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## Abstract

Self-determination theory has been applied to understand the role of affect in motivation and behavior in health contexts. According to self-determination theory, autonomous forms of motivation, reflecting self-endorsed reasons for acting and the satisfaction of psychological needs, are related to participation and persistence in health behavior. Research examining the role of affect in determining health behavior from the perspective of the theory is relatively sparse. Affect has served as both an outcome and process in applications of the theory to health behavior. Positive affect and psychological well-being have been identified as important outcomes of participating in behaviors for autonomous reasons. Affect is inextricably linked to motivational processes through eudaimonic and hedonic well-being, the passionate pursuit of activities, and the regulation of behavior through active management of aversive emotional responses. The chapter outlines how support for autonomous motivation by significant others may lead to adaptive behavioral engagement and affective responses in health behavior.

**Keywords:** intrinsic motivation, autonomous motivation, controlled motivation, psychological need, satisfaction, enjoyment, hedonic well-being, eudaimonic well-being

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## Chapter 7

### Affect in the Context of Self-Determination Theory

Martin S. Hagger and Cleo Protogerou

#### Introduction

Self-determination theory (Deci & Ryan, 1985, 2000) is an established theory of motivation that has been applied extensively to the prediction and understanding of health-related behavior. Although the theory is positioned in the organismic, humanistic tradition, researchers have demonstrated that it is closely related with the antecedents of health-related behavior from multiple theories based on the social cognitive tradition (Biddle, Hagger, Chatzisarantis, & Lippke, 2007; Hagger & Chatzisarantis, 2009; Wilson, Rodgers, Blanchard, & Gessell, 2003). However, unlike the belief-based, information-processing perspective that pervades social cognitive approaches, self-determination theory focuses on psychological needs and motivational quality as central factors that determine motivation toward, engagement in, and persistence with health-related behavior (Ryan & Deci, 2000). The theory has been shown to be efficacious in explaining variance in numerous health-related behaviors and also for guiding interventions to promote greater participation in health behaviors (e.g., Chatzisarantis, Hagger, Biddle, Smith, & Wang, 2003; Ng et al., 2012; Teixeira et al., 2016). In addition, self-determination theory has also focused on predicting a number of adaptive outcomes related to motivation and behavioral engagement, including positive emotional and affective outcomes. A growing body of research has demonstrated the effect of motivational constructs from self-determination theory on affective responses in health-related contexts, as well as adaptive emotion-related outcomes that are important for overall health, such as psychological well-being and life satisfaction (Deci & Ryan, 2008; Ng et al., 2012; Williams,

Frankel, Campbell, & Deci, 2000). There is also evidence to suggest that emotional responses, particularly positive affect and psychological well-being, are integral to motivation itself within self-determination theory (Deci & Ryan, 2000; Ryan, Huta, & Deci, 2006). In the current chapter, we outline the general tenets of self-determination theory, identify the role that emotion and affect plays in self-determination theory as an outcome and a process, review the research applying self-determination theory in health behavior contexts, outline possible future research on affect and self-determination theory applied to health contexts, and summarize the importance of affect in the development of behavioral interventions based on self-determination theory to promote better health.

## The Theory

Self-determination theory (Deci & Ryan, 1985, 2000) is a broad, empirically based theory of motivation that focuses on fundamental processes that relate to salient outcomes in everyday life, including psychological needs and aspirations, goal setting and attainment, self-regulation, interpersonal relations, emotions and affect, cultural and societal influences, and nonconscious processes. The theory has been applied to explain motivation in numerous contexts including education (Black & Deci, 2000; Hagger, Sultan, Hardcastle, & Chatzisarantis, 2015), the workplace (Chan & Hagger, 2012; Gagné & Deci, 2005), sport (Chan et al., 2015; Jöesaar, Hein, & Hagger, 2012; Wallhead, Hagger, & Smith, 2010), health (Teixeira, Carraca, Markland, Silva, & Ryan, 2012; Williams, Minicucci, et al., 2002), economics (Webb, Soutar, Mazzarol, & Saldaris, 2013), and interpersonal relations (Deci & Ryan, 2008).

## Basic Needs and the Organismic Dialectic

Central to self-determination theory is the concept of basic psychological needs. The theory specifies three psychological needs—*competence*, *relatedness*, and *autonomy*—that are seen as innate, fundamental prerequisites or “nutriments” for optimal growth and happiness in

humans (Deci & Ryan, 2000). The need for competence, also referred to as effectance, is the individual's need to have an impact on their environment and to experience a sense of mastery over actions. The need for competence is satisfied through the learning and mastering of new skills, setting goals, and successful goal attainment. The need for relatedness is the desire to connect with others, to love and care for others, and to be loved and cared for by others. The need for relatedness is satisfied through functional group membership and close relationships. The need for autonomy is the propensity to be agentic and to experience a sense of ownership and volition when acting. The need for autonomy is satisfied through the experience of voluntary initiation, execution, and control of behavior. While the theory views competence, relatedness, and autonomy as basic and universal, it also assumes individual differences in the ways people interact in their social environments to satisfy their needs. Basic psychological needs are viewed as the driving force behind motivated action and are viewed as a unifying concept within self-determination theory (Ryan & Deci, 2000). From the perspective of the theory, the important question is not the existence of needs per se—Deci and Ryan point to research demonstrating their existence and universality (Sheldon, Elliot, Kim, & Kasser, 2001)—but rather the extent to which needs are satisfied. The type and quality of motivation toward actions in a given context will determine whether psychological needs are satisfied and the extent to which needs are satisfied will motivate individuals to seek out those actions and experiences in future.

Self-determination theory puts forth the *organismic dialectic* as a fundamental lifelong human process, which exemplifies an *active* dialogue between the individual and others, and functions to produce a coherent and consistent sense of self through the satisfaction of the basic psychological needs (Deci & Ryan, 2000). The organismic dialectic that underpins the theory is firmly in line with philosophical precursors immersed in the humanistic and philosophical traditions that focus on the optimally functioning organism. The

term “organismic” is derived from the Greek word “organismós” and refers to an entity comprising mutually interdependent parts and, more loosely, to a living creature. The word “dialectic” is a direct translation of the Greek word “dialektiké,” which means engaging in logical discourse or conversation, with the aim to find truth and meaning. The organismic dialectic assumes that people are born with innate, natural tendencies to “engage interesting activities, to exercise capacities, to pursue connectedness in social groups, and to integrate intrapsychic and interpersonal experiences into a relative unity” (Deci & Ryan, 2000, p. 229). These inherent developmental tendencies are not satisfied automatically or easily, rather, they require the individual to actively seek “nutriments” and supports in the social environment that scaffold their development. In the context of self-determination theory, these nutrients are represented through the needs of autonomy, relatedness, and competence. However, it is important to stress that the theory does not attribute the organismic dialectic to a need deficit, as previous motivation theorists have postulated (e.g., Hull, 1943; Maslow, 1943). Rather, self-determination theory assumes that seeking need satisfaction in the environment is a natural and organic process. The theory, therefore, suggests that individuals seek to develop overall coherence and consistency in motives and action such that goals and behaviors are consistent with the optimally functioning, genuine sense of self.

## Motivational Regulations and a Graded Continuum of Motivation

Beyond individual differences, Deci and Ryan (2000) suggest that individuals engage in activities in given contexts for reasons that are broadly autonomous or self-determined, or broadly controlled or non-self-determined. They propose a set of motivational styles or *regulations* that reflect the extent to which actions or behaviors satisfy psychological needs and have been partly or wholly internalized into an individual’s repertoire of need-satisfying behaviors. Three autonomous regulations have been identified: intrinsic motivation (engaging in activities because they are inherently interesting and satisfying, even in the apparent

absence of any external controlling contingency), integration (engaging in activities that are consistent with goals and values that are characteristic of the individual's genuine sense of self), and identification (engaging in activities that are self-endorsed and lead to self-relevant outcomes with which they strongly identify). Controlled regulations reflect non-self-determined reasons for acting, such that behavior is determined by contingencies that are perceived to be, or are actually, external to the individual. Two forms of controlled regulation have been proposed: introjection (engaging in activities driven by a desire to be approved by external agents in the environment) and external regulation or extrinsic motivation (engagement in activities in order to gain external rewards and avoid potential punishment). Finally, amotivation reflects the absence of any autonomous or controlled form of motivation. In an amotivated state, the person is not inclined to act due to a sense of diminished efficacy in relation to desired outcomes, or because the person does not find value in the outcome. Autonomous regulations have been consistently associated with better physical and emotional health and, critically, positive affect (Deci & Ryan, 2000; Ng et al., 2012).

The regulatory motives are conceptualized as delineating a self-determination *continuum* (Howard, Gagné, & Bureau, 2017). Intrinsic motivation and external regulation represented at the extremes or “poles” of the continuum and the intermediate motivational regulations situated along the continuum according to their relative degree of autonomy. Amotivation lies outside the continuum because it reflects a lack of endorsement of any reason for acting. The self-determination continuum reflects individuals' motives for action in line with the organismic dialectic. The type of motivational regulation an individual experiences with respect to goal-oriented actions or behaviors will be positioned on the continuum according to the extent to which the behaviors have been internalized as those that satisfies needs. Actions that are autonomously motivated are considered adaptive, as they are

likely to contribute to psychological need satisfaction, increased psychological growth, optimal functioning, and better well-being (Deci & Ryan, 2000; Ng et al., 2012).

Intrinsic motivation is conceptualized as the prototypic form of autonomous motivation, and reflects engaging in behaviors out of the inherent interest, satisfaction, and positive emotion derived from the behavior itself. Importantly, individuals engage in intrinsically motivated actions, even in the apparent absence of any external contingency, and are behaviors that satisfy basic psychological needs. In line with this premise, intrinsically motivated actions play a unique role in self-determination theory as they are viewed as fundamental to lifelong psychological growth and the development of an optimally functioning genuine sense of self (Deci & Ryan, 1985). Importantly, intrinsically motivated actions are associated with optimal self-regulation of actions and persistence on tasks. In contrast, externally motivated behaviors reflect engaging in action for external contingencies such as rewards or praise or to avoid punishment or criticism. External regulation is the prototypical form of extrinsic or controlled motivation. The controlling contingencies in externally regulated action undermine intrinsic motivation and are associated with maladaptive outcomes including diminished creativity, problem-solving, analytic thought, negative affect and frustration, and psychological well-being (Deci & Ryan, 2000, 2008).

Of course, not all behaviors are characterized by the prototypical motivational styles of intrinsic motivation and external regulation (Ryan & Deci, 2009). Individuals' actions are frequently regulated by interpersonal styles situated on intermediate positions on the self-determination continuum. The styles reflect actions that are, to some extent, autonomous or controlled. For example, acting out of identified regulation reflects engaging in behaviors for some self-endorsed, personally valued goal or outcome rather than the action itself. In this case, an individual might not particularly enjoy or derive intrinsic satisfaction from engaging in a health behavior like physical activity. However, outcomes derived from the activity, such



as the feeling of satisfaction afterward and its role in maintaining fitness that are autonomously valued, lead the behavior to be one that satisfies psychological needs. In this respect, the continuum represents an important property of the organismic dialectic, in that individuals will tend to *internalize* and *integrate* external reasons for engaging in behavior if the behavior is experienced as servicing autonomous goals and satisfying psychological needs (Deci, Eghrari, Patrick, & Leone, 1994; Deci & Ryan, 2000). The internalization process is adaptive as it enables individuals to incorporate more actions into their repertoire of need-satisfying behaviors. This process does not happen immediately but occurs through repeatedly experiencing actions as autonomous and supporting psychological needs in contexts and environmental conditions that are likely to be autonomy supportive. Taking the previous example of physical activity, the behavior is characterized as one that is partially internalized with potential to be fully integrated over the passage of time resulting in a shift in regulatory style toward the autonomous pole. Such a shift may occur over time with experience of the activity as servicing autonomous goals and under conditions that are conducive to supporting autonomy (Deci & Ryan, 2000).

### Theoretical Underpinnings and Corollaries

The concept of psychological needs in self-determination theory is consistent with humanistic perspectives of needs as innate and psychological as opposed to exclusively biological (DeCharms, 1968; Maslow, 1943). Needs for autonomy and competence are closely related to control-related constructs (Hagger, 2014) that feature prominently in social-cognitive theories (e.g., Ajzen, 2015; Bandura, 1977). The need for relatedness reflects early attachment perspectives that argue for an innate tendency for humans to form close relationships with others (e.g., Bowlby, 1958). The lifelong human endeavor to satisfy needs in the social environment proposed in the organismic dialectic echoes drive growth processes for competence, effectance, and, ultimately, maturity (e.g., White, 1959). Evidence for

autonomy, competence, and relatedness as candidate needs has been identified in research across nations and cultural groups, providing important evidence that the needs are innate and universal (Sheldon et al., 2001). However, there have also been suggestions that self-esteem (Sheldon et al., 2001), benevolence (Martela & Ryan, 2016), and novelty (González-Cutre, Sicilia, Sierra, Ferriz, & Hagger, 2016) are also separate candidate needs, although evidence in support of these needs is in its infancy. Suffice to say that needs as a unifying concept within self-determination theory has some support, but it is important to note that direct evidence is relatively sparse.

## Affect and Self-Determination Theory

Affect and emotional responses have an important place within the predictions and corollaries of self-determination theory. Generally, affect has been conceptualized in two ways within the theory: as an outcome and as part of the processes by which psychological need satisfaction and autonomous motivation, as core concepts within the theory, related to engagement and persistence in action. Next we outline these two functions of affect within self-determination theory and highlight how research on these functions provides insight into the role of affect in the motivation of health behavior.

### Affect as an Outcome in Self-Determination Theory

From its inception, affect has been identified as a key outcome of self-determined motivation (Deci & Ryan, 1985; Ryan & Deci, 2001). In cognitive evaluation theory (Deci & Ryan, 1985), a fundamental subtheory of self-determination theory, external contingencies (e.g., rewards, deadlines, threats), are proposed to undermine intrinsic motivation, and result in a concomitant increase in generalized negative affect and related negative emotional responses, such as frustration, reduced positive affect, and reduced interest and enjoyment. In contrast, contingencies in the environment that bolster intrinsic motivation, such as informative feedback, are associated with increased interest, enjoyment, and positive affect and a

mitigation of negative affect. These affective responses were evidenced in formative experimental work on cognitive evaluation theory using the free choice paradigm, as a behavioral means to measure intrinsic motivation, and the subsequent development of the intrinsic motivation inventory (Deci, 1972). In free choice experiments, participants provided with rewards exhibited reduced motivation on an inherently interesting task during a free choice period, and also subsequently reported less interest, enjoyment, and engagement in the task. In contrast, participants provided with an informational justification for the task or with contingent feedback were less vulnerable to the undermining effect of external rewards, and were less likely to experience negative affect (Deci, Koestner, & Ryan, 1999).

This general tendency for affective responses to be related to motivational styles and motivational responses to external contingencies has also been observed in the field in health contexts. Consistent with the general tenets of the theory, motivational regulations that reflect greater internalization, including integrated and identified forms of motivation, and, therefore, more autonomous or self-determined forms of motivation with respect to a particular health behavior, are associated with greater intentions to participate in a target health-related behavior and actual future engagement in the behavior. This has been found in research adopting self-determination theory in physical activity (Chatzisarantis et al., 2003; Teixeira et al., 2012), smoking cessation (Williams, Gagne, Ryan, & Deci, 2002), alcohol reduction (Caudwell & Hagger, 2015; Hagger et al., 2012), and occupational risk reduction (Chan, Fung, Xing, & Hagger, 2014; Chan & Hagger, 2012). The research also demonstrates that individuals experiencing their action as self-determined are more likely to persist with the health behavior and less likely to drop out (Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002).

Importantly, just as autonomous motivation has been shown to predict intentions and action in health contexts (Hagger & Chatzisarantis, 2016; Pihu, Hein, Koka, & Hagger,

2008), autonomous motivation been shown to predict adaptive emotional responses, including increased positive affect and psychological well-being, in health (Deci et al., 2001; Sheldon et al., 2004). For example, in the context of healthy eating, individuals who adopt autonomous motives like intrinsic motivation (e.g., they enjoy and value healthy eating itself) or identified regulation (e.g., they view healthy eating as important to personal goals such as losing weight, gaining more energy, and feeling less lethargic) are more likely to experience enjoyment, satisfaction, and positive emotions as a consequence of the behavior. In contrast, individuals adopting more controlled reasons such as introjected regulation (e.g., eating healthily out of obligation to others) are likely to feel increased negative affect such as guilt and frustration (Koestner & Losier, 2002). Further, if the perceived introject or obligation is removed, the individual will likely lapse from their healthy eating. Overall, therefore, motivational styles that reflect greater autonomy will be related to behavioral persistence and adaptive affective responses.

Research has shown that need satisfaction is related to a number of adaptive outcomes, including affect-related outcomes and behavioral persistence (Ryan & Deci, 2000). This is consistent with the overall premise that psychological need satisfaction is a unifying construct within self-determination theory. Just as satisfaction of psychological needs has been shown to be related to increased autonomous motivation and behavioral outcomes, need satisfaction has also been shown to relate to positive affective outcomes and reduced negative affect. For example, research in the domain of physical activity has consistently demonstrated that individuals who feel that engaging in a target health behavior satisfies their psychological needs are more likely to report participating for autonomous reasons, and are also more likely to experience the activity as enjoyable, satisfying, and interesting (Sebire, Jago, Fox, Edwards, & Thompson, 2013). In contrast, when the individual experiences his or her needs as being thwarted or frustrated by the context or environment, they are more likely

to avoid or desist from physical activity and report heightened levels of frustration and negative affect (Gunnell, Crocker, Wilson, Mack, & Zumbo, 2013).

As an outcome, therefore, research has indicated that engaging in health behaviors for self-determined reasons and experiencing the action as supporting the satisfaction of the three basic psychological needs, is related to not only adaptive behavioral outcomes but also increased positive affect. In some respects, affective responses, as a consequence of autonomous behavioral engagement and need satisfaction, have essentially been treated as emotional byproducts of the motivational regulation. In other words, the emotional responses are considered indicators of autonomous motivation and psychological need satisfaction. However, there is increased recognition that emotional responses are an important health-related outcome in their own right. Emotional responses may have a persistence function that provides essential feedback to the individual indicating the optimal nature of their autonomous actions. The emotional response may, therefore, serve an important function in the continuity of action and reinforcing further persistence with the task in future so as to further satisfy psychological needs.

## Affect as a Process in Self-Determination Theory

Most research investigating the role of self-determination theory in predicting health behavior has focused on affect as an outcome. This is based on the premise that affect indicates the type of motivational regulation experienced by the actor. Positive affect reflects autonomous motivation and the optimal satisfaction of psychological needs, and negative affect reflects controlled motivation and the lack of, or thwarting of, psychological needs. In contrast, research that has focused on the role of affect as a process in the genesis of self-determined action has received relatively less attention. However, Ryan and Deci (2001) have illustrated how well-being and self-determined motivation are inextricably linked, and Vallerand (2008) has illustrated how extreme forms of self-determined motivation lead to participation in

behavior that is highly emotive, in research on passion. Furthermore, management and acceptance of affective responses are inextricably linked to the process by which autonomously motivated individuals effectively regulate their behavior (Legault & Inzlicht, 2013). We deal with each of these issues in turn.

## Well-Being and Autonomous Motivation

As outlined previously, psychological well-being is considered an important component of health. Psychological well-being is defined as a state of psychological wellness and reflects overall satisfaction with all aspects of mental health and quality of life. It is, therefore, strongly related to indices of emotional health, such as positive affect, and quality of life. Psychological well-being is consistently related to autonomous motivation. However, well-being is also implicated in the process by which autonomous motivation leads to better overall health and future motivation to engage in health behaviors. Ryan and Deci (2001) make the distinction between hedonic and eudaimonic well-being when discussing the importance of affect and emotion as a process in self-determination theory. Consistent with Ryff and Singer's (2000) conceptualization, the concept of hedonic well-being reflects the pursuit of a state of happiness and felt positive emotion as an end goal. In contrast, eudaimonic well-being focuses on obtaining a state of optimal functioning reflecting personal growth of the true self and a sense of consistency between motives and action, self-actualization or realization, and congruence between action and personally held values. Accordingly, hedonic well-being focuses on felt emotions and happiness alone with little meaning or internal value (Ryff & Singer, 2000). The eudaimonic approach eschews the emphasis on felt happiness and positive emotion for its own sake, and focuses on the attainment of outcomes that reflect self-actualization including mastery of actions, perceived ownership and agency in one's actions, personal growth, cohesive and meaningful relations with others, and self-actualization (see Ryff & Keyes, 1995). Well-being itself is inextricably

linked to positive emotion, with definitions of well-being focusing on the greater frequency of overall feelings of positive affect, but also, consistent with the eudaimonic perspective, greater quality and meaning of the felt emotions.

According to Ryan and Deci (2001), experiences of competence and autonomy are related to psychological well-being, but well-being and adaptive emotions are also implicated in motivational outcomes. Links between experiences of competence and effectance toward health behaviors and psychological well-being are indicative of the properties of self-determined motivation in promoting self-actualization and optimal functioning. Well-being also operates in the process by which autonomous motivation leads to future action. Research has suggested that congruence between the goals that individuals pursue and their motivation relates to subjective well-being. Goal-motive consistency is indicated in levels of well-being, such that as consistency increases so does well-being and the likelihood of future behavioral persistence (Sheldon & Kasser, 1998). For example, if an individual's reasons for acting are autonomous they are more likely to be consistent with the goals that they endorse and choose, and reflect their genuine self. This is likely to lead to greater feelings of positive affect and an overall sense of well-being. In contrast, acting for controlled reasons are likely to conflict with autonomous goals and the sense of inconsistency will not foster well-being. Similarly, while goal progress may lead to happiness in the short term, it is the fulfilling nature of the goal content that leads to well-being. Pursuit of autonomous goals that are consistent with personal values and a genuine, authentic sense of self are more likely to be related to greater experience of well-being. While these findings implicate indices of positive emotion and overall well-being in the process of motivation toward health behavior, evidence of the effects of these factors on subsequent motivation is relatively limited and more research is needed to explore these reciprocal effects.

## Passion and Emotion

A related perspective on emotion and well-being derived from the self-determination theory approach is Vallerand's (2008) dualistic perspective on passion. In his model, Vallerand defines passion as "a strong inclination toward a self-defining activity that one likes (or even loves), finds important, and in which one invests time and energy" (Vallerand, 2008, p. 2). In most respects this definition of passion has parallels with intrinsic motivation as the pursuit of tasks in the absence of external contingencies and to gain a sense of effectance, mastery and competence, self-actualization, and need satisfaction. Vallerand highlights that engaging in activities toward which individuals are passionate is essential to the process of constructing a repertoire of behaviors that satisfy psychological needs and define one's genuine sense of self. Hobbies and leisure-time pursuits are often identified as exemplifying activities that are highly intrinsically motivating and are seen as central to an individual's identity and related to eudaimonic well-being. In many ways, therefore, passion is an extreme form of intrinsic motivation and part of the process by which individuals develop, grow, and attain optimal functioning and promote good psychological health.

However, Vallerand identifies the lighter and darker sides of passion in the distinction between harmonious and obsessive passion. *Harmonious* passion reflects an autonomous, self-endorsed pursuit of an activity that is fully integrated into the individual's true sense of self and identity. Individuals engaging in these activities are met with a sense of effortless control and positive affect. In some respects, this is the prototypical form of passion, and one that is linked to better psychological well-being. In contrast, Vallerand suggests that not all passionately pursued activities are fully integrated into the individuals' repertoire of need-satisfying behaviors. These *obsessive* passions may be pursued due to externally felt contingencies such as the desire to please others or for a sense of contingent self-worth. Or the individual may derive a sense of meaning and satisfaction from the activity, but their engagement in the activity is uncontrollable and not need satisfying or integrated into their



true sense of self. An individual engaging in activities for which they are obsessively passionate experiences an inability to control his or her engagement or desistance from the activity. As the pursuit of the activity is ego-involving, the individual engages through rigid persistence, and, as a result, may engage in the activity at the expense of other more important aspects of their life, making their obsession unhealthy and undermining of their well-being.

A harmoniously passionate exerciser will engage in physical activity as part of their fully integrated self and, as such, will choose to spend as much free time as possible exercising, but it will not be at the expense of other important activities. In contrast, a person who is obsessively passionate about their exercise routine may feel a sense of frustration and negative affect when exercising when they know they should be focusing their attention on other important life activities, but cannot stop themselves because of their perceived obligation to the activity. Conversely, the person might feel that they should be focusing on other activities but become frustrated when they are not able focus on the activity they are passionate about. In this way, obsessive passion resembles addiction—the person may not view that balancing other elements in their life as a priority as long as they “exercise.” As a consequence they experience no sense of balance of “harmony” with respect to their exercise and other aspects of their life.

Vallerand and coworkers (2003) demonstrated the effects of the dual theory of passion in numerous studies using their “passion” scale, which has obsessive and harmonious subscales. Overall, harmonious passion was related to optimal pursuit of tasks and indices of psychological health including psychological well-being, vitality, and life satisfaction in multiple contexts, including health behavior. In contrast, obsessive passion was unrelated or negatively related to these constructs. In addition, research has demonstrated that the mechanism by which harmonious passion relates to adaptive outcomes is through the

persistent experience of positive affect. For example, a longitudinal study in a physical activity context indicated that harmonious passion predicted psychological adjustment mediated by positive affect, while obsessive passion was related to negative affect and unrelated to adjustment (Rousseau & Vallerand, 2008). Overall, the research demonstrates the importance of optimal, autonomous engagement in activities that are consistent with psychological needs and that obsessive pursuit of behaviors that are internalized but not integrated can undermine well-being and is associated with lower functioning and psychological adjustment.

### Emotion, Self-Determination and Self-Regulation

A final perspective on the role of emotion in self-determination theory applied to health behaviors comes from research on autonomous motivation in the self-regulation of actions. Self-regulation reflects an individual's capacity to override a well-learned "dominant" response or a response that is strongly linked to impulses, urges, and cravings that are often reinforced by intrinsic reward (e.g., sensations of pleasure through dopaminergic pathways in the brain) (Allom, Mullan, & Hagger, 2016; Inzlicht, Schmeichel, & Macrae, 2014). Many health-related behaviors such as healthy eating, physical activity, quitting smoking, reducing alcohol consumption, and condom use require an individual to forego the short-term rewards related to engaging in the undesired health-compromising behavior, in favor of longer-term desired outcomes such as psychological well-being and quality of life (Hagger, Leung, et al., 2013; Hagger, Panetta, et al., 2013; Mpondo, Ruiter, van den Borne, & Reddy, 2015; Muraven & Shmueli, 2006). There are numerous perspectives on self-regulation; many view self-regulation as an individual difference, an enduring trait that increases individuals' capacity to pursue long-term goals over short-term gain in multiple domains (Allom, Panetta, Mullan, & Hagger, 2016; de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012).

There is also research suggesting that individuals provided with autonomous goal pursuit or provided with autonomy support prior to engaging in tasks that require self-control (e.g., controlling impulses, thoughts, and emotions) demonstrate better persistence on the tasks (Moller, Deci, & Ryan, 2006). The research indicated that autonomous motivation led individuals to experience the tasks as important to their internalized or integrated goals rather than focus on the arduousness of the task or the limitations of their capacity for self-control. A recently proposed perspective indicates that autonomously motivated individuals recognize and expect the inherent negative affect and aversive experiences when pursuing challenging tasks toward long-term goals (Legault & Inzlicht, 2013). However, autonomously oriented individuals are able to persist on effortful tasks, and effectively manage the associated aversive affective responses, because they have internalized or integrated the long-term goal or outcome as important to their genuine sense of self and satisfying of their basic psychological needs. Legault and Inzlicht (2013) that autonomously oriented individuals were better at engaging in tasks requiring self-regulation. Using an electroencephalogram (EEG), the researchers found that the effect of autonomous orientation on self-regulatory task performance was mediated by error-related negativity (ERN), a neural signal related to error detection on tasks. Legault and Inzlicht replicated and extended their findings in an experimental paradigm where they manipulated autonomy support, and examined its effects on self-regulatory capacity under conditions of ego-depletion, and found the mediating effect of the ERN signals. The ERN signals were interpreted as indicative of autonomous individuals' capacity to recognize and accept aversive feelings like negative affect as part of the task. As a consequence they did not have reactive or defensive responses to threatening self-relevant information, such as failure on the tasks. These better self-regulatory capacities meant they were better able to cope with the aversive nature of the tasks and were, therefore,

better able to self-regulate. This research emphasizes the important role that affect and autonomous individuals' means to cope with it plays in self-regulation.

## Recommendations for Future Research and Practice

Self-determination theory has been used as a means to guide health behavior change intervention development (Ryan, Patrick, Deci, & Williams, 2008). The key focus of these interventions has been to promote the autonomy support of leaders and figures of authority that will foster autonomous forms of motivation among the people under their leadership or influence. The resulting autonomy-supportive social environment (also known as a motivational "climate") increases the internalization and integration of the target behavior by the people acting in the environment. Research has identified the components of autonomy support that are likely to promote autonomous motivation (Hardcastle et al., 2017; Hardcastle, Blake, & Hagger, 2012; Koka & Hagger, 2010; Reeve, Bolt, & Cai, 1999), and programs have been developed that aim to train individuals to promote an autonomy supportive social environment (Cheon, Reeve, & Moon, 2012; McLachlan & Hagger, 2010). These components are behaviors that significant others need to adopt to promote an autonomy-supportive social environment with respect to the behavior of interest: providing choice over behavioral options, providing noncontingent positive feedback regarding behavioral engagement, avoiding controlling language (e.g., "should" or "must") when promoting the target behavior, providing a meaningful rationale for the behavior, being responsive to the actors' questions, providing experiences of competence, and making perspective-acknowledging statements.

There have been recent developments in charting the different individual, irreducible, replicable "components" of behavior change intervention in "taxonomies" of behavior change techniques (Michie et al., 2013). These "components" are the content of interventions that lead to behavior change, and are often referred to as the "active ingredients" of interventions.

This is important to identify and isolate the components that do the work when it comes to changing behavior. Consistent with this process, researchers are engaging in a process to do the same for the components of autonomy supportive interventions (Teixeira et al., 2016). There is recognition that such components comprise content (i.e., *what* is said or delivered to individuals to change their behavior) and interpersonal style (i.e., *how* content is delivered to interventions). The interpersonal style components have been identified as parameters that affect the delivery and assimilation of content-based techniques while others have identified them as separate “relational” techniques in their own right (Dombrowski & Luszczynska, 2009; Hagger & Hardcastle, 2014; Hardcastle, Fortier, Blake, & Hagger, 2016). The interpersonal style components include aspects of emotional support and warmth in the interpersonal relations between significant others and the individuals with whom they work. Positive interpersonal relations are an aspect of interpersonal style that will foster greater relatedness and, as a consequence, greater autonomous motivation. A “taxonomy” of autonomy supportive behavior-change techniques is currently under development (Teixeira et al., 2016). The taxonomy will serve as a useful tool for leaders and authority figures in identifying the appropriate behavior that could be adopted to promote autonomy support. The taxonomy will also permit researchers to identify which components are most effective in promoting autonomous motivation and the extent to which they interact in determining health behavior change through the adoption of factorial designs.

To date, research on autonomy supportive interventions has demonstrated their effectiveness in promoting change in physical activity (Chatzisarantis & Hagger, 2009), medication and self-management (Williams, McGregor, Zeldman, & Freedman, 2004), smoking (Williams, Gagne, et al., 2002), and healthy eating (Resnicow et al., 2008) behaviors. The research has also shown that changes in behavior are also met with changes in affect-related outcomes such as psychological well-being, vitality, and positive affect.

However, to our knowledge, no intervention has sought to include components to assist in the management of stress and negative affect in self-determination theory based interventions in health contexts. Such an emotion-reducing intervention components may act synergistically with autonomy support in promoting better health. Allaying negative emotions or, at least, acknowledging their role as well as supporting autonomy, have both been shown to promote greater autonomous motivation and better self-regulation. Future research should, therefore, investigate the unique and interactive effects of an intervention that leverages these affective components to change behavior using factorial design. Such an approach will provide evidence as to whether it is the independent effects of these components, or their interaction, or both, that leads to health behavior change.

## Conclusion

We have provided an overview of the role of affect in self-determination theory applied to health and health behavior. We outlined the key tenets of self-determination theory and identified the importance of psychological well-being and positive affect as outcomes in self-determination theory research. Psychological well-being, in particular, is an important outcome as it is a reflection of the adaptive, self-actualizing optimal functioning brought about by autonomous motivation. However, we have also indicated that affective responses are inextricably tied to the process by which autonomous motivation affects behavioral outcomes in health contexts. Specifically, we have outlined how positive affect may serve as important feedback of need-satisfying behavior, the importance of eudaimonic well-being as a key goal of autonomous engagement in behavior, the experience of harmonious and obsessive passion when individuals engage in absorbing emotionally salient activities, and the important role autonomous motivation plays in the management of aversive affect responses in self-regulation. Overall, current evidence indicates dual roles for affect in the context of self-determination theory applied to health behavior, as an outcome and as part of

the motivational process. Future research could examine these roles simultaneously in multiple health behavioral contexts. Finally, we have offered some thoughts on how autonomy supportive interventions based on self-determination theory can promote better health behavior change and the potential role affect may play in such interventions.

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