsiveness power analysis conducted in G\*power, for the two-way interaction being tested, the sample size (301) provided 90% power for a medium-sized effect (Cohen's  $f^2$  of 0.19).

**Procedure and materials.** The procedure and materials were the same as those described in the methods section of Study 3 within the main text.

## Results

A 2 (investment condition: investment vs. control) × 2 (attainability condition: unattainable task vs. attainable task) factorial ANOVA revealed non-significant main effects of both investment condition,  $F(1, 297) = 0.58, p = .445, \eta_p^2 = .002$ , and attainability condition,  $F(1, 297) = 0.25, p = .620, \eta_p^2 = .001$ , and a non-significant investment condition × attainability condition interaction,  $F(1, 297) = 0.65, p = .419, \eta_p^2 = .002$ .

## Discussion

Study 3b failed to find the same support for my ideas as Study 3a and the combined data in Study 3. Manipulation check results suggest that the investment manipulation might not have evoked feelings of sunk costs as well for Study 3b as it had for Study 3a. Both samples were

asked the following three questions: *“I kept working on the second set because of the time and effort I put into the first set,”* *“I was motivated to work on the second set because of the time and effort I put into the first set,”* and *“I felt invested in the second set because of the time and effort I put into the first set.”* A composite variable created with these three items (averaging scores across all three) found a marginally significant difference of investment condition within Study 3a,  $p = .058$ , but a non-significant difference within Study 3b,  $p = .898$ . Participants in Study 3b did not seem as motivated and/or influenced by their prior investment compared to participants in Study 3a according to these manipulation check questions.

## Appendix H

### Studies S2a & S2b: Study 4 Pilot Studies

Study 4 experimentally manipulated perceived prior investment and perceived attainability in the context of a personal goal. Both manipulations were piloted. Pilot study S2a examined whether the prior investment manipulation changed perceived prior investment in a personal goal as intended. Pilot study 2b examined whether the attainability manipulation changed perceived attainability of a personal goal as intended. These two studies are presented in detail below.

#### Study S2a

##### Method

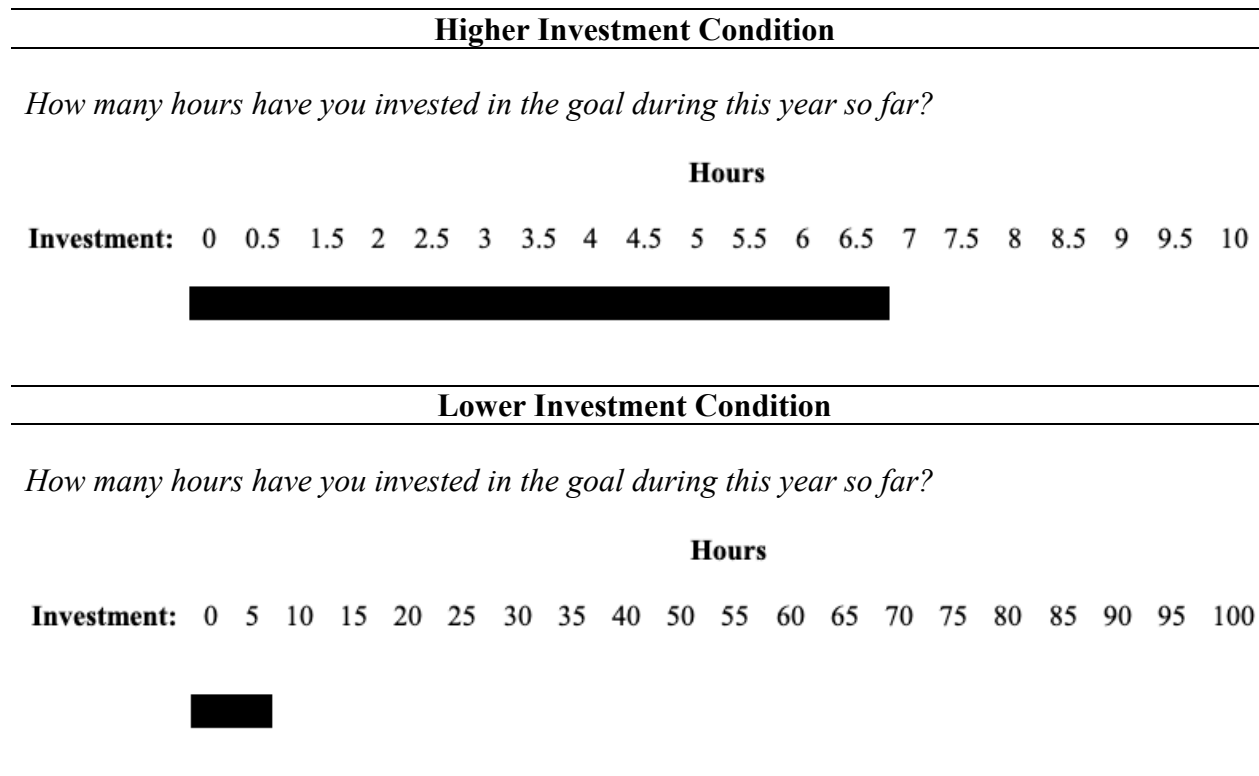
**Participants and design.** I recruited participants (150 U.S. residents) from MTurk (hosted by CloudResearch) in exchange for \$2.00 USD ( $M_{age} = 40.3$  years,  $SD_{age} = 11.0$  years; 91 identifying as man/transman, 59 identifying as woman/transwoman; 72.7% White, 16.0% Black, 6.7% Asian, 3.3% Mixed Race, 1.3% Hispanic). According to a sensitivity power analysis conducted in G\*power, the sample size (150) provided 90% power for a medium-sized effect in an independent samples t-test (Cohen's  $d$  of 0.53).

**Procedure and materials.** Participants first nominated an important personal goal, using the same procedure and materials as Study 4. Participants were then randomly assigned to either a higher investment condition or a lower investment condition using the same procedure and materials as Study 4. The prior investment manipulation used a biased response scale manipulation (see Fishbach & Dhar, 2005 for a similar manipulation) wherein participants either reported the amount of time spent on their personal goal where the scale end-point was 100 (lower investment condition) or 10 (higher investment condition), represented visually on a bar.

Therefore, reported investment would be visually represented as relatively low or high investment depending on condition. For example, if someone had invested 7 hours into the goal, this would be represented as quite high on the progress bar if they were in the higher investment condition (where the end-point is 10), or quite low if they were in the lower investment condition (where the end-point is 100). This manipulation was the same as the one used in Study 4 (see Table H).

**Table H.**

*Visual of prior investment manipulation in Study 4.*



After the manipulation, participants answered three questions assessing perceived prior investment in their goal: “I have invested significantly in this goal,” “I have put a lot of time into this goal,” and “I have spent significant time on this goal.” These items were rated on a Likert

scale from 1 (*strongly disagree*) to 7 (*strongly agree*). For analyses, a composite variable was created by averaging scores on these three items.

Finally, participants completed basic demographic questions (age, race, gender, occupation, income, and education) and questions about their experience with the survey, then were fully debriefed and compensated.

## **Results**

An independent samples t-test was conducted to compare perceived prior investment between the two conditions (higher vs. lower investment). The higher investment condition led to higher reported prior investment in participants' personal goals ( $M = 5.80$ ,  $SD = 1.43$ ) than the lower investment condition ( $M = 5.14$ ,  $SD = 1.61$ ),  $t(148) = 2.66$ ,  $p = .009$ ,  $d = 0.43$ .<sup>33</sup>

## **Discussion**

The results of Study 2a suggest that the prior investment manipulation used in Study 4 worked to manipulate perceptions of prior investment as intended. Participants felt they had invested more time into their goal if they were assigned to the higher investment condition versus lower investment condition.

## **Study S2b**

### **Method**

**Participants and design.** I recruited participants (151 U.S. residents) from MTurk (hosted by CloudResearch) in exchange for \$2.00 USD ( $M_{\text{age}} = 40.8$  years,  $SD_{\text{age}} = 11.4$  years; 79 identifying as man/transman, 69 identifying as woman/transwoman, 3 unspecified; 74.2% White, 13.9% Black, 4.6% Asian, 3.3% Hispanic, 2.6% Mixed Race, 0.7% East Indian, 0.7%, 0.7% unspecified). According to a sensitivity power analysis conducted in G\*power, the sample size

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<sup>33</sup> I had 84% power to detect this effect according to G\*power.

(151) provided 90% power for a medium-sized effect in an independent samples t-test (Cohen's  $d$  of 0.53).

**Procedure and materials.** Participants first nominated an important personal goal, using the same procedure and materials as Study 4. Participants were then randomly assigned to either a higher attainability condition or a lower attainability condition using the same procedure and materials as Study 4. The attainability manipulation involved either writing about the things that could facilitate attaining the goal (higher attainability condition) or work against attaining the goal (lower attainability condition).

After the manipulation, participants answered three questions assessing the perceived attainability of their goal: “*This goal feels attainable,*” “*If I continue with this goal, I think I will be able to attain it,*” and “*Attaining this goal feels unlikely*” (reverse-scored). These items were rated on a Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*). For analyses, a composite variable was created by averaging scores on these three items.

Finally, participants completed basic demographic questions (age, race, gender, occupation, income, and education) and questions about their experience with the survey, then were fully debriefed and compensated.

## **Results**

An independent samples t-test was conducted to compare perceived prior investment between the two conditions (higher vs. lower investment). The lower attainability condition led to lower perceived attainability of participants' personal goals ( $M = 5.23$ ,  $SD = 1.11$ ) compared to the higher attainability condition ( $M = 5.62$ ,  $SD = 1.04$ ),  $t(149) = 2.25$ ,  $p = .026$ ,  $d = 0.60$ .<sup>34</sup>

## **Discussion**

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<sup>34</sup> I had 98% power to detect this effect according to G\*power.

The results of Study 2b suggest that the attainability manipulation used in Study 4 worked to manipulate perceptions of attainability as intended. Participants felt they had a greater chance of attaining their goal if they were assigned to the higher attainability condition versus lower attainability condition.

## Appendix I

### Study 5 Supplemental Analyses

#### *Time 1 Analyses*

As mentioned in the main text, each session administered in Study 5 represents a replication of my previous correlational studies and therefore, I planned to analyze the Time 1 data separately, in addition to running my longitudinal analyses. Next, I present the results for each of my research questions using only the Time 1 data.

***Is prior investment a hook?*** First, I examined zero-order correlations between prior investment, attainability, and commitment/disengagement (summarized in Table II). Consistent with these previous studies, prior investment was positively correlated with commitment,  $r(167) = .43, p < .001$ , and negatively correlated with disengagement,  $r(167) = -.26, p < .001$ . Attainability was also positively correlated with commitment,  $r(167) = .31, p < .001$ , and negatively correlated with disengagement,  $r(167) = -.24, p = .002$ .

**Table II.**

*Zero-order correlations between prior investment, attainability, and commitment (Study 5).*

Variable	<i>M (SD)</i>	1	2	3
1. Prior investment	3.56 (1.10)	--		
2. Attainability	4.00 (0.84)	.02	--	
3. Commitment	5.72 (1.07)	.43***	.31***	--
4. Disengagement	2.10 (1.05)	-.26***	-.24**	-.74***

*Note.* \*\*\* $p < .001$ , \*\* $p < .05$ ;  $df = 167$  for each correlation.

***Is prior investment a maladaptive hook?*** Commitment was regressed on attainability, general prior investment, and their interaction. This analysis revealed a non-significant investment ' attainability interaction,  $b = -0.15, SE = .08, t(160) = 1.90, p = .060, 95\% CI [-0.31, 0.07]$ . Next, *commitment* was regressed on attainability, general prior investment, and their

interaction. This analysis revealed a non-significant investment × attainability interaction,  $b = 0.10$ ,  $SE = .08$ ,  $t(160) = 1.36$ ,  $p = .167$ , 95% CI [-0.05, 0.25], therefore, these analyses did not provide support for prior investment being a maladaptive hook, in contrast to Studies 2 and 4 (and longitudinal Study 5 analyses).

***What forms of investment act as hooks, and which are particularly strong?*** Next, I examined zero-order correlations between each type of prior investment, attainability, and commitment/disengagement (summarized in Table I2). Each type of investment was positively correlated with commitment and negatively correlated with disengagement, replicating findings from Study 2. Also replicating what was found in Study 2, effort investment had the largest correlations and financial investment had the smallest correlations.

**Table I2.**

*Zero-order correlations between each type of prior investment, attainability, and disengagement (Study 5).*

Variable	<i>M (SD)</i>	1	2	3	4	5	6
1. Effort investment	3.48 (1.04)	--					
2. Time investment	3.42 (1.12)	.74***	--				
3. Financial investment	2.68 (1.63)	.40***	.51***	--			
4. Attention investment	3.83 (1.05)	.54***	.51***	.29***	--		
5. Emotional investment	3.74 (1.13)	.40***	.37***	.25**	.54***	--	
6. Commitment	5.72 (1.07)	.54***	.44***	.22**	.48***	.42***	--
7. Disengagement	2.10 (1.05)	-.37***	-.31***	-.18**	-.36***	-.35***	-.74***

*Note.* \*\*\* $p < .001$ ; \*\* $p < .05$ ;  $df = 167$  for each correlation.

Next, I examined which forms of investment are particularly strong. I regressed commitment on each specific form of investment simultaneously in a linear multiple regression.

<sup>35</sup> In this regression model (summarized in Table I3), significant predictors of commitment were effort investment,  $b = 0.38$ ,  $SE = .10$ ,  $t(161) = 3.74$ ,  $p < .001$ , 95% CI [0.18, 0.58], attention investment,  $b = 0.18$ ,  $SE = .09$ ,  $t(161) = 2.17$ ,  $p = .032$ , 95% CI [0.02, 0.35], and emotional investment,  $b = 0.17$ ,  $SE = .07$ ,  $t(161) = 2.38$ ,  $p = .018$ , 95% CI [0.03, 0.32].

**Table I3.**

*Multiple regression results on commitment (Study 5).*

Variable	<i>b</i>	<i>SE</i>	<i>b</i>	<i>t</i>	<i>p</i>	95% CI
Intercept	3.04	.29		10.38	<.001	[2.46, 3.62]
Effort investment	0.38	.10	0.36	3.74	<.001	[0.18, 0.57]
Time investment	0.03	.09	0.03	0.31	.759	[-0.15, 0.21]
Financial investment	-0.03	.05	-0.04	0.55	.585	[-0.12, 0.07]
Attention investment	0.18	.09	0.18	2.17	.032	[0.02, 0.35]
Emotional investment	0.17	.07	0.18	2.38	.018	[0.03, 0.32]

*Note.* Outcome variable is goal commitment.

As in Study 2, I also wanted to examine the effect of each of these investment variables when controlling for attainability, to better understand what forms of investment, if any, predict disengagement even when accounting for attainability. When considering all these potential antecedents of disengagement simultaneously, attainability, effort investment, attention investment, and emotional investment were significant predictors, and each of these predictors positively predicted commitment, replicating what was found in Study 2 (all effects summarized in Table I4).

<sup>35</sup> Collinearity diagnostics indicated that tolerance and variance inflation factors (VIFs) were within an acceptable range to infer a lack of multicollinearity; Tolerance > .2 and VIFs < 5 for all variables. These different types of investment only formed one component in an exploratory factor analysis.

**Table I4.***Multiple regression results on commitment including attainability (Study 5).*

<b>Variable</b>	<b><i>b</i></b>	<b><i>SE</i></b>	<b><i>b</i></b>	<b><i>t</i></b>	<b><i>p</i></b>	<b>95% CI</b>
Intercept	1.42	.42		3.44	.001	[0.61, 2.25]
Attainability	0.41	.08	0.32	5.34	<.001	[0.17, 0.54]
Effort investment	0.35	.09	0.34	3.75	<.001	[0.17, 0.54]
Time investment	-0.01	.08	-0.01	0.14	.888	[-0.18, 0.15]
Financial investment	-0.02	.05	-0.03	0.45	.657	[-0.11, 0.07]
Attention investment	0.19	.08	0.19	2.41	.017	[0.03, 0.35]
Emotional investment	0.22	.07	0.23	3.19	.002	[0.08, 0.35]

*Note.* Outcome variable is goal commitment.

Next, I repeated these analyses with goal disengagement at Time 2 as the outcome variable. When regressing disengagement on each form of investment simultaneously, effort investment and emotional investment were the only significant predictors (see Table I5). When regressing disengagement on each form of investment simultaneously along with attainability, attainability and emotional investment were the only significant predictors (see Table I6).

**Table I5.***Multiple regression results on disengagement (Study 5).*

<b>Variable</b>	<b><i>b</i></b>	<b><i>SE</i></b>	<b><i>b</i></b>	<b><i>t</i></b>	<b><i>p</i></b>	<b>95% CI</b>
Intercept	4.09	.32		12.68	<.001	[3.46, 4.73]
Effort investment	-0.23	.11	-0.23	2.09	.038	[-0.45, -0.01]
Time investment	0.00	.10	0.00	0.02	.983	[-0.19, 0.19]
Financial investment	0.00	.05	-0.01	0.08	.937	[-0.11, 0.10]
Attention investment	-0.13	.09	-0.13	1.44	.153	[-0.32, 0.05]
Emotional investment	-0.17	.08	-0.19	2.18	.030	[-0.33, -0.02]

*Note.* Outcome variable is goal disengagement.

**Table I6.**

*Multiple regression results on commitment including attainability (Study 5).*

<b>Variable</b>	<b><i>b</i></b>	<b><i>SE</i></b>	<b><i>b</i></b>	<b><i>t</i></b>	<b><i>p</i></b>	<b>95% CI</b>
Intercept	5.27	.47		11.28	<.001	[4.35, 6.20]
Attainability	-0.32	.09	-0.26	3.69	<.001	[-0.48, -0.15]
Effort investment	-0.19	.11	-0.19	1.81	.073	[-0.40, 0.02]
Time investment	0.04	.09	0.05	0.41	.680	[-0.15, 0.23]
Financial investment	-0.02	.05	-0.03	-0.37	.714	[-0.12, 0.08]
Attention investment	-0.15	.09	-0.16	1.73	.086	[-0.33, 0.02]
Emotional investment	-0.20	.08	-0.22	2.65	.009	[-0.35, -0.05]

*Note.* Outcome variable is goal disengagement.

### ***Exploring Goal Disengagement Strategies***

As mentioned in the main text, 12 participants indicated that they had quit their goal between the two time points of Study 5. After indicating they had abandoned the goal, these participants were asked why they stopped pursuing the goal (in an open-ended format) and at what point they stopped pursuing the goal on a 6-point Likert scale (relative to Time 1 of the study). These questions have not been analyzed yet. However, these participants were also asked whether they started pursuing an alternative goal (yes, no), and whether they thought they would re-engage in the goal in the future (yes, no, not sure). These participants were also presented with various disengagement “strategies” and were asked to indicate their use of them on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). Here, I present some results from these questions to provide some initial insight into what strategies people use for goal disengagement.

Of the 12 participants who indicated they had quit their goal, 10 said they had started pursuing an alternative goal, which indicates that engagement in alternatives, at least for this sample of university students, was a common strategy. Relatedly, in terms of “strategies,” the most frequent of the ones included was goal switching ( $M = 4.17$ ,  $SD = 1.37$ ), made up of the items “*Switched my focus to one of my other goals,*” and “*Doubled my efforts on my other*

*goals*” (see Table I7 for all strategies) Additionally, 8 of these participants said they thought they would pursue the goal again in the future (i.e., they would re-engage in the same goal), suggesting that for most of these participants, goal abandonment was not entirely final (or complete, as there might have been some remaining goal commitment). Future research should ask a greater subset of questions in similar studies, including the extent to which the individual had reduced their effort versus commitment, to more fully understand what goal reengagement means.

**Table I7.***Descriptive statistics for goal disengagement strategies.*

<b>Strategy</b>	<b>Items</b>	<b><i>M</i></b>	<b><i>SD</i></b>
Re-prioritizing	<i>“Reassessed what is important to me”</i>	3.38	1.64
	<i>“Changed my priorities in life”</i>		
Looking “down”	<i>“Thought about alternative ways that I could still achieve it”</i>	3.13	1.82
	<i>“Tried to figure out a different “how” – a different way of accomplishing the same goal”</i>		
Looking “up”	<i>“Thought about why I was pursuing the goal and tried to find a different goal to pursue that will serve the same “why”</i>	3.63	1.58
	<i>“Started thinking about new goals I could pursue that have the same deeper purpose”</i>		
Goal switching	<i>“Switched my focus to one of my other goals”</i>	4.17	1.37
	<i>“Doubled my efforts on my other goals”</i>		
Downgrading	<i>“Thought about pursuing a similar goal, but that is easier to achieve”</i>	3.13	1.93
	<i>“Lowered my goal to something within reach”</i>		
Goal abandonment	<i>“Completely abandoned any desire I had for the goal”</i>	3.75	2.01
	<i>“Totally removed the goal from my mind”</i>		

*Note.* All items were answered following these instructions: *“Please rate the extent to which you used the following strategies when/after deciding to stop pursuing the goal.”*

## Appendix J

### Exploring Sunk-Costs Resistance

In all of my studies, I included an individual difference measure that might be predicted to moderate the effect of prior investment on goal disengagement: *sunk-costs resistance* (Bruine de Bruin et al., 2007). Sunk-costs resistance captures the ability to discontinue failing commitments despite sunk costs (Bruine de Bruin et al., 2007), and therefore, might reduce the effect of prior investment on disengagement. With these initial exploratory analyses, I began to see whether some people can ignore prior investment in personal goals when it comes to disengagement.

Sunk-costs resistance did not interact with prior investment to predict disengagement in Study 1,  $b = -0.13$ ,  $SE = .14$ ,  $t(67) = 0.95$ ,  $p = .344$ , 95% CI [-0.42, 0.15], Study 2,  $b = 0.05$ ,  $SE = .09$ ,  $t(194) = 0.55$ ,  $p = .586$ , 95% [-0.13, 0.23], or Study 5 (Time 1 data),  $b = -0.03$ ,  $SE = .11$ ,  $t(163) = 0.21$ ,  $p = .756$ , 95% CI [-0.25, 0.18]. It also did not interact with investment condition in Study 3 to predict time spent on anagrams,  $b = -0.07$ ,  $SE = .10$ ,  $t(169) = 0.70$ ,  $p = .483$ , 95% CI [-0.28, 0.13], nor with investment condition in Study 4,  $b = -0.08$ ,  $SE = .06$ ,  $t(295) = 1.42$ ,  $p = .156$ , 95% CI [-0.19, 0.03]. Thus, overall, I did not find evidence that sunk-costs resistance reduces the effect of prior investment as a hook.

There were, however, some direct effects of sunk-costs resistance. The individual difference did not correlate with disengagement from a transition goal in Study 1 ( $p = .987$ ), nor in Study 2 ( $p = .420$ ) or Study 5 ( $p = .341$ ). In Study 3, it did negatively correlate with time spent on the anagrams,  $r(172) = -.20$ ,  $p = .010$ —i.e., it was positively correlated to disengagement—but in Study 4, it *negatively* correlated with goal disengagement,  $r(298) = -.21$ ,  $p < .001$ , and positively correlated with goal commitment,  $r(298) = .16$ ,  $p = .006$ . Thus, overall, these

correlations present contradictory evidence. In some cases, there was evidence that sunk-costs resistance relates to greater disengagement, in some cases it related to less disengagement, and in others there was no effect. Sunk-costs resistance might generally be more applicable to less personal and more short-term contexts (most similar to Study 3), especially given that the variable is based on short-term scenarios similar to typical sunk costs work.

Going forward, it will still be interesting and important to examine individual differences in the ability to ignore sunk costs (or be less affected by them) in the context of personal goals. Perhaps, for example, there are individual differences in the tendency to think about goals in a multiple goal system and perceive investment as transferable/recoupable, related to the proposed intervention in the General Discussion of the main text.

## Appendix K

### Exploring Disengagement Capacity

In all of my studies, I also included the goal adjustment capacities scale (Wrosch et al., 2003a), which includes *disengagement capacity* and *reengagement capacity*, measuring the tendency to disengage and reengage in alternatives, respectively. Given the focus on disengagement capacity in the literature more broadly, I wanted to explore whether and how it related to goal disengagement in my studies. I thought this question was especially interesting given that, as discussed in the main text, for the most part, this capacity has not been connected to concrete goal disengagement, nor how it might interact with goal factors (Hubley & Scholer, 2022). One might expect that in the context of my studies, disengagement capacity would a) have positive correlations with disengagement, and given that it can be conceptualized as the tendency to disengage *when necessary*, b) increase the effect of unattainability on disengagement. Therefore, in my analyses, presented below, I explored correlations between disengagement capacity on goal disengagement, as well as disengagement capacity ' attainability interactions.

In Study 1, disengagement capacity was positively correlated with disengagement from a personal transition goal (the first one participants listed),  $r(70) = .24, p = .042$ . Similarly, in Studies 2 and 5, it positively correlated with disengagement from a personal transition goal: Study 2,  $r(198) = .23, p < .00$ ; Study 5,  $r(165) = .18, p = .018$ . Additionally, in Study 4, it positively correlated with disengagement from a personal goal,  $r(298) = .17, p = .003$ , and negatively with goal commitment,  $r(298) = -.17, p = .003$ . In Study 3, however, the capacity did not significantly correlate with time spent on the anagram task,  $r(172) = -.01, p = .882$ . Thus, overall, these results suggest that disengagement capacity is related to a greater tendency to

disengage from concrete goals, particularly personal goals. Next, I turned to interactions between disengagement capacity and attainability.

Disengagement capacity did not significantly interact with attainability to predict disengagement from a personal transition goal in Study 1,  $b = 0.24$ ,  $SE = 1.17$ ,  $t(67) = 1.18$ ,  $p = .243$ , 95% CI [-0.17, 0.66], nor in Study 5 (Time 1),  $b = -0.14$ ,  $SE = .10$ ,  $t(160) = 1.42$ ,  $p = .159$ , 95% CI [-0.33, 0.05]. It did marginally, however, in Study 2,  $b = -0.12$ ,  $SE = .07$ ,  $t(195) = 1.72$ ,  $p = .086$ , 95% CI [-0.26, 0.02]. Simple effects showed that the effect of attainability on disengagement was stronger when disengagement capacity was high (+1 *SD*),  $b = -0.68$ ,  $SE = .08$ ,  $t(195) = 8.77$ ,  $p < .001$ , 95% CI [-0.84, -0.53] versus low (-1 *SD*),  $b = -0.51$ ,  $SE = .08$ ,  $t(195) = 6.64$ ,  $p < .001$ , 95% CI [-0.66, -0.36]. The capacity did not interact with attainability conditions to predict time spent on the anagrams in Study 3,  $b = -0.19$ ,  $SE = .14$ ,  $t(169) = 1.29$ ,  $p = .199$ , 95% CI [-0.47, 0.10], or to predict disengagement from a personal goal in Study 4,  $b = -0.01$ ,  $SE = .05$ ,  $t(295) = -0.22$ ,  $p = .823$ , 95% CI [-0.11, 0.09], or commitment,  $b = 0.00$ ,  $SE = .05$ ,  $t(295) = 0.00$ ,  $p = .999$ , 95% CI [-0.10, 0.10].

With these exploratory analyses, I found little evidence that disengagement capacity interacts with the goal factor of attainability to predict goal disengagement. Although there was a marginal interaction in Study 2, the rest of these analyses found non-significant interactions. To more fully understand disengagement capacity (e.g., whether it helps with responsiveness to signals that disengagement is adaptive), it could be important for future studies to examine questions like the ones explored here. It will also be important to examine other potential individual differences in tendency to respond to signals that disengagement is adaptive.

## Appendix L

### Exploring Other Individual Differences as Hooks

Given the number of other individual difference measures (beyond sunk-costs resistance and disengagement capacity) in Studies 1 and 5, I wanted to explore whether any of these correlated with goal disengagement as well. These correlations can be found in Table L. These correlations suggest various potential *person hooks* (see Figure 1 in the main text) that could be examined further in future research, and replicate previous research in some cases (Eddington, 2014).

**Table L.***Zero-order correlations between individual differences and goal disengagement (Studies 1 & 5).*

	Correlation with Goal Disengagement in:	
	Study 1:	Study 5:
Promotion focus	-.40***	-.14
Prevention focus	-.02	-.06
Locomotion	-.33**	-.23**
Assessment	-.18	-.16*
Self-oriented perfectionism	-.13	-.16*
Socially-prescribed perfectionism	.13	-.03
Disengagement beliefs	.17	
Grit	-.23	
Tenacious goal pursuit	-.33**	
Flexible goal pursuit	-.03	
Need for cognition	-.04	
Action crisis tendency	.21	
Obsessive passion	-.29*	
Harmonious passion	-.20	
Openness		-.27***
Conscientiousness		-.18*
Extraversion		-.06
Agreeableness		-.25**
Emotional stability		.01
Private self-consciousness		-.13
Public self-consciousness		-.16*
Growth mindset		-.20**
Failure-is-debilitating mindset		.15
Mistake rumination		-.08
Self-esteem		.07
Life satisfaction		-.06
Meaning presence		-.17*
Meaning seeking		-.05
Needs satisfaction - autonomy		-.12
Needs satisfaction - competence		-.16*
Needs satisfaction - relatedness		-.18*

*Note.* \*\*\* $p < .001$ ; \*\* $p < .01$ ; \* $p < .05$ ; Goal disengagement = disengagement from first transition goal in Study 1; disengagement from transition goal at Time 1; disengagement beliefs = endorsement of disengagement in unattainable goal scenarios;  $df = 70$  for Study 1 correlations; 165 for Study 5 correlations.

## Appendix M

### Exploring Features of Investment as Moderators

In Studies 2 and 5, I included a measure of “features” of investment. This measure was designed to capture three features: how *costly* the investment was (e.g., “*My investment in the goal has affected my life [e.g., led to life changes]*”), how *public* the investment was (e.g., “*People know how hard I’ve been working on the goal*”), and how *autonomous* the investment was (e.g., “*The investment I’ve made into the goal was influenced by someone else [e.g., someone else suggested it]*”). I thought it was possible that each of these three features could make the effect of prior investment on reduced disengagement more pronounced, potentially for different reasons. First, the more an individual perceives their investment as costly, the more that losing it would feel wasteful (Arkes & Blumer, 1985). Second, the more autonomous and public the investment was, the more threatening to the self or self-integrity (Dorison et al., 2021; Steele, 1988). Therefore, I explored whether prior investment (general) interacted with any of these three aspects to predict goal disengagement. These analyses can help give an even better picture of the types of investment in personal goals that reduce the likelihood of disengagement, as well as begin to explore potential mechanisms underlying prior investment.

The perceived cost of investment was not a significant moderator in Study 2,  $b = 0.04$ ,  $SE = 0.04$ ,  $t(194) = 0.93$ ,  $p = .352$ , 95% CI [-0.05, 0.13], or Study 5,  $b = -0.05$ ,  $SE = -0.05$ ,  $SE = .06$ ,  $t(163) = 0.79$ ,  $p = .430$ , 95% CI [-0.17, 0.07]. The degree of autonomy involved in the investment was not a significant moderator either, in either study: Study 2,  $b = 0.09$ ,  $SE = .06$ ,  $t(194) = 1.46$ ,  $p = .145$ , 95% CI [-0.03, 0.22]; Study 5,  $b = 0.06$ ,  $SE = .07$ ,  $t(163) = 0.83$ ,  $p = .408$ , 95% CI [-0.08, 0.20]. Finally, the degree of publicity associated with the investment was a significant moderator in Study 2,  $b = 0.11$ ,  $SE = .05$ ,  $t(194) = 2.07$ ,  $p = .040$ , 95% [0.01, 0.21],

but not in Study 5,  $b = -0.05$ ,  $SE = .05$ ,  $t(163) = 0.97$ ,  $p = .332$ , 95% CI [-0.16, 0.05]. Simple effects in Study 2 showed that contrary to expectations, higher public investment (+1 *SD*) had a weaker effect on goal disengagement,  $b = -0.31$ ,  $SE = .13$ ,  $t(194) = 2.49$ ,  $p = .014$ , 95% CI [-0.56, -0.07] than less public investment (-1 *SD*),  $b = -0.61$ ,  $SE = .10$ ,  $t(194) = 6.27$ ,  $p < .001$ , 95% CI [-0.80, -0.42].

Overall, I did not find evidence, at least with these initial exploratory analyses, that the cost, autonomy, or publicity of investment produces stronger hook effects. Furthermore, one study actually found that publicity made the effect of investment *weaker*. Perhaps publicity makes people more willing to disengage in order to escape judgements about continuing with futile goals. However, publicity made the effect of attainability on disengagement weaker rather than stronger: the effect was weaker at high publicity (+1 *SD*),  $b = -0.39$ ,  $SE = .08$ ,  $t(194) = 4.77$ ,  $p < .001$ , 95% CI [-0.55, -0.23] versus at low publicity (-1 *SD*),  $b = -0.67$ ,  $SE = .08$ ,  $t(194) = 8.86$ ,  $p < .001$ , 95% CI [-0.81, -0.52]. This measure was exploratory and future studies should continue to develop similar measures and manipulations to assess moderators and mechanisms.