Brick by Brick: The Origins, Development, and Future of Self-Determination Theory

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Abstract

Self-determination theory is a broad and widely applied theory of motivation, personality development, and wellness. The theory began with a narrow focus on intrinsic motivation but expanded over time to encompass both intrinsic and extrinsic motivations, and models of well-being, goal contents, relationship quality, vitality and depletion, and eudaimonia, among other topics. In this article we first discuss the value of broad theory in psychological science. We then trace the history and strategy of SDT's development of its core mini-theories and models from early studies on intrinsic motivation to the enormous body of research being done today by a global community of SDT scholars. Across this history we highlight evidence for the critical role of autonomy, competence and relatedness in human development and thriving, and the strong practical and translational value of a functionally-focused and empirically-supported framework.

Introduction

Self-determination theory (SDT; Ryan & Deci, 2017) has become one of the most widely researched and applied theories in the field of psychology. Both because of its basic science approach to human motivation and its widely confirmed practical value across multiple domains, the trajectory of the theory is one of escalating development and deployment. As we shall review, the historical expansion and impact of SDT owes its success to a global community of scholars from virtually every sub-discipline of psychology, from neuroscience to social psychology, using a wide variety of methods. Because of this broad participation of thinkers, SDT has moved well beyond its origins as a narrow theory of intrinsic motivation (Deci & Ryan, 1980), to become a more general theory of human motivation, personality development, and wellness (Ryan, Soenens & Vansteenkiste, 2018).

One purpose of the current review is to narrate a history of SDT in terms of its organic development toward a broad framework for the study of human behavior in social contexts. In doing so we will first discuss the benefits of a broad theory, and SDT's "brick by brick" approach to theory development. We then trace the emergence of SDT's six core mini-theories, as well as some of its spin-off empirical models, which have generated the research on intrinsic motivation, on internalization, on personality orientations, on basic psychological needs, on life goals, on awareness, on energy, and on other topics central to SDT. We briefly discuss the strong translational value of SDT's functional approach, before a concluding section in which we point to some future directions for both the theory's basic science and applications.

Why Have a Broad Theory?

In a recent special issue of the *Journal of Personality*, Sheldon and Prentice (2018) argued that SDT represents a general theory of personality that can provide an organizing

framework for many of the field's central questions. As detailed by Ryan et al. (2018) in that same issue, to be such a framework, SDT would need to be able to compellingly describe and account for situational motivation, psychological development, and individual differences. It must also be predictive, not only anticipating experimental results, but also yielding evidence-based interventions. Finally, it must embrace consilience—the aim to coordinate evolutionary, biological, and socio-cultural insights within its psychological framework. SDT researchers are addressing these challenges, albeit with room to improve on each of these criteria.

The broad and integrative theoretical goals that underpin SDT are not widely shared within contemporary scientific psychology. There is, in fact, formidable resistance to large-scale theory. The field is instead characterized by a proliferate empiricism, presented typically as *models*, each with unique contents and terminologies. These models bring specific phenomena into focus, but are rarely coordinated with each other, or with generalizable principles. Resulting from this proliferation of local models are thus collections of *ad hoc* information—sets of observations uncoordinated within broader philosophical foundations and postulates from which new predictions can be deduced. They are, therefore, hard to use in a broad way. Amplifying this splintering of findings, our field frequently rewards catchy, contrarian, or unusual "signature" contributions, rather than careful work in what Kuhn (1973) called "normal science." This leads to reinventing or rebranding of previously explored ideas, as well as a search for hot topics and anomalous findings, rather than the pursuit of incremental science.

Broad scientific theory, although more plodding in its development, conceptually and empirically connects models and phenomena that might otherwise exist as disparate atolls of facts. It generates questions that follow from its assumptions and principles, and operates progressively, fitting new findings within the strong guidelines and constraints of an articulated,

evidence-grounded, framework. It confirms theoretical principles through convergent means rather than single demonstrations and is therefore informed by multiple experimental and observational methods, and by results from controlled interventions. It also demands of itself clinical, qualitative, and conceptual critique, and must pass the criteria of epistemological coherence and rigor. Broad theory thus builds knowledge slowly, but solidly, brick by brick.

SDT's Development: Brick by Brick

SDT has from its outset been focused on this more gradual and arduous strategy, organically developing its behavioral principles within an internally consistent, convergently supported, conceptual framework, and testing their ability to account for behavioral phenomena across multiple domains, methods, and levels of analysis. To be sure, the theory's origins are rooted in its early explorations of *intrinsic motivation* (Deci, 1975; Deci & Ryan, 1980) and the factors that support or undermine that natural propensity. Yet even within its first decade SDT was extended toward a more encompassing formulation of both intrinsic and extrinsic motivation (Deci & Ryan, 1985b; Ryan, Connell, & Deci, 1985). Since then, individual differences in motivation, wellness, personal goals, relationship satisfactions, and other issues of import have been addressed from within the same framework. Across this growth of content, SDT has embraced not only the ideal of coordinating its tenets and findings within a single theory, but also of integrating that theory within the larger framework of the life sciences, an aim fitting with its organismic philosophical grounding (Ryan & Deci, 2017).

SDT's early focus on intrinsic motivation was, in fact, an important part of a "Copernican turn" or reorientation of focus within the field of human motivation (Ryan, Ryan, Di Domenico, & Deci, 2019). Historically, motivation science had been dominated by a behaviorist metapsychology that was preoccupied with how factors external to the person (i.e.,

environmental reinforcements and punishments) could control behavior (Overskeid, 2018; Ryan Bradshaw, & Deci, 2019). This was an important stage of knowledge development for the field, as much was learned about the malleability of human behaviors, as well as limits on that plasticity. But this focus on external control over behavior also crowded out interest in how actions are more naturalistically organized within persons.

In contrast to the behaviorist focus on outer sources of motivation, SDT's foundational concern is the *self,* considered as an active integrative process. The theory posits that throughout development the primary task of the self is to assimilate, coordinate, and regulate inputs from both external (especially social and cultural) and internal (drives, emotions, needs) environments. This idea of self as having a primary integrative or synthetic function is by no means a new intuition; it is reflected in previous organismic perspectives in psychology (see Loevinger, 1976; Ryan, 1995). In SDT, however, this integrative nature is specifically described by identifiable and observable growth processes such as *intrinsic motivation* and *internalization*. Intrinsic motivation, which reflects spontaneous curiosity, interest, and assimilative tendencies, served as a prototype within SDT of that proactive human nature, and it supplied an entry point, rather than a terminus, for developing a broader view of the active integrative nature of self.

Having posited integration to be at the core of healthy self-functioning, SDT takes interest in how such integrative functioning can be supported or undermined. Research on both intrinsic motivation and internalization led to consistent findings of the functional importance of supports for autonomy, competence, and relatedness in enhancing these processes, and frustrations of autonomy, competence, or relatedness to derail them. Furthermore, the findings consistently showed how these supports predicted a broad array of indicators of positive experience and wellness. Together these findings led to the identification of a set of *basic*

psychological needs, the fulfillment of which supports, and the frustration of which hinders, psychological growth, integrity, and wellness.

SDT's basic needs are conceptually distinct from motives, as they represent a specification of what is required for integrative, truly self-regulated functioning. Yet perhaps unsurprising given their functional role, these basic needs are also variables to which people are phenomenally highly sensitive. A plethora of evidence shows that myriad cues, from voice quality (e.g., Weinstein, Zougkou, & Paulmann, 2018), to the structure of reward contingencies (Deci, Koestner, & Ryan, 1999), affect perceived need satisfaction and frustration, which in turn strongly impact motivation quality, persistence, and experiences of wellness. Thus, although basic needs are not themselves often an explicit focus of motives (e.g., people don't usually have a "goal" for autonomy), the satisfaction or frustration of these needs does lead people to differentially invest in the activities or goals they are actively pursuing.

As a theory focused on both internal and external sources and supports for motivation and self-regulation, SDT has from its onset been based on empirical foundations that are continually refined. We made, in fact, an explicit decision when we began our collaboration that the framework should be built "brick by brick," with new extensions building off findings that preceded it, and new ideas being well confirmed before inclusion. We sought to avoid, where possible, *errors of commission* in adding to SDT's formal propositions (see Ryan & Deci, 2017). Doing so meant embracing convergent conceptual replications as a guideline, and considering evidence derived across multiple methods and contexts before adding to theory. As a result, SDT's theorizing has been conservatively elaborated over four decades.

The formal core of SDT is currently comprised of six "mini-theories" that systematically overlap in a manner that is reflective of how they have organically emerged, with each new mini-

theory representing an extension of an existing body of knowledge that was already established within SDT (Vansteenkiste, Niemiec, & Soenens, 2010). For instance, as Deci's (1975) early work on intrinsic motivation expanded to experimental and field settings, it was formalized as *cognitive evaluation theory* (CET; Deci & Ryan, 1980). Insights from CET concerning the importance of autonomy and competence experiences for high-quality motivation led to SDT's second mini-theory called *organismic integration theory* (OIT; Ryan, Connell, & Deci, 1985). OIT includes a descriptive taxonomy of distinct forms of extrinsic motivations, along with considerations of the antecedents and consequences of these different motive types and their relations with each other. Findings on the trait-like tendencies of people to be amotivated, controlled, or autonomous in their motivational styles simultaneously led to *causality orientations theory* (COT; Deci & Ryan, 1985a). Over the research studies comprising CET, OIT and COT, we repeatedly found that supports for autonomy, competence, and relatedness not only predicted more autonomous motivation, but also strongly predicted positive-experience and wellness outcomes. These findings led to *basic psychological needs theory* (BPNT; Ryan, 1995), which describes how fundamental psychological need satisfactions (and frustrations) impact wellness and optimal functioning. These basic need satisfactions were also found to be differentially afforded or crowded out by different lifestyles and the personal aspirations that drive them. This research culminated in *goal contents theory* (GCT; Kasser & Ryan, 1996; Niemiec, Ryan & Deci, 2009). Finally, empirical research on the dynamics of interpersonal need support revealed the roles of all three basic satisfactions in close relationships, which was more recently formalized as *relationship motivation theory* (RMT; Deci & Ryan, 2014; Ryan & Deci, 2017). In short, SDT's formal mini-theories, as well as its numerous "side" models and theories concerning topics such as optimal parenting, vitality, mindfulness, emotion regulation,

eudaimonia and others have each emerged from overlapping and expanding networks of empirical results (Vansteenkiste & Soenens, 2017), with additional mini-theories on the horizon.

This "organic" process of theoretical elaboration is also one that is highly constrained. SDT's clear, foundational organismic principles and its existing propositions strongly limit what new ideas can be congruently hypothesized, as well as the types of explanations that will be acceptable within the framework. Because of these constraints, inconsistent or untenable ideas can be more rapidly identified. SDT has nonetheless faced many challenges to its validity and has in some ways invited such challenges by embracing a "Popperian" ideal of testability. SDT's theorems are formulated in ways that can potentially be disconfirmed, a risk that attends any true scientific framework. As a result, there have been many external challenges to the theory, but at least thus far, the theory has overcome these challenges with its ever-growing and cumulative empirical base. This strong base is reflected in numerous systematic reviews and meta-analyses supporting the theory (e.g., Cerasoli, Nicklin, & Ford, 2014; Deci, Koestner, & Ryan, 1999; Ng. et al., 2012; Slemp, Kern, Patrick, & Ryan, 2018; Van den Broeck, Ferris, Chang, & Rosen, 2016; Vasquez, Patall, Fong, Corrigan, & Pine, 2016; Yu, Levesque-Bristol & Maeda, 2018, among others) and its redundant demonstrations of applied value in domains such as work, parenting, education, sports, health, psychotherapy, and technology.

To describe the organic development of the framework we begin by detailing the foundational "bricks" of SDT's work on motivation, which are represented by the six mini-theories. After these are presented, we briefly review some additional models and ideas that have spun off from SDT. After this quasi-historical review, we turn to the current directions, future questions, and its stability in an ever-changing universe of methods and facts.

Cornerstones: The Building of SDT's Six Mini-theories

Cognitive Evaluation Theory (CET): The Empirical Exploration of Intrinsic Motivation

If there is any phenomenon that illustrates the active, synthetic character of human nature it is *intrinsic motivation*. As exemplified in children's play and exploration, intrinsic motivation is the spontaneous propensity of people to take interest in their inner and outer worlds in an attempt to engage, interact, master, and understand. This assimilative propensity is supported by the "affective aspect" of this form of motivation, namely the interest and enjoyment that accompanies such activities.

The term intrinsic motivation was to our knowledge first coined by Harlow (1950) in describing the exploratory tendencies of primates, as well as the disruption of these tendencies by the introduction of extrinsic rewards. Despite Harlow, this spontaneous motivation was largely neglected in behaviorist approaches, which focused instead on behaviors that could be shaped and controlled through external reinforcements. Yet when intrinsically motivated, people (and other primates) engage in activities without needing external prompts or rewards. Such actions are interesting and enjoyable in their own right; they are "internally rewarding," a fact now supported by considerable neuroscience evidence (see Reeve & Lee, 2018). As people engage in intrinsically motivated behaviors, they show activation in major dopaminergic pathways or "reward systems" of the brain (Di Domenico & Ryan, 2017) as well as greater sensitivity to feedback (e.g., Swanson & Tricomi, 2015).

CET, the first of SDT's mini-theories, was specifically developed to account for variations in intrinsic motivation, and to characterize the factors that sustain or undermine it. A specific impetus for CET was early experimental work showing that rewards, especially monetary rewards, given for doing an interesting activity could sometimes decrease people's intrinsic motivation for doing the activity, whereas positive competence feedback could sustain

or even enhance intrinsic motivation (see Deci, 1971; 1975). These early findings, provocative to some (see Ryan, Ryan, & Di Domenico, 2019), clearly required further study in search of their meaning, applications, limitations, and moderators.

As studies accumulated it became apparent that not all rewards undermine intrinsic motivation. Instead, certain types of rewards are readily perceived as *controlling*, leading to an external *perceived locus of causality* (de Charms, 1968)—thereby frustrating people's need for autonomy and diminishing intrinsic motivation. Other rewards are more readily perceived as *informational;* they are experienced as *effectance relevant* (White, 1959), and thus as supporting perceived competence and enhancing intrinsic motivation (Ryan, Mims, & Koestner, 1983). Several meta-analyses have confirmed these distinctions between informational and controlling rewards and their effects on intrinsic motivation (e.g., Deci et al., 1999), as has a growing body of neuropsychological research (e.g., Di Domenico & Ryan, 2017; Meng & Ma, 2015; Murayama, Matsumoto, Izuma, & Matsumoto, 2010; Reeve & Lee, 2018).

Yet CET addresses much more than this narrow issue of reward effects on intrinsic motivation. It argues further that *any* factors in social environments that detract from an internal perceived locus of causality, or sense of autonomy, will diminish intrinsic motivation. Not only can controlling rewards undermine intrinsic motivation, so can motivational strategies such as controlling praise (e.g., Ryan, 1982), threats of punishment (e.g., Deci & Cascio, 1972), surveillance (e.g., Enzle & Anderson, 1993; Plant & Ryan, 1985), controlling language (e.g., Hooyman, Wulf, & Lewthwaite, 2014; Reeve & Jang, 2006), and grades and evaluations (e.g., Pulfrey, Buchs, & Butera, 2011). Even tone of voice can convey control versus autonomy support (Weinstein et al., 2018), thereby undermining intrinsic motivation.

In contrast, CET posits that social inputs that support perceived autonomy and

competence can enhance intrinsic motivation. As an example of a facilitating factor, experiments show that providing meaningful choice typically enhances autonomy and intrinsic motivation (see Patall, Cooper, & Robinson, 2008), an effect that has been replicated across cultures (e.g., Bao & Lam, 2008), and been supported by neuroscience research (e.g., Murayama, Matsumoto, Izuma, Matsumoto, et al., 2015). Autonomy-support is also facilitated by taking the person's *internal frame of reference* or understanding the person's point of view (Koestner et al., 1984). For example, Patall, Dent, Oyer, and Wynn (2012) found that teachers' perspective-taking and provision of choice were both autonomy-enhancing factors for high school students.

Additionally, in a context of autonomy support, *positive feedback* enhances intrinsic motivation (e.g., Vallerand & Reid, 1984; Muynck et al., 2017) by enhancing felt competence. Recently, for example, Badami, VaezMousavi, Wulf, and Namaziisadeh (2011) tested CET in Iranian students, confirming that positive and negative feedback affected intrinsic motivation in the predicted pattern (see also Chiviacowsky & Wulf, 2007). In fact, from its earliest formalizations (e.g., Deci & Ryan, 1980) to current accounts (Ryan & Deci, 2017), CET has highlighted how perceived competence is an important, and yet (by itself) insufficient basis for sustaining intrinsic motivation—autonomy is also required (Ryan & Moller, 2017).

At this point an expansive literature makes clear that intrinsic motivation, a vital expression of our active human nature, is facilitated by supports for autonomy, competence, and (for many activities) relatedness (Ryan & Deci, 2000b; 2017), a literature that extends from infancy through adult workplaces. To illustrate, Grolnick, Frodi, and Bridges (1984) found that mothers rated as autonomy supportive had one-year old infants who explored more and were more persistent at a play task than infants of mothers rated as more controlling. In experimental research with middle childhood participants, Mabbe, Soenens, Muynck, and Vansteenkiste

(2018) showed that both positive feedback and autonomy supportive communications yielded positive experiences of competence and autonomy during task engagement, which in turn predicted intrinsic motivation assessed both behaviorally and through self-report. In a somewhat older group, Tsai, Kunter, Lüdtke, Trautwein and Ryan (2008) found that day to day variations in teacher autonomy support affect day-to-day variations in student interest. In college age students, Ryan, Rigby, and Przybylski (2006) found that intrinsic motivation for video games was predicted by game features that afford experiences of autonomy and competence. On the adult end, Kuvaas (2009) found that intrinsic motivation for work among public sector employees positively predicted their self-reported work performance.

In short, CET has been an important body of work within SDT, not only for our basic understanding of intrinsic motivation in development, but also in applied domains such as education, work, games, and sport. Yet intrinsic motivation is only one important type of motivation. To address a broader set of motives, including those that are not intrinsically motivated, another SDT mini-theory was developed to which we now turn.

Organismic Integration Theory: Internalization and Extrinsic Motivation

Organismic integration theory (OIT) emerged shortly after CET, and is primarily concerned with *extrinsic motivation* (Ryan, Connell, & Deci, 1985). Extrinsic motivation is defined within SDT as instrumental motivation, and thus concerns all activities aimed at achieving outcomes separable from the behavior itself. Clearly this is a large and heterogeneous category of motives, and thus OIT describes extrinsic motivation's various forms, some controlled and some more autonomous.

On the controlled side, a person can be extrinsically motivated due to external pressures, reward contingencies, or coercion, motives classified within OIT as *external regulation*. External

regulation is understood as a very powerful form of motivation, but also one difficult to sustain because it is dependent on the external controls. It has therefore poor "maintenance and transfer" qualities (Ryan & Deci, 2000a). Yet another type of controlled extrinsic motivation is termed *introjected regulation,* and concerns behaviors driven by internally controlling pressures and regulations, as exemplified in ego-involvement (Ryan, 1982), contingent self-worth (Deci & Ryan, 1995), self-critical perfectionism (Soenens, Vansteenkiste, Luyten, Duriez, & Goossens, 2005) and other often maladaptive processes (e.g., Assor, Vansteenkiste, & Kaplan, 2009; Weinstein, Deci, & Ryan, 2011). Again, although a potent motivator of many individuals, introjected behavior can be fragile, especially in the face of setbacks or ego blows, and also presents risks for well-being.

On the more autonomous side of extrinsic motives are those described within OIT as *identified and integrated regulations*. These forms of motivation are well internalized such that, even when a task is not inherently enjoyable, the person willingly and volitionally engages in it because the person endorses its value or worth. In identification the individual consciously accepts the worth and value of the activity, and when integrated, that identification fits congruently with the individuals' other values and identifications, allowing a full endorsement. Such autonomous types of extrinsic motivation are more sustainable than controlled motivations—people persist even in the absence of external supports because they are guided by that sense of value and purpose for acting. For example, in a classic demonstration, Pelletier, Fortier, Vallerand, and Briere (2001) showed prospectively how autonomous motives promoted the long-term persistence of elite swimmers in an arduous sport context.

OIT further describes a *process* of internalization—a natural tendency of people to move beyond external control toward autonomous self-regulation where possible. People have an

inherent tendency to assimilate social regulations and practices into self-regulations where they can as a part of our adaptive design as social creatures. However, like intrinsic motivation the process of internalization can be facilitated or thwarted by specifiable factors associated with the support of psychological needs for autonomy, competence, and relatedness. OIT posits that factors in social contexts that support autonomy, competence, and relatedness facilitate the development and adoption of more autonomous forms of extrinsic regulation. In contrast, in environments where people feel controlled, incompetent, or alienated from socializers, internalization fares less well, and people remain prone to more controlled (external and introjected) forms of regulation. In the absence of these need supports they may even remain *amotivated* to act. As a result, internalization is always a matter of degree. As just one example, Chirkov and Ryan (2001) assessed the perceived autonomy-support of teachers and parents in Russian and U.S. high schoolers. Results indicated that perceived teacher and parent autonomy support was associated with less controlled and more autonomous forms of motivation, as well as with greater well-being in both samples.

Developmental considerations in OIT. Early in the development of OIT, SDT researchers became interested in the factors in socializing environments that support the development of more autonomous forms of self-regulation. Initially generated by Grolnick and Ryan's (1989) for coding interviews with parents, three distinct dimensions were identified as being critical for satisfying children's psychological needs and contributing to their development and wellness: parental *autonomy support*, parental *structure*, and parental *involvement* (Grolnick & Pomerantz, 2009; Soenens & Vansteenkiste, 2010). Substantial evidence has shown that caregiving environments that afford these three types of support facilitate healthy self-development (Ryan, Vansteenkiste, & Deci, 2016). Conversely, neglect or thwarting of these

supports not only prevents children from developing capacities for autonomous self-regulation but can even contribute to maladjustment and psychopathology. That is, when parents are *controlling, chaotic,* or *neglectful* basic psychological needs are frustrated, and defensive, compensatory, and need-substitutive behaviors emerge, contributing to ill-being and psychopathology (Costa, Sireno, Larcan, & Cuzzocrea, 2018; Vansteenkiste & Ryan, 2013).

Today there is a rich literature on developmental supports for motivation and internalization that has emerged from work in infancy through the lifespan. As examples, Bernier, Carlson, and Whipple (2010) studied the relations of maternal autonomy support to toddlers' capacity for executive control, assessed via indicators of flexible goal-setting, impulse control, and planning. After controlling for children's cognitive capacity, maternal education, and even maternal sensitivity (which we see as an aspect of autonomy support), maternal autonomy support, assessed when children were 12-15 months old, related to executive control at 18- and 26-months. Andreadakis, Jouussemet, and Margeau (2018) recently showed, in line with OIT, that maternal autonomy support also predicted rule internalization among two-year olds. Moving to preschool children, Bindman, Pomerantz and Roisman (2015) documented that maternal autonomy support in the first three years predicted executive functioning in kindergarten and later academic achievement in elementary school. Piotrowski, Lapierre and Linebarger (2013) showed how parental autonomy support predicted stronger self-regulation skills and rule internalization. Looking to childhood years, literally hundreds of studies have shown that autonomy-supportive parenting yields developmental benefits, including greater teacher-rated competence and higher grades (e.g. Grolnick, Ryan, & Deci 1991), greater well-being (e.g., Chirkov & Ryan, 2001; Lekes, Gingras, Philippe, Koestner, & Fang, 2010) and social adjustment (e.g., Soenens & Vansteenkiste, 2005).

Studies of children and teens in the domains of education (e.g., Vansteenkiste et al., 2012) and sports (e.g., Curran, Hill, & Niemiec, 2013) indicate that optimal outcomes are most likely attained under conditions of both high autonomy-support (especially) and high *structure*. Structure concerns the degree to which parents, teachers, and others organize the environment to be optimally challenging for the child and scaffold activities so mastery is the common experience (Grolnick & Pomerantz, 2009). A number of studies confirm the enhancing effects of high autonomy/high structure contexts for facilitating development and wellness (Grolnick, Raferty, et al., 2014; Sirens, Vansteenkiste, Goosens, Soenens, & Dochy, 2009).

Turning to the darker side of parenting, SDT sees need thwarting as a key element in compromised development, distress, and psychopathology (Ryan et al., 2016). SDT's understanding of controlling parenting differentiates it into additional categories (see Soenens & Vansteenkiste, 2010). Parents can be *externally controlling* by relying on controlling reward and punishment contingencies or even direct coercion. Such parents, in attempting to externally regulate their child, often diminish their child's *self*-regulatory capacity. For example, Joussemet et al. (2008) linked more controlling strategies of parents with higher rates of children's aggression in elementary school. A second type of controlling parenting is *internally controlling* in nature. In this case, parents try to instill in the child positive and negative self-related feelings, contingent upon compliance with the parent's standards or goals. Within SDT the construct of *parental conditional regard* (PCR) specifically describes such an approach, as caregivers use attention or affection contingently to shape their child's behavior (Roth, Assor, Niemiec, Ryan & Deci, 2009). PCR is theorized to be have detrimental effects on self-functioning, as caregivers who use conditional regard are essentially putting children's needs for relatedness and autonomy in opposition to each other. To maintain relatedness, the child must comply, a compliance that

typically takes the form of introjection (e.g., Assor, Roth & Deci, 2004; Roth & Assor, 2012).

Basic Psychological Needs Theory (BPNT)

As research emerged on how autonomy, competence, and relatedness supports enhanced high-quality motivation, a repeated observation was how these supports also fostered greater well-being. This led to BPNT, a third mini-theory that concerns the nature of human wellness and thriving, and their antecedents. The core of BPNT is the proposal that there are (at least) three fundamental psychological needs, namely those for autonomy, competence, and relatedness, the satisfaction of which fosters psychological wellness, and the frustration of which conduces to ill-being. In fact, the thwarting of these needs, especially in severe or chronic ways, directly contributes to various forms of psychopathology (Vansteenkiste & Ryan, 2013).

Developmental considerations in BPNT. BPNT has major implications for healthy self-development (Vansteenkiste & Ryan, 2013). As already argued, support for basic needs is critical to enhancing intrinsic motivation and internalization—both fundamental to psychological growth and integrity (Ryan, 1995). In fact, autonomy and relatedness need supports in early childhood have been linked with stronger development of both cognitive capacities such as executive functioning (Bindman et al., 2015), higher academic engagement and performance (e.g., Vasquez et al., 2016) and social capacities, including even better relationships with siblings (van der Kaap-Deeder et al., 2015), whereas developmental conditions that thwart these need satisfactions produce not only frustration, but also do developmental damage manifest as distress and psychopathology (see Ryan, Deci, & Vansteenkiste, 2016)

Basic needs across cultures? BPNT argues that its basic psychological needs are relevant across all cultures. This has been a controversial issue for some. For example, some scholars have suggested that, because collectivist cultures emphasize duty and obligation to the

group, autonomy is not very important for their members (e.g., Markus, Kitayama, & Heiman, 1996; Iyengar & Devoe, 2003). Yet, this is a misinterpretation of the concept of autonomy, as it assumes people cannot autonomously engage in a duty, willingly comply with their parents, or volitionally adhere to collectivistic norms. BPNT suggests in contrast that across cultural contexts need support is critical for ensuring deeper internalization of social practices and values (Chirkov, Ryan, & Sheldon, 2011), including those associated with varied forms of collectivism (Chirkov, Ryan, Kim & Kaplan, 2003).

At this point there is, in fact, a voluminous literature that is richly sampling people across cultural boundaries and that supports the important role of SDT's basic psychological need satisfactions for health and wellness. For instance, Chen, Vansteenkiste, Beyers, et al. (2015) assessed need satisfaction and frustration in samples drawn from Peru, China, the United States, and Belgium, finding that each of SDT's basic needs was uniquely related to subjective wellness, regardless of cultural membership. Church, Katigbak, Ching, et al. (2013) surveyed participants from China, Japan, Venezuela, the Philippines, and the U. S., using experience sampling. They reported that SDT's basic need satisfactions predicted greater openness, agreeableness, conscientiousness, and less neuroticism, as well as more positive and lower negative affect across samples. Assessing Indian and Nigerian adolescents' perceptions of parent and teacher autonomy support, Sheldon, Abad, and Omoile (2009) found that autonomy support predicted need satisfaction in school, which in turn predicted higher life satisfaction—findings common to both samples. As a final example, Yu et al. (2018) performed a meta-analysis of studies collected in the U.S. and in East Asian nations looking at the relations between subjective well-being and autonomy satisfaction. Although characterized as a largely Western preoccupation by some (e.g., Iyengar & DeVoe, 2003), Yu et al.'s analysis showed positive effects of autonomy across

samples with East or West backgrounds. These are just examples drawn from a large literature supporting SDT's claims about the fundamental importance of basic psychological needs.

In saying this, it is important to delimit, however, exactly what is "universal" in this SDT formulation. In BPNT basic psychological needs are understood as *etic universals*, that is, as attributes or processes that can be empirically shown to have cross-cultural significance (Reeve, Ryan, & Deci, 2018; Ryan & Deci, 2017). Across cultures, the satisfaction of these needs is expected to enhance thriving, and their frustration, to compromise wellness. However, SDT does not claim that these basic needs are *emic universals*. We fully expect that these basic needs vary in the degree to which they are valued, voiced, and expressed in different cultures and social groups. In many cultures, autonomy is actually suppressed or denied for certain subgroups. Thus, although SDT posits that autonomy is a universal need, how it is supported and valued varies considerably across cultures (e.g., Cheng, Shu, Zhou, & Lam, 2016; Marbell & Grolnick, 2013). Studying how cultural and economic contexts support or thwart basic needs is an increasingly active area of SDT research (e.g., DeHaan, Hirai, & Ryan, 2016; Di Domenico & Fourier, 2014).

Causality Orientations Theory (COT)

The mini-theory of *causality orientations* had its roots in CET and OIT, where evidence made clear that people can be differentially motivated by different social conditions. Although much of that variation can be attributed to the environment, individuals also, as a function of both temperament and developmental history, seem prone to focus on some features over others. Some people readily orient to controls, reward contingencies, and powerful others; others to opportunities to explore and grow; and still others seem to focus on fears of failure or needs for safety. Causality orientations theory (COT; Deci & Ryan, 1985a) was spawned from research intended to tap such differences.

Underlying COT are three motivational orientations, conceived of as propensities to focus on specific features and affordances within social contexts, and to express corresponding motives. All individuals have each of these orientations to different degrees, although situations can prime people to emphasize one over the others. An *autonomy orientation* taps a proactive stance in which one is focused on interests and opportunities for growth. In the *controlled orientation* one is focused on external contingencies and power structures to guide behaviors; and an *impersonal orientation* is focused on performance anxieties and on avoiding failure. Each orientation can be differentially salient to an individual, often as a function of context. Thus, in some research causality orientations have been measured as general (Deci & Ryan, 1985a) or domain specific propensities (e.g., Baard, Deci & Ryan, 2004), whereas in others they have been primed in individuals, resulting in corresponding interpersonal behaviors and performance outcomes (e.g., Weinstein, Hodgins, & Ryan, 2010).

As reflective of how people tend to construe or interpret environments, causality orientations are traits, and thus are both related to and yet distinct from the classic personality traits represented in the *five-factor model* (FFM; McCrae & Costa, 2003). For example, studies by Olesen and colleagues (Olesen, Thomsen, Schnieber, & Tønnesvang, 2010; Olesen, 2011) found that autonomy and control orientations as measured by the *general causality orientations scale* (GCOS; Deci & Ryan, 1985a) were largely distinct from the big five, although control was somewhat negatively associated with agreeableness, and autonomy positively with openness and extraversion. The impersonal orientation was both distinct from and partly overlapping with neuroticism. In these studies, Olesen and colleagues demonstrated that causality orientations predicted a range of outcomes and accounted for variance beyond that explained by the big five traits. Accordingly, we turn to some specific attributes associated with these orientations.

Research with the GCOS has shown that an autonomy orientation (AO) correlates with greater focus on learning goals, and a focus on interest and challenge (e.g., Amabile, Hill, Hennessey, & Tighe, 1994). Soenens, Berzonsky, Vansteenkiste, Beyers, and Goosens (2005) found the AO predicted more open and flexible identity construction in young adults. Knee, Patrick, Vietor, Nanayakkara, and Neigbors (2002) found that AO predicted more positive and less negative affect in relationship settings. Weinstein and Hodgins (2009) showed that AO predicted better coping with distressing experiences. Hagger and Chatzisarantis (2011) reported that AO experimental participants were less prone to undermining effects of extrinsic rewards. Such findings point to the constructive, interest-focused approach that characterizes an AO.

In addition, AO is associated with greater personality integration. For example, Weinstein, Deci and Ryan (2011) showed that people high in AO as measured by GCOS, or primed with autonomy, showed more ability to integrate (i.e., show acceptance and ownership of) both positive and negative memories from their past. Taking a different approach to integration, Koestner, Bierneieri, and Zuckerman (1992) suggested that higher behavior-attitude consistency is indicative of greater integrity. They had students complete a measure of conscientiousness (Costa & McCrae, 1985), and then, as the students left the experiment, they were given an additional survey and asked to fill it out at home and return it to the psychology department office. As predicted, Koestner et al. found that the correlation between self-reports of conscientiousness and the conscientious behavior of actually returning the survey was greater for the autonomy-oriented group than the control-oriented group.

Control orientation (CO), being indicative of conformity and control, has yielded a quite different set of correlates. For example, Soenens, Bernowsky, et al. (2005) found that CO was associated with a conformist style of identity in developing adults, focused on living up to

expectations of others. McHosky (1999) found CO to predict Machiavellian attributes. Koestner and Zuckerman (1994) related CO to performance rather than learning goals. Neighbors, Larimer, Geisner, and Knee (2004) showed CO was associated with more proneness to using alcohol to cope or to "fit in" with others. Moller and Deci (2010) found that CO predicted a greater tendency to dehumanize others, and to endorse violence. These and other findings suggest CO is associated with more ego-involved, and less well integrated, functioning.

As detailed by Deci and Ryan (1985a), the Impersonal Orientation (IO) is characterized by an external locus of control over outcomes—a belief that one cannot predict or control what will happen. The IO thus correlates with a sense of powerlessness and fear of incompetence (McHoskey, 1999). Koestner and Zuckerman (1994) related the IO to both a focus on social comparisons and low confidence. Soenens, Berzonsky, et al. (2005) related it to a diffuse-avoidant identity style that is associated with more maladaptive coping. Cooper, Lavaysse, and Gard (2015), investigating people with severe mental illness, reported a higher impersonal orientation in persons with schizophrenia relative to others. Such studies confirm the problematic nature of this orientation which is characterized by such a low sense of control over outcomes.

Causality orientations in interpersonal relationships. Hodgins and colleagues provided a program of research examining whether persons who are more autonomy-oriented display greater openness, interest, and less defensiveness in relationships. In their early research, Hodgins, Koestner, and Duncan (1996) followed the interactions of college students with their parents over a 3-week period. Those high in AO and low in CO were especially honest and disclosing, had more positive affect, and felt better about themselves when interacting with parents. Subsequently, Hodgins et al. (1996) tracked all significant social interactions students had over a week time span. Those with a greater AO were more trusting, disclosing, and honest

with others, especially when those others reciprocated. As in the study with parents, these high AO students also reported more positive emotions and felt better about themselves in their encounters. In further studies, Hodgins and colleagues (Hodgins & Liebeskind, 2003; Hodgins, Liebeskind, & Schwartz, 1996) examined how people deal with conflict in relationships. They reported that people who were higher in AO were less defensive and deceptive in explaining wrongs they had done, and they provided more complex apologies for harms they committed.

Investigating defensiveness across several studies, Hodgins, Yacko, and Gottlieb (2006) primed autonomous, controlled, and impersonal orientations in different groups using a scrambled sentence task. In one study they had participants work on an anagram task, for which they received either success or failure feedback, followed by a questionnaire that assessed a *self-serving bias* in accounting for performance. Whereas autonomy-primed individuals were least self-serving in accounting for their performance, control-primed individuals were somewhat more so, and impersonally primed individuals were the most self-serving. In another study in this series, Hodgins et al. (2006) examined *self-handicapping*, a defensive phenomenon in which people who face a challenging task defend against potential ego blows by generating excuses for why they might fail. As expected, autonomy-primed participants displayed less self-handicapping than those exposed to either a control or an impersonal prime.

In still another set of studies, Hodgins et al. (2010) explored the effects of primed autonomous and controlled orientations on defensiveness and performance during a stressful interviewing task. Defensiveness was assessed using coding of videotapes for distortion and low awareness of inner states (Feldman Barrett, Cleveland, Conner, & Williams, 2000), for the length of their answers to stressful questions, and for the ratio of perceived threat to perceived coping capacity. It was also tapped using physiological measures such as ventricular contractility

(Mendes, Blascovich, Hunter, Lickel, & Jost, 2007). Across indicators, students in the autonomy prime condition appeared less defensive than those given control primes. They also performed better in their speech, a result mediated by the level of defensiveness. In sum, Hodgins and colleagues have systematically shown how causality orientations can help account for people's differential openness, non-defensiveness, and positive experience within interpersonal contexts.

There are, of course, many more findings on causality orientations we could review, but those mentioned illustrate that people do differ in their style of engaging environments and the affordances to which they are most attuned. Causality orientations can also be primed by settings and cues, with significant effects on whether people function with defensiveness or openness. We turn next to another important set of individual difference variables that deeply affects people's lives, namely people's aspirations or life goals.

Goal Content Theory (GCT)

People internalize and embrace different life goals and aspirations that shape much of their day-to-day attitudes and behaviors. These goals and aspirations are shaped by numerous factors, from family dynamics to economic, cultural, and media inputs. In SDT research it became apparent that different life goals differentially afford basic need satisfactions, and therefore influence well-being in systematic ways.

The initial work leading to GCT becoming a formal SDT mini-theory stemmed from research by Kasser and Ryan (1993; 1996). They had participants rate the importance of two sets of goals, with one set focused on *extrinsic aspirations* including accumulating wealth, becoming popular or famous, or having an attractive image, and a second type of goals labeled intrinsic aspirations, such as personal growth, having close relationships, contributing to the community, and being physically healthy. More broadly, extrinsic life goals were thought of as focused on

the pursuit of external rewards and the garnering of esteem and approval of others, whereas intrinsic goals entail a focus on inherent, often eudaimonic, propensities (see Ryan, Curren, & Deci, 2012) such as fully actualizing one's capacities, caring for one's larger community, or acting with benevolence (Froiland, 2011; Froiland & Worrell, 2016; Guillen-Royo & Kasser, 2015; Kasser & Ryan, 2001; Wray-Lake, DeHaan, Shubert, & Ryan, 2017).

It is interesting that these two groups of aspirations empirically stand together as two higher order factors, and cluster together in circumplex and network analyses (Martela, Bradshaw, & Ryan, 2019). People who are into money also tend to care about social recognition and appearance. People who care about personal growth also tend to value relationships and community. Intrinsic and extrinsic aspirations also appear to be antipodal, in the sense that people who are more extrinsic-goal focused are less likely to care about community, close relationships and personal growth (e.g., Grouzet et al, 2005). From the beginning of this research, analyses have indicated that the greater relative importance people place on extrinsic goals, the less their satisfaction of basic psychological needs, and thus the less they experience well-being. They also report greater need frustration, accompanied by more signs of ill-being, such as symptoms of anxiety, stress, and depression. In contrast, placing greater importance on intrinsic goals such as growth and community has been associated with greater satisfaction of basic psychological needs, and enhanced well-being.

GCT research has consistently supported the claim that "not all goals are created equal" (Ryan, Sheldon, Kasser, & Deci, 1995). The differential effect of intrinsic versus extrinsic life goals on wellness has been shown with a variety of methodologies including cross-sectional (e.g., Kasser & Ryan, 1996), longitudinal (e.g., Niemiec, Ryan, & Deci, 2009), experimental (e.g., Vansteenkiste, Simons, Lens, Soenens, Matos & Lacante 2004), and person-centered (e.g.,

Bradshaw, Sahdra, Ciarrochi, Parker, Martos, & Ryan, 2018) strategies. These results have also been observed cross-culturally (Grouzet et al., 2005; Ryan et al., 1999), and in various populations such as Japanese fathers and their children (Nishimura, Bradshaw, Deci & Ryan, 2018), business students and teachers in training (Kasser & Ahuvia, 2002; Vansteenkiste, Duriez, Simons & Soenens, 2006), older adults (Van Hiel & Vansteenkiste, 2009) and others.

Thus, in contrast to some goal theories which suggest that attainment of any valued goal is beneficial (e.g., Locke & Latham, 1990), GCT argues that the content of goals matters for wellness, especially as goal contents relate to basic need satisfactions. Vividly illustrating this is a study by Sheldon and Kreiger (2014). They contrasted lawyers with high paying jobs within money-focused firms, and those in more public service positions who tended to work in lower paying jobs. The "money lawyers", despite making significantly more, reported lower well-being, more negative affect, and more alcohol use. Their focus on extrinsic goals was also associated with lower autonomy at work, partially explaining these GCT-consistent results. This illustrates that aspiring for and even attaining certain types of goals may not lead to the happiness anticipated, largely due to the need satisfactions and frustrations associated with them.

Relationship Motivation Theory (RMT)

Many theories in social and personality psychology assume that relatedness to others is opposed to or antithetical to autonomy. This is, for example, an explicit claim in the cross-cultural work of Markus and Kitayama (2003) who cast autonomy as a "Western" value, and relatedness as an "Eastern" priority. Similarly, some gender theories have cast autonomy as a male concern, and relatedness as a female concern (Jordan, 1991). In strong opposition to these views, SDT claims that in these formulations the concept of autonomy as willingness, empowerment and volition is confused or conflated with concepts of individualism,

independence, or non-reliance on others. Moreover, empirical findings from SDT show over and over that not only are autonomy and relatedness not contradictory or opposing, but rather they tend to be highly correlated, and co-occur in the best of social contexts and close relationships.

Such considerations led to the most recent SDT mini-theory to be formalized, namely *relationships motivation theory* (RMT). RMT of course embraces the idea that relatedness, one of SDT's three basic psychological needs, is an experience that is critical to high-quality, sustainable relationships and to wellness more generally. Another important proposition of RMT, however, is that satisfaction of the autonomy need is as fully important to a high-quality relationship as is satisfaction of relatedness. People need to feel volitional about being in a relationship, and to see the other as volitional, for the connection to be high in quality. In this regard, RMT suggests that highest quality dyadic relationships in adulthood entail *mutuality of autonomy* (Deci, La Guardia, Moller, Scheiner, & Ryan, 2006).

RMT helps explain many relational dynamics. For example, it helps us understand variations in security of attachment, because these are largely a function of basic psychological need supports (e.g., La Guardia, Ryan, Couchman, & Deci, 2000). It speaks to why parental styles such as contingent regard, which pit autonomy and relatedness against each other, hamper both internalization and wellness (e.g., Roth, Assor, Niemiec, Ryan, & Deci, 2009). It highlights why volitional or autonomous actions enhance recipients' feelings of care and relatedness in stations of help giving (e.g., Weinstein, DeHaan, & Ryan, 2010; Weinstein & Ryan, 2010) or cooperation (e.g., Weinstein, Hodgins, & Ryan, 2010). This mini-theory also helps explain why objectification disrupts relationships (Ryan & Deci, 2017). In short, RMT deepens our understanding of what motivates and sustains relationships well beyond the more standard ideas that they are "instrumental" to adaptation, or that they provide warmth and security.

Beyond the Mini-theories: Topical Models Spawned by SDT

On Awareness: Mindfulness and Autonomous Functioning

Since our earliest writings on SDT we have highlighted the critical role of awareness in facilitating autonomous functioning (e.g., Deci & Ryan, 1980b). Greater awareness promotes integration and volition, as people are better informed in the self-regulation of behavior. Autonomy, which is characterized by a wholehearted willingness to act, represents congruence among motives, goals, and values. This unity is supported by reflectivity, and even more specifically by *mindfulness,* understood within SDT as non-defensive or open experiencing of what is occurring within and outside oneself (Deci, Ryan, Schultz, & Niemiec, 2015; Ryan & Rigby, 2015). Mindful awareness opposes and buffers against compartmentalization and defensiveness, which are cardinal features of controlled motivation (Ryan & Deci, 2017).

Research has supported this SDT view. For example, Ryan and Brown (2003) showed that mindfulness is associated with autonomy at both state and trait levels of analysis, suggesting that more mindful people act in more congruent, integrated, ways. Weinstein, Brown and Ryan (2009) further showed that mindfulness was associated with lower stress, as a result of both less negative appraisal of situations, and more adaptive coping strategies. It appears that mindfulness has its positive effects in part by facilitating more integrated self-regulation.

This idea was vividly illustrated by a series of studies examining whether mindfulness could moderate people's reactions to mortality salience effects as studied within *terror management* theory (TMT; Greenberg, Pyszczynski, & Solomon, 1995). According to TMT when people are reminded of death, they will tend to defend against those thoughts in ways that defensively protect their self-esteem, often by affirming the worldviews that have protected them psychologically. For example, TMT research shows that, after making mortality salient to

people, they will rate “in-group” members who share their values more positively, and perceived “out-group” members more negatively. But SDT suggests that mindfulness, which gives a person more access to integrated values, should buffer against such defensiveness. Supporting this, Niemiec, Brown, et al. (2010) reported seven experiments, all finding that people higher in mindfulness were less likely to evidence world-view defense following mortality salience manipulations. This buffering effect was not mediated by avoidance or suppression, but rather by fuller processing in the moment, resulting in less residual suppression of death thoughts and conducing to a more integrated, less defensive awareness of mortality.

On Energy: Psychological Sources of Vitality and Depletion

The concept of motivation is often described as involving both the direction and energy for action. However, the energetic aspects of action have been less well explored than the directional or goal-oriented elements. It was with this in mind that Ryan and Frederick (1997) began a concerted effort to explore this topic, introducing the concept of *subjective vitality* defined as the highly accessible “feeling of having energy available to the self” (Nix, Ryan, Manly, & Deci, 1999, p. 266). Vitality is seen as distinct from activation or energy *per se*, which includes also negatively toned types of arousal. Instead a person with subjective vitality experiences energy they can *mobilize* and *regulate* toward their own ends. In a series of studies Ryan and Frederick (1997) showed how subjective vitality can be enhanced not only by physical factors (health, rest, freedom from pain), but also by basic psychological need satisfactions. This ‘mini-mini’ theory within SDT further asserts that not all effortful activities deplete vitality to the same degree. Activities pursued with more autonomous motivation can maintain and can even enhance subjective vitality, whereas controlled motivations and need thwarting experiences reduce the energy available to the self (Martella, DeHaan, & Ryan, 2016; Ryan & Deci, 2008).

SDT and ego-depletion. This SDT work on subjective vitality both converges and diverges with the popular *resource strength model* of ego-depletion (Baumeister, Muraven, & Tice, 2000; Muraven, 2012) which also addresses the issue of energy. Baumeister, Muraven and colleagues proposed that the self-regulation of behavior requires energy, and 'like a muscle' *it draws* upon energetic resources that become depleted through use. *Ego depletion* is thus "a temporary reduction in the self's capacity or willingness to engage in volitional action…., caused by prior exercise of volition" (Baumeister, Bratslavsky, Muraven, & Tice, 1998, p. 1253). Numerous experiments have supported this view, demonstrating that the exercise of self-control can deplete energy, as manifest in diminished subsequent persistence on assigned tasks (e.g., Baumeister & Vohs, 2007; Tice, Baumeister, Shmueli, & Muraven, 2007).

Although many theories including this ego-depletion model, equate the concepts of self-control and volitional self-regulation, SDT has long maintained that these concepts should be clearly differentiated (Ryan, 1982). Motivation is considered *self-controlling* when it is based in external and introjected regulations, whereas *autonomous self-regulation* refers to a behavior that is intrinsically motivating or is regulated by identified or integrated motivations. Self-controlling motives are expected in SDT to be more vitality draining because they entail conflict—one part of personality must override or suppress another. SDT thus converges with the ego-depletion model in cases where the regulation of behavior is "controlling" in nature; both theories suggest this should result in the depletion of energy. Yet because autonomous forms of self-regulation involve motives that are more self-congruent and expressive of one's interests and values, such behaviors do not require the same internal conflict and need for inhibition of competing energies. As Ryan and Frederick (1997) argued, the more the *perceived locus of causality* for actions is

external to the self, the more the regulation of the activity drains subjective vitality. Thus, SDT uniquely predicts less depletion the more autonomous the regulation.

In researching these principles, Muraven, Gagné, and Rosman (2008) had participants complete a task requiring self-control in two conditions: a controlling condition, in which they were reminded about the time pressure and a demand to do well; and a contrasting autonomy supportive condition. Results showed that those in the controlling condition performed worse on a subsequent task used to measure depletion effects, a relation mediated by subjective vitality. In related research, Muraven, Rosman, and Gagné (2007) posited and showed that performance-contingent rewards, which tend to be experienced as controlling (Deci et al., 1999), were more ego-depleting than non-contingent rewards. Subsequently, Muraven (2008), instead of manipulating autonomy, simply placed a bowl of cookies in front of students and assessed their relative autonomy for not eating the cookies. His findings showed that more autonomous reasons predicted better performance on a subsequent ego-depletion task.

Kazén, Kuhl, and Leicht (2015) provided similarly supportive evidence of the importance of autonomy versus control in understanding depletion effects. They gave participants either self-controlling or more autonomy-supportive instructions as they engaged in a demanding task, and then assessed depletion effects on a second task, along with blood glucose levels. Basing their hypotheses on both *Personality Systems Interaction* (PSI; Kuhl, 2000) and SDT, they expected that self-controlled actions would deplete energy, whereas autonomously motivated actions would not. Further, applying Beedie and Lane's (2012) *resource allocation model*, they suggested that blood glucose levels would follow a similar pattern: Instead of being simply depleted by mental effort as suggested by Gailliot and Baumeister (2007), the allocation of glucose to the brain would be affected by an appraisal of the importance of the activity.

Consistent with the ego-depletion model, Kazén et al. found that blood glucose levels of the self-controlling group dropped during the experiment. In contrast, the more autonomous group not only performed better on the depletion task, they showed a *rise* in blood glucose levels. Such results fit a pattern in which autonomy mobilized more energy for effortful regulation.

Unique to SDT is research on a set of *psychological* factors that robustly impact vitality and depletion, namely basic psychological need satisfactions and frustrations. Based on SDT, a number of studies have looked at daily fluctuations in people's sense of need satisfaction in relation to vitality. For example, Reis et al. (2000) showed that daily vitality was higher on days when psychological needs for autonomy, competence, and relatedness were satisfied and that each of these three needs had an independent influence on vitality. These results have been corroborated by similar findings in other experience sampling studies (Martela & Ryan, 2016; Sheldon, Ryan, & Reis, 1996). Similarly, in work contexts, all three needs have been found to be associated with greater vigor and negatively associated with exhaustion (Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010), and need satisfaction has mediated the relations between job resources, job demands, and employees' exhaustion and vigor (Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008). Ryan, Bernstein, and Brown (2010) did an experience sampling study of American workers, finding that on average they reported lower vitality when at work compared to non-work contexts. These differences in vitality were mediated by autonomy and relatedness, which for most workers were needs not well satisfied in the workplace. Vitality for most of those full-time employees rose significantly on weekends, an effect accounted for by both increased choice and self-direction of activities and greater opportunities to find relatedness satisfactions.

Nature and vitality. Many people believe that natural environments replenish their sense

of vigor and vitality. It is possible that natural settings allow people to be more open and relaxed instead of engaging in effortful and directed attention (Kaplan & Kaplan, 1989). These may even be more direct biophilic effects (Wilson, 1984). These everyday experiences led Ryan, Weinstein, Bernstein, Brown, Mistretta, and Gagné (2010) to examine whether there is some special connection between nature and vitality, in the sense that nature would provide or catalyze positive energy. Ryan, Weinstein, et al. (2010) conducted five studies utilizing survey, experimental, and diary methods that assessed the effects on subjective vitality of being outdoors or around natural elements. Results supported this positive co-variation. In other studies Weinstein, Przybylski, and Ryan (2009) showed that exposure to nature not only increased participants sense of vitality, it also made them more prosocial, more valuing of intrinsic goals, and increased their sense of autonomy and relatedness to nature (see also Zelinski & Nisbet, 2014). Together, these studies utilizing multiple methods have found a reliable association between exposure to outdoor natural environments and enhanced vitality, as well as to other positive effects on wellness that may be mediated by need satisfactions (e.g., see Quested, Thogersen, Uren, Hardcastle & Ryan, 2018). The positive effects of nature, that is, are partially mediated by basic need satisfactions, along with some independent effects. This has led to increasing research on the vitalizing effects of nature and even the question of whether exposure to living nature is among our basic psychological needs (e.g., Baxter & Pelletier, 2018)

On Full Functioning: Wellness and SDT's Position on Hedonia and Eudaimonia

Across studies SDT has been focused on optimal functioning and thriving. But how is that conceptualized? The field has often been divided in approaches to this question, with some people arguing for hedonic definitions (e.g., Kashdan et al., 2009) and other offering more eudaimonic views (Ryff, 1995). Within SDT, however we see thriving as *full functioning*—

having access to and using one's full sensibilities and capabilities. This means a full functioning person is aware of feelings and perceptions, and able to integrate and process inputs so as to be able to deploy abilities in self-determined way. As a result, the individual will be likely to both live a more eudaimonic life, and on average find in those satisfactions hedonic benefits.

In this regard, SDT does not define eudaimonia as a particular set of experiences such as awe or meaning, or the presence of wellness outcomes per se. Rather, in line with Aristotelian traditions (see Ryan & Martela, 2016; Ryan, Curren, & Deci, 2012) eudaimonia is understood as *a way of living* that involves the pursuit of intrinsic values, virtues, and excellences. As we have specified (e.g., Ryan, Huta, & Deci, 2008), SDT describes eudaimonic living with its constructs of mindfulness, integrated functioning, the pursuit of intrinsic aspirations, all of which contribute to the satisfaction of basic psychological needs. It is consistent and fitting with eudaimonic perspectives that these constructs predict greater wellness and vitality, including enhanced hedonic outcomes such as more positive and less negative affect.

A eudaimonic life is something only some individuals actively pursue, and usually people who develop eudaimonic lifestyles have themselves had nurturing and support from others. SDT suggests that people who receive high basic psychological need supports in development will also develop greater social competencies, mindfulness, capacities for empathy, and ultimately propensities to emphasize intrinsic values, all of which are associated with eudaimonic living (Ryan & Deci, 2017). As it turns out, when people are engaged in basic need satisfying lifestyles, their subjective well-being is higher, as is their reporting of deeper meaning in life. Indeed, Martella, Ryan, and Steger (2017) found that a sense of meaning is largely accounted for by pursuits that satisfy SDT's basic psychological needs, along with benevolence.

The Applied Significance of SDT

Thus far we have focused primarily on the evolution of the basic science of self-determination theory through its six core mini-theories. We turn briefly now to SDT as an applied and translational science, beginning with two thoughts about its value within SDT. First, applied research is a testing ground for theory. By taking principles discovered in experimental and field-descriptive studies and extending their application to varied domains and situations, the extent of their generalizability can be critically examined. What is a general principle can be differentiated from what is domain or population specific. Indeed, there is a reciprocal relation between applied intervention studies and SDT's basic science, as each informs the other in an iterative manner. But beyond its scientific utility, applied research has inherent value, as we think the ultimate purpose of research on human motivation is to benefit humanity and humanity's nest—the earth—which is affected by human motives and behaviors. Thus, a driver of much research for us and others using SDT is identification with this value of putting behavioral principles to work in domains of practice toward human betterment. These include areas such as healthcare, psychotherapy, environmentalism, education, parenting, technology, and organizations, among others. In our recent book (Ryan & Deci, 2017) we review these and other applied topics comprehensively, so we will not reiterate those reviews here. Rather we provide just a few examples of how SDT applications are both informing the theory's "brick-by-brick" science and yielding possibilities for societal improvements.

Healthcare. SDT has been widely applied in healthcare settings, shaping interventions focused on supporting patient autonomy and competence for engaging in health promoting behaviors and adhering to medical advice (La Guardia, 2017). A number of randomized trials have supported the efficacy of SDT in areas such as weight loss, smoking cessation, physical activity promotion, medication adherence, dietary change and other areas critical to health

(Ryan, Williams, Patrick, & Deci, 2009). In addition, meta-analyses show how practitioner autonomy support influences patients' internalization of motivation to change, and thus their long-term success (e.g., Gillison, Rouse, Standage, Sebire, & Ryan, 2018; Ng et al., 2012).

Education. SDT research in education has been plentiful, whereas well-studied interventions in this domain such as that of Early et al. (2016) have been less prevalent. The research literature clearly shows, however, the importance of autonomous motivation for students' quality of learning and engagement. It also shows how factors within the classroom, including autonomy supportive techniques, competence scaffolds, and feedback approaches, influence motivational and performance outcomes in ways predicted within CET and OIT.

SDT research also shows how the conditions that teachers encounter affects their motivation to teach and their downstream strategies. The more they have autonomy supportive principals and administrators, the greater their intrinsic motivation and self-determination to teach (e.g., Nie, Chua, Yeung, Ryan, & Chan, 2016; Pelletier, Seguin-Levesque & Legault, 2002). In turn, when teachers are more autonomously engaged, students are more likely to be autonomously motivated to learn (e.g., Roth, Assor, Kanat-Maymon & Kaplan, 2006).

In recent years there has been advancement in SDT's modeling of facilitating classroom environments (Vansteenkiste, Sierens, et al., 2012). For example, Aelterman et al. (2018) introduced a circumplex model of motivating styles used by teachers with independent dimensions for structure versus chaos and autonomy versus control. Accompanying measurement improvements are controlled intervention studies demonstrating that teacher autonomy and competence support can be increased, with positive effects on students (e.g., Cheon & Reeve, 2015; Assor, Feinberg, Kanat-Maymon & Kaplan, 2018).

Yet despite such promising research and exemplars, few nations have implemented the kind of broad scale reforms SDT would advocate to facilitate high-quality student engagement and learning. Instead, high stakes testing policies and other "accountability" strategies that SDT has long critiqued as being misguided (e.g., Ryan & Brown, 2005), are still in effect in many nations, even as they continue to fail. In contrast to the predictable negative effects of outcome-focused pressures and rewards, SDT suggests a focus on *process* rather than outcomes (Ryan & Moller, 2017). When the focus is on nurturing and supporting the teacher's and learner's autonomy, relatedness and competence, the desired outcomes will be produced. Schools would in that case be preferred environments for students—that is, places they want to be. Yet, ironically the more controlling techniques are used to make children achieve preordained outcomes, both their motivation and the richness and depth of their learning are compromised.

Work and organizations. SDT has been increasingly adopted in organizations, as leaders of modern firms recognize the value of employees who are engaged and committed to their work (Deci, Olafsen & Ryan, 2017; Ryan & Deci, 2018). SDT goes well beyond carrot and stick theories to specify not only effective compensation strategies, but also the psychological need satisfactions that bring out employees' highest quality motivation.

Particularly where retention is concerned, it is often said that people don't leave jobs, they leave their bosses. Supporting this view, SDT research highlights the role of managers' styles in predicting not only employees' turnover intentions, but also indicators of their work quality such as absenteeism, affective commitment, productivity, and job satisfaction. This was supported in a recent meta-analysis by Slemp et al. (2018). Drawing form over 30,000 employees from 70 firms in nine nations, Slemp et al. showed that more autonomy-supportive managers had employees who experienced greater need satisfaction and more autonomy for

work, which in turn predicted better work-related outcomes. No moderation by country or organization types was found, speaking to the generalizability of this model.

Sport and physical activity. There are literally thousands of studies supporting the importance of autonomous motivation for sustained engagement in sport and physical activity (Standage & Ryan, 2019). These have been especially active areas of research because persistence at many sports and physical activities requires both intrinsic motivation and identified regulation, and these motivations can be deeply affected by coaching or training styles, issues that SDT directly addresses.

Among important topics in recent work has been research illuminating both the bright and dark sides of sport experiences. For example, Bartholomew, Ntoumanis, Ryan, Bosch, and Thorgensen-Ntoumani (2011) looked at need frustrating and need satisfying sport climates, finding distinct effects on ill-being and well-being indicators, respectively. Beyond wellness, data have shown how need thwarting coaching climates and controlled motives are associated with other "dark side" outcomes such as risk for doping, lower sportsmanship, and lower morality (Hodge & Gucciardi, 2015). In addition, intervention work has been done with coaches and PE instructors on how to enhance motivation and actual activity, with evidence showing that techniques emphasizing autonomy support and structure can be taught, with positive effects on student outcomes (e.g., Cheon, Reeve & Song, 2019; Tessier, Sarrazin, & Ntoumanis, 2010).

Technology. People's use of technology is one more domain we briefly consider here, in part because of the rapidly growing application of SDT to this area (Peters, Calvo, & Ryan, 2018). Modern living has been saturated with technologies as people spend increasing time on screens or engaged with media, some of which people are intrinsically motivated to do and some of which can feel compelled by work and social demands.

For example, considerable work has assessed people's intrinsic motivation for video games, and the features of games and platforms that support it. Ryan, Rigby, and Przybylski (2006), for example, showed how player experience of need satisfaction predicted differential game preferences and enjoyment. The connection between specific features of games and need satisfactions has also been explored (Rigby and Ryan, 2011). For example, Peng, Lin, Pfeiffer, and Winn (2012) showed how enabling or disabling features affecting avatar choices and levels of challenge impacted intrinsic motivation for an exergame, with these effects mediated by autonomy and competence need satisfactions, respectively. These active affordances in video games contrast with the "attractors" in evidence within passive media such as TV dramas. Here people appear to want to engage programs with eudaimonic themes and characters with whom they can identify and experience relatedness (Adachi, Ryan, Frye, McClurg, & Rigby, 2018), yielding more intrinsic motivation to watch.

When it comes to other technologies, SDT speaks to engagement not only at the level of motivational design, but also in terms of the impact of technologies on wellness through basic need satisfactions (Peters et al., 2018). For example, SDT suggests that the impact of a device such as a smartphone or fitness tracker on wellness and full functioning will be medicated by its impact on autonomy, competence, or relatedness. Does the device afford valued choices or rather feel controlling? Does it enhance effectiveness or feel hard to use or control? Does it really connect one socially, or instead pull one away from intimate connections with others? These are all issues at the interface of SDT studies of user experience that can be applied to multiple social media, apps, devices, and other augmentations of human reality.

Conclusions

SDT has been steadily evolving to address more and more areas of human endeavor and concern, and in this overview we have only covered some of the critical topics the theory examines. SDT's theoretic-empirical approach is conservative in some regards, but we think it is because of that solidly built foundation that novel additions and extensions can be constructed within and atop the framework, and reliable experiments and interventions launched. That is, the generalizability of SDT's principles stems from their grounding in convergent basic experimental and field research, as well as what has been learned from controlled interventions. It also stems from the fact that SDT's organismic viewpoint is *functional* in focus. The theory is centrally concerned with what people need to experience integrated, vital living, and as such SDT research is directed at variables that are meaningful, measurable, and capable of change.

New Directions: Both Broader and Deeper

Although SDT research is becoming ever more elaborated in the areas we reviewed in this article, it is a never-ending process. Measurement refinements and construct development is continuous, both within each mini-theory and within each domain of practice. As we have emphasized, SDT is an organismic framework, and as such, it accepts that there are variables influencing and predicting people's need satisfaction and functioning at every level of analysis, from microbiological to macrosocial. This means that research is both going "smaller", into the mechanistic underpinnings of motivation and wellness; and going "larger," exploring the impact of pervasive cultural and economic factors.

Mechanistic research. An important current agenda within SDT research is the pursuit of physiological and neurological studies of the underpinnings of both intrinsic motivation (e.g., Di Domenico & Ryan, 2017; Meng & Ma, 2015) and integrative self-regulatory processes (e.g., Di Domenico, Fournier, Ayaz, & Ruocco, 2013). A mechanistic understanding of how autonomy

works differently from control will help explain its efficiencies and benefits (e.g., Legault & Inzlicht, 2013), as well as some of the health and performance costs associated with need frustration (e.g., Reeve & Tseng, 2011; Weinstein, Legate, Kumashiro, & Ryan, 2016).

Societal research and pervasive environments. Moving to wider-scale social structure, SDT is increasingly researching pervasive environments—that is, the individuals' ambient cultural and economic worlds as they impact on need satisfaction, basic need frustration and overall functioning and wellness. Cultural studies such as Yu et al., (2017) and Chen et al., (2015) confirm SDT's general expectations, but a growing body of research also investigates the nuances of cultural forms and their functional significance. For example, Pan, Gauvain, and Schwartz (2013) showed how the Confucian value for filial piety can be transmitted and internalized in both controlling and autonomy supportive ways in Chinese families, and Chao and Aque (2009) explored how parental psychological control is differentially experienced in Asian teens. In other words, both the emic and etic aspects of cultures are being actively and simultaneously researched within the SDT community.

Beyond cultures, economic and political systems represent other pervasive contextual influences on motivation and wellness. SDT studies are increasingly looking at how factors such as human rights, educational opportunities, income, and income inequality affect need satisfaction (e.g., Di Domenico & Fourier, 2014). Of additional interest is how affordances within economic contexts for *capabilities* shapes people's need satisfaction and capacities to pursue what matters to them. For example, DeHaan et al. (2016) showed how the effects of the ten core capabilities conceived of by Nussbaum (2000) as essential to human flourishing are largely mediated by SDT's basic psychological needs.

In summary, the trajectory of SDT is towards: (a) greater refinement of methods and measures; (b) greater depth in mechanistic understanding of motivational processes and effects; and (c) greater study of pervasive environments, and how of SDT's motivational variables are influenced by societal and economic affordances. Thus, there is movement towards both more depth and breadth in the theory's application, and toward even greater integration of the SDT knowledge base within both micro and macro causal processes.

As a final note on the future of SDT, we have witnessed a growing community of global scholars appropriate the theory and drive its new directions. Because SDT has been formalized as an open framework with clear propositions and openly accessible measurement strategies it is today not owned by any particular theorists or driven by hard orthodoxies. Rather, the theory has been built to serve researchers who will adopt, extend, and apply it. Increasingly then, the authors of this article are less and less needed for the advancement of the theory, and instead, as in the case of this writing, are merely in the position of documenting and describing where this river is flowing.

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