

## Chapter 2

# The Dynamic Nature of Interest: Embedding Interest Within Self-Regulation

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We began our study of interest by thinking about why and how people maintain motivation over longer periods of time—and what is missing when they do not. To maintain motivation in the short term, extrinsic rewards or other valued outcomes (e.g., winning, getting a positive evaluation) are often sufficient. But when thinking about how people sustain motivation over the longer term, even for an important activity, their experience *during* the activity (not just why they started doing it) matters. That is, sustaining motivation over weeks or months to keep up an exercise routine or stay engaged with a weeks-long class project, for example, seems much easier when the person regularly experiences some level of interest. Persisting and maintaining engagement with these kinds of activities is more difficult when the experience of interest is missing, requiring more psychological resources and often resulting in quitting the activity when possible (O’Keefe & Linnenbrink-Garcia, 2014; Sansone & Harackiewicz, 1996; Thoman, Smith, & Silvia, 2011).

This experience of interest can be thought of as the source of *intrinsic motivation*. Traditionally, the term intrinsic motivation has been used to refer to when individuals engage in an activity for its own sake because it is interesting and

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enjoyable (Deci & Ryan, 2000; Sansone & Harackiewicz, 2000). However, people start many activities for reasons unrelated to interest. For example, a student might start a class project because it was assigned and he or she wants to earn a good grade. Because the student is not engaging in the project for its own sake, he or she would be exhibiting extrinsic motivation. This traditional distinction between extrinsic and intrinsic motivation thus restricts intrinsic motivation to only those activities that do not (knowingly) lead to other desired outcomes. Even when interest does not drive the choice to start an activity, however, individuals could still experience interest during engagement, and this experience can motivate persistence and progress toward the goal of completing the project. We thus suggest that people are intrinsically motivated when their behavior is motivated by the *anticipated, actual, or sought experience of "interest"* (Sansone & Harackiewicz, 1996; Sansone & Smith, 2000; Sansone & Thoman, 2005), whether or not that was their initial or only reason for engaging in an activity. From this perspective, distinguishing between intrinsically and extrinsically motivated activities becomes less useful when considering engagement over a longer time period.

As described in other papers (Renninger & Hidi, 2011; Sansone & Morgan, 1992; Sansone & Smith, 2000; Sansone & Thoman, 2005), we focus on interest as a phenomenological experience involving both cognitive and affective components. Attention is directed and focused and the general affective tone is positive. At its extreme, this may be experienced as "flow" (Csikszentmihalyi, 1975). We have also noted (e.g., Sansone, Thoman, & Fraughton, 2015) that the experience of interest has important motivational implications at all phases of interest development (Hidi & Renninger, 2006) because it reflects what individuals feel in the moment while engaged with an activity (whether the activity is novel or relevant to well-developed individual interests). Thus, our focus on the interest experience is similar to what Knogler (see Chap. 6) refers to as the "interest state." We consider this experience as a dynamic state that arises through an ongoing transaction among individuals' goals, activity characteristics, and the surrounding context. That is, interest arises during the pursuit of goals, as a function of both what a person brings to the activity and the activity parameters. Importantly, this experience is not necessarily stable over time. One's experience may vary as the activity itself changes or the activity context changes. These changes might be influenced by the nature of the activity itself, those who structure the task (e.g., teachers, parents, or peers), or even by the individual doing the activity.

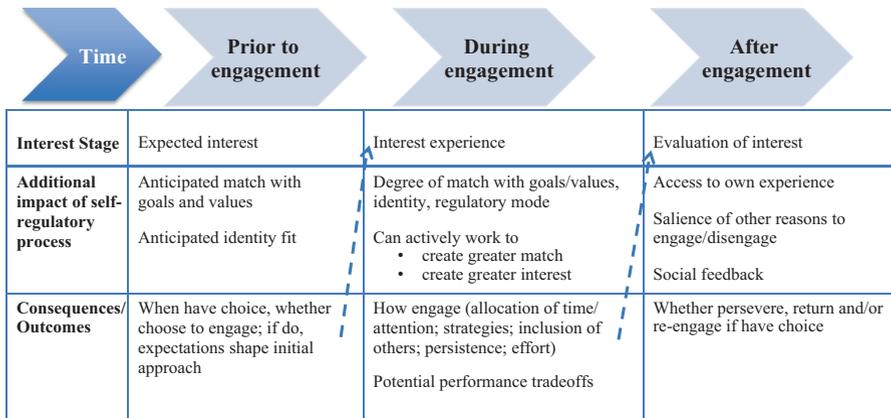
We place our study of interest within a framework of self-regulation for two main reasons. First, it opens up potential sources of interest to include a variety of goals that might motivate individuals to engage with an activity, and suggests that the entire process of goal-striving can be important for interest. Second, it allows us to capture the possibility that individuals may actively regulate their experiences during the pursuit of important goals to make them more interesting and thus more motivating.

## Specifying the Source of Interest and Accounting for Changes in Interest Over Time

How a model conceptualizes the source of interest has important implications for whether and how interest might change over time. For example, Silvia's (2006) appraisal model conceptualizes interest as a "knowledge" emotion and places the source of interest primarily within the person. Like all emotions, the experience is preceded by a cognitive appraisal. Silvia's work has mapped out appraisal structures of interest (Silvia, 2005) and demonstrates that individual differences in appraisal structures can explain variability of interest across people and situations (Silvia, Henson, & Templin, 2009). This model suggests that, as people learn more about an activity or topic, their appraisal structures can change and these cognitive changes explain fluctuations in interest over time.

Other models, most notably Hidi and Renninger's model of interest development (Hidi & Renninger, 2006; Renninger & Hidi, 2016), view the role of time and changes in interest through a developmental lens. This model attempts to explain the processes through which an individual's interest in a topic sparks, deepens, and ultimately becomes part of that person's identity. This model suggests that the source of interest begins with external triggers (e.g., interesting text). Interest can subsequently grow if initial interest leads individuals to seek out and gain more knowledge about the topic or domain and comes to value it more. When supported, over time and experiences, this initial interest potentially can continue to grow into well-developed individual interests that become a part of the person's identity. In this approach, interest begins as surface-level reactions to stimuli and becomes "interests" integrated and embedded within the person's knowledge structures and their predispositions toward the world.

Our model focuses on the motivational properties of the experience of interest and integrates interest within a self-regulatory framework. This framework recognizes that interest can be actively created and controlled both for its own sake and as a means to sustain motivation for valued activities. Our definition of the interest experience locates the source of interest primarily in the person, but we emphasize that the person is not the same over time. Interest fluctuates once the person is placed into time and setting because the experience arises from ongoing engagement in goal-directed activity. In our model, interest is neither a passive experience nor a stable individual predisposition toward task features or topics. The experience of interest can change over time, as a function of what the person brings to the activity (e.g., goals, individual differences), the activity context (including activity parameters and the social context), and how the person works on the activity (behaviors), all of which can change over time. Shifts in interest often occur unintentionally (as the activity context changes, for example), but individuals can also take advantage of this point by actively doing something to change their experience, even if not always done consciously. Identifying the location of interest in a person who is both actively and reactively engaging with the environment/task is what



**Fig. 2.1** Identification of determinants of interest that emerge from embedding interest within the dynamics of self-regulation as well as the consequences for choices and actions. *Dashed arrows* indicate that the outcomes of self-regulation processes at each stage have implications for interest at the next point of activity engagement

gives rise to our self-regulation model and differentiates our dynamic approach to the psychological science of interest.

To illustrate the dynamic nature of the interest experience as an ongoing transaction between the person and activity, we describe studies from our program of research that highlight this dynamic aspect of interest experience across time, relative to activity engagement. As outlined in Fig. 2.1, for the purpose of the present chapter we focus on the determinants of interest that emerge when considering interest as embedded within the process of goal-striving over time. The overarching self-regulation framework integrates previous research that identifies certain factors as impacting interest in negative (e.g., deadlines) or positive (e.g., personal relevance) directions, but also helps to understand why there might be circumstances under which they do not have those effects. Moreover, this framework allows the identification of additional determinants of interest that are tied specifically to the dynamics of self-regulation.

The figure illustrates two central points. The first is that rather than certain factors always being associated with greater or lesser interest, it is important to know whether those factors match or are congruent with the person’s goals. For example, two students could both decide to learn Hypertext Markup Language (HTML) but with different goals. The first student might be learning in order to make his or her blog more eye-catching; the second student might be learning in order to be able to update product information on his or her company’s website. Our approach suggests that the same factor (e.g., instruction on how to make animated cartoon characters appear on the web page) might lead to different interest experiences for the two students.

The second point is that individuals actively monitor and react to their experiences, and take these anticipated or actual experiences into account when deciding

whether to start, persist, or re-engage with an activity or related activities. This active role includes engaging with activities in ways that make them more congruent with goals (e.g., the student learning HTML to enrich his or her blog might skip over instructions about how to create forms to collect information from viewers, and instead spend more time exploring different kinds of cartoon characters that could be added). This active role could also mean engaging with the activity in ways that makes the experience more interesting whether or not it advances progress toward the goal (e.g., the same student could spend time texting cartoon characters to friends). This active role in how they engage with the activity has implications for performance behaviors as well as subsequent evaluations of performance by self and by others upon completion.

As noted elsewhere (e.g., Sansone, Wiebe & Morgan, 1999; Sansone & Thoman, 2006), we are not suggesting that interest is the only source of motivation to persist, nor that it is always necessary for persistence. Rather, we are suggesting that the experience of interest (or its lack) is integral to the self-regulatory process, and thus its presence or absence has consequences on our choices and actions at each stage of engagement. In the following sections, we review research that illustrates the implication of these points when individuals are deciding whether to engage with an activity or domain (prior to engagement), when individuals are engaged (during engagement), and when individuals are evaluating their experience (after engagement).

## **A Dynamic Basis of Expected Interest**

As noted by Bandura (1991), one of the important things we regulate is whether we enter a context or begin an activity in the first place. For our present purpose, we focus on how anticipating that an activity or domain will be interesting shapes these choices. We have examined these questions in the context of understanding why individuals from different groups (e.g., as defined by gender, SES, etc.) might differentially select STEM (Science, Technology, Engineering, and Mathematics)-related careers. Individuals often have multiple goals for engaging in an activity. For example, in academic achievement contexts, students often want to learn and to demonstrate competence to others (Barron & Harackiewicz, 2001), or have interpersonal goals as well as competence goals (e.g., Sansone & Morgan, 1992). If individuals from different backgrounds systematically differ in some of these goals, then the goal-matching concepts outlined previously would suggest that they might anticipate different levels of interest if the activity and surrounding context are not perceived as congruent with those goals.

Morgan, Isaac, and Sansone (2001) examined whether women and men undergraduates expected that STEM careers might be differentially interesting as a function of match with goals. They asked one group of students what their work plans were, and why, and then coded the reasons provided for these career preferences. They found that overall, both men and women cited the anticipated interestingness

of the work most frequently, and this was cited equally frequently by both men and women. The second most cited reason overall was “people-oriented,” framed in terms of wanting to work with or to help other people. However, this was also cited by more women than men. Pay and status were cited least frequently overall, but also were cited significantly more by men than by women. Morgan et al. then asked a second group of students to rate a variety of potential careers in terms of their perceived affordances for different kinds of goals, including the “people-oriented” goals and pay and status goals identified by the first group of students. They also asked them to rate how interesting they thought careers in the different fields might be. In support of the matching hypothesis, both men and women perceived that mathematical and physical science careers were less likely to afford interpersonal goals and more likely to afford extrinsic reward goals, and perceptions of these affordances predicted how interesting individuals expected careers in these fields to be. A similar effect was later found by Diekman, Brown, Johnson, and Clark (2010), who examined gender differences in anticipated interest in STEM fields as a function of anticipated match with “communal goals” (defined as wanting to work with or help other people).

Recent research has focused on match with culturally connected values, demonstrating that underrepresented minority (URM) and first-generation (FG) college students (for whom neither parent graduated with a four-year degree) tend to more strongly value prosocial goals of helping society and giving back to one’s community through work than white students and continuing generation students (Harackiewicz, Canning, Tibbetts, Priniski, & Hyde, 2016; Thoman, Brown, Mason, Harmsen, & Smith, 2015). URM students who see science as providing opportunities to fulfill these goals expressed greater interest in science careers, but these perceptions did not influence career interest for non-URMs or continuing generation students (Allen, Muragishi, Smith, Thoman, & Brown, 2015; Jackson, Galvez, Landa, Buonora, & Thoman, 2016; Thoman et al., 2015).

Together, these studies suggest that perceived mismatch with goals creates the perception of an activity or domain that it would be less interesting to do compared to other options. A consequence is that individuals are less likely to select these kinds of activities initially when given a choice.

## **The Dynamic Basis of Interest Once Engaged**

Once engaged with an activity, individuals’ goals can again influence whether the same activity performed in a given context is experienced as interesting. For example, in Sansone, Sachau, and Weir (1989), individuals performed a fantasy-based computer game that prompted adoption of goals to become involved in the fantasy adventure. Some students were randomly assigned to conditions which instead prompted adoption of competence-related goals (e.g., they received performance feedback relative to other students (Study 1); they read task descriptions that described the game as a test of skill (Study 2)). Students then received feedback that

provided suggestions for how to increase their scores. When contextual cues had first prompted the adoption of skill-related goals, this instructional feedback was associated with *greater* subsequent interest and with participants being more likely to take a company brochure when they left. However, the same feedback was associated with *decreases* in interest and participants being less likely to take the game brochure when individuals' goals were focused on the fantasy adventure. A mediation analysis indicated that individuals in the mismatch condition (i.e., those with fantasy adventure goals who received instructions about scoring) experienced a lower degree of positive affect (including interest) while engaged. Although performing ostensibly the same activity, individuals experienced different levels of interest depending on whether or not the instruction was congruent with their initial goals.

A similar matching effect has been found for achievement goals (e.g., Harackiewicz & Elliott, 1993) and interpersonal goals (e.g., Isaac, Sansone, & Smith, 1999; Morf, Weir, & Davidov, 2000; Smith & Ruiz, 2007). Although the presence of others might make an activity more interesting to do for most people (e.g., Plass, O'Keefe et al., 2013; Sansone, Weir, Harpster, & Morgan, 1992; Tauer & Harackiewicz, 2004), the presence of others can be especially impactful for those for whom interpersonal goals are especially important. For example, in Isaac et al. (1999), individuals higher in characteristic interpersonal orientation (who characteristically approach activities with interpersonal goals) experienced greater interest in a math-related activity and were more likely to request further information about the topic when they worked with or even just alongside another person (a confederate), as opposed to when they worked alone.

Isaac et al. also videotaped the work sessions to explore *how* the presence of others might have resulted in a more interesting experience. They found that individuals higher in interpersonal orientation reached out and engaged with the other person, displaying a more interpersonally involving interaction style (e.g., expressing thoughts and information to a greater degree). These actions drew more off-task conversation out of the other person, and this in turn predicted greater interest in the activity (and more interest in getting further information about the topic in the future). These results demonstrate that the goals that individuals bring to the activity not only influence how they engage with the task but also how they engage with the surrounding context. If they can, individuals will actively create experiences that are congruent with their goals, resulting in greater interest. In other words, when goals are matched with context, either because they match initially or are made to match through individuals' actions while engaged (Smith & Ruiz, 2007), individuals will experience greater interest.

This research suggests that interest can be a by-product of regulation that brings the activity in line with initial goals. However, our approach also suggests that interest itself can be the target of regulation. Even if individuals are sufficiently motivated to begin an activity, motivation can wane as time passes. Because interest is an important source of motivation for persistence and effort, whether the experience is interesting can be critical for whether individuals persist or re-engage. Moreover, when the experience is not interesting, individuals can actively change how they

engage with the activity, with the purpose of enhancing interest. In this case, interest is not a by-product of self-regulation—it is the thing being regulated.

Initial work on this hypothesis was reported in Sansone et al. (1992), who outlined the conditions under which individuals should be most likely to actively engage in strategic actions to enhance interest: (1) when the activity is currently not interesting (i.e., there is a need to regulate), (2) there is a good reason to persist anyway, and (3) the actions that would make the experience more interesting (e.g., varying how the activity is performed) are possible in that situation. They created an experimental paradigm to test these hypotheses using identical materials across conditions, comparing an initially boring task (copying letters matrices) and an initially interesting task (finding words hidden in those same matrices). A subset of those doing the copying task were also provided a reason to value the task (i.e., health benefits). Those who performed the copying task with knowledge of health benefits were most likely to engage in interest-enhancing actions (e.g., varying the procedure) while engaged with the copying task. For example, they attempted to copy the particular type font displayed in each matrix (although that was not necessary for the task), varied the pattern with which they copied the letters (e.g., did all the diagonals first), and so on. Individuals who performed the hidden words task were least likely to vary how they performed the task, and individuals who performed the copying task without the health benefit information fell between the two. Moreover, varying the procedure predicted greater likelihood of doing the activity in the future (i.e., requests for matrices to take away with them). Importantly, the health benefit information by itself did not predict greater likelihood of doing the activity again. Rather, the health benefit information made it more likely that individuals would do the interest-enhancing actions, and it was these actions that predicted greater likelihood of future engagement.

The purposeful regulation of the interest experience also raises the question of how these actions might work with (or against) performance. In Sansone et al. (1992), for example, although individuals who varied the procedure were more likely to do the activity again, they also copied fewer letters in the time allowed. In a later study, Sansone et al. (1999) found that when individuals were free to choose how long they worked on the copying task, those who varied the procedure persisted longer, and thus copied more letters, than individuals who did not engage in these strategies. These results suggest that there can be trade-offs, at least in the short term, between regulating the interest experience and performance. However, these results were also limited to a laboratory paradigm with no consequences for poor performance, and so it was possible that these trade-offs do not occur in other situations, such as in academic situations.

Later research suggested that trade-offs can occur within academic domains as well. For example, Sansone, Smith, Thoman, and MacNamara (2012) found that undergraduates in an online section of an upper division psychology course were more likely than students in the on-campus section to report trying to make studying for an exam more enjoyable by exploring material on the class web page (which was available to students in both class sections). Although overall students in the online section reported lower interest than students in the on-campus section, online

students who reported exploring material on the class web page had interest levels equivalent to students in the on-campus section. The more that students in the online section reported using the strategy, however, the greater their interest but the poorer their exam performance.

In a series of follow-up laboratory studies using an online learning paradigm, a similar possibility for trade-offs emerged. Undergraduates were provided a good reason to value learning HTML (Hypertext Markup Language) through a utility value manipulation (Eccles & Wigfield, 2002). Specifically, students in utility value conditions were provided information about how learning HTML could be useful in personal or organizational applications. Students who received the utility value information were more likely to engage with the examples and exercises in the online lesson in ways that predicted greater interest and likelihood of continuing to learn about HTML on their own. For example, they were more likely to experiment with sample HTML commands displayed in the examples. However, for some students, the higher degree of engagement was associated with running out of time to submit the assignment (Sansone, Butner, Fraughton, & Zachary, 2011). Taken together, these studies suggest that once engaged in an activity, individuals can actively monitor and regulate the degree of interest they experience. They can do so purposely, in order to maintain motivation for a valued or necessary activity. However, in some circumstances the time and effort directed toward regulating interest might come at a cost to efforts more directly related to external requirements and evaluated outcomes, at least in the short term.

## **A Dynamic Basis of Interest after Engagement**

One implication of our self-regulation model is that individuals can continue to think about and evaluate their interest even *after* activity engagement. That is, individuals not only evaluate progress toward goals (Carver & Scheier, 1990), they also evaluate their experience. Of course, one important source of information for this evaluation is the person's own immediate perception of their experience, as well as their attributions about what led to that experience (Silvia, 2006). However, people's perceptions of how they felt after an event or experience is over can be colored by initial expectations (e.g., Klaaren, Hodges & Wilson, 1994), and by how they think others feel about the same event (e.g., Gilbert, Killingsworth, Eyre, & Wilson, 2009). After behavioral engagement stops, people think about past events and this process of recalling events and activities has implications for reconstructing our memories and experiences (Pasupathi, 2001), including attributions for and appraisals of experiences of interest (Silvia, 2006). Just as was found at other points in the engagement process, other people may play an important role in this reconstruction of our experience.

For example, in a study by Pasupathi and Rich (2005), pairs of friends (college students) came into the lab, and one person was randomly assigned to play a novel computer game and subsequently describe the game to his or her friend. Participants

who were assigned to play the game rated their interest in the game both before and after the conversation. These participants were unaware that experimenters had manipulated their friends' pattern of responsiveness as they listened to the description of the game. Pasupathi and Rich randomly assigned listeners to one of three conditions. In the unresponsive listener condition, listeners were instructed to count the number of 'th' words that the speaker said while describing the activity (i.e., which created the appearance of inattentive listening). This was compared to the condition where the listener was responsive but disagreed with the speakers' statements, and the condition where the listener was responsive and agreeable (as they would normally be with the friend). In the condition where listeners were instructed to count the "th" words, speakers' interest in the activity dropped from pre- to post-conversation. When listeners instead were instructed to listen to their friends as they normally would, interest levels were maintained. Importantly, when listeners had been instructed to disagree with the speaker's description, interest was also maintained. Thus, interest dropped after the conversation period only when the listener appeared unresponsive, suggesting that (un)responsiveness (conveying lack of interest or value) may be more important for evaluation of interest than whether one's descriptions of the activity are explicitly verified by the listener. Subsequent research replicated these findings, and also showed that listener responsiveness when individuals discussed their experience outside of the lab predicted subsequent interest over and above interest levels at the end of the lab session (Thoman, Sansone, & Pasupathi, 2007).

Two subsequent studies extended this research into the classroom (Thoman, Sansone, Fraughton, & Pasupathi, 2012). In Study 1, Thoman et al. examined conversations about class topics that took place as a structured part of an online psychology class (i.e., discussion board). They found that how often students posted on the discussion board did not predict their subsequent ratings of interest in the class. Rather, the important factor was how often other students had responded to their posts. In Study 2, college students in an introductory physics course completed diaries throughout the semester that included students' reports of everyday conversations about class topics and about class exams. Students' reports of perceived listener responsiveness in conversations about class topics predicted students' class interest, even when controlling for anticipated interest at the beginning of the semester. Importantly, this effect occurred only for conversations about class topics, and not for conversations about exams. This pattern suggests that subtle feedback conveying that listeners are interested (or disinterested) in the topic has implications for evaluations of interest in a way that feedback about issues of competence assessment or class difficulty do not.

This work suggests that interest in an activity is not only affected by the individual's experience during the activity but also by talking with others after the activity has occurred. The reactions of others—and particularly, whether they appear to be interested in what we are saying—can be an important determinant of our own evaluations of our experiences.

Moreover, this may be another point in the process that helps to explain why individuals from different backgrounds might differentially select into STEM

careers. For those who are underrepresented in STEM (e.g., women and underrepresented minorities), the concern about being judged negatively based on their identity (i.e., social identity threat) can lead them to be vigilant for situational cues related to whether they are being socially accepted (Cohen & Garcia, 2008). Consistent with the idea that women in STEM experience social identity threat, a study on workplace interactions among STEM faculty members found that discussing research with male colleagues was associated with greater disengagement for women, whereas socializing with male colleagues was associated with less disengagement (Holleran, Whitehead, Schamder, & Mehl, 2011). When talking with someone about their STEM interest, therefore, women may be particularly sensitive to signs of (un)responsiveness (Thoman, Smith, Brown, Chase, & Lee, 2013). Recent findings from a larger longitudinal survey study of freshmen and sophomore college science majors support this prediction (Curti, Zambrano, Lee, Jackson, & Thoman, 2016). The part of the data from Curti et al. directly relevant to group-based differences indicated that for women, but not for men, feeling that one's interest in science had been encouraged and understood by others (i.e., listeners were responsive and encouraging) predicted greater end-of-semester science career interest. This was particularly true for women with low or average science identity at the beginning of the semester. Thus, these results suggest that underrepresented students might be most affected by responsive listeners. Even when they do engage with a STEM-related activity, their subsequent evaluations may be more vulnerable to the appraisals conveyed (sometimes subtly) by others.

In addition to regulating the evaluation of interest to align with the presumed appraisals by others, individuals may also regulate their evaluations of the experience in service of other goals—and in particular, to protect or promote the self. For example, in Festinger and Carlsmith's (1959) classic study on cognitive dissonance, participants who were given insufficient external justification (\$1) to tell another participant that a boring task (e.g., repeatedly turning pegs a quarter turn) was interesting subsequently rated the task as more interesting. This and later studies (e.g., Fazio, Zanna, & Cooper, 1977; Stone & Cooper, 2001) have been considered evidence of how individuals will change attitudes in order to protect against negative evaluations of self (e.g., in Festinger and Carlsmith's study, to protect against having lied to another person). For our present purposes, these studies provide evidence that individuals can purposely change interest appraisals after engagement as a way to protect or promote the self.

Thoman and Sansone (2016) examined whether this possibility can help to explain how women and men can come to have different interest appraisals of a STEM-related activity after engagement even when their engagement experiences were similar. Research has shown that women and men can receive different feedback for similar performance (Moss-Racusin, Dovidio, Brescoll, Graham, & Handelsman, 2012), and Thoman and Sansone examined whether the experience of receiving different feedback for similar work could lead men and women to differentially evaluate how interesting the experience was. When participants arrived at the lab, they were assigned to work on a forensic activity independently from but in the same room as an opposite-sex participant. However, in Study 1, women were the

real participants and the men were actually confederates; in Study 2, this was reversed. In both studies, after the activity was completed, the experimenter skimmed both sets of materials and commented that the woman and a man had performed about the same. Next, they “accidentally” overheard the male researcher in charge of the study select the man as the outstanding group member (Major, Quinton, & Schmader, 2003). Some of the women in Study 1 and men in Study 2 also “accidentally” overheard the head researcher saying that the reason he had selected the man was because men were better at science. Following the feedback, participants reported their interest in the activity and were also given the opportunity to request information on related careers. Compared to control conditions, when the feedback was perceived as due to pro-male bias, women (Study 1) reported lower interest and men (Study 2) reported greater interest in the science activity. Higher levels of interest, in turn, positively predicted whether participants subsequently requested career information. These findings suggest that individuals can purposely change their evaluations of activity interest after engagement as a way to protect or promote the self. For women, lowered interest would make them less likely to select similar activities in the future, thus allowing them to avoid future experiences of bias. For men, in contrast, greater interest would lead them to be more likely to select similar activities in the future (where they may also experience bias in their favor).

Together, the studies in this section suggest that the evaluation of interest after engagement is not a passive reaction to activity characteristics. Although the actual experience while engaged is an important source of information for the evaluation (Silvia, 2006), evaluations are an active process, influenced by others, and in service of potentially multiple goals (e.g., to have a good experience, to avoid rejection).

## Implications of a Dynamic Model of Interest

The sections above highlight how approaching interest from a dynamic, self-regulatory framework can answer questions about the nature of interest and the role of interest in helping us to maintain motivation over time. In sum, the key points from this approach are:

- Interest can be actively monitored, evaluated, and regulated.
- Monitoring, evaluation, and regulation happen in context—which critically shapes, supports, and/or constrains the interest regulation process.
- It is important to examine not just *whether* someone engages with an activity, and *why*, but also *how* he/she chooses to engage.
- The *process* of interest regulation results in both between- and within-person differences in interest over time

These key points have important implications for research. In the next sections, we focus on two areas that seem especially fruitful areas of continued investigation.

## **Expanding the Examination of Meta-motivational Variables**

Researchers have recently started to emphasize the need for expanding the examination of meta-motivational variables beyond inferences about reasons or perceptions about autonomy or control (e.g., Miele & Scholer, 2016). For example, how do theories about the nature of motivation affect whether and how individuals regulate their motivation? Furthermore, how do theories about the nature of interest affect whether and how individuals attempt to regulate interest?

Our framework also suggests that, in addition to the importance of considering people's beliefs, or implicit theories, about why they performed an activity (e.g., Lepper, Sagotsky, Dafoe, & Greene, 1982) or why they struggle or succeed (Blackwell, Trzesniewski, & Dweck, 2007), it is important to consider beliefs about one's experience during engagement. For example, across three studies, implicit theories about interest regulation (i.e., beliefs about whether it is possible to make the task interesting) predicted actual interest regulation (Thoman, Sansone, & Robinson, 2016). In two experimental studies using the copying task from Sansone et al. (1992), participants were asked to complete either the boring copy version of the task or the interesting hidden words version. All participants were told that doing this activity would help others and were asked to complete several activity sheets. Prior to the copy task having been introduced, however, participants' implicit theories of interest regulation were either measured (Study 1) or manipulated (Study 2). In both studies, for those who completed the boring copy task, those who believed that interest in an activity can change were more likely to regulate their interest than those who believed that interest experiences are stable. As expected, no such difference was found for those who completed the interesting task because there was no need to regulate interest. In a third study, Thoman et al. (2016) replicated these findings in a correlational survey study. College students were asked if they could recall any recent boring assignments from their actual classes, and if so, whether they used any interest-enhancing strategies. Across a range of academic domains, students who believed that interest in an activity could change were more likely to report having used interest-enhancing strategies than students who believed that experiences of interest were stable. Related research on implicit theories of interest by O'Keefe and colleagues has examined implications of whether people think their interests are inherent and relatively stable or developed. Their work suggests that believing that interests are developed leads to higher interest in a greater variety of topics and greater maintained interest in the face of difficulty (O'Keefe, Dweck, & Walton, 2016; Chap. 3).

## Determining What Is “Effective” Regulation

Effective self-regulation of motivational and emotional states, in general, requires flexibility across time and situations (Bonanno & Burton, 2013). One important feature of our model is that the monitoring, evaluation, and regulation of interest happen in coordination with features of the activity, including what (and who) defines successful engagement. Thus, the context in which interest regulation is occurring critically shapes, supports, and/or constrains the process itself. By extension, whether regulation of motivation and interest is deemed “effective” thus depends on the activity context, the timeline of engagement, and on what grounds the evaluation is based (e.g., performance vs. persistence or retention).

When individuals choose to regulate their motivation by making a task more interesting, there are sometimes long-term benefits but short-term costs. For example, as noted previously, students who attempted to make a letter-copying task more interesting actually copied fewer letters in the limited time allowed than students who did not attempt to regulate their interest (Sansone et al., 1992). However, when the time frame was left open-ended, those who regulated their interest persisted longer and therefore copied more letters (Sansone et al., 1999). Moreover, the more that online students reported exploring the class webpage as a way to make studying more enjoyable, the lower were their exam grades (Sansone et al., 2012).

Thus, one barrier to effective interest regulation is the presence of competing goals (Sansone, 2009). Individuals may have competing goals themselves (Barron & Harackiewicz, 2001), but those who create or structure the activity (e.g., teachers) can also define activity goals that compete with an individual’s other goals. For example, when externally set deadlines do not allow time for exploration or variety, individuals who engage in such interest-enhancing behaviors might be penalized with lower performance scores. Of course, individuals could avoid this penalty if they did not try to engage with the materials in ways that create or maintain interest, but rather focused narrowly on performance-related aspects of their work. However, this also means that these individuals may be less likely to persist or re-engage in the future. In situations when regulating interest and maximizing evaluated performance are incompatible, what type of engagement is more “effective”?

When an important goal is to promote sustained engagement (e.g., retention in a field of study), it may be possible to construct environments in ways that minimize incompatibilities. For instance, to encourage persistence in STEM fields, it would be important for educators to emphasize students’ subjective experiences in STEM (e.g., by promoting exploration of novel and interest-enhancing portions of the course website) in addition to providing means for academic achievement within the field. Our framework thus suggests that it is important to consider the possibility of promoting both performance and interest goals when creating learning and working environments for ourselves and for others.

Although we have mostly emphasized the need to allow for the regulation of interest in order to promote long-term positive outcomes, it is possible that the focus on the interest experience at the expense of other considerations can also be

problematic. For example, work by Vallerand and colleagues on “passions” suggests that some passions can be detrimental to well-being (see Chap. 8, this volume). Vallerand’s description of passions is similar to Hidi and Renninger’s (2006) description of well-developed individual interests, including the integration with a person’s identity. However, Vallerand differentiates between “harmonious” and “obsessive” passions. Harmonious passions are positive; they are associated with autonomous activity choices and healthy adaptations. Obsessive passions are problematic; they can take over or control one’s life, create conflicts within relationships and with work or school requirements, and so on. With obsessive passions, regulation is focused on maximizing engagement with these intensely interesting activities, but with serious costs to other aspects of well-being. In this case, the rewarding aspects of the interest experience can become addictive. “Effective” regulation thus needs to be judged within the overall context of the person’s life, and the person might make different judgments than the people with whom he or she interacts at home, work, or play.

## Unanswered Questions and Future Directions

Building upon the work described above and the implications of our dynamic self-regulation model of the interest experience, we identify key unanswered questions and directions for further research.

**Can we teach effective self-regulation of interest?** Our research has studied spontaneous interest regulation behaviors in laboratory paradigms and measured regulation strategies through surveys. Across these studies we have observed variability in whether and when individuals will regulate interest. In many instances the choice to regulate interest or not is likely rational (even if not always conscious). At other times, however, people might not change how they do the activity even though they could benefit from making it more interesting. The questions that follow are: Can we teach self-regulation of interest? And what is the best target, the individual or the situation (e.g., teachers, managers)?

Our self-regulatory framework highlights multiple potential areas for intervention. For example, encouraging individuals to find what is meaningful, useful, and of personal relevance in what they are doing can directly enhance interest (e.g., Hulleman & Harackiewicz, 2009), or indirectly enhance interest if it provides a “good reason” to exert the effort to make how they engage with the work more interesting. However, recent work suggests that utility value interventions can also lead to decreased interest, as a function of whether the value is externally provided by an experimenter (or teacher) or self-generated in a personal essay, as well as individuals’ levels of perceived competence (e.g., Canning & Harackiewicz, 2015; Durik, Shechter, Noh, Rozek, & Harackiewicz, 2014). Thus, our perspective on interest regulation suggests that it is important for researchers to better understand

whether and how increases in value might affect patterns of engagement and interest regulation over time.

Another potential area for intervention is to teach individuals to recognize when and how they might change how they work on uninteresting school- or work-related tasks when they have a good reason to persist. Helping individuals become aware of the benefits of interest regulation and teaching simple strategies for how they can change different types of activities seem relatively easy. But the implications of teaching self-regulation of interest become much more complicated when considering the findings above on trade-offs (e.g., performance costs). Rather than asking whether we can teach self-regulation of interest, therefore, it is far more important to ask whether we can teach *effective* self-regulation of interest within the complete dynamic context of activity engagement over time (Sansone et al., 2015).

Focusing on interest regulation for students, this more complex question becomes: Is it possible to design interventions to teach students how to engage with courses in order to maximize *all* of their performance- and experience-related goals, including the mastery of material, achievement of good grades, *and* an enhanced interest experience? This question is far more difficult to answer than the simpler version and may need to consider intervention not at the level of the student, but of the student within a learning context. For example, effectively creating such an intervention might mean developing a coordinated intervention program for both students and teachers. In this type of model, students would need to learn how to regulate their interest and teachers would need to learn how to recognize when students were pursuing goals to learning or goals to create interest, how to design activities that create the flexibility needed for each student to pursue interest regulation options, and how to create a scaffolding that would help students effectively manage trade-offs between multiple goals. At the minimum, our perspective suggests that instructors should be aware that interest regulation can be essential to maintaining motivation over the longer term. Our model clearly suggests that developing educational interventions must take into account the dynamic basis of interest to be effective.

**Dynamic Analysis** By emphasizing that there are differences in interest regulation processes both between and within individuals over time, our model opens up a host of complicated questions about how interest changes. For instance, our framework raises questions not only about *mean-level* group differences in interest, but also about group differences in interest *trajectories over time* (i.e., differences in the stability of interests). Further, our model allows us to ask more nuanced questions about how mechanisms involved in interest development might play into the interest regulation process. For example, we can ask how changes in perceived competence over the span of a semester might be coupled with changes in interest in order to determine if changes in one necessarily entail changes in the other.

Using traditional analytic approaches, we are unable to answer these complex, temporal questions. Along with other interest researchers (e.g., Goetz, Sticca, Pekrun, Murayama, & Elliot, 2016; Knogler, Harackiewicz, Gegenfurtner, & Lewalter, 2015; Tanaka & Murayama, 2014) we recognize the importance of new

statistical approaches to test these questions. We believe that integrating a dynamic systems analysis can be very effective, because it allows modeling of multicomponent systems that interact to form complex temporal patterns (Butner, Gagnon, Geuss, Lessard, & Story, 2014). A variety of statistical techniques commonly used in systems modeling (e.g., multilevel modeling, structural equation modeling) can help us to describe and predict both between-groups and within-groups change in interest over time. Thus, dynamic systems approaches are key to helping us answer some of the more complicated, unresolved questions that follow from a dynamic model of interest.

## Conclusions

Interest is often described as a static binary variable: you have it or you do not. At any one snapshot in time, this depiction might accurately describe a person's experience. Our approach to the psychological study of interest underscores that interest is far more complex and dynamic, particularly when considering how the experience of interest functions within a broader self-regulatory system in which motivation drives behavior and emerges during ongoing engagement. One's experience of interest necessarily fluctuates over time, but our model suggests that these changes are not capricious and that interest can in fact be purposely monitored and regulated. When we investigate experiences of people situated within activity contexts over time, we can better understand the causes and consequences of interest and the role of the interest experience in maintaining motivation over time.

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