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Revisiting the Multidimensional Work Motivation Scale (MWMS)

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ABSTRACT

This multi-sample study (5 samples) revisited the content and factor structure of the Multidimensional Work Motivation Scale (MWMS) through exploratory structural equation modelling. Specifically, the operational representation of, and the relations between, the types of behavioural regulation were investigated as was their relation to theoretical outcomes. Results suggest the removal of three problematic items and show that work motivation, as measured by the MWMS, is best represented by a factor structure reflecting autonomous motivation, introjected and external regulation as well as amotivation. Furthermore, introjected regulation is more strongly represented by its avoidance subscale, whereas the two types of external regulation (material and social) are not distinguishable. Lastly, autonomous motivation is linked to optimal employee functioning (e.g., vigor/vitality, satisfaction, lower turnover intention). The two controlled types of regulation have differentiated relations with performance, but are both linked to poor employee health and turnover intention, with (avoidance) introjected regulation being a particularly important predictor. By revisiting the content of the MWMS and cross-validating its structure in five samples, this study provides an empirically adequate representation of the types of regulation and their outcomes. Suggestions for future research aimed at improving the content of the MWMS are also offered.

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Multidimensional Work Motivation Scale (MWMS); work motivation; self-determination theory; employee health and functioning; Exploratory Structural Equation Modelling (ESEM)

Self-determination theory (SDT; Deci & Ryan, 1985, 2000; Deci et al., 2017) has received increasing attention in recent years from researchers and practitioners in management and organizational psychology. This framework provides valuable insight into the motivational forces through which employees can achieve optimal functioning at work, expressed through manifestations of both intra- and interpersonal growth in terms of well-being (e.g., vitality, work engagement), positive attitudes (e.g., affective organizational commitment) and behaviour (e.g., performance, organizational citizenship behaviour; Van den Broeck et al., 2019). More specifically, SDT focuses not only on the quantity of motivation, but also distinguishes qualitatively-different types of behavioural regulation (i.e., intrinsic motivation, identified, introjected, and external regulation, as well as amotivation) to explain why employees expend their efforts at work. Several scales have been developed to measure work motivation and its underlying types of behavioural regulation (e.g., Blais et al., 1993; Fernet et al., 2008; Gagné et al., 2010; Tremblay et al., 2009), although the more recently developed Multidimensional Work Motivation Scale (MWMS; Gagné et al., 2015) has become the most widely used instrument for measuring work motivation as conceptualized by SDT. To date, studies that have used the MWMS to assess employee motivation and evaluate its relation to other relevant concepts (e.g., antecedents and outcomes) have done so mainly by combining the various types of behavioural regulation into composite scores of motivation: autonomous motivation (i.e., intrinsic motivation and identified regulation) and controlled motivation (i.e., external and introjected regulation). However, recent findings (e.g., Howard et al., 2017; Howard, Gagné, & Morin, 2020; Howard, Gagné, Van den Broeck, et al., 2020) suggest that this conceptualization (i.e., autonomous and controlled motivation) may not be the most appropriate way of assessing work motivation, notably because the two types of controlled regulation relate differently to more autonomous forms of motivation as well as indicators of employee functioning (Howard et al., 2017; Van den Broeck et al., 2021). More research is thus needed on how to best operationalize work motivation as conceptualized by SDT using the MWMS.

As such, the present multi-sample study (5 samples) aims to explore the content and factor structure of the MWMS and investigate the most appropriate way of operationalizing work motivation using this scale. Doing so offers insight into the nature of, and interplay between, the different motivational types (e.g., identified, introjected) or forms (i.e., autonomous, controlled) and provides a better understanding of how work motivation relates to indicators of employee health and functioning.

The conceptualization of motivation according to self-determination theory

SDT distinguishes between five types of behavioural regulation, which lie on a continuum of self-determination, referring to the

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degree to which the values of the work are internalized and integrated to the self (Deci & Ryan, 2008; Howard, Gagné, & Morin, 2020). First, intrinsic motivation is defined as accomplishing one's work for the inherent pleasure and satisfaction it provides. It is the most self-determined type of motivation. There are also three types of extrinsic motivation[1]. The most internalized is identified regulation, in which one fully recognizes and accepts the underlying importance of one's work as objectives aligned with personal goals and values (e.g., accomplishing one's work because it is deemed meaningful). Introjected regulation refers to behaving out of internal pressure (e.g., to feel proud of oneself, to avoid feeling guilty or shameful). The least internalized type of extrinsic motivation is external regulation, which refers to engaging in one's work for specific instrumental reasons: to attain desired outcomes (e.g., obtaining a promotion or others' approval) or to avoid undesired ones (e.g., being reprimanded by one's supervisor). Lastly, amotivation is defined as a lack of motivation or voluntary intention towards accomplishing one's work. This translates into a lack of self-determination, as it reflects a complete lack of internalization (Deci & Ryan, 2000).

Initial research on work motivation often measured it using a relative autonomy index (RAI; Grolnick & Ryan, 1987), which consists of a single score reflecting employees' relative autonomy or autonomous motivation. Studies using the RAI assign weights to the different types of regulation, according to their placement on the continuum of self-determination. For instance, external regulation is weighted at −2, introjected regulation at −1, identified regulation at +1, and intrinsic motivation at +2. The higher the score, the higher the quality of work motivation or self-determination. Although the RAI has been frequently used (e.g., Fernet et al., 2004; Lam & Gurland, 2008; Milyavskaya & Koestner, 2011; Richer et al., 2002; Trépanier et al., 2013), it has often been called into question, notably because it conceals the nature and effects of specific types of regulation (Chemolli & Gagné, 2014; Gagné et al., 2015; Howard et al., 2017; Howard et al., 2018; Howard, Gagné, Van den Broeck, et al, 2020).

More recent research has investigated work motivation through two qualitatively different composite scores (or forms of motivation): external and introjected regulation are combined to represent controlled motivation (i.e., doing one's work because one feels obligated or pressured to do so), whereas identified regulation and intrinsic motivation are combined to represent autonomous motivation (i.e., doing one's work for the pleasure or satisfaction it provides; or to pursue valued, meaningful goals). It has been shown that autonomous motivation is positively associated with employee well-being and effective functioning (e.g., occupational and organizational commitment, work engagement, performance, job satisfaction; Fernet et al., 2012; Fernet et al., 2017; Gillet et al., 2016; Güntert, 2015; Trépanier, Forest, et al., 2015), whereas controlled motivation promotes unfavourable outcomes (e.g., emotional exhaustion, anxiety, psychosomatic complaints, psychological distress, and turnover intention; Fernet et al., 2012; Gillet et al., 2016; Kuvaas et al., 2016; Trépanier, Forest, et al., 2015).

Given this tendency to assess motivation via composite scores, less is known about the outcomes of the specific types of regulation in the work domain. Nevertheless, a recent meta-analysis (Van den Broeck et al., 2021) sheds light on this question, showing that amotivation is negatively associated with indicators of employee health as well as favourable attitudes and behaviours (e.g., is linked to burnout, disengagement, job dissatisfaction, as well as lower performance, proactivity and affective commitment), whereas the opposite pattern is observed for the two underlying motivational types of autonomous motivation. Regarding the two specific types of regulation underlying controlled motivation, results show that external regulation is generally negatively associated with employee health, as it is positively related to indicators of ill-being (burnout and distress), but weakly (and positively) related to affective commitment and proactivity. For introjection, results show a positive relation to both employee ill-being (burnout and distress) and well-being (engagement and job satisfaction) as well as favourable professional functioning (affective commitment, performance, proactivity, organizational citizenship behaviour).

Multidimensional Work Motivation Scale (MWMS)

The Multidimensional Work Motivation Scale (MWMS; Gagné et al., 2015) was developed to overcome the inability of previous scales to capture the complexity of controlled regulation. The MWMS, validated in seven languages, has become the most commonly used instrument for measuring work motivation. This 19-item scale assesses the five types of regulation proposed by SDT: amotivation, external, introjected, and identified regulation, as well as intrinsic motivation. In order to more comprehensively capture the potential contingencies attached to external regulation, on the one hand, and the internal pressures related to introjected regulation, on the other, the MWMS distinguishes two subtypes of each regulation. More specifically, it includes items that focus on attaining desired outcomes and feelings (e.g., pursuit of rewards, praise [external] or a sense of self-worth [introjected]), conceptualized as approach-oriented behaviours, as well as items that focus on avoiding undesirable outcomes and feelings (e.g., avoiding reprimands [external] or a sense of shame [introjected]), conceptualized as avoidance-oriented behaviours. In addition, the MWMS considers two types of external contingencies (external regulation) – material (e.g., money) and social rewards (e.g., praise) – to help better capture the external motivators present in the work environment.

In the validation study, Gagné et al. (2015) compared several CFA models to identify the factor structure that best represents the interplay between the MWMS items and their overarching behavioural regulation. Based on AIC (Akaike's information criterion), a 7-factor model consisting of 6 first-order factors (i.e., amotivation, external-material, external-social, introjected, and identified regulation, intrinsic motivation) and one second-order factor "external regulation", created by combining the first order factors "external-material" and "external-social", was found to be the more parsimonious model, although there were fit issues with this solution in some samples (German and Chinese). Some of the regulation types were highly related, with inter-correlations ranging from −.42 to .75. Of these correlations, the intrinsic motivation-identified regulation correlation was particularly strong, ranging from .57 to .70 (median:

.65). Furthermore, introjected regulation, a type of controlled motivation, was found to be positively (and strongly) related to types of regulation reflecting autonomous motivation: the correlations between introjected and identified regulation ranged from .20 to .75 (median: .54) and the correlations between introjected regulation and intrinsic motivation ranged from .14 to .57 (median: .36).

Construct validity of the MWMS was also investigated in the validation study (Gagné et al., 2015) in several samples that used both positive (i.e., vitality, affective commitment, performance) and negative (i.e., emotional exhaustion, turnover intention) indicators of employee functioning. Amotivation was systematically positively related to unfavourable outcomes and negatively related to favourable outcomes, whereas the opposite pattern was observed for intrinsic motivation and identified regulation. The second-order external regulation factor was either unrelated or positively related (but more weakly, relative to autonomous forms of motivation) to the outcomes in several of the samples. Overall, results show non-significant relations with vitality, as well as positive relations with emotional exhaustion, turnover intention, affective organizational commitment, and performance. For introjected regulation, results initially revealed overall positive relations with vitality, affective commitment, and performance, as well as negative relations with emotional exhaustion. Partial correlations subsequently illustrated that when controlling for the shared variance with identified regulation, introjected regulation was negatively related to vitality and positively related to emotional exhaustion, performance, and turnover intention. Similar results were obtained by subsequent studies using the MWMS (e.g., Battistelli et al., 2017; Güntert, 2015). For example, in Battistelli et al.'s (2017) study, introjected regulation was positively related to prosocial behaviour and unrelated to organizational commitment, whereas the two types of external regulation (social and material) were unrelated to prosocial behaviour. Only material external regulation was related, negatively so, to organizational commitment.

Overall, past research reveals that the nature of the relations between the controlled types of motivation (as evaluated by the MWMS) and indicators of employee functioning is often inconsistent with SDT propositions that external and introjected regulation should lead to less favourable outcomes than autonomous motivation (Deci & Ryan, 2008). In light of this, as well as the growing popularity of the MWMS, it appears important to cross-validate and potentially revisit the MWMS in order to shed light on the most appropriate way of operationalizing work motivation with this scale and gain insight into the relation work motivation holds with various indicators of employee functioning.

The present study

Accordingly, the objective of the present study is to investigate the content and factor structure of the MWMS. More specifically, we aim to shed light on the interplay between the different types of regulation as well as on the distinct nature of (or possible overlaps between) these concepts. This endeavour aligns with recent work that has called into question the common method of assessing work motivation (Howard et al., 2017; Howard et al., 2018; Howard, Gagné, Van den Broeck, et al., 2020). Indeed, despite the popularity of using two global composite scores reflecting autonomous and controlled motivation to assess work motivation (including by studies using the MWMS), recent research has highlighted the theoretical and empirical pitfalls of this method, especially regarding the merge of the more controlled motives into a single factor (Howard et al., 2017; Howard et al., 2018; Howard, Gagné, Van den Broeck, et al., 2020; Van den Broeck et al., 2021). More specifically, past research highlights that choosing to combine introjected regulation with external regulation to form a composite score of controlled motivation appears arbitrary, given that it is as closely related to identified regulation as it is to external regulation (Howard et al., 2017). Furthermore, assessing the types of regulation separately provides a better fit to the data and accounts for more variance in outcomes, as each type of regulation accounts for independent variance in outcomes (Howard, Gagné, Van den Broeck, et al., 2020; Van den Broeck et al., 2021).

As such, more research is needed on how to best operationalize work motivation using the MWMS: investigating types of regulation individually, or combining them into qualitatively different forms (composite scores representing autonomous and controlled motivation). A better understanding of this issue would provide valuable insight into the nature of work motivation and, secondarily, its effect on employee functioning. In line with this, the present study also examines the relation between the motivation types (regulation) and forms (autonomous and controlled) and their theoretical outcomes to shed light on their specific associations. More specifically, both positive and negative emotional (vigor/vitality, emotional exhaustion), attitudinal (life/job satisfaction, turnover intention) and behavioural (job performance) indicators are taken into account to offer an encompassing understanding of how each motivation type/form differentially relates to employee health and functioning. Because replicability of results and, more generally, cross-validation are of the most importance (Peterson, 2019), the findings of this study are cross-validated among five independent samples using exploratory structural equation modelling (ESEM), thus providing strong support for the empirical adequacy of the MWMS (Peterson, 2019).

ESEM is a mixture of Structural Equation Modelling (SEM) and Exploratory Factor Analysis (EFA) that can be helpful when researchers aim to study the factor structure of multidimensional instruments measuring interrelated concepts (Asparouhov & Muthén, 2009; Marsh et al., 2009; Morin et al., 2013), as is the case for the different types of behavioural regulation (Howard et al., 2018). Measurement models in SEM are typically defined on the grounds of Confirmatory Factor Analysis (CFA) and are specified a priori by researchers, who specify the number of factors theorized to reflect the latent constructs of interest (e.g., five factors to represent work motivation) and which items should be taken as indicators of these factors (e.g., three specific items to represent the factor interpreted as "intrinsic motivation"). A basic assumption in CFA measurement models is that an item is an indicator of only one factor. That is, items represent and are related to their respective factor only, and to no other latent factor. However, this assumption can be restrictive and the formal requirement of forcing all cross-loadings to zero can lead to numerous

problems, especially when factors are known to be theoretically interrelated (Asparouhov & Muthén, 2009). As such, although CFA is a more parsimonious statistical approach which should be retained when a factor structure is well established (Asparouhov & Muthén, 2009), ESEM provides an alternate approach that is ideally suited to validation studies, especially when factors are expected to correlate, as it permits a detailed examination of individual item functioning by freely estimating all cross-loadings of indicators (i.e., items) on all latent factors in measurement models. Specifically, ESEM estimates the measurement model as in EFA, with a rotation of the matrix of the factor loadings where items are allowed to load on any factor of a given set. However, a clear advantage of ESEM over EFA is that it allows researchers to use EFA measurement models, which are less restrictive than CFA measurement models, in subsequent SEM to assess the strength and nature of the relation between the factors contained in the measurement model and theoretical antecedents and/or outcomes. Allowing for cross-loadings between factors deemphasizes amplified correlations between related factors and, subsequently, can help to clarify their relations with other concepts (i.e., antecedents and outcomes).

Several studies have compared ESEM and CFA and highlighted that the former statistical approach can offer an appropriate representation of multidimensional constructs when CFA fails and can reveal overlaps between related dimensions (e.g., Guay et al., 2015; Howard et al., 2018; Levesque-Côté et al., 2018; Trépanier, Fernet, et al., 2015).

Overall, results of past studies illustrate that ESEM can be a helpful statistical tool to study theoretically-related multidimensional constructs, notably by uncovering overlaps between these underlying dimensions. Given that the different types of regulation are highly interrelated, the present study assesses the content and factor structure of the MWMS as well as its relation to theoretical outcomes of work motivation (i.e., emotional, attitudinal and behavioural indicators of employee functioning) using ESEM in five samples to cross-validate and replicate the results.

Method

Participants and Procedures[2]

Sample 1

Participants were nurses ($n = 508$, participation rate of 73%) working in the province of Quebec, Canada. The majority of participants were women (91.1%) and worked full-time (67.2%). Participants had a mean age of 43.67 years ($SD = 10.00$) and an average of 20.57 years ($SD = 10.34$) of experience on the job.

Sample 2

Participants were workers ($n = 508$, participation rate of 84%) from the province of Quebec, Canada. The majority of participants were women (51.8%) and worked full-time (81.50%). Participants had a mean age of 41.51 years ($SD = 14.15$) and an average of 10.65 years ($SD = 10.05$) of experience on the job.

Sample 3

Participants in this study were nurses ($n = 637$; participation rate of 17%) working in the province of Quebec, Canada. The majority of participants were women (88.4%) and worked full-time (56.1%). Participants had a mean age of 29.63 years ($SD = 9.40$) and an average of 3.47 years ($SD = 3.45$) of experience on the job.

Samples 4 and 5

Participants were a subsample of a larger data set collected through Amazon's MTurk: Sample 4 ($n = 520$) and Sample 5 ($n = 520$). Criteria for participation included being employed full-time. Attention check questions were included, and participants who failed them or who took less than 2.5 seconds to answer each question on average were discarded (Ward & Pond, 2015). In both samples, participants resided in the United States. In Sample 4, the majority of participants were male (52.5%), had a mean age of 36.62 years ($SD = 11.31$) and an average of 6.10 years ($SD = 6.03$) of experience on the job, whereas in Sample 5, the majority of participants were male (54.3%), had a mean age of 35.82 years ($SD = 10.30$) and an average of 5.62 years ($SD = 4.98$) of experience on the job.

Measures

Measures in samples 1, 2 and 3 were administered in French, whereas measures in samples 4 and 5 were administered in English.

Work motivation

The Multidimensional Work Motivation Scale (MWMS; Gagné et al., 2015; see Appendix) was used to assess participants' motivation at work. Participants rated their main reasons for investing efforts in their job on a seven-point scale from 1 (*not at all for this reason*) to 7 (*exactly for this reason*). The scale assesses five motivational dimensions[3]: intrinsic motivation (e.g., *"Because the work I do is interesting"*; 3 items; $\alpha_{\text{sample 1}} = .91$, $\alpha_{\text{sample 2}} = .91$, $\alpha_{\text{sample 3}} = .88$, $\alpha_{\text{sample 4}} = .93$, $\alpha_{\text{sample 5}} = .93$), identified regulation (e.g., *"Because putting efforts in this job has personal significance to me"*; 3 items; $\alpha_{\text{sample 1}} = .71$, $\alpha_{\text{sample 2}} = .75$, $\alpha_{\text{sample 3}} = .62$, $\alpha_{\text{sample 4}} = .87$, $\alpha_{\text{sample 5}} = .84$), introjected regulation (e.g., *'Because otherwise I will feel bad about myself"*; 4 items; $\alpha_{\text{sample 1}} = .70$, $\alpha_{\text{sample 2}} = .64$, $\alpha_{\text{sample 3}} = .63$, $\alpha_{\text{sample 4}} = .72$, $\alpha_{\text{sample 5}} = .75$), and external regulation: social (e.g., *"Because others will respect me more (e.g., supervisor, colleagues, family, clients . . .)"*; 3 items; $\alpha_{\text{sample 1}} = .81$, $\alpha_{\text{sample 2}} = .76$, $\alpha_{\text{sample 3}} = .75$, $\alpha_{\text{sample 4}} = .75$, $\alpha_{\text{sample 5}} = .78$) as well as material (e.g., *"Because I risk losing my job if I don't put enough effort in it"*; 3 items; $\alpha_{\text{sample 1}} = .59$, $\alpha_{\text{sample 2}} = .61$, $\alpha_{\text{sample 3}} = .48$, $\alpha_{\text{sample 4}} = .67$, $\alpha_{\text{sample 5}} = .64$).

Turnover intention

Turnover intention was assessed in samples 1, 2 and 3 using an adapted item taken from O'Driscoll and Beehr's (1994) scale. In samples 1 and 3, this item was "*I plan to look for another job within the next 12 months*", whereas the item "*I am thinking of leaving my current organization"* was used in sample 2. Items were scored on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The Meyer and Allen scale (Meyer et al., 1993; 3 items; $\alpha_{\text{sample 4}} = .89$, $\alpha_{\text{sample 5}} = .88$) was used in samples 4 and 5 to assess turnover intention (e.g., "*How frequently do you think about leaving this organization?"*) using a scale ranging from 1 (*never)* to 5 (*every day*).

Satisfaction

In sample 1, life satisfaction was assessed using the French version (Blais et al., 1989) of Diener et al.'s (1985) scale (4 items; α = .87), while in sample 2 job satisfaction was assessed using Fouquereau and Rioux's (2002) scale (5 items; α = .89). Sample items are "*In most ways my life is close to my ideal*" (life satisfaction) *and* "*I am satisfied with my work*" (job satisfaction). Participants were asked to indicate the extent to which they agreed with the proposed statements on a seven-point scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). Satisfaction was not assessed in samples 3, 4 and 5.

Emotional exhaustion

Emotional exhaustion was assessed in samples 1, 2 and 3 using the corresponding subscale of the Maslach Burnout Inventory General Survey (MBI-GS; Schaufeli et al., 1996). A sample item is "*I feel emotionally drained by my work*" (5 items; $\alpha_{\text{sample 1}}$= .92, $\alpha_{\text{sample 2}}$= .89, $\alpha_{\text{sample 3}}$ = .90). Participants were asked to rate how often they experienced the described feelings regarding their work on a seven-point scale ranging from *never* to *every day*.

Vigor/vitality

Vigour was assessed in samples 1, 2 and 3 using the corresponding short subscale of the Utrecht Work Engagement Scale (UWES-9; Schaufeli et al., 2006). A sample item is "*When I get up in the morning, I feel like going to work*" (3 items; $\alpha_{\text{sample 1}}$= .89, $\alpha_{\text{sample 2}}$= .90, $\alpha_{\text{sample 3}}$ = .88). Participants were asked to rate how often they experienced the described feelings regarding their work on a seven-point scale ranging from *never* to *every day*. Vitality was assessed in sample 4 using Porath et al. (2012) scale (e.g., "*I have energy and spirit*"; 5 items, α =.94) on a scale ranging from 1 (*strongly disagree)* to 5 (*strongly agree*). Vigour/vitality was not assessed in sample 5.

Performance

Performance was assessed in samples 1, 2 and 3 using an adapted version of the in-role performance subscale (Williams & Anderson, 1991). A sample item is "*I adequately complete the tasks that are assigned to me*" (4 items; $\alpha_{\text{sample 1}}$= .93, $\alpha_{\text{sample 2}}$= .94, $\alpha_{\text{sample 3}}$= .90). Participants were asked to evaluate whether they agreed with the statements describing their tasks at work on a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Performance was not assessed in samples 4 and 5.

Statistical analyses

All analyses were performed using M*plus* v.8 (Muthén & Muthén, 1998-2017), with the main analyses (factor structure and criterion validity) using robust maximum likelihood (MLR) estimation and target rotation (Asparouhov & Muthén, 2009). With target rotation, cross-loadings are freely estimated but targeted to be as close to zero as possible. This approach thus penalizes high cross-loadings and results in poor model fit in the presence of model misspecification. The goodness-of-fit of all tested models was evaluated using four indices: the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), the Root Mean Square Error of Approximation (RMSEA), and the Standardized Root Mean Square Residual (SRMR). Values higher than .90 for the CFI and TLI indicate an acceptable fit (Hoyle, 1995; Schumacker & Lomax, 1996), whereas values lower than .08 for the RMSEA and the SRMR represent a satisfactory fit (Browne & Cudeck, 1993; Hu & Bentler, 1999). The Bayesian Information Criterion (BIC; Schwarz, 1978) was also used to compare competing models. One benefit of using BIC is that it balances simplicity and goodness of fit to avoid overfitting (Hitchcock & Sober, 2004). An overfitting model, which takes into account idiosyncratic properties of the sample, is not likely to be predictively accurate and replicable in other samples (Peterson, 2019). As such, when comparing models using BIC, choosing a model with a lower BIC score can help obtain a model that will be generalizable to other samples.

Results

Factor structure of the MWMS through ESEM

The factor structure of the MWMS was evaluated separately in all five samples using ESEM. In line with the MWMS validation study (Gagné et al., 2015), a 5-factor model (M1; external-material, external-social, introjected, and identified regulation, and intrinsic motivation) was first tested. In all samples, the 5-factor structure was deemed unsatisfactory and rejected, given a negative residual variance (Brown, 2015). In view of this unsuitability, different factor structures were tested and compared (see Table 1), including a 4-factor model (M2; the two types of external regulation combined), a subsequent 4-factor model (M3; external-social, external-material, introjected regulation, and autonomous motivation [identified regulation and intrinsic motivation]), a 3-factor model (M4; external regulation, introjected regulation, and autonomous motivation), as well as a 2-factor solution (M5; controlled motivation [external and introjected regulation] and autonomous motivation). Overall, all tested models (M2-M5) showed a lack of consistency of goodness-of-fit across all samples (see Table 1), and a general pattern could be observed. Indeed, results revealed strong overlaps (i.e., significant cross-loadings) between several factors as well as problematic items. Specifically, (i) items representing the two types of external regulation (i.e., social and material) tended to be best represented by only one factor; (ii) items representing identified regulation and intrinsic motivation tended to load on the same factor, reflecting autonomous motivation, with the exception of ID2 ("*Because I personally consider it important to put efforts in this job*") in samples 1 and 2, which did not have a satisfactory loading on this global factor but instead loaded on the introjected regulation factor. Lastly, the introjected regulation factor was ill-defined, with INTRO1 ("*Because I have to prove to myself that I can*") and INTRO2 ("*Because it makes me feel proud of myself*") either not significantly loading on introjected regulation, or loading on identified regulation, intrinsic motivation, external-social regulation, or autonomous motivation. As such, all models depicted ill-defined factor structures that could not be interpreted meaningfully (Thurstone, 1947, 1954).

The problematic items (INTRO1, INTRO2, ID2) were thus removed and the aforementioned factor structures were tested using the new set of items in all samples (see Table 2). The

Table 1. Fit indices for the tested models using ESEM (full scale).

Model description	Sample	χ^2 (*df*)	CFI	TLI	RMSEA [90% CI]	SRMR	BIC	Simple Structure	Problem(s)
M1 (5 factors)	S1/S2/S4/S5	-	-	-	-	-	-	-	a
	S3	75.47 (50)	.99	.98	.03 [.01, .04]	.02	32 062	No	d
M2 (4 factors)	S1	197.98 (62)	.96	.92	.07 [.06, .08]	.02	25 206	No	b, c, d
	S2	N/A	N/A	N/A	N/A	.03	29 377	No	b, c, d
	S3	145.04 (62)	.97	.94	.05 [.04, .06]	.02	32 063	No	b, d
	S4	146.80 (60)	.98	.95	.05 [.05, .06]	.03	27 647	No	b, d
	S5	141.18 (60)	.98	.95	.05 [.04, .06]	.03	29 230	No	d
M3 (4 factors)	S1	197.98 (62)	.96	.92	.07 [.06, .08]	.02	25 206	No	d, e
	S2	N/A	N/A	N/A	N/A	.03	29 377	No	d, e
	S3	145.04 (62)	.97	.94	.05 [.04, .06]	.02	32 063	No	d
	S4	146.80 (60)	.98	.95	.05 [.04, .06]	.03	27 647	No	d, e
	S5	141.18 (60)	.98	.95	.05 [.04, .06]	.03	29 230	No	d, e
M4 (3 factors)	S1	297.70 (75)	.93	.89	.08 [.07, .09]	.04	25 258	No	d
	S2	200.40 (75)	.95	.92	.06 [.05, .07]	.03	29 367	No	d
	S3	246.78 (75)	.94	.90	.06 [.05, .07]	.04	32 091	No	d
	S4	366.23 (73)	.92	.87	.09 [.08, .10]	.04	27 812	No	d
	S5	331.55 (73)	.92	.87	.08 [.07, .09]	.04	29 367	No	d
M5 (2 factors)	S1	531.41 (89)	.86	.81	.10 [.09, .11]	.06	25 433	No	d
	S2	411.79 (89)	.87	.83	.08 [.08, .09]	.06	29 559	No	d
	S3	444.74 (89)	.87	.82	.08 [.07, .09]	.06	32 235	No	d
	S4	764.74 (87)	.81	.74	.12 [.11, .13]	.07	28 202	No	d
	S5	692.77 (87)	.82	.75	.11 [.11, .12]	.07	29 739	No	d

df = degrees of freedom. CFI = Comparative Fit Index. TLI = Tuckey-Lewis Index. RMSEA = Root Mean Square Error of Approximation. CI = Confidence Interval. SRMR= Standardized Root Mean Square Residual. BIC = Bayesian Information Criterion. Problems a = negative residual variance/does not converge. b = significant cross-loadings between intrinsic motivation and identified regulation. c = ID2 does not load on identified regulation. d = INTRO1/INTRO2 do not load on introjected regulation, or load on identified regulation, external-social regulation, intrinsic motivation or autonomous motivation. e = significant cross-loadings between external-material and external-social regulation.

Table 2. Fit indices for the tested models using ESEM (ID2, INTRO1 and INTRO2 removed).

Model description	Sample	χ^2 (*df*)	CFI	TLI	RMSEA [90% CI]	SRMR	BIC	Simple Structure	Problems
M1a (5 factors)	S1/S2/S3/S4/S5	-	-	-	-	-	-	-	a
M2a (4 factors)	S1/S4/S5	-	-	-	-	-	-	-	a
	S2	159.80 (32)	.93	.84	.09 [.08, .10]	.02	24 309	No	b
	S3	40.90 (32)	1.00	.99	.02 [.00, .04]	.01	26 666	No	b
M3a (4 factors)	S1/S4/S5	-	-	-	-	-	-	-	a
	S2	159.80 (32)	.93	.84	.09 [.08, .10]	.02	24 309	No	d
	S3	40.90 (32)	1.00	.99	.02 [.00, .04]	.01	26 666	Yes	
M4a (3 factors)	S1	155.29 (42)	.95	.91	.07 [.06, .09]	.04	20 835	Yes	
	S2	122.63 (42)	.96	.92	.06 [.05, .07]	.03	24 302	Yes	
	S3	147.53 (42)	.95	.91	.06 [.05, .08]	.04	26 710	Yes	
	S4	134.59 (40)	.97	.93	.07 [.06, .08]	.03	22 983	Yes	
	S5	113.37 (40)	.97	.95	.06 [.05, .07]	.04	24 100	Yes	
M5a (2 factors)	S1	320.10 (53)	.88	.83	.10 [.09, .11]	.06	20 949	Yes	
	S2	252.95 (53)	.89	.84	.09 [.08, .10]	.06	24 406	No	c
	S3	313.12 (53)	.88	.83	.09 [.08, .10]	.06	26 828	Yes	
	S4	447.22 (51)	.85	.78	.12 [.11, .13]	.07	23 281	Yes	
	S5	397.58 (51)	.87	.80	.11 [.10, .12]	.07	24 390	Yes	
M4b (Final model [M4a] with amotivation)	S1	127.31 (61)	.97	.94	.05 [.04, .06]	.02	23 247	Yes	
	S2	162.18 (62)	.96	.91	.06 [.05, .07]	.03	28 463	Yes	
	S3	169.05 (62)	.95	.90	.05 [.04, .06]	.03	29 450	Yes	

df = degrees of freedom. CFI = Comparative Fit Index. TLI = Tuckey-Lewis Index. RMSEA = Root Mean Square Error of Approximation. CI = Confidence Interval. SRMR= Standardized Root Mean Square Residual. BIC = Bayesian Information Criterion. Problems a = negative residual variance/does not converge. b = significant cross-loadings between intrinsic motivation and identified regulation. c = INTRO3 loads on autonomous motivation. d = significant cross-loadings between external-material and external-social regulation.

5-factor structure (M1a) was rejected, given a negative residual variance, indicating model misspecification (Brown, 2015). The first 4-factor structure (M2a; the two types of external regulation combined) revealed a strong overlap (i.e., significant cross-loadings) between identified regulation and intrinsic motivation in samples 2 and 3, whereas it was rejected due to negative residual variances in samples 1, 4 and 5. The second 4-factor structure (M3a) was also rejected, given a negative residual variance in samples 1, 4 and 5, and no simple structure in sample 2. The 2-factor (M5a) structure had an unsatisfactory fit in all samples, although a simple structure was obtained in samples 1, 3, 4 and 5. The 3-factor structure (M4a) provided a good fit to the data and satisfied the simple structure criterion in all samples (i.e., items loaded significantly only on their specific factor, and the model had the lowest number of factors). As a result of our analyses, the 3-factor structure (M4a) was retained as the best structural solution. Not only did all samples share similar problems with the other structures, the M4a was replicated successfully in all five samples. This choice was further justified by the fact that it had a better Bayesian Information Criterion than the other factor structures in all samples, suggesting a better balance between complexity

Table 3. Standardized factor loadings of the final ESEM solution (M4a).

	Autonomous motivation					Introjected regulation					External regulation				
	S1	S2	S3	S4	S5	S1	S2	S3	S4	S5	S1	S2	S3	S4	S5
IM1	**.85***	**.92***	**.83***	**.92***	**.93***	−.02	−.10	−.02	−.07*	−.04	.03	−.01	−.01	.01	−.01
IM2	**.92***	**.87***	**.85***	**.90***	**.91***	−.06*	−.07	−.04	−.08*	−.10*	.04	.04	.05	.04	.03
IM3	**.87***	**.86***	**.84***	**.91***	**.89***	−.01	−.03	−.03	−.02	−.03	−.07*	−.06*	−.03	>0	−.01
ID1	**.77***	**.72***	**.72***	**.57***	**.48***	.04	.03	.02	.27*	.34*	−.03	.01	−.05	−.09*	−.05
ID3	**.58***	**.57***	**.49***	**.75***	**.68***	.16*	.27*	.22*	.12*	.11*	−.01	.01	.03	−.01	.03
INTRO3	.16*	.15*	.06*	.09*	.09*	**.53***	**.58***	**.60***	**.77***	**.81***	.15	.02	.13*	.03	.06
INTRO4	−.05*	−.05	.01	.02	.04	**1.01***	**.69***	**.85***	**.85***	**.78***	−.05	.08	−.04	.07*	.07*
EXS1	.06*	.16*	.03	.06	.02	−.03	.08	.01	−.03	−.04	**.71***	**.58***	**.62***	**.82***	**.85***
EXS2	−.13*	−.08*	−.11*	−.23*	−.23*	.14*	.08	.02	.20*	.13*	**.71***	**.76***	**.73***	**.60***	**.67***
EXS3	−.01	.04	.02	.23	.16*	.05	.24*	.11*	.02	.12*	**.77***	**.65***	**.69***	**.68***	**.64***
EXM1	−.01	−.17*	−.12*	−.25*	−.21*	−.05	−.01	.10	.10*	.09	**.64***	**.53***	**.36***	**.37***	**.34***
EXM2	−.05	−.01	.04	−.04	.07	<0	−.28*	−.16	−.16*	−.13*	**.22***	**.49***	**.34***	**.46***	**.40***
EXM3	−.08	.05	.18*	.07	.14*	−.11	−.20*	−.17*	−.07	−.18*	**.55***	**.61***	**.39***	**.54***	**.51***

IM = Intrinsic motivation. ID = Identified regulation. INTRO = Introjected regulation. EXS = External regulation-social. EXM = External regulation-material.
* $p < .05$.

and goodness of fit. The factor loadings of this 3-factor structure are presented in Table 3. Results show that identified regulation and intrinsic motivation items load on the same factor, suggesting that these two types of behavioural regulation are best represented as a single construct (i.e., autonomous motivation). Results also reveal that the two types of external regulation (social and material) are best represented by a single factor.

Measurement invariance

Measurement invariance (Widaman & Reise, 1997) of the 3-factor solution across language (French [samples 1, 2 and 3] and English [samples 4 and 5]) was subsequently assessed using MLR estimation and goemin oblique rotation (Asparouhov & Muthén, 2009). Specifically, measurement invariance was investigated in the following order (see Muthén & Muthén, 1998-2017; Widaman et al., 2010): *configural invariance* (same pattern of factor loadings; factor loadings, intercepts and residual variances are all free across groups); *weak invariance* (invariant factor loadings, which are constrained to be equal across groups, while intercepts and residual variances are free); *strong invariance* (invariant factor loadings and intercepts, which are constrained to be equal across groups, while residual variances are free); *factor variance-covariance invariance* (or *strict invariance*: invariant loadings, intercepts, and residual variances, which are constrained to be equal across groups); and *mean invariance* (invariant factor means across groups). Results show (see Table 4) that while configural invariance and (full) weak invariance could be established, (full) strong invariance provided a poor fit. As such, equality constraints on the model were relaxed and partial invariance was investigated (Muthén & Muthén, 1998-2017). Partial strong invariance was reached by relaxing the equality constraint on ID1 (samples 1, 2 and 3), ID3 (sample 2), INTRO3 (all samples), INTRO4 (samples 1, 2 and 3), EXS2 (sample 1) and EXS3 (sample 2). On these grounds, partial factor variance-covariance invariance could also be reached, although partial strong invariance arguably provides a better fit to the data, with a more parsimonious model, as indicated by a lower BIC score (see Table 4). Overall, results provide strong support for the invariance of measurement across samples and languages (French and English versions of the MWMS), showing that the model is replicable and can be generalized across samples and languages. Specifically, we not only obtained the

Table 4. Measurement Invariance of the final ESEM solution (M4a) of the MWMS across samples and languages.

							Comparison of invariance models				
	χ^2 (*df*)	CFI	TLI	RMSEA [90% CI]	SRMR	BIC		$\Delta\chi^2$ (Δ *df*)	Δ CFI	Δ TLI	Δ RMSEA
Configural invariance (M6)	667.27 (206)	.96	.95	.07 [.06, .07]	.03	119 437	M7 vs M6	516.24* (120)	.03	.04	.00
Weak invariance (M7)	1 186.31 (326)	.93	.91	.07 [.07, .07]	.08	119 105	M8a vs M7	170.33* (27)	.02	.00	.00
Strong invariance (M8)	2 278.33 (366)	.84	.83	.10 [.10, .10]	.10	120 025					
Strong partial invariance (M8a)	1 356.78 (353)	.91	.91	.07 [.07, .08]	.08	119 078	M9a vs M8a	213.1* (24)	.01	.01	.01
Factor variance-covariance invariance (M9)	2 504.31 (390)	.82	.82	.10 [.10, .10]	.17	120 111					
Factor partial variance-covariance invariance (M9a)	1 562.21 (377)	.90	.90	.08 [.07, .08]	.16	119 118					
Mean invariance (M10)	4 904.12 (402)	.61	.62	.15 [.14, .15]	.35	122 767					
Mean partial invariance (M10a)	4204.70 (389)	.67	.67	.14 [.13, .14]	.34	122 070					

df = degrees of freedom. CFI = Comparative Fit Index. TLI = Tuckey-Lewis Index. RMSEA = Root Mean Square Error of Approximation. CI = Confidence Interval. SRMR= Standardized Root Mean Square Residual. BIC = Bayesian Information Criterion.
* $p \leq .01$.

Table 5. Standardized factor loadings of the final ESEM solution with amotivation (M4b) for samples 1–3.

	Autonomous motivation			Introjected regulation			External regulation			Amotivation		
	S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S2	S3
IM1	**.87***	**.89***	**.82***	−.01	−.09*	−.02	.02	.01	<0	.07*	−.08*	−.03
IM2	**.91***	**.87***	**.84***	−.05*	−.06	−.03	.05	.04	.05	−.02	−.03	−.03
IM3	**.85***	**.86***	**.83***	−.01	−.03	−.04	−.06*	−.07*	−.02	−.04	−.01	−.04
ID1	**.76***	**.71***	**.73***	.04	.05	.02	−.02	<0	−.05	−.03	−.01	>0
ID3	**.56***	**.63***	**.51***	.16*	.27*	.22*	<0	−.02	.03	−.04	.11*	.03
INTRO3	.14*	.12*	.05	**.52***	**.60***	**.62***	.18*	.06	.13*	−.08	−.12*	−.04
INTRO4	−.02	.02	.03	**1.02***	**.65***	**.82***	−.06	.07	−.03	.05*	.12*	.05
EXS1	.04	.14*	.01	−.04	.09	.02	**.72***	**.59***	**.62***	−.07	−.05	−.07*
EXS2	−.12*	−.12*	−.13*	.13*	.09	.03	**.72***	**.79***	**.73***	.02	−.09*	−.05
EXS3	−.02	.05	.04	.05	.22*	.12*	**.79***	**.66***	**.68***	−.05	.01	.02
EXM1	<0	−.16*	−.01	−.06	<0	.09	**.64***	**.52***	**.36***	.05	.04	.08
EXM2	.03	>0	.07	.04	−.28*	−.18*	**.12***	**.46***	**.36***	.26*	.05	.08
EXM3	.11*	.08	.21*	−.10	−.20*	−.18*	**.51***	**.57***	**.40***	.08	.11*	.06
AMO1	−.13	−.08	−.18*	−.03	.03	−.04	.07	−.01	.11*	**.51***	**.66***	**.41***
AMO2	−.18*	−.11*	−.08	.13*	.09*	.05	.04	.01	−.02	**.36***	**.72***	**.73***
AMO3	.11*	.13*	.11*	−.03	−.09*	−.01	−.02	.04	−.02	**.87***	**.81***	**.90***

IM = Intrinsic motivation. ID = Identified regulation. INTRO = Introjected regulation. EXS = External regulation-social. EXM = External regulation-material. AMO = Amotivation.
* $p < .05$.

same pattern of factor loadings (i.e., items load on the same factors across samples), but also comparable loadings and intercepts across samples and languages.

Supplementary analyses

Given that the MWMS also includes indicators capturing amotivation, subsequent analyses were conducted in samples 1, 2 and 3 (for which data pertaining to amotivation was available) to integrate amotivation in the revised factor structure. More specifically, a subsequent model was tested, comprised of the final factor structure (M4a) with the inclusion of the three items of amotivation. The model (M4b) fit the data well in all three samples (see Table 2). Table 5 presents the factor loadings. Results show that including amotivation does not alter the structure of the final retained model (M4a) and that the three amotivation items load adequately on the same and only factor. The inter-correlations of the final structure for all five samples (M4b for samples 1, 2 and 3; M4a for samples 4 and 5) are presented in Table 6.

Investigating the outcomes of the behavioral regulation types

Relations between the motivational constructs and various indicators of employee functioning were examined. Specifically, in each sample a structural equation model in which the final factor solution (external and introjected regulation, autonomous motivation and amotivation [samples 1–3 only]) predicted all outcomes was tested[4]. Results show that autonomous motivation negatively predicted turnover intention (samples 1–5) as well as emotional exhaustion (samples 1–3), whereas it positively predicted vigor/vitality (samples 1–4) and performance (samples 1–3). Turnover intention was positively predicted by external regulation in sample 1 and was positively predicted by introjected regulation in samples 2, 3 and 5 (as well as amotivation in sample 2). External regulation positively predicted emotional exhaustion (sample 3), and negatively predicted satisfaction (sample 2), vigor/vitality (samples 2 and 3) and performance (sample 3). Introjected regulation positively predicted emotional exhaustion (samples 1–3) and performance (sample 3), as well as negatively predicted vigor/vitality (samples 1 and 4; see Table 7).

Discussion

Theoretical and methodological contributions

The factor structure of the MWMS

By investigating and cross-validating the factor structure of one of the most widely used instruments for measuring work motivation as conceptualized by SDT, the present study contributes to the self-determination literature by offering researchers using the MWMS insight into (i) the indicators (i.e., items) that best represent the different types of behavioural regulation at work and (ii) the interplay between these types of regulation, as well as how to regroup them, in order to best capture work motivation. Our results suggest that work motivation, as conceptualized by SDT and measured by the MWMS, is best represented by a 4-factor solution, reflecting autonomous motivation (intrinsic motivation and identified regulation combined), external regulation, (avoidance) introjected regulation, as well as amotivation.

In order to overcome limitations of past scales, which assessed introjected regulation solely through avoidance-oriented behaviours (e.g., averting feelings of guilt and shame), the MWMS was designed to assess introjected regulation through both avoidance-oriented behaviour (2 items) and approach-oriented behaviour (2 items). However, our results reveal that this theoretical distinction is not adequately reflected in the factor structure of the MWMS when taking into account cross-loadings through ESEM. More specifically, both approach items were removed due to problematic loadings on other factors. On the one hand, "*Because it makes me feel proud of myself*" loaded on the autonomous motivation factor, as it has in previous research (Howard et al., 2018). From a theoretical standpoint, these results suggest that feelings of pride might not inevitably reflect adopting a behaviour

Table 6. Correlations between the types of behavioural regulation (final ESEM solution).

	Autonomous motivation	Introjected regulation	External regulation
Sample 1			
1- Autonomous motivation	–		
2- Introjected regulation	.10*	–	
3- External regulation	−.04	.43**	–
4- Amotivation	−.35**	−.01	.21**
Sample 2			
1- Autonomous motivation	–		
2- Introjected regulation	.21**	–	
3- External regulation	−.15**	.24**	–
4- Amotivation	−.38**	.01	.35**
Sample 3			
1- Autonomous motivation	–		
2- Introjected regulation	−.01	–	
3- External regulation	−.12*	.40**	–
4- Amotivation	−.35**	.06	.13*
Sample 4			
1- Autonomous motivation	–		
2- Introjected regulation	.10	–	
3- External regulation	−.04	.33**	–
4- Amotivation	–	–	–
Sample 5			
1- Autonomous motivation	–		
2- Introjected regulation	.16**	–	
3- External regulation	.08	.37**	–
4- Amotivation	–	–	–

Samples 1-3: M4b and samples 4-5: M4a.
** $p < .01$; * $p < .05$.

without accepting it as one's own and being controlled by contingent self-esteem and ego-involvement (Deci & Ryan, 2008; Ryan & Deci, 2000). Indeed, in some cases, feelings of pride could echo more positive, self-integrated motivational forces, reflecting, for example, a sense of accomplishment associated with conducting highly-valued work. For example, a nurse could experience a sense of pride regarding their work because they believe that this work is meaningful and significantly contributes to society (autonomous forms of motivation). This echoes past findings from the social and behavioural psychology literature (Tracy & Robins, 2007) showing that pride can manifest itself more or less adaptively depending on its nature: authentic pride (i.e., achievement-oriented conceptualization where the emotion originates from one's efforts and achievements) versus hubristic pride (i.e., a self-aggrandizing facet of pride where the emotion originates from a self-evaluative process). Future SDT-based research is encouraged to investigate in greater detail the underlying sources of employees' sense of pride by integrating these two components of pride into the MWMS to delimit when it derives from internal pressuring and controlling forces (reflecting a self-enhancement motive, aligning with hubristic pride) and when it is more self-determined and reflects the gratification of carrying out actions coherent with one's values and aspirations (autonomous types of motivation, aligning with authentic pride).

On the other hand, the item "*Because I have to prove to myself that I can*" of the MWMS appears to tap into less positive motives, as it loaded on the (social) external regulation factor, as it has in previous research (Howard et al., 2018). It appears that conducting one's work for self-validation is closely intertwined with the importance accorded to others' evaluation and is thus less integrated to the self than other manifestations of introjection, as this motivational force is highly dependent on contextual elements (i.e., social rewards and approval). This echoes pioneering SDT research (Ryan & Connell, 1989), which initially conceptualized introjected regulation as esteem-based pressures to act, based on concerns regarding both self-perceptions (e.g., "*because I will feel bad about myself*") and approval from others (e.g., "*because I want people to like me*") and further aligns with more recent work in the education domain that integrates the notion of social appreciation in the conceptualization of approach-introjected regulation (Assor et al., 2009). Future research is encouraged to investigate more closely the conceptual (nature) and methodological (measurement) similarities and divergences between social-external regulation and introjection, and more specifically its approach component, to determine if social-external regulation is more representative of a dimension of introjection.

Overall, aligning with past research conducted outside the work domain (Assor et al., 2009), our findings hint at the fact that ego-protecting (avoidance-oriented behaviour aimed at averting adverse feelings such as anxiety, shame or guilt) and ego-enhancing (approach-oriented behaviour aimed at building one's feeling of self-worth) motives do not have the same motivational nature. Furthermore, our results indicate that introjected regulation, as assessed with the MWMS in its current form, is best represented through its avoidance component, reflecting motives that aim to avoid tarnishing one's self-image, as its items were successfully distinguished from external regulation and autonomous motivation. These findings suggest that the MWMS items reflecting the approach component of introjection (striving to feel pride and a strong sense of self-worth) tap into more diverse motives that are integrated to the self to varying degrees. Future research is encouraged to shed light on these questions by exploring the item content of the MWMS introjected subscale in greater depth to assess whether other items could more successfully distinguish the approach component of introjection from other types of regulation.

Furthermore, results show that the two dimensions of autonomous motivation (intrinsic motivation and identified regulation), as assessed by the MWMS, were not distinguishable from a factor structure standpoint in the samples included in this study. Indeed, all three items of intrinsic motivation and the two remaining identified regulation items significantly loaded on the same factor. These results suggest that both subscales tap into the same psychological experience: conducting one's work out of pleasure, interest and authentic preference (Vansteenkiste & Ryan, 2013). This

Table 7. The outcomes of the types of behavioural regulation.

	Turnover intention					Satisfaction		Emotional Exhaustion			Vigor/Vitality				Performance		
	β (*S.E.*)					β (*S.E.*)		β (*S.E.*)			β (*S.E.*)				β (*S.E.*)		
	S1	S2	S3	S4	S5	S1	S2	S1	S2	S3	S1	S2	S3	S4	S1	S2	S3
Autonomous motivation	**−.24*** (.07)	**−.31*** (.06)	**−.27*** (.06)	**−.53*** (.04)	**−.54*** (.04)	**.50*** (.05)	**.74*** (.04)	**−.38*** (.05)	**−.33*** (.06)	**−.29*** (.05)	**.74*** (.04)	**.48*** (.05)	**.53*** (.05)	**.65*** (.03)	**.26*** (.07)	**.22*** (.07)	**.26*** (.05)
Introjected regulation	.07 (.07)	**.14*** (.06)	**.12*** (.06)	.04 (.05)	**.22*** (.05)	−.06 (.06)	−.01 (.06)	**.22*** (.09)	**.32*** (.07)	**.15*** (.06)	**−.12*** (.06)	.14 (.07)	.06 (.05)	**−.10*** (.05)	−.02 (.07)	.06 (.06)	**.19*** (.06)
External regulation	**.18*** (.08)	.03 (.06)	>0 (.06)	−.06 (.06)	−.02 (.05)	−.10 (.06)	**−.11*** (.05)	.15 (.08)	−.04 (.07)	**.13*** (.06)	−.04 (.06)	**−.27*** (.06)	**−.16*** (.05)	.01 (.05)	.02 (.07)	>0 (.06)	**−.23*** (.06)
Amotivation	.26 (.14)	**.26*** (.08)	.13 (.08)	–	–	.01 (.07)	−.06 (.06)	−.04 (.08)	.10 (.08)	.04 (.07)	−.03 (.07)	−.04 (.07)	.01 (.05)	–	−.14 (.09)	−.11 (.07)	−.11 (.08)

β = Standardized coefficient. *S.E.* = Standard error. Satisfaction: sample 1 = life satisfaction, sample 2 = job satisfaction.
Note: * $p \leq .05$.

may explain the strong correlations between intrinsic motivation and identified regulation in the MWMS validation study (median: .65) as well as in Van den Broeck et al.'s (2021) recent meta-analysis, comprised of 124 samples in which work motivation was assessed using various scales (ρ = .77; SE =.02; 95% [0.73; 0.81]). Similar results have also been obtained in Howard et al.'s (2017) meta-analysis, which focused on motivation as conceptualized by SDT in different life domains using data from 486 samples: the correlation between intrinsic motivation and identified regulation was .85 across life domains and utilized scales. Specifically related to the work domain, Howard et al. (2017) reported a .82 correlation between intrinsic motivation and identified regulation (.76 for data related to the MWMS only). Our results illustrate that the added value of investigating the two dimensions of autonomous motivation distinctly using the MWMS is less salient, in contrast to the controlled types of regulation. From a methodological standpoint, based on our results, assessing autonomous motivation globally (by merging its two underlying dimensions) would provide a more parsimonious representation of employees' most self-determined work motives when using the MWMS. However, this approach does not take into account the notions of meaning and enjoyment that are specifically inherent to identified regulation and intrinsic motivation respectively, as conceptualized by SDT. Furthermore, research shows that these two types of regulation are differentially linked to certain indicators of individual functioning (Howard, Gagné, Van den Broeck, et al., 2020; Van den Broeck et al., 2021). For example, Van den Broeck et al.'s (2021) meta-analysis shows that while identified regulation and intrinsic motivation were similarly associated with several outcomes (confidence intervals [CIs] of meta-analytic correlations overlapped for 8 out of 13 outcomes compared), both types of regulation played a unique role in accounting for the investigated outcomes, with intrinsic motivation being overall more strongly associated with emotional and attitudinal (e.g., burnout, engagement, job satisfaction) indicators of employee health and functioning than identified regulation. As such, more research is needed on how to best operationalize autonomous motivation and its underlying dimensions, while allowing proper assessment of their relation to employee health and functioning. Future research is also encouraged to examine whether the considerable overlap found between the two dimensions of autonomous motivation found in the present study as well as past research (as demonstrated by the strong correlations reported between its two dimensions) is primarily methodological, that is, how these concepts are measured in the MWMS (and other motivation scales). If so, the next step would be to revise the content of the MWMS and propose items that more clearly tap into the distinct aspects of both identified regulation (understanding of, and identification with, the value and meaning of the work conducted) and intrinsic motivation (sense of enjoyment and pleasure derived from conducting one's work). Future research should further consider the specificity level for these particular types of regulation, as they are likely to operate selectively across different context-specific tasks (Fernet et al., 2008; Fernet et al., 2017).

Lastly, the results of this study show that the two external regulation subtypes (social and material) of the MWMS do not represent distinct forms of contingencies and are best represented as a single factor. Indeed, it appears that employees' representation of relational as well as tangible contingencies that can drive them at work taps into the same source of pressure. These results differ from the conceptual proposition and empirical findings obtained in the MWMS validation study as well as Howard et al.'s (2018) study, which suggested that the two external regulation subtypes reflect distinct external motives and act as separate indicators of external regulation. Our results nevertheless align with past research that has typically measured external regulation globally by merging the two subscales (e.g., Sullivan et al., 2014; Trépanier, Forest, et al., 2015). Our findings are also consistent with Van den Broeck et al.'s (2021) meta-analysis, which highlighted that both types of external regulation are indistinguishably related to employee well-being (burnout, engagement, performance, and organizational citizenship behaviour), with the exception of turnover intention (material-external regulation was related more strongly to turnover intention than social-external regulation). In addition, it is important to note that in all five samples included in the present study, the internal consistency of the material-external regulation subscale was below .70 (ranging from .48 to .67), whereas the internal consistency of external regulation (both material and social) ranged from .70 to .81 (median: .75), further highlighting the relevance of investigating the two subtypes conjointly, as they reflect indistinguishable externalized regulations towards the accomplishment of one's job.

Criterion validity of the MWMS

The present study offers a new understanding of the distinct relations between regulation types (and motivational forms), as assessed with the MWMS, and employee outcomes. Overall, results show that autonomous motivation has a generalized positive effect on employee functioning, as it positively predicted vigor/vitality, satisfaction and performance as well as negatively predicted turnover intention and emotional exhaustion. These results align with past research (e.g., Fernet et al., 2012; Gillet et al., 2016; Kuvaas et al., 2016; Trépanier, Forest, et al., 2015) and recent meta-analytical findings (Van den Broeck et al., 2021) that have identified autonomous motivation (and its underlying indicators) as a key ingredient to foster optimal emotional (e.g., engagement, less burnout and psychological distress), attitudinal (e.g., job satisfaction, occupational and organizational commitment, less turnover intention), and behavioural (e.g., work effort, proactivity, performance, and organizational citizenship behaviour) functioning.

Regarding controlled types of regulation, although introjected regulation has been linked to negative indicators of employee health (e.g., distress and burnout; Van den Broeck et al., 2021), it nevertheless appears to have a more favourable impact than external regulation, as it has also been positively linked in past research to certain indicators of employee well-being, and positive job attitudes and behaviours, including

engagement, job satisfaction and performance (see Van den Broeck et al., 2021 for a meta-analytical review). For example, Howard, Gagné, Van den Broeck, et al. (2020) found that introjected regulation was notably positively linked to performance and intention to stay in the organization. Furthermore, using a latent profile approach, Gillet et al. (2018) found that employees with high levels of autonomous motivation and introjected regulation but low external regulation did not significantly differ from employees with high levels of autonomous motivation and low controlled motivation (introjected and external regulation) in terms of work engagement, burnout, job satisfaction, quality of work life and job anxiety, suggesting that introjected regulation does not have a negative influence on employee functioning. Our results paint a different and nuanced picture of the outcomes of introjected regulation, and more specifically its avoidance dimension. Indeed, although this type of behavioural regulation was found to be positively related to job performance in sample 3 (contrary to external regulation, which negatively predicted performance in sample 3), it had a generalized negative effect on emotional indicators of employee health: it positively predicted emotional exhaustion in all samples and negatively predicted vitality/vigour in two samples. It was also positively related to turnover intention in three samples. These findings suggest that the self-derived pressure to avoid negative feelings (e.g., sense of guilt, anxiety) associated with avoidance introjected regulation can fuel task proficiency, as employees feel obligated to invest in their work to avoid feeling unworthy. However, the results suggest that this internal pressure can come at a price, as it is psychologically taxing and undermines employees' emotional, cognitive and physical resources (Trépanier, Forest, et al., 2015; Trépanier et al., 2020), leading to impaired health and functioning (emotional exhaustion, turnover intention, reduced vigour/vitality). The inconsistency between results from past research and the present study pertaining to the effects of introjected regulation could notably be explained by differences in its operationalization. Indeed, past research (e.g., Gillet et al., 2018; Gillet et al., 2020; Parker et al., 2017) has investigated introjected regulation through both avoidance behaviours (avoiding emotions that threaten one's self-esteem) and those that are approach-oriented (seeking emotions that boost one's self-esteem). In contrast, the present study solely investigated the avoidance component, since results from ESEM show that the MWMS, in its current form, best captures this form of introjection. Combining both avoidance- and approach-orientated behaviours could provide a biased representation of the effects of introjected regulation, as some evidence suggests that both components are distinguishable and that avoidance-oriented introjected regulation is more detrimental to well-being and functioning than its approach counterpart (Assor et al., 2009; Van den Broeck et al., 2021). For example, results from Van den Broeck et al.'s (2021) meta-analysis showed that introjected regulation was more strongly related to burnout (but not distress) when the subscale used to assess introjected regulation only took into account its avoidance component (compared to scales that assessed both components of introjection).

Overall, in line with recent work (e.g., Howard et al., 2017; Howard, Gagné, Van den Broeck, et al., 2020), our results show that controlled types of regulation appear to be distinct manifestations, best conceptualized as separate factors. Indeed, not only did the factor solution in which external and introjected regulation were assessed individually yield a better fit to the data than the factor solution in which both forms of regulation were integrated in a global factor, external and (avoidance) introjected regulation showed a different pattern of relations with indicators of employee health and functioning. As such, although past research (e.g., Fernet et al., 2012; Fernet et al., 2017; Gillet et al., 2016; Güntert, 2015; Trépanier, Forest, et al., 2015) has commonly assessed work motivation using composite scores reflecting autonomous and controlled motivation, future SDT-based research is encouraged to revisit how work motivation is assessed using the MWMS in its current form and adopt a hybrid approach. The use of a composite score for autonomous motivation is recommended, given that our results show that intrinsic motivation and identified regulation are indistinguishable from a factor structure standpoint, and distinct factors are appropriate for the two types of controlled regulation.

Limitations and directions for future research

Although the results of the present multi-sample study shed new light on the content and factor structure of the MWMS and offer insight into how to better capture work motivation outcomes, the study nevertheless has limitations that need to be addressed. First, the criterion validity of the MWMS was evaluated using a limited number of outcomes and all data was self-reported. Future studies are encouraged to simultaneously assess antecedents (e.g., job autonomy, social support, role ambiguity and conflict) as well as other outcomes (e.g., commitment, counterproductive behaviours) using multiple data sources (e.g., peer perceptions of job demands and resources, actual turnover, performance evaluated by peers or supervisors) to validate and widen the scope of the findings. Second, the present study examined the French and English versions of the MWMS only, and the five samples included were all North American. However, results from the validation study showed that the factor structure of the MWMS is equivalent across seven languages and nine different countries and recent findings suggest that culture does not alter the relations between the types of behavioural regulation and employee outcomes (Van den Broeck et al., 2021). Nevertheless, future research should attempt to replicate our findings using different versions of the MWMS in samples from different countries and cultures in order to strengthen the generalizability of the revised content and structure of the MWMS, as proposed in the present study.

Third, all data reported in the present study was cross-sectional. Despite past longitudinal research supporting the associations observed in this study (e.g., Fernet et al., 2012), we cannot exclude the possibility of reciprocal or reverse relations (e.g., Dagenais-Desmarais et al., 2018). Future research using multiple time points could thus validate the temporal stability of the proposed MWMS factor structure as well as assess how the relation between the motivational dimensions and employee outcomes unfolds over time. Given that research (see Van den Broeck et al., 2021 for a meta-analytical review)

shows that introjected regulation can have mixed effects on employee health and functioning, some positive (e.g., commitment, performance, engagement, job satisfaction) and some negative (e.g., burnout, psychological distress), particular attention could be put on the temporal effects of this specific type of regulation. Doing so could shed light on the durability of potential beneficial effects of introjection on specific outcomes (e.g., performance). Indeed, employees with controlled motives may engage in compensatory behaviours (e.g., overinvesting in one's job to protect one's sense of self-worth; Trépanier et al., 2020), which may lead to initial positive gains (e.g., greater performance or proactivity). However, over time, such actions can lead to energy depletion (Gagné, 2014; Vansteenkiste & Ryan, 2013) and important psychological costs (e.g., burnout; Fernet et al., 2012), which can ultimately undermine job performance (Bakker & Demerouti, 2017).

Conclusion

The objective of this multi-sample study was to revisit, cross-validate and replicate the content, factor structure and criterion validity of the MWMS using ESEM. Overall, results illustrate that the two most self-determined motivation types (i.e., identified regulation and intrinsic motivation), as assessed by the MWMS, are highly intertwined and best conceptualized as one encompassing concept of autonomous motivation. Furthermore, the MWMS appears to best capture the avoidance component of introjected regulation, whereas external regulation manifests itself through two indistinguishable types of contingencies: material and social. Results also highlight the relevance of distinctly assessing the two controlled regulation types (introjected and external), as it provides a more adequate operationalization of these constructs and offers a more precise understanding of their outcomes. Overall, this study provides valuable insight for future SDT-based research into how to best operationalize the different types of behavioural regulation at work using the MWMS. This study also paves the way for research aimed at improving the item content of the MWMS in order to optimally capture the complex nature of the different types of regulation, as conceptualized by self-determination theory.

Notes

1. Self-determination theory proposes a fourth type of extrinsic motivation: integrated regulation. This type of regulation involves engaging in an activity because it is an integral part of one's sense of self. It reflects a more fully internalized regulation than identified regulation. However, as past research shows that integrated regulation is difficult to distinguish empirically from identified regulation as well as intrinsic motivation and that integrated regulation does not predict employee functioning over and above identified regulation and intrinsic motivation, the MWMS does not include a subscale assessing integrated regulation.
2. Ethical approval was obtained from the Ethic's committee of the institution to which the authors were affiliated to at the time of the data collections [Samples 1-3: Université du Québec à Trois-Rivières; Samples 4-5: University of Western Australia].
3. Amotivation (e.g., '*I do little because I don't think this work is worth putting efforts into*'; 3 items; $\alpha_{sample\ 1}$= .61, $\alpha_{sample\ 2}$= .79, $\alpha_{sample\ 3}$ =.69) was only assessed in samples 1–3. It was thus excluded from the main analyses in order to allow proper assessment of the replicability of the factor structure as well as measurement invariance across all samples. Subsequent analyses nevertheless integrate amotivation for samples 1–3.
4. S1 (χ^2 = 790.95 (*424*); CFI =.95; TLI =.94; RMSEA =.04 [90% CI; .04, .05]; SRMR =.04); S2 (χ^2 = 963.56 (*456*); CFI =.94; TLI =.92; RMSEA =.05 [90% CI; .04, .05]; SRMR =.05); S3 (χ^2 = 661.90 (*314*); CFI =.94; TLI =.93; RMSEA =.04 [90% CI; .04, .05]; SRMR =.04); S4 (χ^2 = 345.84 (157); CFI =.97; TLI =.96; RMSEA =.03 [90% CI; .03, .04]; SRMR =.04); S5 (χ^2 = 694.67 (*243*); CFI =.94; TLI =.93; RMSEA =.04 [90% CI; .04, .05]; SRMR =.05).

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Appendix. The Multidimensional Work Motivation Scale (MWMS)

Intrinsic motivation	IM1	Because the work I do is interesting.
	IM2	Because what I do in my work is exciting.
	IM3	Because I have fun doing my job.
Identified regulation	ID1	Because putting efforts in this job aligns with my personal values.
	ID2*	Because I personally consider it important to put efforts in this job.
	ID3	Because putting efforts in this job has personal significance to me.
Introjected regulation	INTRO1*	Because I have to prove to myself that I can.
	INTRO2*	Because it makes me feel proud of myself.
	INTRO3	Because otherwise I will feel bad about myself.
	INTRO4	Because otherwise I will feel ashamed of myself.
Extrinsic	EXS1	To get others' approval (e.g., supervisor, colleagues, family, clients . . .).
regulation – social	EXS2	To avoid being criticized by others (e.g., supervisor, colleagues, family, clients . . .).
	EXS3	Because others will respect me more (e.g., supervisor, colleagues, family, clients . . .).
Extrinsic	EXM1	Because I risk losing my job if I don't put enough effort in it.
regulation – material	EXM2	Because others will reward me financially only if I put enough effort in my job (e.g., employer, supervisor . . .).
	EXM3	Because others offer me greater job security if I put enough effort in my job (e.g., employer, supervisor . . .).
Amotivation	AMO1	I don't, because I really feel that I'm wasting my time at work.
	AMO2	I don't know why I'm doing this job, it's pointless work.
	AMO3	I do little because I don't think this work is worth putting efforts into.

*Removed items.