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Beyond intrinsic and extrinsic motivation: A meta-analysis on self-determination theory's multidimensional conceptualization of work motivation

Anja Van den Broeck
KU Leuven, Belgium; North West University, South Africa

Joshua L. Howard
Monash University, Australia

Yves Van Vaerenbergh
KU Leuven, Belgium

Hannes Leroy
Erasmus University, Netherlands

Marylène Gagné
Curtin University, Australia

Abstract

This meta-analysis aims to shed light on the added value of the complex multidimensional view on motivation of Self-determination theory (SDT). We assess the unique and incremental validity of each of SDT's types of motivation in predicting organizational behavior, and examine SDT's core proposition that increasing self-determined types of motivation should have increasingly positive outcomes. Meta-analytic findings (124 samples) support SDT, but also adds precision to its predictions: Intrinsic motivation is the most important type of motivation for employee well-being, attitudes and behavior, yet identified regulation is more powerful in predicting performance and

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Corresponding author:
Anja Van den Broeck, Department of Work and Organization Studies, KU Leuven, 3000 Leuven, Belgium.
Email: anja.vandenbroeck@kuleuven.be

organizational citizenship behavior. Furthermore, introjection has both positive and negative consequences, while external regulation has limited associations with employee behavior and has well-being costs. Amotivation only has negative consequences. We address conceptual and methodological implications arising from this research and exemplify how these results may inform and clarify lingering issues in the literature on employee motivation.

Keywords
extrinsic motivation, intrinsic motivation, self-determination theory, well-being, performance, meta-analysis, motivation

Employee motivation is defined as the force that drives the direction, intensity, and persistence of employee behavior (Pinder, 2008). It is an important determinant of job performance, on par with employees' personal abilities (Van Iddekinge et al., 2014), and has been considered a contributing factor to employee well-being (e.g., Demerouti et al., 2001). It may therefore be no surprise that employee motivation is seen as one of the most enduring and compelling topics in work and organizational psychology (Kanfer et al., 2017).

Motivation has been approached from multiple different perspectives. The old saying "Find a job you enjoy, and you will never have to work a day in your life" advocates for the value of intrinsic motivation (i.e., doing an activity out of inherent interest or pleasure) relative to extrinsic motivation (i.e., engaging in an activity to achieve a separable outcome; Ryan & Deci, 2017). Extending this dichotomy, in addition to amotivation (i.e., a lack of motivation) and intrinsic motivation, Self-Determination Theory (SDT; Deci & Ryan, 1985) posits that people may have several different and unique extrinsic reasons to invest their time and energy in particular behaviors (Deci & Ryan, 2000). These reasons are referred to as: external (i.e., being pressured by others), introjected (i.e., putting pressure on oneself through ego-involvement), identified (i.e., doing an activity because one finds it meaningful), and integrated regulations (i.e., engaging in an activity because this is fully aligned with one's values and sense of self). Research on these various types of motivation in the context of work has grown exponentially and has been frequently cited (e.g., Gagné & Deci [2005] is cited over 2000 times), and their popularity in management books reflects their resonance within practice (e.g., Fowler, 2014; Pink, 2009). Given the growing importance of these types of motivation for research and practice, the first aim of this meta-analysis is to take stock: we provide a comprehensive overview of what we know about the outcomes associated with these different types of motivation, and subsequently identify the gaps and limitations within this body of research in order to guide future research.

Second, and perhaps most importantly, we also aim to assess the degree to which it is valuable and necessary to differentiate between each of SDT's different types of motivation. According to SDT, each of these motivation types can be ordered along a continuum of self-determination, ranging from more controlled to more autonomous or volitional types of motivation. Yet despite this predictable linear order, each is also expected to have different implications for employee outcomes (Deci & Ryan, 2000). Although the underlying structure and nature of the different types of motivation have been carefully conceptualized, their incremental and unique contribution to core organizational behavior outcomes are not well understood. At the empirical level, this is mainly due to the

dominance of scoring methods that combine some of the motivation types (e.g. into a relative autonomy index or into the overarching factors of autonomous and controlled motivation; Howard et al., 2020), and multicollinearity issues caused by the highly correlated nature of these motives (Howard et al., 2017). Moreover, the theoretical proposition regarding how these motivation types should relate to specific facets of employee well-being and performance remains rather broad. For example, SDT-scholars argue that "when people's goal-directed behavior is autonomous rather than controlled, the correlates and consequences are more positive" (Deci & Ryan, 2000, p. 243; see also Deci et al., 2017). This however raises the question of whether each type of motivation yields unique relations with outcomes. For example, if there is linear dependence between regulation types—that is, if intrinsic motivation always produces better employee outcomes than identified regulation, and identified regulation is always better than introjected regulation—a more simplified motivational perspective may be warranted. While some authors have theorized that each regulation type produces better outcomes in certain circumstances and for different outcomes (Gagné & Deci, 2005; Koestner & Losier, 2002), strong evidence remains scattered and relatively scarce. Empirical evidence for the theorized differential associations with outcomes, and for explaining incremental variance in outcomes, is necessary in order to support (or refute) the theoretical claims within SDT.

To test the validity and unique contribution of SDT's multidimensional view to our understanding of work motivation and work outcomes, we conducted a meta-analysis aiming to examine how each of SDT's types of motivation relates to a broad array of outcomes. We used relative weights analyses to assess the incremental validity of the different types of work motivation in predicting employee outcomes, and summarized their specific relations with various aspects of employee well-being, attitudes, and behaviors. Furthermore, we examined the potential boundary conditions of these relations through both contextual (e.g. cultural contexts & job type) and methodological (scales used and publication bias) moderators. From these results, we address several theoretical and methodological issues within the SDT literature and take steps to integrate SDT with neighboring motivation theories.

In providing more detailed and nuanced information on SDT's different types of motivation, and their consequences, this study contributes to our understanding of employee motivation over and above recent qualitative reviews of work motivation (Kanfer & Chen, 2016; Kanfer et al., 2017). It goes beyond a meta-analysis shedding light on the importance of one's level of motivation (defined unidimensionally) for individual performance (Van Iddekinge et al., 2014). Our study goes further than meta-analyses on intrinsic and extrinsic motivation (or proxies, such as the presence of incentives), which have only focused on performance outcomes (Byron & Khazanchi, 2012; Cerasoli et al., 2014). Moreover, by providing meta-analytic evidence for the relative importance of SDT's different types of motivation in predicting many organizationally relevant outcomes, we extend previous meta-analytic work that was limited to examining: a) the interrelations among the different types of motivation in and of themselves (Howard et al., 2017); b) leader autonomy support as a specific antecedent of these types of motivation (Slemp et al., 2018); c) the relations of the different types of work motivation with the basic psychological needs at work (Van den Broeck et al., 2016); d) the relations between specific health-related motivation and health-related outcomes (e.g. smoking cessation, healthy eating & mental health; Ng et al., 2012); and e) the associations of autonomous and controlled motivation on well-being and autonomy support in specific populations, such as teachers (Slemp et al., 2020). In the following we elaborate on SDT and the specific research questions of this meta-analysis.

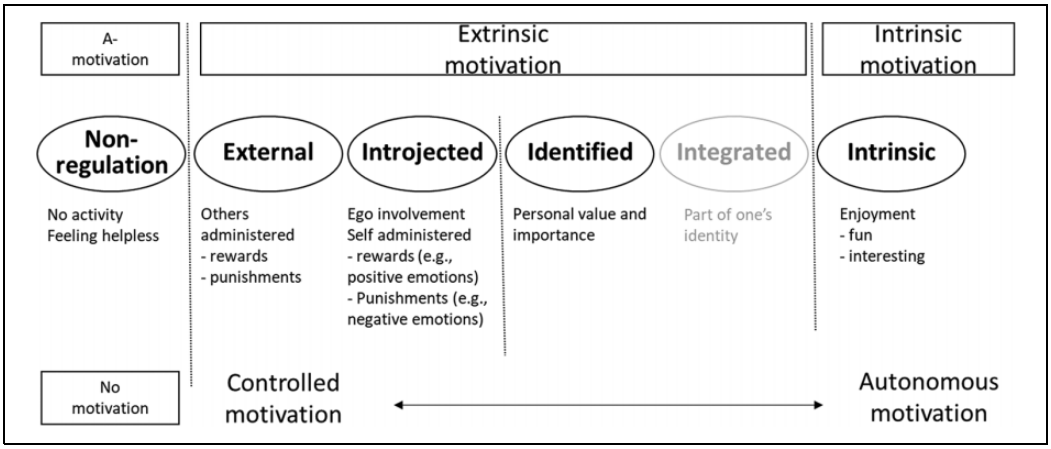

Figure 1. Different types of motivation. Note: Integration is put in grey as together with previous evidence, our results show there is little added value in considering this type of motivation.

Self-determination theory's different types of motivation

Self-determination theory (SDT) is a broad theory of human motivation that has been applied to various life domains including sports, education, and organizational psychology. It originated from the work of Deci (1971) which built upon the distinction between intrinsic motivation (i.e., doing the activity because of the intrinsic interest derived from it) and extrinsic motivation (i.e., doing an activity to obtain an external outcome; Ryan & Deci, 2017). These ideas were developed further to propose that people have qualitatively different reasons to engage in extrinsically motivated behavior (Deci & Ryan, 1985).

To date, SDT arguably presents one of the most comprehensive perspectives on the complexities of human motivation. First, as depicted in Figure 1, SDT acknowledges that people may experience a lack of motivation, otherwise known as being "a-motivated" (Deci & Ryan, 2000). When *amotivated*, employees lack the intention to engage in a behavior as they do not see any reasons to do so. They may not value the activity, feel capable of engaging or sustaining the particular behavior, or perceive a contingency between their actions and the outcomes they desire, thereby resulting in very little desire to exert effort (e.g., Green-Demers et al., 2008).

Furthermore, SDT differentiates between qualitatively different types of extrinsic motivation that fall along a continuum of self-determination (Deci & Ryan, 2000). First, *external regulation* is a non-self-determined type of extrinsic motivation and relates to the classic "carrot and stick" approach. Employees are externally regulated when they do something solely to obtain rewards or avoid punishments from others such as managers, colleagues, or clients. These external contingencies can be material (e.g., obtaining a bonus or avoiding being fired) or social in nature (e.g., when one seeks approval or avoids being criticized by others; Gagné et al., 2015). Externally regulated tenure-track professors, for example, may put a lot of effort into their job because they want to be tenured.

Second, *introjected regulation* is a partially internalized form of extrinsic motivation and, hence, is still relatively low on self-determination. It is evident when people pursue an activity out of ego-involvement or contingent self-esteem such as when rewarding

or punishing oneself through self-related emotions, that is, when one aims to approach positive feelings such as pride, and aim to avoid negative ones such as guilt or shame, often using self-controlling language such as "I should do X." Scholars experiencing introjected regulation may, for example, attempt to publish more for perceived reputational gains, or remain silent in seminars to avoid losing face in front of their colleagues. Like in the case of external regulation, introjected regulation is characterized by feelings of being controlled and pressured, albeit by internal rather than external forces (Deci & Ryan, 2000). Consequently, external and introjected regulations are regarded as controlled forms of motivation and are often combined into one factor.

Third, in the case of *identified regulation*, the reasons for engaging in the behavior are more internalized and are thus more self-determined (Deci & Ryan, 2000). Identified regulation reflects engaging in activities because of perceived personal meaningfulness and importance. Academics identifying with the importance of student learning may, for example, be motivated to provide extra help for students who are struggling to foster such learning.

Finally, in the case of *integrated regulation*, the reason underlying the behavior is not only completely internalized and self-determined, but also fully integrated within one's value system. Integrated reasons for engaging in an activity are seen as an inherent and coherent part of one's identity or true sense of self (Deci & Ryan, 2000). When driven by integrated regulation, people do not only find the behavior valuable, they enact the behavior simply because it reflects who they are. For example, academics may study how to best design online classes, because applying evidence-based procedures has become a critical part of their professional identity, which they endeavor to enact across situations and time. Notably, identified and integrated regulations are still considered extrinsic forms of motivation as they are instrumental in reaching an outcome separate from the activity itself—however, they are most often considered as autonomous due to their volitional nature, just like intrinsic motivation.

Qualitatively or quantitatively different constructs

Although SDT explicitly details the conceptual differences between the various types of motivation, in terms of the source and quality of motivation, there is an ongoing debate concerning whether SDT's types of motivation should be considered: a) qualitatively different constructs; or b) quantitatively different manifestations of the underlying construct of self-determination, ranging from non-self-determined (i.e., a-motivation) to fully self-determined motivation (i.e., intrinsic motivation). If the types of motivation are qualitatively different, they should factor into separate constructs and relate differentially to various outcomes. If they only differ in terms of the quantity of self-determined motivation, it would be possible and adequate to represent all types by using a single factor predicting all of the variance in outcomes (Chemolli & Gagné, 2014), thus questioning the validity of the complex multidimensional view of SDT.

Both perspectives have received some degree of empirical support through factor analysis and examination of the inter-correlations between the different types of motivation. On the one hand, Gagné et al. (2015) differentiated the various types of motivation into separate constructs based on confirmatory factor analysis using data from 3435 employees across several languages (e.g., French, English, German). On the other hand, using multidimensional scaling based on meta-analytic correlations, Howard et al. (2017) concluded that "people experience these motivational regulations as differing in degree of self-determination" (p. 1357), due to the fact that adjacent types of motivation (e.g., external and introjected regulation) correlated more strongly than non-adjacent types (e.g., external and identified regulation). Most

recently, Howard et al. (2018) integrated both perspectives. Based on bifactor ESEM, they concluded that SDT's types of motivation represent quantitatively different levels of self-determination, captured in a general factor; yet they also have unique qualitative motivational characteristics that allow them to explain variance in basic need satisfaction and commitment over and above this general factor.

One exception is integrated regulation. This type of regulation could not be distinguished from identified and intrinsic regulation in confirmatory factor analysis (Gagné et al., 2015), and its meta-analytic correlations with identified and intrinsic regulation were untenably high (Howard et al., 2017). Questions have therefore been raised about the distinctiveness of this type of motivation, which may explain why integrated regulation has not been included in most validated scales (except for Tremblay et al., 2009) and, consequently, why it has been often excluded from research on work motivation.

Associations with outcomes

Despite their clear conceptual differentiation, whether the different types of motivation also hold discriminant and incremental validity in empirically predicting important workplace outcomes remains unknown. SDT proposes that with increasingly autonomous forms of motivation (i.e., from amotivation to external to intrinsic motivation), employees should increasingly show "optimal functioning" (Deci & Ryan, 2000), which is defined as the "manifestation of intra- and interpersonal growth and development in terms of employee well-being (e.g., positive emotions, vitality), attitudes (e.g., job satisfaction, organizational commitment), and behavior (e.g., performance, proactivity, and collaborative behaviors)" (Van den Broeck et al., 2019, p. 30). However, this general statement leaves us to question whether each of the different types of motivation has unique relations with such outcomes. Therefore, to further study the discriminant validity of SDT's types of motivation, and hence examine the added value of differentiating between them, we aim to answer the following research question through this meta-analysis:

> **Research Question 1**: Do the types of motivation correlate differentially, and in a non-linear fashion, with outcomes, therefore explaining incremental variance in outcomes?

Studying the discriminant and incremental validity of the various types of motivation also allows for a more fine-grained analysis of how exactly the different types of motivation relate to various outcomes. The general statement that increasingly autonomous forms of motivation (i.e., from external to intrinsic) should lead to more positive outcomes (Gagné et al., 2015) leaves at least three questions around how the different types of motivation should be related to these outcomes.

First, the contribution of extrinsic autonomous types of motivation, relative to intrinsic motivation, remains unclear. Based on their conceptualization, we identified three different perspectives on their relative contribution in explaining employee well-being and behavior. First, given that intrinsic motivation is considered the "prototype of autonomous motivation" (Ryan & Deci, 2017, p. 197), it may be posited that SDT considers intrinsic motivation as the most valuable type of motivation to drive employee outcomes (Sheldon et al., 2003). Secondly, and alternatively, as intrinsic motivation does not have "greater value or greater autonomy" than integrated regulation (Ryan & Deci, 2017, p. 198), both may be similar in nature, and should therefore have similar relations with employee optimal functioning. Finally, in specifying several autonomous types of extrinsic motivation, SDT implies that each type should be beneficial in at least some circumstances and for some outcomes. While intrinsic motivation directs employees to do what they themselves find interesting in the moment, identified and integrated types of

regulation should help employees sustain efforts toward personally meaningful goals (Gagné & Deci, 2005; Ryan & Deci, 2017). In line with this reasoning, identified regulation is sometimes shown to relate more strongly to outcomes such as proficient task performance, job effort, and health behaviors such as smoking abstinence than intrinsic motivation (Koestner & Losier, 2002; Ng et al., 2012)—suggesting that the effect of the motivational type depends on the outcome of interest.

Research Question 2: Do identified, integrated, and intrinsic regulation relate differentially to outcomes?

Second, SDT's general proposition raises the question of whether the two forms of controlled motivation (i.e., external and introjected motivation): a) impair employee functioning (i.e., negatively relate to well-being, adaptive attitudes, and performance), b) are unrelated to these outcomes (i.e., are not important motivational processes), or c) are less positively related to these outcomes compared to autonomous types of motivation. The lack of theoretical specification on how external and introjected motivation relate to outcomes has led scholars to pose diverging hypotheses about these relations (e.g., Gagné et al., 2015; Van den Broeck et al., 2011). The literature demonstrates mixed empirical results; even when the same scale is used to assess the types of motivation, external regulation has frequently failed to relate to employee functioning, but also sometimes seems to mildly improve it (Gagné et al., 2015). Introjected regulation has been shown to relate both positively and negatively to aspects of well-being such as burnout (van Beek et al., 2011, 2012). As such, it remains unclear how each of these regulations relate to outcomes, and the degree to which they are empirically distinguishable (or not). Therefore, we posit the following research question:

Research Question 3: Do external and introjected types of motivation relate differentially to employee well-being, attitudes, and behavior; and are these results indicative of these types of motivation being detrimental, unrelated, or beneficial to employee functioning?

Finally, while it is posited that autonomous types of motivation lead to more beneficial outcomes than controlled types of motivation, the implications of amotivation are unclear. Is having controlled types of motivation more detrimental for employee functioning than having no motivation at all? Or does having at least some motivation yield better consequences than being amotivated. Theoretically, this has led to debates about whether the quality of motivation is more important than the quantity (Van den Broeck et al., 2013); and questions about whether the use of incentives, which are assumed to increase levels of external regulation (Gerhart & Fang, 2015), may foster well-being and performance when employees are amotivated. To shed light on this issue, we examine the following research question:

Research Question 4: Does amotivation relate more negatively to employee well-being, attitudes, and behavior than external regulation?

Contextual moderators

Finally, we performed moderation analyses to explore whether contextual factors (i.e., national culture and blue versus white collar) and methodological factors (i.e., differences between measurement scales and publication status) influence the relations between the types of motivation and employee outcomes.

In terms of contextual factors, we first examine whether culture may affect the associations between SDT's types of motivation and employee well-being, attitudes, and behavior. Because of its emphasis on autonomy, SDT has frequently been criticized to be less applicable to people who may attach less value to autonomy

(Iyengar & Lepper, 1999)—such as is the case in collectivistic (i.e., Eastern) rather than individualistic (i.e., Western) cultures, and among blue versus white collar workers. In collectivistic cultures, for example, following externally imposed group norms is socially encouraged and people are highly motivated to avoid guilt and shame (Buchtel et al., 2018). External and introjected regulations may naturally fit these cultures, and following the person-environment fit literature (Kristof-Brown et al., 2005), more controlled types of motivation may therefore be related to better outcomes in collectivistic (compared to individualistic) cultures. Similarly, while blue-collar workers attach high importance to pay and job security, white collar workers put greater emphasis on developing themselves and being autonomous (De Witte & Van den Broeck, 2011). As such, the latter group may benefit more from more autonomous types of motivation, compared to the former. These assumptions stand in strong contrast to SDT's claim of being universal (Deci & Ryan, 2000), and research supporting SDT's propositions in collective cultures (Chirkov et al., 2003; Slemp et al., 2018; Yu et al., 2018) and among blue-collar workers (Ilardi et al., 1993). Given these conflicting perspectives, it is imperative to meta-analytically test whether culture and job type moderate the relations between the types of motivation and their correlates.

Second, we also examine whether the results depend on methodological features such as publication status (published versus unpublished) and the specific operationalizations of the types of motivation. As the review process tends to be biased toward publishing significant results (Rosenthal, 1979), scholars may be tempted to include or exclude hypotheses and analyses based on whether or not they are supported, which may lead to the under-reporting of empirical evidence that does not align with presumed theory and stronger support for a theory than is warranted based on empirical results (Rubin, 2017). Only including published studies in a meta-analysis may overestimate the true effect sizes by no less than 12% on average (McAuley et al., 2000). Given this, we deemed it necessary to examine whether publication bias moderates the relations of the different types of motivation with outcome variables.

Finally, we examine whether apparent differences in the operationalization of types of motivation alter their correlations with outcomes. Much in line with the initial focus on tangible outcomes (Deci & Ryan, 2000), almost all available measures of external regulation focus on one's orientation to acquire money and earn an income (e.g., "it allows me to earn money," "I'm paid to do it"; Fernet et al., 2008; Tremblay et al., 2009). Recently however, Gagné et al., (2015) explicitly differentiated between external regulation for material (e.g., financial rewards, job security) and social reasons (e.g., to get approval or respect from others). While these material and social external reasons resulted in separate factors, Gagné et al. (2015) did not examine their differential effects. Yet, some research seems to suggest that the implications of external material and social motivation may diverge. For example, compared to external social motivation, being externally regulated for material reasons has been found to relate more strongly to job satisfaction (Smokrović et al., 2019) but less strongly to burnout (Tóth-Király et al., 2020). Also, in his initial research on SDT, Deci found that material rewards had more detrimental effects than feedback, the latter of which is more social in nature (Deci, 1971; Deci et al., 1999). To examine whether the outcomes of material and social external regulation differ systematically, we examine, based on all available evidence, whether the nature of the external regulation scale (i.e., material versus social) moderates the relations of external motivation with employee well-being, attitudes, and performance.

Introjected regulation has also been operationalized in different ways. Some scales primarily include items that reflect employees'

motivation to *avoid* negative feelings (e.g., feeling unworthy, ashamed, guilty) that put a threat to one's self-esteem (e.g., Fernet et al., 2008). Others adopt a more balanced approach, including also *approach-oriented* items referring to positive feelings (e.g. self-worth, pride) that may boost one's self esteem (e.g., Gagné et al., 2010, 2015). Yet each of these scales are considered to indicate the same SDT construct of introjected regulation. SDT scholars thus routinely ignore the well-established differential effects of approach and avoidance motivation (Carver, 2006; Higgins, 2002), and initial studies suggesting that approach-oriented introjection may be less harmful than avoidance-oriented introjection (Assor et al., 2009). To see whether more nuanced measurement of introjected regulation is needed, this meta-analysis systematically compares introjection scales that rely only (Fernet et al., 2008) or heavily (Tremblay et al., 2009) on avoidance items compared to those that cover both approach and avoidance introjected regulation (Fernet, 2011; Gagné et al., 2010, 2015).

Finally, because integrated and identified regulations are hard to empirically differentiate (Howard et al., 2017), most scales do not have a separate subscale for integrated regulation. However, careful reading of the literature revealed that the identified regulation scale of Gagné et al. (2015) may include items that go above and beyond finding work as merely meaningful, and may draw upon elements of integrated regulation (i.e., putting effort in this jobs aligns with my personal values/has personal significance to me). To further assess the importance of separating the construct of integrated regulation, we therefore ran a moderation analysis comparing this scale reflecting identified *and* integrated regulation (i.e., Gagné et al., 2015) with all other scales purely referring to identified regulation.

In summary, to examine the degree to which our findings on the relationships between SDT's types of motivation and employee outcomes are generalizable and robust, we sought to answer the following research question:

> **Research Question 5**: Are the relations between the types of motivation and their outcomes generalizable across cultures, job types, published versus unpublished studies, and measures?

Method

We conducted a meta-analysis of the relations between SDT's types of motivation and their conceptual outcomes that have been examined in the literature. Before examining the strength and direction of these relations for each motivation type, we studied their relative importance in explaining employee outcomes using relative weights analysis (RWA). RWA is a procedure commonly employed in organizational psychology to determine the unique and relative contribution of multiple correlated predictors, thereby addressing the problem of multicollinearity and hence unstable beta coefficients in regression analyses (Tonidandel & LeBreton, 2015). Multicollinearity is often encountered when using SDT-based motivation scales (Howard et al., 2017), which has forced most researchers to use aggregated scores (e.g., controlled and autonomous motivation or the relative autonomy index; Howard et al., 2020). Such scores however prevent examination of the precise relationships between each type of motivation and the outcomes, and potentially lead to information loss and reduced variance accounted for in published research. Using RWA in this meta-analysis allowed us to look at the relative importance of each motivation type in predicting work-related outcomes and to determine if the multidimensional conceptualization of work motivation offered by SDT adds valuable information about work motivation.

Inclusion criteria

We included empirical studies if they a) presented primary quantitative research; b)

referred to one of the major validated SDT scales specific to the work domain (i.e., Blais et al., 1993; Fernet, 2011; Fernet et al., 2008; Gagné et al., 2010, 2015; Tremblay et al., 2009) or adaptations thereof; c) provided correlations between at least one regulation and one work-related outcome (well-being, attitudes, and behavior); and d) examined adult participants in an organizational setting. This resulted in the exclusion of studies including unemployed people, volunteers, students, and athletes, as well as experimental, laboratory, and intervention studies.

Literature search

First, we searched for all articles validating a work motivation scale in the realm of SDT as mentioned above, and all studies citing these works (years 1989–Oct 2020). Second, the databases of Web of Science, Google Scholar, EBSCO and PsycINFO were searched independently by the authors using the following search terms: "external", "introjected", "identified", "integrated", "intrinsic", "motivation", and "+ self determin*," which were paired with "employ*" or "work*." Additionally, we searched using scale names as keywords (e.g., *Multidimensional Work Motivation Scale, MWMS*). All duplicates were removed and exclusion criteria were applied. Of the remaining articles, 92 did not provide correlation tables or other pertinent information (e.g., only aggregate motivation scores were reported). Authors were contacted to obtain missing information and simultaneously asked for other unpublished data. Accordingly, 90 authors were contacted with a 14% response rate. These authors provided an additional 21 samples. In total, our search resulted in 104 articles and manuscripts containing 124 samples (72 published, 32 unpublished samples) that met our inclusion criteria. The overview of the search process (Figure S1), references, and final dataset are available in supplementary materials.

Coding

The first two authors and four research assistants (with expertise in organizational psychology) entered all potentially relevant information into a spreadsheet. These variables included the scale used, the nationality and sector of the sample, as well as outcomes of motivation. Correlation coefficients were collected as effect sizes of primary interest. Intercoder agreement rates were high (Cohen's K = .94; McHugh, 2012), and disagreements were all resolved through reexamination of articles. Correlations between regulations and covariates that did not occur at least twice and that could not be meaningfully integrated with similar variables were removed.

Meta-analytic procedures

We conducted this meta-analysis following the Hunter-Schmidt model (Schmidt & Hunter, 2015), with random-effects models applied throughout. This method assumes that between-study variance can be attributed to either study artifacts or moderating effects. It is strongly recommended over the alternative fixed-effects model which assumes that between-study variance is solely due to sampling error and does not allow for moderating factors—an untenable assumption in all but a few instances.

For each relation between a type of motivation and an expected outcome, corrections for reliability were made before weighting correlations according to sample size (Schmidt & Hunter, 2015). When alpha coefficients were not obtainable, mean reliability scores were imputed for the scale. The standard deviation and standard error of the corrected correlations were calculated (Schmidt & Hunter, 2015). Based upon the estimated standard error, 95% confidence intervals (CI) were calculated around the corrected correlation coefficients, with CIs indicating a significant effect when zero is not included within the CIs. Examination of 95% CIs were used to indicate the extent to which the relations of the various types of motivation with

outcomes are significantly different or not. In accordance with Cumming and Finch (2005), non-overlapping CIs indicated differences between values at a probability approximately equal to < .01, and CIs which overlapped less than 50% were considered indicative of differences in values of approximately $p < .05$. The 80% credibility intervals (CV) and the percentage of the proportion of variance explained by sampling and measurement error (the "75% rule") were used to assess the homogeneity of the effect size distribution (Schmidt & Hunter, 2015). We used two different metrics to assess publication bias: Egger's regression intercept (z) test (Egger et al., 1997) and Begg and Mazumdar's (1994) rank correlation (τ) test. As recommended by Van Aert et al. (2019), we only calculated these statistics when 10 effect sizes were available in order to achieve sufficient statistical power.

To assess the incremental validity of the types of motivation, relative weights analysis (RWA) was conducted in the R software package following procedures from Tonidandel and LeBreton (2015). Analyses were based on the corrected meta-analytic correlations among the types of motivation derived in this study (see Table S2 in supplementary materials). Each model consisted of motivation types predicting a single outcome variable, with this process repeated for each available outcome. Results of these analyses produce relative weights representing the variance in an outcome accounted for by the predictor, as well as rescaled relative weights, which presents the information as a percentage of R^2.

Subgroup analyses were performed to examine whether contextual and methodological moderators would influence the results. Following Aguinis et al.'s (2008) recommendations, we used Hunter and Schmidt's (2004) procedures for a subgroup analysis with categorical variables. Even though we are aware that subgroup analysis is suboptimal to meta-regressions (Geyskens et al., 2009), this analysis was chosen because of the (at times) limited number of effect sizes per relationship.

Results

The relative importance of the motivation types

To examine whether the types of motivation correlated differentially and in a non-linear fashion with employee outcomes, and therefore explain incremental variance in these outcomes (RQ1), we first provide an overview of the associations between SDT's motivation types and broad categories of desirable (e.g., performance) and undesirables outcomes (e.g., distress). Overall, results outlined in Figure 2 and Table S3, show that increasingly autonomous types of motivation related increasingly positively with desirable and increasingly negatively with undesirable outcomes. In general, intrinsic motivation related more strongly with the outcomes compared to identified regulation. The CIs of these relations did not overlap, providing first evidence for the discriminant validity of the types of motivation. Integrated regulation was an exception in this regard as its relations overlapped significantly with those of identified and intrinsic motivation (Cumming & Finch, 2005). These results should however be interpreted with caution due to the limited number of observations containing integrated regulation and the very large CIs resulting from this. External and introjected regulations were positively related to both desirable and undesirable outcomes, yet effect sizes were generally very small. Amotivation related more strongly to the outcomes than external regulation.

Second, we performed RWA to examine the incremental validity of SDT's types of motivation. Integrated regulation was omitted from this analysis due to the paucity of available effect sizes. As presented in Table 1, the results indicated that, in general, the other motivation types each made unique contributions in accounting for the outcomes. The total explained variance in each outcome ranged from 1% (i.e., absenteeism) to 40% (i.e., engagement), and the different types of motivation accounted for about 30% or

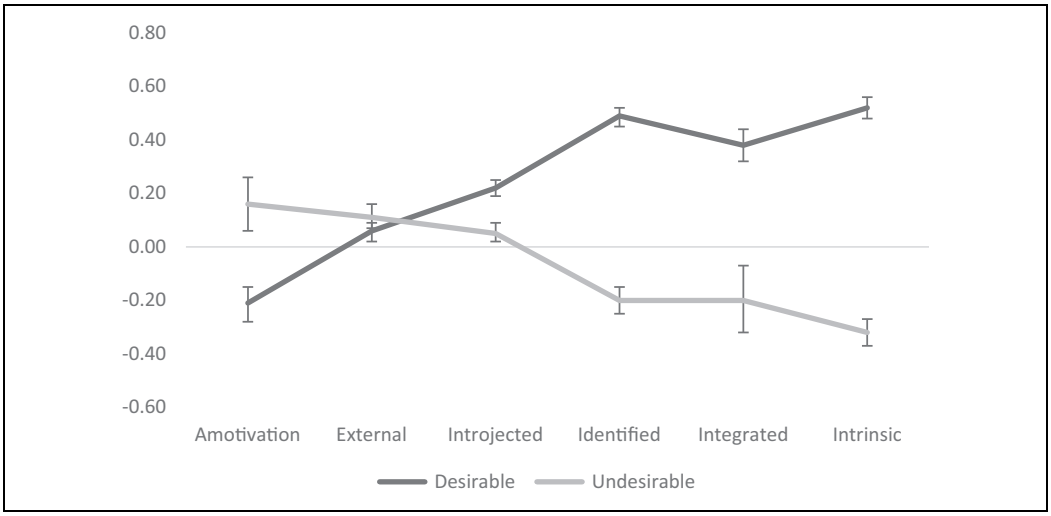

Figure 2. Summary of results regarding the relationships of the types of motivation on outcomes. *Note.* Desirable outcomes include affective commitment, normative commitment, engagement, job satisfaction, OCB, performance, & proactivity. Undesirable outcomes include absenteeism, burnout, continuance commitment, distress, turnover intention.

Table 1. Relative weights analysis of the different types of motivation predicting outcomes.

		Amotivation		External		Introjected		Identified		Intrinsic	
Outcomes	R^2	RW	%	RW	%	RW	%	RW	%	RW	%
Distress	.10	.01	11.88	.00	4.82	.01	12.65	.04	35.60	.04	35.05
Burnout	.27	.10	33.96	.00	.56	.02	5.82	.02	8.85	.14	50.82
Engagement	.40	.03	6.29	.00	.14	.01	2.11	.12	28.75	.25	62.71
Job Satisfaction	.39	.07	17.73	.00	.42	.01	2.54	.10	24.96	.21	54.34
Affective Com.	.33	.02	4.51	.00	.72	.03	8.33	.09	27.80	.20	58.64
Normative Com.	.33	.00	.38	.01	3.43	.13	38.29	.05	15.54	.14	42.36
Continuance Com.	.05	.00	7.84	.04	76.78	.00	8.62	.00	4.87	.00	1.88
Turnover Intention	.12	.01	4.08	.01	4.99	.00	2.50	.04	34.96	.07	53.47
Performance	.25	.06	22.80	.00	.84	.04	17.40	.09	35.30	.06	23.65
Proactivity	.27	.01	2.54	.03	11.38	.03	9.93	.06	21.27	.15	54.87
OCB	.19	—	—	.02	9.99	.06	33.91	.06	31.05	.05	25.04
CWB	.28	.04	14.47	.02	8.12	.03	10.90	.04	14.45	.15	52.06
Absenteeism	.01	—	—	.00	0.34	.00	2.36	.00	11.26	.01	86.04
Average			11.50		9.43		11.95		22.67		46.23

Note: RW: relative weight; %: rescaled relative weight (i.e., relative weight divided by full model *R*2); Affective Com.: Affective commitment; Normative Com.: Normative commitment; Continuance Com.: Continuance Commitment; CWB: Counterproductive Work Behaviors.

more of the variance in the well-being outcomes (except for distress) and CWB. Intrinsic motivation was the most important motivation factor as evidenced by its disproportionately high relative weights and accounting for over 46.23% of the motivational effects on outcomes. It

explained more than 50% of the variance in burnout, engagement, job satisfaction, affective commitment, turnover intentions, proactivity, counterproductive work behavior (CWB) and absenteeism and was the strongest predictor for 10 out of the 13 outcomes.

Identified regulation was the second most important motivation type, explaining over 22.67% of the variance in the outcomes. It was more important for performance than intrinsic motivation, predicted an equal amount of variance as intrinsic motivation in distress, and was, together with introjected regulation, the most important predictor of OCB. Introjected (11.95%) and amotivation (11.50%) predicted about the same amount of additional variance in the outcomes. Introjected regulation was particularly important in predicting normative commitment, while amotivation accounted for considerable variance in burnout. External regulation was the least important motivation type, explaining less than 10% of the variance in the outcomes. It was only of particular importance in explaining continuance commitment. Notably, except for external regulation, all types of motivation explained a substantial proportion of variance in performance, with identified regulation being the most important predictor.

Specific relations between motivation types and outcomes

We then examined the specific relations between each of SDT's type of motivation and the specific outcomes to answer RQ2 and RQ3. Table 2 shows the meta-analytic calculations between the types of motivation and the four different well-being aspects we could examine given the available data (i.e., distress, burnout, engagement, and job satisfaction). Amotivation was clearly associated with decreased well-being: it related positively to burnout and negatively to work engagement and job satisfaction. External regulation was also associated with well-being costs, relating positively to both distress and burnout, but it was unrelated to the positive well-being constructs of engagement and job satisfaction. Introjected regulation, in contrast, seemed to have both negative and positive well-being implications: it was positively related to burnout and distress, as well as to engagement and job satisfaction. Identified regulation and intrinsic motivation were negatively associated with distress and burnout, and were positively associated with engagement and job satisfaction. Results for integrated regulation followed the same pattern.

In terms of job attitudes, we calculated the meta-analytic correlations for turnover intention and affective, normative, and continuance commitment (Meyer et al., 2004). As shown in Table 2, while amotivation was unrelated to normative commitment and turnover intentions, it was related negatively to affective commitment and positively to continuance commitment. External, introjected, and identified regulations were each positively associated with all types of commitment and negatively associated with turnover intentions. Integrated regulation and intrinsic motivation followed largely the same pattern, although intrinsic motivation was unrelated to continuance commitment.

As shown in Table 3, the results for workplace behaviors (i.e., performance, proactivity, organizational citizenship behavior [OCB], counterproductive work behavior [CWB], and absenteeism) seemed to deviate from the pattern observed for well-being and attitudes. Specifically, although few correlations were available for amotivation, the results showed its detrimental association with employee performance and proactivity and its positive relation with CWB. External regulation, in contrast, related positively to performance and proactivity, was negatively related to organizational citizenship behavior (OCB), and unrelated to the other performance outcomes. Introjected and Identified regulations were both positively related to performance, proactivity, and OCB, but also unrelated to CWB and absenteeism. Integrated regulation was positively related to performance. Intrinsic motivation related positively to all

Table 2. Meta analytic correlations of the different types of motivation with well-being and attitudes.

		k	N	r	ρ	S.D.	S.E.	95% CI	80% CV	% acc	Eggers' z	rank correlation test
Amotivation	Distress	5	1820	0.12	0.15	0.32	0.14	[−0.13; 0.43]	[−0.17; 0.47]	4.1%	—	—
	Burnout	16	8266	0.34	0.44	0.21	0.05	[0.34; 0.54]	[0.21; 0.67]	3.9%	−1.83	−.53**
	Engagement	12	6532	−0.22	−0.27	0.14	0.04	[−0.34; −0.19]	[−0.4; −0.13]	12.3%	−1.60	−.33
	Job satisfaction	18	11202	−0.25	−0.32	0.11	0.03	[−0.37; −0.27]	[−0.45; −0.19]	11%	.05	.17
	Affective com.	14	10277	−0.12	−0.17	0.28	0.07	[−0.31; −0.02]	[−0.42; 0.09]	3.1%	.32	.13
	Normative com.	4	5432	−0.02	−0.03	0.06	0.03	[−0.08; 0.03]	[−0.06; 0]	54.6%	—	—
	Continuance com.	5	5635	0.07	0.1	0.05	0.02	[0.06; 0.15]	[0.06; 0.15]	45.2%	—	—
	Turnover intention	9	9799	0.07	0.1	0.22	0.07	[−0.05; 0.24]	[−0.11; 0.3]	3.5%	—	—
External	Distress	40	20746	0.07	0.09	0.12	0.02	[0.05; 0.12]	[−0.02; 0.2]	20.1%	.99	.12
	Burnout	50	26679	0.07	0.08	0.18	0.03	[0.03; 0.13]	[−0.11; 0.28]	7.5%	−.33	−.32***
	Engagement	51	24809	0.01	0.01	0.14	0.02	[−0.03; 0.05]	[−0.13; 0.15]	14.7%	−.80	.07
	Job satisfaction	54	28594	0.02	0.03	0.19	0.03	[−0.02; 0.09]	[−0.15; 0.22]	7.9%	−.40	.20*
	Affective com.	45	23796	0.04	0.06	0.18	0.03	[0.01; 0.11]	[−0.11; 0.23]	10.1%	.68	.09
	Normative com.	8	6542	0.1	0.15	0.13	0.05	[0.06; 0.24]	[0.02; 0.27]	10.8%	—	—
	Continuance com.	13	8127	0.22	0.33	0.12	0.03	[0.26; 0.39]	[0.17; 0.48]	7.9%	1.00	.14
	Turnover intention	18	16184	−0.06	−0.08	0.13	0.03	[−0.14; −0.02]	[−0.18; 0.03]	14.4%	1.66	0.01
Introjected	Distress	38	20603	0.05	0.06	0.14	0.02	[0.02; 0.1]	[−0.07; 0.19]	15.4%	−.17	−.07
	Burnout	57	30625	0.07	0.08	0.18	0.02	[0.03; 0.13]	[−0.1; 0.26]	8.5%	−2.60**	−.19*
	Engagement	47	25852	0.15	0.18	0.13	0.02	[0.14; 0.21]	[0.04; 0.32]	12.5%	−.92	−.06
	Job satisfaction	54	28216	0.14	0.17	0.19	0.03	[0.12; 0.22]	[−0.02; 0.36]	7.6%	−.50	.08
	Affective com.	42	21208	0.21	0.26	0.22	0.03	[0.19; 0.33]	[0.03; 0.49]	5.3%	−.74	.08
	Normative com.	10	7352	0.36	0.45	0.07	0.02	[0.41; 0.50]	[0.31; 0.6]	6.4%	1.12	.20
	Continuance com.	12	7776	0.11	0.14	0.16	0.05	[0.05; 0.24]	[0.02; 0.27]	14%	.32	.17
	Turnover intention	23	20002	−0.08	−0.1	0.14	0.03	[−0.16; −0.05]	[−0.24; 0.03]	9.3%	−.06	−.08

(continued)

Table 2. (continued)

		k	N	r	ρ	S.D.	S.E.	95% CI	80% CV	% acc	Eggers' z	rank correlation test
Identified	Distress	39	17907	−0.2	−0.23	0.18	0.03	[−0.29; −0.18]	[−0.42; −0.04]	8%	1.54	.06
	Burnout	56	26730	−0.21	−0.25	0.17	0.02	[−0.29; −0.2]	[−0.42; −0.08]	9.3%	.28	.03
	Engagement	49	26633	0.49	0.57	0.1	0.01	[0.54; 0.59]	[0.42; 0.71]	6.2%	−1.33	−.13
	Job satisfaction	51	23451	0.38	0.47	0.18	0.02	[0.43; 0.52]	[0.26; 0.69]	4.3%	2.18*	−.07
	Affective com.	41	22840	0.37	0.46	0.12	0.02	[0.43; 0.5]	[0.3; 0.62]	6.9%	−1.31	−.07
	Normative com.	8	6804	0.3	0.38	0.13	0.05	[0.29; 0.47]	[0.27; 0.5]	9.4%	—	—
	Continuance com.	9	7047	0.07	0.09	0.11	0.04	[0.02; 0.17]	[0; 0.19]	19%	—	—
	Turnover intention	11	10762	−0.24	−0.29	0.18	0.06	[−0.4; −0.18]	[−0.48; −0.1]	3.7%	.40	.02
Integrated	Distress	5	7758	−0.14	−0.16	0.28	0.12	[−0.41; 0.08]	[−0.45; 0.12]	1.2%	—	—
	Burnout	4	7581	−0.18	−0.22	0.03	0.01	[−0.24; −0.19]	[−0.26; −0.18]	31%	—	—
	Engagement	2	3788	0.33	0.4	0.22	0.15	[0.1; 0.69]	[0.23; 0.56]	2.1%	—	—
	Job satisfaction	11	6859	0.3	0.35	0.1	0.03	[0.3; 0.41]	[0.24; 0.47]	14%	1.01	.11
	Affective com.	4	2728	0.4	0.47	0.12	0.06	[0.35; 0.6]	[0.36; 0.58]	10.5%	—	—
	Continuance com.	2	433	0.37	0.52	0.21	0.15	[0.23; 0.8]	[0.26; 0.77]	5.9%	—	—
	Turnover intention	5	4737	−0.14	−0.18	0.1	0.04	[−0.26; −0.09]	[−0.27; −0.08]	15.6%	—	—
Intrinsic	Distress	47	25114	−0.21	−0.24	0.21	0.03	[−0.3; −0.18]	[−0.48; 0]	4.5%	1.22	.12
	Burnout	62	33980	−0.34	−0.4	0.21	0.03	[−0.45; −0.35]	[−0.63; −0.17]	3.8%	.80	.12
	Engagement	62	30311	0.61	0.67	0.19	0.02	[0.62; 0.72]	[0.43; 0.91]	1.7%	−3.17**	−.35***
	Job satisfaction	60	32734	0.48	0.57	0.2	0.03	[0.52; 0.62]	[0.33; 0.81]	2.3%	−1.40	−.20*
	Affective com.	48	25748	0.44	0.55	0.14	0.02	[0.5; 0.59]	[0.37; 0.72]	4.6%	−1.80	−.13
	Normative com.	9	7455	0.37	0.47	0.11	0.04	[0.39; 0.54]	[0.3; 0.63]	4.2%	—	—
	Continuance com.	11	7857	0.04	0.05	0.12	0.04	[−0.02; 0.13]	[−0.04; 0.14]	22%	.32	.11
	Turnover intention	24	20426	−0.28	−0.32	0.25	0.05	[−0.42; −0.22]	[−0.6; −0.05]	2%	.35	.09

Note: *k*: number of effect sizes; *N*: total subject number; r: average correlation coefficient; ρ: correlation corrected for unreliability and weighted by sample; SD: Standard deviation, SE: Standard error; CI: Confidence intervals, CV: Credibility intervals; % acc: percent of variance attributable to sampling error; Com.: Commitment. Table only includes relations for which more than one correlation could be found.

Table 3. Meta analytic correlations of the different types of motivation with behaviors.

		k	N	r	ρ	S.D.	S.E.	95% CI	80% CV	% acc	Eggers' z	rank correlation test
Amotivation	Performance	10	9531	−0.2	−0.28	0.06	0.02	[−0.32; −0.24]	[−0.39; −0.17]	10.4%	−.15	−.11
	Proactivity	2	444	−0.1	−0.11	0.01	0.01	[−0.13; −0.09]	[−0.19; −0.03]	1819.9%	—	—
	CWB	2	332	0.18	0.21	0.07	0.05	[0.11; 0.31]	[0.17; 0.25]	123.5%	—	—
External	Performance	29	17335	0.03	0.04	0.11	0.02	[0; 0.08]	[−0.06; 0.13]	22.8%	−.46	.03
	Proactivity	18	6759	0.15	0.2	0.3	0.07	[0.06; 0.34]	[−0.05; 0.45]	6.2%	−1.66	.11
	OCB	10	9939	−0.05	−0.07	0.06	0.02	[−0.11; −0.03]	[−0.12; −0.03]	47.1%	.96	.07
	CWB	5	1088	0.12	0.14	0.17	0.07	[−0.01; 0.28]	[−0.02; 0.29]	23.4%	—	—
	Absenteeism	18	7556	.00	.00	0.07	0.02	[−0.04; 0.03]	[−0.05; 0.04]	64.7%	−.76	−.06
Introjected	Performance	25	16628	0.22	0.28	0.17	0.03	[0.22; 0.35]	[0.13; 0.44]	8%	−.80	.03
	Proactivity	11	4712	0.22	0.27	0.16	0.05	[0.17; 0.37]	[0.1; 0.44]	10%	−.06	−.16
	OCB	8	9414	0.24	0.29	0.21	0.07	[0.15; 0.44]	[0.1; 0.49]	3%	—	—
	CWB	2	332	−0.12	−0.14	0.15	0.11	[−0.35; 0.07]	[−0.26; −0.02]	39.7%	—	—
	Absenteeism	18	7556	0	0	0.07	0.02	[−0.03; 0.03]	[−0.05; 0.05]	64.2%	−.67	−.09
Identified	Performance	27	17163	0.35	0.43	0.16	0.03	[0.37; 0.49]	[0.24; 0.61]	4.7%	−1.78	−.11
	Proactivity	15	5187	0.33	0.38	0.18	0.05	[0.29; 0.48]	[0.18; 0.59]	7.8%	−1.07	−.20
	OCB	8	9414	0.29	0.34	0.27	0.1	[0.16; 0.53]	[0.08; 0.61]	1.5%	—	—
	CWB	4	687	−0.02	−0.04	0.41	0.2	[−0.44; 0.36]	[−0.43; 0.35]	6%	—	—
	Absenteeism	18	7556	−0.02	−0.02	0.07	0.02	[−0.05; 0.01]	[−0.07; 0.03]	62.9%	−.88	−.12
Integrated	Performance	4	1128	0.26	0.31	0.04	0.02	[0.27; 0.35]	[0.27; 0.34]	77.2%	—	—
Intrinsic	Performance	43	21200	0.3	0.36	0.2	0.03	[0.3; 0.42]	[0.15; 0.56]	5.7%	−2.44*	−.21*
	Proactivity	26	9491	0.39	0.47	0.21	0.04	[0.39; 0.55]	[0.27; 0.66]	6.9%	−3.29***	−.29*
	OCB	16	12259	0.26	0.31	0.29	0.07	[0.17; 0.45]	[0; 0.62]	1.8%	.03	−.24
	CWB	5	1337	−0.3	−0.36	0.14	0.06	[−0.48; −0.24]	[−0.51; −0.21]	17.3%	—	—
	Absenteeism	18	7556	−0.07	−0.07	0.06	0.02	[−0.1; −0.04]	[−0.12; −0.02]	60.5%	−.12	−.05

Note: *k*: number of effect sizes; *N*: total subject number; r: average correlation coefficient; ρ: correlation corrected for unreliability and weighted by sample; SD: Standard deviation, SE: Standard error; CI: Confidence intervals, CV: Credibility intervals; % acc: percent of variance attributable to sampling error; Com.: Commitment. Table only includes relations for which more than one correlation could be found.

constructive behaviors and was the only type of motivation that significantly related (negatively) to absenteeism.

We then examined if CIs overlapped to determine whether regulations were associated differentially with outcomes (Cumming & Finch, 2005). Focusing on adjacent types of motivation, amotivation and external regulation were similar in only 2 out of 11 comparisons (pertaining to distress and CWB). External and introjected regulations were similar in 5 out of 13 comparisons (the negative well-being indicators [distress and burnout], turnover, proactivity, and absenteeism). Introjected and identified regulations overlapped on 6 out of 13 comparisons, including normative and continuance commitment, and all types of behavior except for performance (i.e. proactivity, OCB, CWB, and absenteeism). Finally, identified and intrinsic motivation overlapped in 8 out of 13 comparisons. Exceptions were burnout, engagement, job satisfaction, affective commitment, and absenteeism. This indicates that there is some overlap in the consequences of these types of motivation for employee optimal functioning. The results for integrated regulation overlapped with either those of identification or intrinsic motivation in 6 out of 8 comparisons (job satisfaction and continuance commitment were exceptions herein), suggesting the nomological networks between these variables are nearly identical.

Moderation analyses

As shown in Tables 2 and 3, for most relationships, sampling and measurement error account for less than 75% of the observed variance (Schmidt & Hunter, 2015). Only for a few relations, which were typically based on few observations, was this threshold exceeded, suggesting that sampling and measurement error could account for differences in the magnitude of these few correlations. The credibility intervals were generally large, including zero in 34% of the cases. Hence, moderator analyses are necessary to explain this observed variance and to examine the generalizability of our results (i.e., RQ 5). This was done for all relations for which enough effect sizes were available. For amotivation this was generally not the case. The full results are available in the supplementary materials S4 to S10 and summarized in Tables 4 and 5.

In examining whether the relations between the motivation types and outcomes varied depending on cultural context (i.e., "Western" cultural contexts such as Canada vs. "Eastern" cultural contexts such as China), only 7 out of 47 correlations (15%) testing for different results did not overlap: Introjected regulation related more strongly to burnout, yet less strongly to job satisfaction and affective commitment in Western compared to Eastern countries. Intrinsic motivation also related more strongly to burnout, engagement, job satisfaction and affective commitment in the West than in the East.

The results comparing blue versus white collar workers showed significant differences between both groups in 10 out of 44 comparisons (23%). They all pointed at a stronger relation between motivation and employee well-being, attitudes, and performance for blue collar workers compared to white collar workers; external regulation related more strongly to engagement, and all types of motivation—except for external regulation—related more strongly to job satisfaction. Introjected regulation was more indicative of affective commitment, while intrinsic motivation associated more strongly with normative commitment. Both introjected regulation and intrinsic motivation related more strongly to turnover intentions and performance.

No systematic pattern was present regarding the effects of publication status. In only 12 out of 47 cases (25%) were differences were found between published and unpublished data. In nine cases the published data presented stronger effect sizes, while in the other three cases the effects in the unpublished data were stronger. To gain further insight into whether publication bias was an issue in our data, we supplement this moderation analysis with Egger's

Table 4. Subgroup analyses testing moderation of various sample characteristics.

	Western vs. Eastern					Blue vs. White Collar					Published vs. Unpublished				
Covariates	Amotivation	External	Introjected	Identified	Intrinsic	Amotivation	External	Introjected	Identified	Intrinsic	Amotivation	External	Introjected	Identified	Intrinsic
Distress		=	=	=	=		=	=	=	=		>	>	^	=
Burnout	=	=	^	=	^		=	=	=	=		=	=	=	>
Engagement	=	=	=	=	^		>	=	=	=		=	=	=	=
Job Satisfaction	=	=	>	=	^		=	^	^	^	=	>	=	=	>
Affective Com.	=	=	>	=	^	=	=	^	=	=	^	=	=	^	=
Normative Com.			=	=	=		=	=	=	^		=	=	=	=
Continuance Com.			=		=		=	=	=	=		>	=	=	=
Turnover Intention	=	=	=	=	=		=	^	=	^		=	=	=	=
Performance	=	=	=	=	=	=	=	^	=	^		=	>	=	=
Proactivity		=	=	=	=				=	=		=	=	=	=
CWB		=													=
OCB		=	=	=	=							=	>	=	>
Absenteism							=	=	=	=					

Note. < indicates e.g. significantly lower effect sizes for published data compared to unpublished; > represents greater effect sizes e.g. for published compared to unpublished; = represents non-significant differences using $p = .05$ as a cut-off. More detailed results are available in the supplementary materials Tables S4–6.

regression test and the rank-correlation test. These tests further indicated that overall, the reported results did not seem affected by publication bias. However, for burnout, smaller correlations tended to be reported less often, which was also the case for studies examining the associations between intrinsic motivation and engagement, performance, and proactivity.

Finally, we examined whether the various operationalizations of SDT's types of motivation, as reflected in the different measurement scales, could explain differences in the strength of the relationships between these types of motivation and employee outcomes (Table 5 and S7–10). Concerning external regulation, material external regulation related more strongly than social external regulation to turnover intention, but no differences were found for burnout, engagement, performance, and OCB.

For introjected regulation, the results indicate that measures that only tap into avoiding negative emotions associate more strongly with burnout, compared to measures including some approach items or a balanced mix of avoidance and approach items. This result was not replicated with regards to distress, which was the only other outcome on which the three types of measures for introjected regulation could be compared. No further differences were found in the strength of the relations between the unbalanced and balanced scales tapping into introjected regulation and job satisfaction, affective commitment, or turnover intentions. Slight differences in the operationalization of identified regulation led to very few differences in the relationships: Identified measures excluding integrated regulation items associated more strongly with distress and job satisfaction; but no differences were found for burnout, engagement, affective or continuance commitment, turnover intentions, performance, proactivity, or OCB.

Discussion

Motivation is a critical issue for employees and employers alike (Kanfer & Chen, 2016). Self-

Table 5. Subgroup analyses testing moderation of various operationalizations of the types of motivation.

Covariates	Material vs. Social External Reguation	Only avoidance vs. unbalanced avoidance introjected regulation	Only avoidance vs. balanced avoidance/ approach introjected regulation	Unbalanced vs. balanced avoidance/ approach introjected regulation	Indentified measures without vs. with integration items
Distress		=	=	=	>
Burnout	=	>	>	=	=
Engagement	=				=
Job Satisfaction				=	>
Affective Com.				=	=
Normative Com.					
Continuance Com.					=
Turnover Intention	>			=	=
Performance	=				=
Proactivity					=
CWB					
OCB	=				=
Absenteeism					

Note. > represents greater effect sizes for e.g. material vs. social external regulation scales; = represents non-significant differences using $p = .05$ as a cut-off. More detailed results are available in the supplementary materials Tables S7–10.

determination theory (SDT; Deci & Ryan, 2000) has provided a nuanced view on this topic, suggesting that one should not only take into account *how much* employees are motivated (i.e., amotivation versus motivation), or whether they are intrinsically or extrinsically motivated, but also *which types* of extrinsic motivation they hold (i.e., external, introjected, identified or integrated regulation).

SDT has become increasingly popular in organizational psychology, and it is therefore time to take stock of the associations between SDT's different types of work motivation and important outcomes in the organizational literature (i.e., employee well-being, attitudes, and performance). This helps us to understand the strengths and limitations of the current body of research, and to identify avenues for future research. By obtaining all relevant data, this meta-analysis allows us to shed light on some fundamental issues that remain unclear within existing SDT research: *whether* (i.e., RQ1) and *how* (i.e., RQ2–4) each of the SDT types of motivation is uniquely influential in predicting a broad range of employee outcomes, and to what extent these results are generalizable (i.e., RQ5). In doing so, this meta-analysis provides a more precise picture of the value and necessity of SDT's nuanced view of the nature and consequences of employee motivation.

Answers to our research questions

Research question 1: Relative contribution of the types of motivation. All in all, our meta-analysis provides support for the discriminant and incremental validity of SDT's different types of motivation in explaining variance in employee outcomes that we consider to be crucial in the field of organizational psychology. Our results indicate that the correlations of SDT's types of motivation, ordered along the continuum of self-determination, show a linear trend with employee outcomes. While several relations between the motivation types and employee outcomes overlapped, RWA revealed that every type of motivation (including amotivation) holds incremental validity in predicting employee well-being, attitudes, and behavior.

These findings align with previous research that has examined the structure of SDT's types of motivation (Howard et al., 2017, 2018). Using

meta-analytic multidimensional scaling and bifactor analysis, respectively, these studies showed that each of the types of motivation can be ordered along a continuum of self-determination (Howard et al., 2017), reflected by their loadings on a general factor representing the degree of self-determination in each item (Howard et al., 2018). This "truncus communis" likely accounts for most of the linear trend in our data and the overlapping confidence intervals. In addition to this general factor, SDT's types of motivation have been shown to possess unique properties, which are reflected in their specific factors. These factors likely play a strong role in the unique and incremental effects of the types of motivation on employee outcomes, as evidenced in our RWA.

Integrated regulation is an exception in this regard: the limited results pertaining to this type of motivation indicate that its correlations are almost identical to those of identified regulation or intrinsic motivation, meaning that it adds little incremental explanatory value beyond that of the other motivation types. Despite being clearly differentiated at the conceptual level, the measurement of integrated regulation has challenged SDT researchers for a long time. Even the first scale to assess SDT's different types of regulations (i.e., Ryan & Connell, 1989, tapping into academic motivation) did not include a scale for integrated regulation, which could be attributed to the fact that children may not be mature enough to have integrated extrinsic regulations in a coherent sense of self (Howard et al., 2017). The survey of Ryan and Connell (1989) served as an example for many subsequent scales to assess SDT's types of motivation in different life domains. Despite considerable efforts, many other authors also failed to include integrated regulation in these scales, as such items could not be differentiated from items of identification or intrinsic motivation through of factor analysis (see e.g. Gagné et al., 2015, and Pelletier et al., 1995, in the work and sports domain, respectively). Moreover, meta-analytic findings indicated that the integrated regulation scales that were developed (e.g. Tremblay et al., 2009) were highly related to identification and intrinsic motivation and that the relations of these integrated regulation scales with the other types of motivation overlapped considerably with those of identification and intrinsic motivation (Howard et al., 2017).

Our meta-analysis expands these findings on integrated motivation. It shows that integrated regulation is hardly examined within the context of work, which is consistent with other meta-analyses in the academic setting (Slemp et al., 2020) and the health context (Ng et al., 2012). Our results add to this body of research in revealing that the associations between integrated regulation and employee well-being, attitudes, and performance almost always overlap with the associations of identified and intrinsic motivation. Further, when no overlap was found, contrary to expectations, integrated regulation (or scales mixing items for identified and integrated regulation) did *not* show the stronger relations with the outcomes than (purely) identified regulation.

We therefore see little compelling evidence to focus on integrated regulation in future questionnaire research in the context of work. This is not to say, however, that integrated regulations should be omitted from SDT theory. The lack of differentiation between integrated, identified, and intrinsic motivation in questionnaire research may simply be due to the fact that people may describe themselves as being more consistent across time and situations than they truly are (Sadler & Woody, 2003). This consistency bias may then cause individuals to say that they consistently engage in particular behavior because they have integrated this reason (e.g., it has become a fundamental part of who they really are; Tremblay et al., 2009), while actually they may only merely identify with the value of the particular behavior (e.g., because it allows them to attain work objectives that they consider important; Fernet et al., 2008), yet the behavior may not be displayed across time and settings. Hence, because people like to

see themselves as more consistent than they really are, people may confuse valuing something as a lower order goal with striving for a higher level, well-integrated goal that defines one's identity and drives consistent behavior (Kruglanski et al., 2002). Future research avoiding, or accounting for, this consistency bias (e.g. through observations or interviews) may be better suited for examining whether integrated regulation has discriminant validity vis a vis SDT's other types of motivation.

Research questions 2–5: Specific associations for the types of motivation. With respect to the specific impact of the autonomous types of motivation (i.e., research questions 2), the results support the highly beneficial nature of intrinsic motivation in the workplace: intrinsic motivation explained the most variance in almost all outcomes (except continuance commitment and OCB), and was the sole predictor of absenteeism, albeit with a small impact. Overall, these results suggest that making work inherently enjoyable and interesting pays off.

Comparing these results with those of identified regulation, which represents an autonomous type of extrinsic motivation, we see some overlapping results. However, RWA suggests that intrinsic motivation and identified regulation yield differential and incremental effects: while intrinsic motivation associates more strongly with well-being than identified regulation, the opposite is true for employee behavior (i.e., performance and OCB). This supports the idea that engaging in a particular behavior because one considers it meaningful or valuable (e.g., because it corresponds to one's values, motives or goals; Sheldon, 2011; Sheldon & Schüler, 2011) may be more important for continuous effort investment, goal directed behavior, or "going the extra mile," than engaging in a behavior because it is inherently enjoyable—especially when work tasks become more tedious or stressful. This idea has already been voiced by some SDT-scholars (Gagné & Deci, 2005), and adds nuance to previous meta-analytic findings that have highlighted the importance of intrinsic motivation for high quality performance (Cerasoli et al., 2014). That is, the current meta-analytical results indicate that some types of extrinsic motivation (i.e., identified regulation) may sometimes lead to higher levels of performance, extra-role behavior, or helping behavior than intrinsic motivation. We encourage further research examining the differential impact of identified regulation and intrinsic motivation on the quantity, quality, and duration of (ideally objectively-rated) performance to further support this claim. All in all, our findings indicate that work does not need to be "all play" for employees to feel well and perform well, as long as they find their work meaningful.

Our results also help uncover the complex nature of controlled motivation. Specifically, our results highlight that the question of whether controlled forms of motivation are detrimental, unrelated, or less positively related to employee outcomes (i.e., RQ3), should be answered in a nuanced way, taking into account the particular outcome and the type of controlled motivation under study. First, our meta-analysis highlights the Janus face of introjected regulation: engaging in a particular behavior to boost one's self esteem was positively related to both ill-being (e.g., distress) and well-being (e.g., engagement). It also related to all forms of commitment, though most strongly to normative commitment (see also Meyer et al., 2004), and was a relatively strong predictor of performance and OCB. This indicates that introjected people may perform well by pressuring themselves or striving to feel better about themselves, but with some well-being price to pay. In general, these results were found across operationalizations of introjected regulation that focused solely on avoiding negative emotions such as guilt or shame (i.e., avoidance-based operationalisation), and also operationalisations that also incorporated at least some measurement of striving for positive emotions such as pride (i.e., inclusion of approach-based operationalisations).

Second, the current results also show that expecting rewards (e.g., praise, bonus) or aiming to avoid of punishments (e.g., criticism, being fired) may not be the best types of motivation: they may be stressful; will mostly lead to continuance commitment, which is the form of commitment associated with the worst performance and well-being outcomes (Meyer et al., 2004); offer quite limited contributions to employee performance; and inhibit OCB. These results resemble previous meta-analytic findings in the health context (Ng et al., 2012), but add the perspective of RWA, highlighting the small relative impact of external regulation in explaining these outcomes. Notably, whether one is driven by material (e.g., money) or social (e.g., social pressure) external reasons did not make a difference in terms of employee well-being or behavior, except that being driven by external material reasons may lead to increased odds of turnover. All in all, the results showed that external regulation should therefore not be the only, or even the most important, form of extrinsic work motivation to rely on in the work domain.

Pertaining to research question 4, the results indicated that amotivation proved particularly helpful in understanding burnout and was associated strongly (and negatively) with performance. The current meta-analytic results therefore indicate that having no motivation (i.e., low quantity of motivation) may be more detrimental than external regulation (i.e., low quality of motivation).

The moderation analysis (i.e., research question 5) showed that relationships between motivation types and employee outcomes are generally generalizable across contexts in terms of cultures and job types. With some exceptions, the results did not seem to be systematically affected by publication bias or the particular operationalizations of the types of motivation. This attests to the universality of SDT and the reliability of our results. However, given the limited number of studies able to be included in the moderation analysis, we nonetheless encourage future research incorporating contextual and methodological variables to further explain the variability in our results and investigate the generalizability of our conclusions.

In sum, our results show that SDT's types of motivation can have different implications for employee well-being, attitudes and performance. However, the relationships were a bit more complex than can be summarized by SDT's higher-level proposition that increasingly autonomous forms of motivation (i.e., from amotivation to external, introjected, and identified regulation, to intrinsic motivation) should associate increasingly (positively) with employee optimal functioning (Deci & Ryan, 2000). Specifically, identified regulation may sometimes associate with more beneficial (performance related) outcomes than intrinsic motivation; introjected regulation may associate with both positive and detrimental outcomes; while external regulation, and particularly amotivation, likely have negative implications. Despite these nuances, the results support the validity and usefulness of SDT's multidimensional view on motivation as a comprehensive framework to understand the complex phenomenon of motivation. Most importantly, these results indicate that not only the quantity, but also the nuanced differences in the quality of motivation matters. As such, SDT goes above and beyond most motivational theories, which do not take into account the nature or quality of motivation, and instead focus solely on how *much* one is motivated (Kanfer & Chen, 2016; Kanfer et al., 2017)—of which Goal Setting Theory is a prime example, yet has nonetheless dominated the literature on employee motivation and practice (Locke & Latham, 2019).

Implications for theory and practice

Modeling of the different types of motivation. Our results attest to the discriminant validity of the various types of motivation and provide further evidence of their specific implications for employee outcomes. These results thus have

clear implications for how the types of motivation should be modeled in future research. First, as mentioned above, we argue that questionnaire studies may leave out integrated regulation until we find better ways to capture it. Second, our results indicate that, unfortunately, relatively few studies have paid attention to amotivation. Some scholars have posited that people would have at least some kind of motivation to do their job, making the study of amotivation irrelevant (Gagné et al., 2015). Yet, recent person-centered studies estimate that about 10 to 25% of workers are predominantly amotivated (Howard et al., 2016). The current meta-analytic results further attest to the importance of amotivation by showing its incremental value for understanding employee outcomes. We therefore contend that SDT scholars should not only focus on the motivational types (i.e., quality of motivation), but also on the amount of motivation (i.e., quantity of motivation)—and, importantly, include amotivation alongside SDT's different types of motivation in order to fully understand employees' motivation in the workplace.

Most importantly, the results highlight that there are clear advantages in considering the motivational regulations separately rather than in composites (e.g., a relative autonomy index, or autonomous versus controlled motivation). These results align with the conclusions of Howard et al. (2020), providing additional meta-analytic insights demonstrating that considering the regulations separately may not only lead to more explained variance, it also allows for a more nuanced understanding of the implications of motivation on employee functioning, thus offering more nuanced guidelines for interventions.

First and foremost, it is not advisable to group external and introjected regulations together to form a construct of controlled motivation, as the use of such a composite score masks their differential effects. Non-significant results of controlled motivation may be driven by the non-significant population correlations of external regulation with the various aspects of employee well-being, attitudes and behavior; and it may also mask the more nuanced and complex findings of introjected regulation.

Grouping identified and intrinsic motivation into the composite of autonomous motivation may be less problematic, as both relate to outcomes in the same direction. However, such an approach would miss out on the difference in the strength of the relations of these two types of motivation with employee well-being and behavior (e.g., Koestner & Losier, 2002), and further prevent research verifying the effects of targeted interventions on each type of motivation. Future research therefore needs to consider the role of each type of motivation. While this can be achieved through the use of highly complex bi-factor models (Howard et al., 2020), this meta-analysis also points to the viability of using relative weights analysis as a way to circumvent potential issues of multicollinearity when bi-factor modeling is not feasible. We do not recommend the use of regression analysis as the current meta-analytic correlations (available upon request) highlighted that multicollinearity would lead to unreliable regression coefficients when the different types of motivation are included simultaneously, leading to suppression effects and Heywood cases.

Contributions to the motivation literature. This meta-analysis also amplifies SDT's contribution to the wider literature on (employee) motivation. First, the results regarding the associations with intrinsic and identified motivation make clear there is not necessarily a tradeoff between motivating employees to perform well and/or sustaining their health-related well-being, as suggested by the HR-literature (Van De Voorde et al., 2012); enhancing both types of employee autonomous motivation is likely to lead to both outcomes. SDT's types of motivation may also help explain why focusing on HR-practices that increase external regulation (e.g., performance-contingent pay; Gagné & Forest, 2008) or introjected regulation (e.g. employee of the month programs; Johnson & Dickinson, 2010)

may have no or limited effects on performance and raise well-being issues.

Second, the importance of identified regulation for employee outcomes is in line with, and contributes to the reviving of, research on the meaning of work (Allan et al., 2019; Rosso et al., 2010). We complement this line of work, showing that meaningful work may not only relate to well-being (Allan et al., 2019), but also—and particularly—contributes to predicting performance. Moreover, SDT may help to solve some issues regarding the conceptualization of "meaning." When people identify with extrinsic reasons to engage in a particular behavior, they bring together both *inter-personal* and *intra-personal* experiences into one coherent sense of self—and meaning can therefore be derived from both other and self-oriented experiences (Bailey et al., 2019). SDT further specifies identified regulation as an autonomous extrinsic type of motivation, which helps us to understand why employees may find meaning in work because it serves another end (i.e., extrinsic motivation), yet experience this type of motivation as internal (Hackman & Oldham, 1976). Our findings indicate that theories that use the intrinsic/extrinsic dichotomy are too simplistic to capture this important nuance. This shows how SDT may help to understand and reconcile issues or inconsistencies regarding facets of motivation in the broader literature on organizational psychology.

The results pertaining to introjected regulation point at the importance of specifying motivational constructs. We see at least four reasons why introjected regulation has these mixed correlates. First, introjected regulation includes both a focus on avoiding emotions that pose a threat to one's self esteem (e.g., guilt, shame) and striving for positive emotions that may boost one's self-esteem (e.g., pride). Our moderation analysis could not find any differences in the strength of the relations of introjected regulation operationalized in different ways—except for burnout, which was more strongly associated with scales tapping into avoiding negative emotions than with an (un)balanced mix of approach and avoidance items. However, a true comparison with solely approach oriented introjected regulation could not be made, as no such scales are available within organizational psychology. We would encourage future research to look further into this issue and integrate approach/avoidance theories (e.g., Carver, 2006; Higgins, 2002; Kuhl, 2000) with SDT. Such research could allow us to see whether initial findings showing that avoidance introjected regulation is more detrimental than a focus on approach introjected regulation (Assor et al., 2009) can be replicated and generalized across contexts.

Second, even when focusing on either approach or avoidance, measures for introjected regulation can be criticized for including an amalgam of negative (e.g., guilt and shame) and positive (e.g., pride) emotions. Yet, each of these emotions represent qualitatively different constructs, with external shame and hubristic pride for example being more negatively related to outcomes than internal shame and authentic pride (Kim et al., 2011; Tracy & Robins, 2007). Third, moderating variables may alter the implications of these discrete emotions. Shame may for example lead employees to engage in either OCB or CBW, depending on the reparability and injustice of the situation (Daniels & Robinson, 2019). Apart from these self-relevant emotions, the focus on maintaining or improving one's self-esteem included in introjected regulation (Leary, 2007) may be a fourth aspect, adding ambivalence to introjected regulation, as a focus on self-esteem may only lead to negative consequences if it pertains to contingent self-esteem (Ferris et al., 2009). Future research could further investigate whether, and under what circumstances, the various aspects inherent in introjected regulation may associate differently with employee outcomes.

Notably, some SDT-scholars argue that the heterogeneity inherent in introjected regulation represents the "partially internalized" nature of

this type of motivation (Deci & Ryan, 2000). Introjected regulation is neither clearly controlled, nor clearly autonomous, but rather falls somewhere in between—and therefore will, by definition, result in a mix of desirable and undesirable outcomes. Our results pointing at the Janus-face of introjected regulation are in line with this perspective and expand previous results demonstrating that introjected regulation is equidistant between external and identified regulation (Howard et al., 2017), with moderately positive factor loadings on a general factor of self-determination (Howard et al., 2018). In any case, our results overall indicate that managers should withhold from fostering employee motivation through introjected regulation, and focus instead on increasing autonomous types of motivation instead.

Finally, our results for external regulation stand in sharp contrast with studies of extrinsic motivation and monetary incentives (Cerasoli et al., 2014), and the ubiquitous use of management methods that coerce employees into behaving in certain ways through the use of reinforcements, monitoring, and sanctions. For example, the literature within HRM strongly supports the effectiveness of monetary-based incentives (Shaw & Gupta, 2015), and the prevalence of individual reward schemes in contemporary organizations likewise assume a positive effect on employee outcomes. The literature from SDT summarized here provides critical nuances to these strongly held beliefs. First, our findings indicate that external regulation, which likely results from striving for rewards and avoiding punishments, is far less strongly related to performance than the other types of motivation. This may be explained by previous meta-analytic findings that incentives are more strongly related to how much one performs (i.e., how much output one generates), and less predictive of performance quality (i.e., creativity, quality of the output; Cerasoli et al., 2014). Although the current results did not allow us to differentiate between these types of performance, delivering high quality performance is increasingly important in the context of work (Carpini et al., 2017). This then brings into question the value of motivating employees externally. Second, and perhaps most notably, HRM and management studies typically examine turnover and performance of employees following incentivization interventions, but rarely do they consider the well-being implications (Jiang et al., 2015; Shaw & Gupta, 2015). We show that external regulation is likely to have a negative impact on employee well-being. Such an effect may well lead to further problems over time, including performance issues and turnover, and as such may not be as beneficial as is believed. We argue that much progress can be made through better integration of these literatures, building upon the current findings to inform future research.

Limitations and suggestions for future research

This meta-analysis has some limitations, which may also inspire future research to advance the study of employee motivation through SDT's multidimensional perspective. First, the quality of this meta-analyses is of course based on the quality of the primary studies. As the majority of research included in this meta-analysis relied on cross-sectional correlational survey designs, shared method variance and self-report bias may have obscured our results (Podsakoff et al., 2003). There is a clear need for longitudinal and quasi-experimental research that would meet more causality criteria so we can improve our understanding of how the various types of work motivation influence work-related outcomes.

Second, parts of the literature on SDT's multidimensional view on motivation include very few studies. This limited the sample size on which some of the effect sizes were based (e.g., relations with CWB, the relations of amotivation, moderation analysis) and forced us to aggregate several constructs into a broader category (e.g., CWB includes withdrawal as well as interpersonal deviance) to have sufficient

sample numbers to run analyses. This may have influenced the precision of some of our estimates. The limited number of available correlations also prevented us from modeling the structural relations among our variables and testing research questions pertaining to, for example, the relative importance of motivation types for various aspects of performance, including the quantity and quality of work. Answering such questions would be informative in understanding the extent to which results differ for hedonic (e.g., happiness) versus eudemonic (e.g., mindfulness) well-being (Ryan et al., 2008).

The results of our meta-analysis clearly demonstrate SDT's focus on positive outcomes, much in line with the 20-year-old criticism that SDT does not account for the "dark side" of human functioning (Pyszczynski et al., 2000). Although scholars have since broadened their scope and started to include ill-being (e.g., distress), this criticism is still very applicable to the behavioral outcomes studied to date. Future research could include more negative behaviors, such as antisocial behaviors (e.g., deviance, sabotage, theft, cheating; e.g., Tremblay et al., 2009) as this would increase our understanding of whether externally regulated people just "don't contribute" in organizations, as our current results suggest, or whether they actively cause trouble (e.g., conflict, cheating, etc.).

We also encourage future research to disentangle the finding that all types of motivation (except external) were important for performance. Relations between the types of motivation and performance may not be straightforward, and might depend on abilities (Van Iddekinge et al., 2014), task characteristics, and types of performance (Byron & Khazanchi, 2012; Cerasoli et al., 2014). Consequently, it may be that external regulation is particularly relevant for task performance on simple/boring tasks, while identified regulation may be more relevant for complex tasks that require extended effort, and intrinsic motivation more relevant for interesting or creative tasks. This would nuance earlier findings focusing on performance quantity and quality in the context of work (Cerasoli et al., 2014) and shed light on which of the types of motivation are likely to predict diverse performance criteria such as proficiency, creativity, being a good team player, and adapting to rapid changes.

We would also encourage scholars to move beyond the study of SDT's types of motivation in and of itself, and in relation to other OB-related constructs, and integrate other motivational theories. Previous research in the domain of work, for example, have endeavored to marry the different types of motivation with goal achievement theory. On the one hand, such studies show that autonomous motivation is related to mastery-approach goals; while controlled motivation and amotivation relates to mastery-avoidance goals and both performance-approach and -avoidance goals (Vanthournout et al., 2015). On the other hand, intrinsic motivation and mastery-approach goals also predict outcomes such as work effort (Dysvik & Kuvaas, 2013). We welcome future research that sheds more light on the temporal and synergistic effects of SDT's and other types of motivation in order to facilitate a more integrated literature on work motivation.

Relatedly, such studies could also make use of profile analysis to see which types of motivation naturally co-occur with SDT's types of motivation. Previous studies have differentiated employees based on profiles characterized by different levels of the types of motivation (e.g., Howard et al., 2016; Van den Broeck et al., 2013). Whereas these studies adopt a person-oriented perspective, our meta-analysis is among the first to meta-analytically examine the nomological network of each of the various types of motivation from a variable centered perspective. Our results may therefore help profile studies further interpret their results and inform the literature about the added value of both approaches. Moreover, to shed further

light on the specific nature of the types of motivation, future research may examine more closely the implications of holding various types of motivation at the same time by looking at their interactions. Previous research indicates that the specific combination of high autonomous and low controlled motivation is associated with high levels of performance; while a combination of low autonomous and high controlled motivation is associated most strongly with distress (Grant et al., 2011; Strauss et al., 2017). As our results provided evidence for differential effects among the autonomous as well as the controlled motivation types, a nuanced perspective examining the implications of interactions between the types of motivation may provide additional insights.

Practical implications

The results of this meta-analysis show that when organizations want to achieve employee well-being, positive attitudes, and performance, they should shy away from trying to motivate employees to work through incentives and sanctions; external regulation was shown to be the least potent form of motivation to regulate performance, and was also associated with high well-being costs. Instead, organizations should nurture intrinsic motivation, perhaps through motivating, job design (Van den Broeck et al., 2016), or autonomy support from colleagues (Jungert et al., 2018) or supervisors (Slemp et al., 2018), as intrinsic motivation is most strongly associated with employee optimal functioning. However, organizations are not limited to solely promoting intrinsic motivation. Though intrinsic motivation is the best predictor for most outcomes, when it comes to work performance and OCB, identified regulation is potentially more important. This means that organizations should not only think about how to make jobs more fun and interesting, but should also concentrate on creating meaning by, for example, increasing the perceived impact of one's work on beneficiaries (Grant, 2012). Leaders can also articulate a compelling vision that speaks to the values of their employees, which is the hallmark of transformational and charismatic leadership research (Bass & Avolio, 1995). All in all, our results highlight the importance of differentiating between the various types of motivation, above and beyond their general degree of self-determination or categorization into autonomous and controlled motivation. Organizations can therefore strategically decide which type of motivation they want to foster in order to achieve the outcomes they value the most.

Conclusion

Self-determination theory has become a popular theory within organizational psychology (see also Deci et al., 2017; Van den Broeck et al., 2016). Taking stock of this growing body of literature, this meta-analysis revealed that differentiating between each of the various types of motivation is valuable for understanding employee well-being, attitudes, and behavior. The available empirical evidence also provided additional detail to SDT's overall theoretical statement that the correlates of the different types of motivation become more and more positive as autonomy increases (Deci & Ryan, 2000). It seems that, in some cases, identified regulation may be more important than intrinsic motivation. Introjected regulation is an ambivalent type of motivation, while external regulation has small positive associations with performance and negative relations with well-being. Our results show that amotivation should be considered too in SDT research, particularly because it is strongly associated with distress and low performance. Given the promising results regarding the incremental and discriminant validity of SDT's various types of motivation, we encourage scholars to further invest in examining their differential effects in more detail. Such endeavors should, however, make use of more nuanced analysis such as RWA, and rely on more ambitious research methods so that

firmer conclusions can be drawn on the importance of the quality of employee motivation.

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ORCID iD

Anja Van den Broeck https://orcid.org/0000-0002-5896-9506

Supplemental material

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Author biographies

Anja Van den Broeck is an associate professor of work and organization studies at KU Leuven, Belgium. Her research goal is to examine how, and under which circumstances individuals may thrive at work. In her research, she

unravels the interplay between job design, well-being and motivation.

Joshua L. Howard is an assistant professor at the Monash Business School, Department of Management, Monash University. His main research goal centers around understanding work motivation and he wants to innovate this field through conducting meta-analyses and using advanced psychometrics.

Yves Van Vaerenbergh is an associate professor of marketing at the department of marketing, KU Leuven in Belgium. His research interests include mainly service issues, such as service failures, service recovery, service innovations, and meta-analysis. He published in *Journal of the Academy of Marketing Science, Journal of Service Research*, among others.

Hannes Leroy is an Associate Professor at Rotterdam School of Management, Erasmus University. His research interests include the study of authenticity and its value to organizations, especially its leadership implications. He holds a PhD from the University of Leuven in Belgium.

Marylène Gagné (PhD University of Rochester) is Professor of Organizational Behavior at the Future of Work Institute, Curtin University in Perth Australia. Her research examines how job design, management, and compensation affect people's motivational orientations toward their work. She also examines the consequences of these orientations for individual and organizational performance and for individual mental health.