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# Examining the Structure and Outcomes of Work Motivation Profiles: A Mindset-Based Approach

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**Abstract**

Self-determination theory (SDT) distinguishes between both quality and quantity of motivation. Motivation within SDT has been treated both as a unidimensional (autonomy continuum) and multidimensional (motivation types) construct. Recently, Meyer et al. (2022) suggested that drawing a distinction between reasons for exerting effort and the mindset experienced while exerting effort may help reconcile the two approaches. Using profile analyses, Meyer and colleagues demonstrated that reasons for engaging in an activity combine in ways that are not unambiguously interpretable from an SDT standpoint. In the present study (N = 500), we replicate the results of Meyer et al. using reason-based motivation measures, as well as develop and test a mindset-based measure of SDT motivation types. We find that autonomous profiles of both measures are associated with superior outcomes. We also find additional theoretical value by including separate approach/avoidance motivation mindset scales. Study implications and limitations are discussed.

*Keywords:* Self-determination theory, profile analysis, motivation.

## Summary for Lay Audience

Human motivation is a complex research area that has been examined from a variety of theoretical perspectives. Self-determination theory (SDT) has been conceptualized for decades, and has recently gained additional traction as a work motivation theory. One of the reasons for the popularity of SDT is its broad scope, helping us explain how human beings thrive in various life domains. As the name suggests, self-determination is a central concept to the theory, referring to one's ability to make their own choices and set their own direction without the influence of external coercive forces. As such, SDT separates motivation into distinct types differing in degree of self-determination or autonomy. Evidence suggests that motivational states characterized by greater autonomy are generally associated with better organizational and well-being outcomes than when one's motivation is driven by external influences.

In recent years, statistical techniques have evolved to allow researchers to examine how psychological variables combine within individuals to form profiles. As such, these techniques also allow us to see how motivation types can combine within individuals. Past research has demonstrated that using the most common measures of workplace motivation, internal and external forms of motivation combine in unexpected and interesting ways, such as combinations of extrinsic and intrinsic motivation without the hypothesized undesirable influence of the former. This may be a result of asking people why they work as opposed to how they feel when they work. In this study, we develop a measure of motivational mindsets that might assess motivational states more accurately. Results both replicate past findings and suggest that the new measure might be a useful tool that makes finer-grained distinctions in how people feel when exerting effort. Results also reinforce some core assertions of SDT, namely that autonomous (self-determined) motivation is superior to externally controlled forms.

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## Table of Contents

## List of Tables

## List of Figures

## List of Appendices

## Introduction

Unlike motivation theories which primarily focus on strength of experienced motivation, self-determination theory (SDT) makes the distinction between both quality and quantity of motivation (e.g., Ryan & Deci, 2017). The dimension of motivation quality varies along an autonomy continuum, with different motivational types reflecting varying levels of self-determination (Howard et al., 2017). One end of this continuum is anchored by the absence of motivation, while on the other end the intrinsic enjoyment of the task itself regulates the motivational experience. Various forms of extrinsic motivations reside between these two endpoints in an order that reflects increasing self-determination. These types of motivation are thought to reflect a simplex-like structure, where scores on adjacent regulations correlate more strongly than those further apart on the continuum. As such, one might have varying scores on internal and external types.

There is a debate in the SDT literature about two conflicting operationalization and analysis methods. The set of sequentially ordered constructs characterized by an underlying continuum within SDT lends itself to two primary measurement approaches. The first approach treats motivation as a unidimensional construct reflecting the extent or degree of autonomy (e.g., relative autonomy index: RAI; Grolnick & Ryan, 1987; Sheldon et al., 2017). The RAI is computed by subtracting one's scores on external motivations from one's scores on internal motivation, thus yielding a total relative autonomy score. In contrast, proponents of the second measurement approach suggest that there is added value in measuring individual types and treating each score separately (from amotivation to intrinsic motivation) (e.g., Ven den Broeck et al., 2021). Howard and colleagues (2020) proposed a solution to reconcile the two measurement approaches, suggesting that the individual motivation types coexist with the autonomy dimension

by illustrating them using a semi-radex structure. This structure presents the motivation types as "slices" with fixed positions in a semi-circle. As such, the outer edge of the semi-circle represents the autonomy dimension, while the radii within represent varying levels of each motivation type.

Recently, Meyer et al. (2022) observed that in person-centered (profile) research, studies often identify a profile characterized by high scores on both internal and external motivation. Meyer and colleagues suggested that this may be explained by the use of reason-based measures of motivation, asking individuals *why* they exert effort. In particular, they observed that reasons for an action that reside outside the self (e.g., pay) can be perceived as either externally controlling or autonomous, depending on whether they are standalone or combined with other internal reasons. This was demonstrated by directly measuring perceived autonomy and control, and subsequently relating them to the various observed profiles. As such, Meyer et al. challenged the notion that motivation types reside in fixed positions, which presents a problem with the semi-radex structure. This also suggests that interpreting external and introjected motivations as unambiguously reflecting external control may not be accurate, raising a potential issue with computing an RAI score. It also creates problems for the interpretation of correlations between the individual type scores with other variables.

Although Meyer et al. (2022) proposed that it might be best in future research to measure autonomy and external control directly, they also acknowledge the important theoretical distinctions between various motivation types within SDT. In light of their findings, they suggested that perhaps these too might be better measured using mindsets as opposed to reasons for action. One of the potential advantages to approaching measurement in this way is better compliance with the simplex-like structure central to the theory, as well as better highlighting

some of the nuanced distinctions between various motivation types, such as approach and avoidance versions of external types of motivation. The objective of the present research is to replicate Meyer et al.'s findings with respect to the profile structure of the MWMS and associated outcomes, and to develop specific mindset measures for the individual motivation types posited by SDT. The goals of the present study also include examining the predictive validity of such a measure in comparison to the existing reason-based measurement approach, as well as the added value of measuring approach and avoidance motivation.

**Self-Determination Theory**

There have been numerous work motivation theories developed over the course of many decades, each with their own benefits, drawbacks, and uniquely applicable attributes (Pinder, 2014). One of the theories that has become well established and gained significant research attention in recent decades SDT (Deci & Ryan, 1985; Ryan & Deci, 2000, 2017).

One of the defining contributions of SDT is the treatment of motivation not as a unitary construct, but one that can be meaningfully separated into types, and therefore vary not only in quantity but also in quality (Ryan & Deci, 2000, 2017). These motivational types, called *regulations*, are distinguishable from each other by the degree of self-determination of the associated motivational experience. A foundational concept to SDT, *perceived locus of causality* (PLOC) is likewise classified as either internal or external. In internal PLOC, the "actor is perceived as the 'origin' of his or her behaviour", whereas in external PLOC, the "actor is seen as a 'pawn' to heteronomous forces" (Ryan & Connell, 1989, p. 749). In other words, behaviours can vary in the extent to which they have an external or internal perceived origin, and the motivation for these behaviours consequently varies on the central motivational dimension of SDT in terms of their degree of *autonomy.* That is, the extent to which an individual has

internalized their motivation and feels autonomous in their actions (versus externally controlled). In this regard, SDT posits that motivation can vary both in quantity as well as quality, with more autonomous forms being generally preferable and associated with more desirable outcomes (e.g., Cerasoli et al., 2014). Although the primary focus of this paper is the relevance of SDT to work motivation measurement, other notable areas include healthcare, sports performance, education, psychotherapy, and parenting (selfdeterminationtheory.org). Beneficial outcomes of autonomous motivation have been demonstrated in research across these various life domains – for example, when applied to patient behaviour modification, autonomously motivated patients experience better health outcomes (Ng et al., 2012). The authors suggest that SDT is a useful theoretical framework for examining health-related behavioural antecedents and outcomes. In the educational psychology literature, Vasconcellos and colleagues (2020) found that autonomous motivation was related to positive outcomes in the context of physical education. Finally, meta-analytic evidence suggests that high quality motivation is favourably related to outcomes such as employee work attitudes and well-being (Van den Broeck et al., 2021). In recent years, SDT and its related constructs have made appearances in mainstream business publications and journals aimed at managers and human resources practitioners (Manganelli et al., 2018; Rigby & Ryan, 2018).

As noted above, SDT distinguishes between various types of motivation depending on the extent of self-determination associated with a given regulation. These are, in order of increasing autonomy: Amotivation, External Regulation, Introjected Regulation, Identified Regulation, Integrated Regulation, and Intrinsic Motivation. Their positions and associated features aligned with the autonomy continuum can be found in Figure 1.

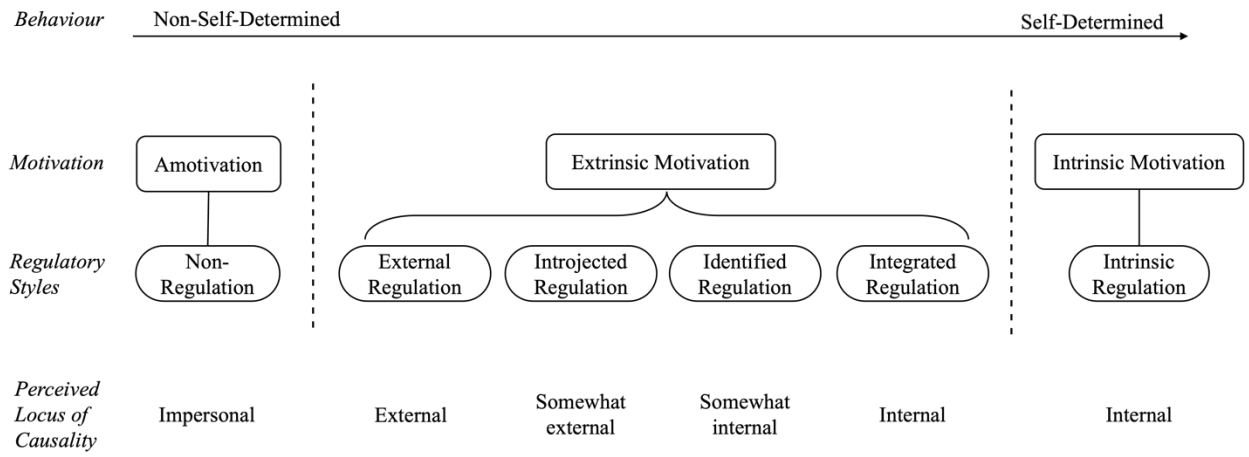


*Figure 1.* Self-Determination Continuum and Positioning of Motivation Types (adapted from Ryan & Deci, 2000)

The definitions and features associated with each regulation type can be summarized as follows:

*Amotivation*

Complete disengagement from the activity, characterized by the absence of motivation and intentionality. This can be a result of perceptions of incompetence, lack of interest, or active resistance to external control.

*External regulation*

Characterized by exerting effort to obtain a particular outcome or avoid undesirable consequences (external contingencies). The resulting experience is one of being controlled.

*Introjected regulation*

Often characterized as extrinsic motivations that have been partially internalized. For example, one can exert effort to avoid guilt and shame, or to uphold their self-esteem.

*Identified regulation*

The goals of effort exertion or the outcomes are accepted as personally valued. While the outcomes can still be external to the self (controlled by others), they become personally endorsed and therefore further internalized.

*Integrated regulation*

The most autonomous form of extrinsic regulations. The outcomes arising from exerting effort become consistent with one's personal values, belief structure, and self-perception.

*Intrinsic motivation*

Exerting effort for the enjoyment of the activity itself. Intrinsic motivation is the prototypical depiction of human autonomy, as well as the holistic viewpoint that humans are innately drawn towards learning and mastery.

For some of these motivation types, finer-grained distinctions have been made both conceptually/theoretically and empirically (e.g., Assor et al., 2009; van Beek et al., 2012). More specifically, external forces associated with these types (external regulation) can be further subcategorized into approach/avoidance as well as social/material facets. For example, one might exert effort to *avoid* an undesirable *social* outcome (such as being ostracized by their peers – external regulation, social avoidance) or to *obtain* a *material* outcome (such as money – external regulation, material approach). As such, introjected motivation can be subclassified as approach or avoidance, of both social and material varieties. It should be noted that not all of these distinctions are made salient in measurement. Many measures of motivation, such as the Multidimensional Work Motivation Scale (MWMS; Gagné et al., 2015), do not differentiate approach and avoidance motivation with separate subscales, instead opting to combine items addressing each within the social and material scales. It is not necessarily clear why this is the case, though the MWMS improves on its predecessors with the purposeful inclusion of approach and avoidance items in balanced quantities. That is, a roughly even balance of approach- and avoidance-reflecting items are included within the social and material external motivation scales.

As noted previously, motivational types within SDT are theoretically arranged in such a way that they reflect varying degrees of autonomy and internalization with the self. This arrangement, ranging from amotivation to intrinsic motivation, is generally labeled as the *autonomy continuum.* While the specifics of the structure surrounding this continuum are up for academic (and perhaps philosophical) debate, evidence suggests that motivational types are distinguished by the degree of autonomy associated with the resulting motivational experience. Based on a longstanding psychological and philosophical literature, Ryan and Deci (2017, p. 56) note that "…there are *degrees of autonomy* and that the extent of autonomy is often dependent upon the degree to which the individual has mindfully and reflectively identified with and integrated a particular regulation or value." It is important to note that, although autonomous motivation should not be considered synonymous with general free will or the absence of external coercive forces, SDT findings generally indicate that external influences can undermine one's autonomy (Ryan & Deci, 2017). In short, one cannot be both completely autonomous and externally controlled simultaneously, as these are mutually exclusive ends of the autonomy continuum and are associated with theoretically incompatible motivational states. However, in the middle of the continuum, external and internal motivation sources could potentially overlap. According to sub-theories of SDT (e.g., Organismic Integration Theory; Ryan & Deci, 2017), in situations where external influences are persistent, humans are predisposed to internalizing these influences to preserve their autonomy. For example, it is not necessarily the case that receiving pay on the job or grades at school will undermine an individual's sense of autonomy.

It should be noted that there exists some debate about the positioning of amotivation on the external end of the autonomy continuum, and whether positive correlations with external motivation types are logically consistent with its conceptualization as the absence of any

motivation (Chatzisarantis et al., 2003; Howard et al., 2020). For present purposes, we will keep amotivation in its traditional place on the continuum depicted in Figure 1.

Another key feature of SDT that has implications for the nature of an individual's motivation is the notion that individuals seek to satisfy three basic psychological needs: autonomy, competence, and relatedness (Deci & Ryan, 2000). Autonomy refers to the need to experience a sense of free will in one's activities, as well as consistency of the activities with one's belief structure. Competence refers to the need to be and feel capable in meeting challenges associated with progressing towards personal goals. Finally, relatedness refers to the need to feel valued and accepted by other people. Conditions that support the satisfaction of these needs are viewed as precursors to higher quality motivation and general well-being, whereas conditions that thwart satisfaction have the opposite effect.

Both individual differences (e.g., external or internal PLOC) as well as the external context within which one operates (e.g., having a good or poor manager) can contribute to the satisfaction or frustration of basic needs through supporting or thwarting mechanisms (Deci & Ryan, 2000). As one's basic needs are met, behavioural regulation becomes more internalized. That is, it seen as emanating from the self and is experienced as autonomous, as opposed to arising as a result of external pressures and therefore being experienced as controlling. In short, since humans are viewed within SDT as innately drawn toward mastery and integration of experiences into a sense of self, and as having the aforementioned basic psychological needs, it follows that these needs must be satisfied to allow humans to function with a sense of autonomy to their fullest potential. Although motivational antecedents are not the focus of this paper, the concept of basic needs is theoretically foundational and helps contextualize the overall discussion.

**Unidimensional and Multidimensional Perspectives**

The autonomy continuum presumed to underpin motivation as conceptualized by SDT is thought to resemble a simplex-like structure. The motivation types described previously are theoretically arranged in order of increasing autonomy, with amotivation on one end and intrinsic motivation on the opposite end. What supports the notion of a motivational continuum structure is that adjacent motivational regulations tend to be correlated more highly than those located further apart. For example, extrinsic regulation might correlate more strongly with introjected regulation than it does with the integrated variety. Evidence, including meta-analysis, appears to support the notion of an autonomy continuum (Howard et al., 2017; Litalien et al., 2017). That is, correlations between motivation types across a variety of samples and domains appears to follow the simplex-like structure.

As mentioned previously, there is substantial debate regarding the structure of motivation in alignment with SDT, as well as approaches to measuring motivation quantity and quality. Some researchers maintain we should be measuring specific motivational regulations, while others believe that what is important is to simply measure the degree of autonomy or external control. Although one of the defining features of SDT is the emphasis on both quantity and quality of motivation, some researchers argue that only directing attention to the central autonomy dimension is sufficient for assessing both characteristics in addition to associated positive outcomes. For example, Sheldon and colleagues (2017) argue that while it may be useful to measure the various regulations underlying the autonomy continuum, what is germane here is to compute an individual's relative autonomy index (RAI) score as an overall indicator of motivational quality and quantity. In other words, individual scores for the specific factors that feed into the computation of one's position on the continuum are not of primary interest (or at

all). In this case, the simplex-like structure is used to justify the use of the RAI. Others such as Chemolli and Gagné (2014), argue that we cannot reduce the motivational types into one score, because they are standalone and distinct from each other. Furthermore, they maintain that the statistical evidence for a continuum underlying the motivational types is weak to begin with. In essence, both sides present evidence in support of their favoured structure, and no conclusive resolution to this debate currently exists.

**A Person-Centered Approach**

Much of past psychological research, including inquiry into motivational constructs, has been done utilizing a variable-centered approach. This approach is designed to identify relationships between variables under the assumption that the sample is drawn from a homogeneous population, and that all parameter estimates (including those reflecting interactions) apply to the population as a whole. In contrast, person-centered perspectives are intended to identify how levels within systems of variables might combine differently across individuals (Meyer et al., 2013). By relaxing more traditional assumptions of population homogeneity, person-centered analyses can help identify subgroups characterized by particular levels and/or combinations of variables. As such, if distinct subpopulations are identified for some variable(s), then the corresponding variable-centered findings may require additional qualification. This approach is especially useful for examination of closed variable sets tied together by robust theory. Personality, for example, is a system of variables that lends itself particularly well to person-centered examinations, and evidence suggests that there are latent subgroups of individuals within the population whose personality structures resemble several replicable “profiles” (Espinoza et al., 2020).

One of the advantages of the person-centered approach is the ability to examine whether certain combinations of variables are experienced differently by individuals. Seeing as motivation within SDT is a system of variables (motivational types) tied together by theory, one can see how it might be a good candidate for undergoing person-centered examination. Indeed, researchers have applied various statistical techniques to examine motivation from this perspective, finding that motivational profiles characterized by greater autonomy are generally related to more positive outcomes (e.g., Howard et al., 2016; Moran et al., 2012; Parker et al., 2021).

The person-centered approach can also help us examine whether observed variable levels are consistent in their structure with theoretical propositions. As discussed, motivation types within SDT are thought to resemble a simplex-like structure. Visual inspection of motivation profiles can help determine whether this structure holds. Figure 2 depicts an approximation of what motivation profiles depicting a simplex-like structure might look like. In this example, we see that each profile has a dominant elevated score or scores on adjacent types, with scores becoming more discrepant on types located further away.

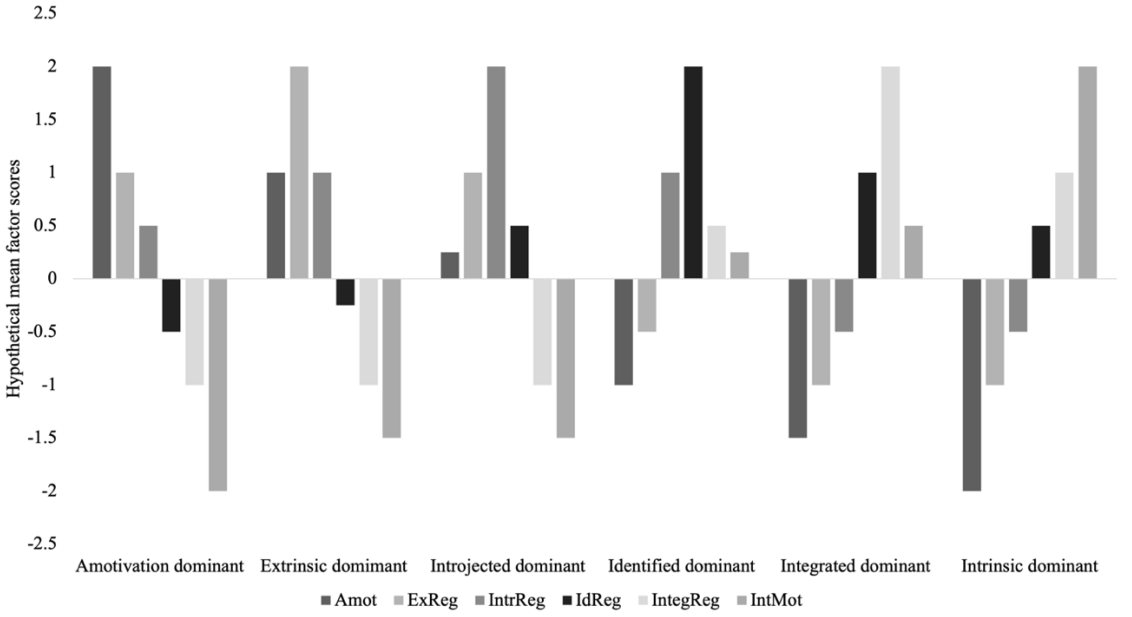


*Figure 2.* Hypothetical motivation profiles that depict a simplex structure.

**Inconsistencies of Past Research with Person-Centered Approaches**

Despite the parsimony and intuitiveness of the recently proposed semi-radex structure described prior, it appears inconsistent with the results of person-centered studies modelling motivation within SDT using profile approaches. These studies have demonstrated that individuals can score similarly on both internal *and* external motivations while still exhibiting the same positive outcomes as those who score highly only on internal motivation types (e.g., Gillet et al., 2017, Gillet et al., 2020; Howard et al., 2016; Litalien et al., 2019; Ratelle et al., 2007). If this is the case, then one might question whether motivation types are located in a fixed position along the autonomy continuum (at least in the form that they are currently being measured), adequately depicting the proposed simplex structure. Since profile studies demonstrate that internal and external motivation types seem to coexist, their fixed positions on the proposed semi-radex is also questionable. Meyer and colleagues (2022) found that when using the MWMS (Gagné et al., 2015), the underlying reasons endorsed for engaging in an

activity can combine in interesting ways. For example, external reasons for exerting effort are only associated with the experience of being controlled in the absence of intrinsic reasons. Similarly, when combined with intrinsic reasons, extrinsic ones do not necessarily undermine one's overall autonomy. In other words, external regulation seems to only be experienced as controlling when *not* combined with internal types of motivation. Such findings warrant further investigation into the structure of motivation within SDT, as well as the way that the motivation types are measured. At the very least, the interpretation of results from variable-centered studies might not be as straightforward as one might think.

**Reasons versus Mindsets**

In addition to person-centered findings demonstrating the combinations of internal and external motivation for exerting effort, Meyer and colleagues (2022) also questioned the use of reasons for exerting effort as a way to measure both individual motivational regulations as well as computing various indices of overall autonomy. By measuring perceptions of autonomy and control directly, they demonstrated that reason-based motivation measures cannot be interpreted as adequately reflecting the autonomy continuum posited by SDT, since individuals can endorse both external and internal reasons for acting (a mixed profile) without the accompanying experience of being controlled. Indeed, there is a tradition within SDT research to utilize items reflecting reasons for engaging in some activity as an indication of the motivational experience that aligns with a particular regulation. It is not clear why this has been tradition as such, however, it is interesting to note that motivational experiences associated with autonomy and control, as defined within SDT, are not characterized by reasons exclusively. Particularly when examining original papers outlining the theory itself, we can see that autonomy and control are *experiences* (e.g., Ryan & Deci, 2000). One might *feel* controlled or autonomous, but one cannot

experience the extreme forms of both simultaneously. This is particularly true when examining polar opposites of the autonomy continuum. While reasons for engaging in activities are undoubtedly important, it might be inaccurate to assume that reasons thought to be indicative of motivational types will be consistent from person to person or equally perceived as either controlling or autonomous. As a measurement tradition, this assumes that not only are reasons the same for all, but that the relative 'weighting' in terms of autonomy or control is consistent as well. As we have seen from person-centered analyses of reason-based measures, this is simply not the case. Perhaps this approach also partially contributes to the lack of clarity with respect to the structure of motivation within SDT, and therefore the debate that ensues. As suggested by Meyer and colleagues (2022), perhaps a better way to measure motivation within SDT is through a novel approach – by examining mindsets and experiences associated with the proposed motivation types.

**Objectives and Hypotheses of the Present Study**

Although the primary objective of the present research was to develop and evaluate measures of the SDT motivational mindsets, we began by attempting to replicate Meyer et al.'s (2022) findings regarding the MWMS. Specifically, we test the following hypotheses:

*Hypothesis 1a: Profile analysis of the reason measure will reveal qualitative differences between profiles. In particular, we expect to replicate previous results, finding a profile with high levels of both internal and external regulations (we do not expect to find such a profile with the mindset measure).*

*Hypothesis 1b: Profiles with higher levels of autonomous motivation or high levels of both autonomous and controlled motivation will be associated with superior outcomes, greater*

*perceived autonomy, and weaker external control compared to those only characterized by controlled motivation types.*

Meyer and colleagues (2022) demonstrated that measuring global mindsets of autonomy, control, and motivation strength better depicts the theoretical structure of motivation within SDT than using reason-based measures. However, there may still be utility in attempting to measure specific mindsets associated with individual motivational regulations, as this would allow for a finer-grained analysis of motivational states (a specific mindset measure). The primary purpose of the present study is to develop and test a new approach to measurement of motivation within SDT, it might also bring increased clarity to relevant constructs and underlying structure. This should, in theory, accentuate the distinctions between regulations (e.g., the oft-foggy boundary between identified and integrated varieties, approach and avoidance motivations), as well as hopefully clarify the combinatory relationship between autonomous and controlled regulations within SDT. To achieve this, we sought to develop a measure of specific motivational mindsets to complement Meyer et al.'s (2022) measures of global mindsets and the existing reason-based measure (MWMS). Such a measure must conform to the basic theoretical structures of SDT. As such, we propose:

*Hypothesis 2: Scores on the specific mindset measures will reflect the simplex-like structure posited by the theory (adjacent types will correlate more strongly than those further apart). As one experiences regulations further from the middle of the autonomy continuum, relative levels of autonomous versus controlled motivations are expected to become more discrepant.*

Besides conforming to the simplex-like structure, consistent with theory, profiles of the new mindset measure scores should reflect differential levels of perceived control, autonomy, and experienced motivation strength. Here, we propose:

*Hypothesis 3a: Those with profiles characterized by high levels of desirable motivation types (e.g., integrated, intrinsic dominant) will exhibit greater self-reported autonomy on the global mindset measures than those characterized by high levels of controlled motivation types.*

*Hypothesis 3b: Those with mindset profiles characterized by elevated controlled motivation types (e.g., extrinsic dominant) will exhibit greater self-reported control on the global mindset measure.*

*Hypothesis 3c: More desirable specific mindset profiles characterized by high levels of desirable motivation types will exhibit greater overall motivation strength than controlled profiles.*

Next, consistent with the distinction made within SDT between high- and low-quality motivational states, we make a general proposition about motivational profiles that might be identified in the study using both measurement approaches:

*Hypothesis 4: Profiles characterized by high levels of desirable motivation types are expected to be associated with better organizational and well-being outcomes compared to those characterized by more controlled forms of motivation.*

Finally, for exploratory purposes, we aim to compare the predictive validity of the new measure against the reason-based measure on outcomes relevant to organizations and employee well-being.

## Method

### Participants

Participants ($n$ = 503) were recruited for this study through the Prolific Academic survey platform and were compensated £2.25 for their time. Compensation was designed to be roughly equivalent to the local minimum wage for 15 minutes of participation. Participation prerequisite filters included being a full-time working adult with English fluency, as well as a platform

submission approval rating of 90% or higher. Careless responses were identified using four directed-response attention check items (Meade & Craig, 2012) embedded throughout the survey, a comprehension check item included at the end of the survey, as well as completion time monitoring. To help prevent automated responding, we included a captcha V2 verification at the start of the survey. Participants were excluded if they incorrectly responded to two or more attention check items and/or the comprehension check item, as well as if their completion time was faster than the median by two standard deviations or more. Data were collected in a staggered fashion over the course various days of the week and times of day to address any potential temporal influences on participant responding.

The final sample consisted of 500 participants with 2 removed due to failed attention checks and 1 due to a failed comprehension check (300 males, 197 females, 3 other or unspecified), with an age range of 18 to 74 years ($M$ = 33.82, $SD$ = 10.34). Approximately 66% of participants identified as Caucasian, with other groups including Black (12%), Latin American (10%), Chinese (4%), and South Asian (2%). The rest of the participants were distributed among groups such as Southeast Asian, Korean, Arab, Japanese, Filipino, West Asian, and other. Participants reported an organizational tenure range of 1 to 516 months ($M$ = 58.78, $SD$ = 68.76) and a job tenure range of 1 to 480 months ($M$ = 45.12, $SD$ = 50.63). Participants' reported occupational categories included: business, finance, administration (22%), management (18%), sales and service (17%), education, law and social, community and government services (14%), health occupations (7%), manufacturing and utilities (7%) natural and applied sciences (5%), art, culture, recreation, and sport (5%), trades, transport, and equipment operators (4%), as well as natural resources and agriculture (1%). Employment categories were based on the National Occupation Classification of Canada.

**Measures**

*Reason-based motivation types.* Reason-based motivation was measured using the Multidimensional Work Motivation Scale (MWMS; Gagné et al., 2015). Scale length, reliability, and sample items are as follows: intrinsic motivation (3 items, α = .90; e.g., "Because the work I do is interesting."), identified regulation (3 items, α = .88; e.g., "Because I personally consider it important to put effort into this job."), introjected regulation (4 items, α = 82; e.g., "Because I have to prove to myself that I can succeed"), external regulation-social (3 items, α = 85; e.g., "To avoid being criticized by others (e.g., supervisor, colleagues, family, clients...)."), external regulation-material (3 items, α = .62; e.g., "Because I risk losing my job if I don't put enough effort into it."), and amotivation (3 items, α = .85; e.g., "I don't know why I'm doing this, it's pointless work."). Following Meyer and colleagues (2022), responses were made on a 7-point scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

*Mindset-based specific motivation types.* Measures of the specific motivational mindsets were developed for the purpose of this study. The subscales measured: amotivation, external social avoidance, external material avoidance, external social approach, external material approach, introjected avoidance, introjected approach, identified, integrated, and intrinsic motivation. To achieve this, we consulted original and authoritative sources (e.g. Ryan & Deci, 2017) in the SDT literature to identify descriptions of the ways that the different motivation types are experienced. We then devised a measure with the purpose of examining specific motivational mindsets, with items reflecting key features of how each motivation type might be experienced by an individual. Crucially, the items were written to reflect the individual's psychological state, or mindset, while engaging in the activity rather than the reasons for exerting

effort (as in the MWMS). A table with sample quotations used during item construction can be found in Appendix A.

All items shared the common stem "Think about the primary activities you engage in while at work. Read each of the following statements and indicate how strongly you agree or disagree with the statement as it pertains to your frame of mind as you engage in these activities. When I am engaged in work-related activities…". All item responses were made on a 7-point scale from 1 (*completely disagree*) to 7 (*completely agree*). Cronbach's alphas for the 10 subscales ranged from .77 to .91 (see Appendix B for full scale).

*Global autonomy, control, motivation strength.* We measured global motivation mindsets using the scales developed by Meyer and colleagues (2022). Experienced autonomy ($\alpha = .72$) and external control ($\alpha = .78$) were each measured with four items with a common stem: "When you engage in your work, how frequently do you feel the following?" The experienced autonomy items were: "autonomous", "self-motivated", "self-determined", and "self-directed". The experienced external control items were: "controlled", "pressured", "strained", and "trapped". Responses were made on a 7-point frequency scale, ranging from 1 (*never*) to 7 (*always*).

Experienced motivation strength was measured with three items ($\alpha = .85$). The first item measured absolute motivation strength ("How motivated are you in your work?") and used a 5-point response scale, ranging from 1 (*not at all*) to 5 (*very strongly*). The other two items assessed relative motivation strength ("Compared to the average employee, how motivated are you in your work?"; "Compared to other areas in your life, how motivated are you in your work?") and used a 5-point response scale, ranging from 1 (*much less*) to 5 (*much more*).

*Engagement.* We measured engagement using the Utrecht Work Engagement Scale (Schaufeli et al., 2002). The 9-item scale (e.g., "At my work, I feel bursting with energy"; "My

job inspires me"; "I am proud of the work that I do") is designed to measure the engagement dimensions of vigor, dedication, and absorption. Responses were made on a 7-point scale from 0 (*never*) to 6 (*always/every day*). Cronbach's alpha for the engagement scale was .95.

*Affective commitment.* Affective commitment was measured using three items from Gellatly et al. (2006) (e.g., "This organization has a great deal of personal meaning for me"). Responses were made on a 6-point scale from *strongly disagree* to *strongly agree*. Cronbach's alpha was .91.

*Self-rated performance.* Participants rated their own job performance using two items (α = .83) from Meyer et al. (1993): "How do you think your immediate supervisor would rate your job performance over the last year relative to others who have a similar amount of experience?" and "How would you rate your job performance over the last year relative to others who have a similar amount of experience?". Responses were made on a 7-point scale, ranging from 1 (*below average)* to 7 (*well above average*).

*Turnover intentions.* Participants indicated their turnover intentions using two items (α = .93) from Meyer and Allen (1987): "How likely is it that you will actively look for work in a different organization within the next year?" and "How likely is it that you will leave your organization within the next year?" Responses were made on a 7-point scale, ranging from 1 (*extremely unlikely*) to 7 (*extremely likely*).

*Basic need satisfaction and frustration.* We measured the satisfaction and frustration of SDT basic needs using the Basic Psychological Need Satisfaction and Frustration Scale (Chen et al., 2015). Autonomy satisfaction (α = .85) was measured with 4 items (e.g., "I feel a sense of choice and freedom in the things I undertake"). Competence satisfaction (α = .88) was measured with 4 items (e.g., "I feel confident that I can do things well"). Relatedness satisfaction (α = .89)

was measured with 4 items (e.g., “I feel that the people I care about also care about me”). Autonomy frustration (α = 83.) was measured with 4 items (e.g., “Most of the things I do I feel like ‘I have to’”). Competence frustration (α = .88) was measured with 4 items (e.g., “I have serious doubts about whether I can do things well”). Finally, relatedness frustration (α = .82) was measured with 4 items (e.g., “I feel excluded from the group I want to belong to”). All responses were made on a 5-point scale from 1 (*not true at all*) to 5 (*completely true*).

*Physical health complaints.* We asked participants how often they experience a variety of physical health symptoms in a typical week (e.g., headache, nausea, sleep disturbances, musculoskeletal aches and pain, respiratory issues) using a set of 8 items created for this study (α = .82). Participants responded on a 5-point scale from 0 (*never*) to 4 (*every day*).

*Work stress.* Participants were asked about the level of stress on their job using a single item (“From 1 to 10, please indicate the amount of stress on your job.”) from Stanton et al. (2001). Reponses were made on a 10-point numerical scale.

**Analysis**

We first examined the specific motivational mindset measure characteristics for internal consistency. Reliability analysis was conducted on item scores for each of the ten subscales measuring motivation types, including: alpha statistics for each subscale, alpha with each item omitted, and item-total correlations. We subsequently correlated subscales of the new measure with the established MWMS to examine whether correlations with similar scales are sizeable. We also examined within-measure correlations for resemblance to the expected simplex-like structure (adjacent subscales correlating more strongly than those further apart). Correlations were also examined for approach/avoidance subscales for differences that might suggest

additional informativeness compared to collapsing the subscales into social/material distinctions only. All analyses to this point were conducted using SPSS® version 28.

Next, we evaluated the factor structure of both the specific mindset measure as well as the MWMS. We compared the fit for hypothesized 10- and 6-factor models, respectively, against those for corresponding single-factor models. For the mindset measure, we also tested several alternative models combining related scales (e.g., approach and avoidance). Factor structure analyses were completed using Mplus version 8.4 (Muthén & Muthén, 2017). To do this, both confirmatory factor analysis (CFA) and exploratory structural equation modelling (ESEM) were used. The ESEM was specified using target rotation. That is, item loadings on target factors were freely estimated and all cross-loadings were freely estimated but targeted to be as close to zero as possible. The fit indices considered included the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the root mean square error of approximation (RMSEA). Adequate/excellent fit is indicated by CFI and TLI scores above .90/.95 and RMSEA values below .08/.05 (Hu & Bentler, 1999). When comparing CFA and ESEM models, the ESEM model was favored if a) it resulted in substantially improved fit, b) the item loadings on target factors were large and significant, c) cross-loadings were considerably lower than the target-factor loadings, and d) correlations between the factors were considerably reduced.

Next, we conducted latent profile analysis (LPA) on the MWMS and specific mindset measure using factor scores from optimal models obtained in the previous step. LPA solutions from 1-10 profiles were estimated, with means for each motivation factor freely estimated across profiles. Factor variances were fixed across profiles because of convergence problems that can result from overparameterization (Bauer & Curran, 2003; Chen, Bollen, Paxton, Curran, & Kirby, 2001). LPA solutions were estimated with 5,000 random sets of start values, 100

iterations, and a final optimization process conducted on the 200 best solutions (Hipp & Bauer, 2006; McLachlan & Peel, 2000). The decision of how many profiles to retain in the final solution was based on several factors. First, we examined statistical indicators including the Akaïke Information Criterion (AIC), Bayesian Information Criterion (BIC), and the sample-size Adjusted BIC (SABIC). Generally, lower values on these indicators represent a better-fitting model. However, we also examined a graphical plot of these values to identify the point where values levelled off (Meyer & Morin, 2016; Morin et al., 2011). Additionally, we considered that any profiles representing less than 5% of our sample might be spurious (Nylund, Asparouhov, & Muthén, 2007). Finally, we considered theoretical compliance with SDT and added informational value from a given profile solution. We favoured solutions with the maximum number of informative profiles characterized by qualitative (configural) differences.

In the next step of our person-centered analyses, we conducted BCH tests of mean equality (Asparouhov & Muthén, 2015; Bakk, Tekle, & Vermunt, 2013; Vermunt, 2010) to compare the MWMS profiles to the mindset profiles regarding relevant organizational and well-being outcomes. The BCH procedure includes pairwise comparisons of profile means on the outcomes using Wald chi-square tests. The BCH procedure builds the model without the outcomes, determines profile membership, and then compares profiles on the outcomes while appropriately weighting profile groupings. The BCH approach also retains the structure of the profiles and accounts for classification error in comparisons (Asparouhov & Muthén, 2015). Simulation research indicates that the BCH procedure is the most appropriate method for comparing profiles on continuous outcomes currently available (Bakk & Vermunt, 2016).

In the final exploratory step of our analyses, we conducted 2-step hierarchical linear regressions using the new measure as well as the MWMS. For each outcome variable, our items

were entered in step 1 with MWMS items in step 2. Subsequently, the MWMS was entered in step 1 with new items in step 2. Regression results, specifically change in $R^2$, were examined to determine if the new measure accounts for additional variance in outcomes and to confirm the utility of separate approach/avoidance subscales for external and introjected regulations.

## Results

### *Correlations between MWMS and Specific Mindset Measure*

Means, standard deviations, reliabilities, and correlations among study variables for the sample are reported in Table 1. Correlations of the new mindset measure with the existing MWMS revealed strongly correlated corresponding subscales and evidence for a simplex-like structure. Avoidance and approach subscales demonstrated notabl different correlations with our outcomes of interest, with the latter appearing to correlate more strongly with desirable outcomes and the former with undesirable ones. As such, these distinctions were retained for subsequent analyses, including evaluation of dimensionality and input into profile analyses.

### *Dimensionality of the MWMS and Specific Mindset Measure*

For the MWMS, the CFA revealed a better fit for the 6-factor model (CFI = .89; TLI = .84; RMSEA = .09) than for a single-factor model (CFI = .57; TLI = .51; RMSEA = .17). However, the 6-factor ESEM produced an excellent fit (CFI = .99; TLI = .98; RMSEA = .04). For the ESEM model, item loadings on their respective target factors were significant, ranging from .118 to .917.

Table 1.

*Scale-level descriptive statistics and intercorrelations among study variables*

| | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. AmotMI | 3.35 | 1.44 | (.86) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. ExSocAvMI | 4.39 | 1.35 | .28** | (.77) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. ExMatAvMI | 4.57 | 1.39 | .12** | .58** | (.81) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. ExSocApMI | 4.94 | 1.21 | -.23** | .49** | .42** | (.79) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. ExMatApMI | 4.65 | 1.36 | -.03 | .30** | .52** | .41** | (.87) | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. IntrAvMI | 5.07 | 1.38 | -.28** | .40** | .46** | .53** | .23** | (.88) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. IntrApMI | 5.74 | 1.13 | -.50** | .19** | .27** | .61** | .29** | .66** | (.90) | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. IdenMI | 4.89 | 1.50 | -.67** | .00 | .15** | .56** | .25** | .45** | .69** | (.91) | | | | | | | | | | | | | | | | | | | | | | | |
| 9. IntegMI | 4.77 | 1.39 | -.65** | -.03 | .13** | .52** | .20** | .47** | .68** | .86** | (.86) | | | | | | | | | | | | | | | | | | | | | | |
| 10. IntMotMI | 4.66 | 1.48 | -.62** | -.01 | .11* | .53** | .23** | .41** | .63** | .84** | .88** | (.90) | | | | | | | | | | | | | | | | | | | | | |
| 11. AmotRE | 2.39 | 1.50 | .72** | .04 | -.04 | -.30** | -.07 | -.42** | -.61** | -.61** | -.57** | -.56** | (.85) | | | | | | | | | | | | | | | | | | | | |
| 12. ExSocRE | 4.26 | 1.56 | .14** | .69** | .54** | .59** | .33** | .36** | .28** | .11* | .10* | .07 | -.01 | (.85) | | | | | | | | | | | | | | | | | | | |
| 13. ExMatRE | 4.54 | 1.41 | .18** | .36** | .52** | .31** | .52** | .10* | .06 | -.02 | -.08 | -.08 | .13** | .53** | (.62) | | | | | | | | | | | | | | | | | | |
| 14. IntrRE | 4.99 | 1.34 | -.30** | .38** | .44** | .57** | .26** | .75** | .67** | .54** | .54* | .51** | -.44** | .46** | .18** | (.82) | | | | | | | | | | | | | | | | | |
| 15. IdenRE | 5.15 | 1.47 | -.56** | .15** | .25** | .54** | .20** | .61** | .71** | .76** | .76** | .71** | -.63** | .23** | -.01 | .71** | (.88) | | | | | | | | | | | | | | | | |
| 16. IntMotRE | 4.54 | 1.75 | -.59** | -.01 | .12** | .49** | .20** | .36** | .57** | .81** | .81** | .88** | -.55** | .10* | -.06 | .49** | .72** | (.94) | | | | | | | | | | | | | | | |
| 17. GlobAut | 5.07 | 1.00 | -.43** | -.07 | 0.05 | .30** | .11* | .30** | .48** | .49** | .52** | .55** | -.46** | .03 | -.10* | .33** | .46** | .47** | (.72) | | | | | | | | | | | | | | |
| 18. GlobCon | 3.65 | 1.27 | .57** | .30** | .19** | -.16** | .05 | -.07 | -.23** | -.41** | -.40** | -.41** | .42** | .17** | .16** | -.10* | -.32** | -.34** | -.28** | (.78) | | | | | | | | | | | | | |
| 19. GlobStr | 3.47 | 0.88 | -.61** | -.04 | .10* | .45** | .13** | .44** | .59** | .67** | .72** | .70** | -.57** | .09* | -.09* | .46** | .65** | .64** | .58** | -.38** | (.85) | | | | | | | | | | | | |
| 20. Eng | 3.62 | 1.43 | -.67** | -.03 | .11* | .46** | .18** | .42** | .63** | .81** | .82** | .85** | -.62** | .08 | -.08 | .53** | .74** | .84** | .58** | -.40** | .73** | (.95) | | | | | | | | | | | |
| 21. AC | 3.53 | 1.49 | -.52** | .04 | .14** | .44** | .22** | .33** | .48** | .65** | .65** | .63** | -.46** | .15** | .03 | .42** | .62** | .64** | .39** | -.34** | .53** | .66** | (.91) | | | | | | | | | | |
| 22. TrnInt | 3.51 | 2.09 | .44** | -.03 | -.04 | -.23** | -.06 | -.20** | -.29** | -.38** | -.36** | -.36** | .46** | -.08 | -.06 | -.21** | -.36** | -.36** | -.28** | .35** | -.35** | -.41** | -.55** | (.93) | | | | | | | | |
| 23. WrkPrf | 5.43 | 1.12 | -.41** | -.14** | -.03 | .21** | .04 | .28** | .41** | .36** | .42** | .39** | -.38** | -.06 | -.09* | .30** | .38** | .33** | .40** | -.24** | .51** | .44** | .32** | -.17** | (.83) | | | | | | | | |
| 24. WrkStrs | 5.74 | 2.17 | .27** | .28** | .25** | .06 | .04 | .12** | -.03 | -.11* | -.20** | -.16** | .14** | .15** | .09 | .12** | -.05 | -.15** | -.11* | .53** | -.11* | -.15** | -.15** | .16** | -.06 | -- | | | | | | | |
| 25. AutSat | 3.46 | 0.93 | -.65** | -.09* | .07 | .41** | .21** | .35** | .59** | .75** | .75** | .76** | -.54** | .03 | -.06 | .44** | .63** | .75** | .46** | -.42** | .61** | .75** | .60** | -.35** | .38** | -.16** | (.85) | | | | | | |
| 26. CompSat | 4.03 | 0.80 | -.56** | -.23** | -.09* | .18** | .10* | .28** | .53** | .51** | .53** | .48** | -.51** | -.14** | -.11* | .30** | .45** | .45** | .43** | -.37** | .48* | .56** | .33** | -.22** | .53** | -.18** | .58** | (.88) | | | | | |
| 27. RelSat | 3.78 | 0.93 | -.45** | -.05 | .04 | .30** | .18** | .34** | .46** | .51** | .51** | .48** | -.44** | .03 | .03 | .32** | .44** | .44** | .37** | -.31** | .44** | .51** | .49** | -.30** | .40** | -.14** | .64** | .50** | (.89) | | | | |
| 28. AutFr | 2.81 | 1.01 | .67** | .23** | .18** | -.20** | .03 | -.13** | -.33** | -.52** | -.53** | -.53** | .49** | .15** | .19** | -.13** | -.38** | -.52** | -.31** | .64** | -.44** | -.53** | -.42** | .37** | -.27** | .42** | -.60** | -.39** | -.40** | (.83) | | |
| 29. CompFr | 2.26 | 1.09 | .63** | .43** | .32** | -.02 | .08 | -.03 | -.25** | -.38** | -.39** | -.35** | .44** | .30** | .20** | .00 | -.27** | -.32** | -.31** | .47** | -.38** | -.40** | -.30** | .26** | -.45** | .32** | -.44** | -.67** | -.38** | .54** | (.88) | |
| 30. RelFr | 2.05 | 0.94 | .57** | .26** | .16** | -.07 | .04 | -.18** | -.31** | -.35** | -.35** | -.31** | .51** | .14** | .12** | -.14** | -.29** | -.30** | -.29** | .42** | -.28** | -.37** | -.32** | .34** | -.36** | .24** | -.46** | -.51** | -.61** | .53** | .61** | (.82) |
| 31. PhysHlth | 6.28 | 5.26 | .39** | .22** | .18** | -.10* | .00 | -.02 | -.16** | -.25** | -.25** | -.24** | .30** | .13** | .08 | .00 | -.15** | -.22** | -.19** | .41** | -.22** | -.26** | -.22** | .22** | -.17** | .40** | -.25** | -.28** | -.29** | .41** | .45** | .41** | (.82) |

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

*Note.* $N$ = 500. Reliabilities indicated in parentheses. MI = Mindset; RE = Reasons; Amot = Amotivation; ExSocAv = External social avoidance, ExMatAv = External material avoidance; ExSocAp = External social approach; ExMatAp = External material approach; IntrAv = Introjectected avoidance; IntrAp = Introjected approach; Iden = Identified; Integ = Integrated; IntMot = Intrinsic motivation; GlobAut = Global autonomy; GlobCon = Global control; GlobStr = Motivation strength; Eng = Engagement; AC = Affective commitment; TrnInt = Turnover intentions; WrkPrf = Self-rated performance; WrkStrs = Work stress; AutSat = Autonomy satisfaction; CompSat = Competence satisfaction; RelSat = Relatedness satisfaction; AutFr = Autonomy Frustration; CompFr = Competence frustration; RelFr = Relatedness frustration; PhysHlth = Physical health complaints

For the mindset measure, CFA revealed a better fit for the 10-factor model (CFI = .90; TLI = .89; RMSEA = .06) than for a single-factor model (CFI = .55; TLI = .53; RMSEA = .12). However, despite good loadings, the covariance matrix was not positive definite, suggesting that one or more variables were not strictly defined by their indicated items or that one or more of the variables was perfectly predicted by others. While the 10-factor ESEM produced an excellent fit (CFI = .98; TLI = .97; RMSEA = .03), integrated regulation was not well-defined by its items, failing to produce acceptable loadings. As such, aware of the known difficulties with measuring this construct, we elected to test a 9-factor model with integrated regulation removed. The revised model again demonstrated excellent fit (CFI = .98; TLI = .97; RMSEA = .03), with significant loadings on target factors ranging from .292 to .829. Cross loadings were generally low, varying from .003 to .332. More information about the ESEM results can be found in Appendix C.

***Structure of MWMS Profiles***

Using factor scores from the 6-factor ESEM as input, we conducted LPA on the reason measure with solutions from 1-10 profiles (statistical indicators in Figure 3 and Appendix F). As the indicators showed a levelling-off at around 5 profiles, we visually examined 4-7 profile solutions for heuristic value and compliance with theory. Both the 5- and 6-profile solutions were interpretable and characterized by qualitative distinctions, though in the latter case an additional profile appeared that allowed for more nuanced interpretation. As such, we retained the 6-profile solution as the optimal balance of heuristic value and parsimony.

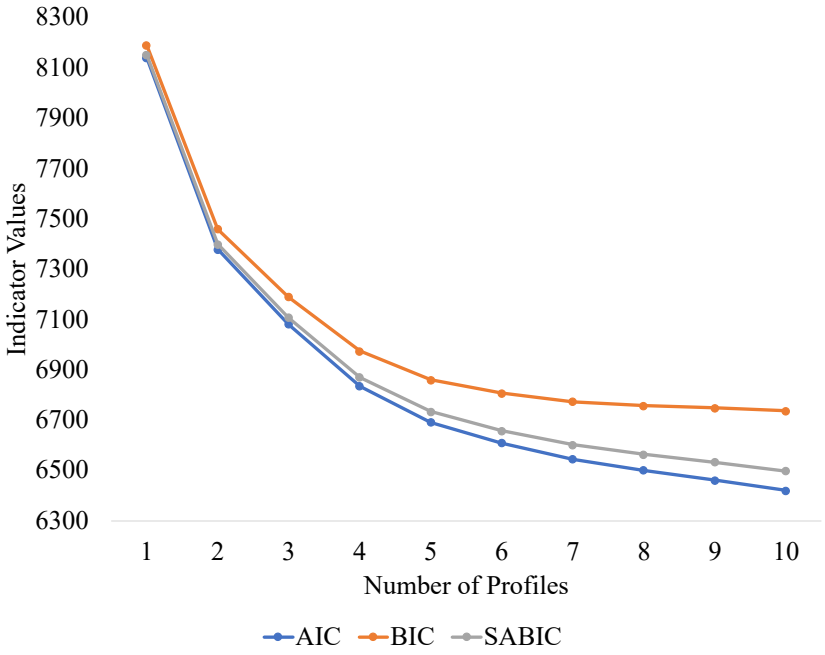


*Figure 3.* Statistical indicators for MWMS profile solutions

*Note.* AIC = Akaïke information criterion; BIC = Bayesian information criterion; SABIC = Sample-size adjusted BIC.

The means of the chosen solution are presented in Figure 4, with tables in Appendix E. For purposes of interpretation and labelling, profiles were reordered from highest to lowest levels of amotivation, left to right, reflecting theoretical desirability. We labelled the profiles to be consistent with theory and reflect their respective dominant scores. Profile 1 (*Amotivated*; 5% of the sample) is characterized by well above average levels of amotivation and below to well below average levels of all other motivation types. Profile 2 (*Moderately amotivated, external material;* 8% of sample) still has above average levels of amotivation, but with the addition of above average social external regulation. Profile 3 (*Moderately amotivated, external;* 13% of sample) again has above average amotivation levels, albeit lower than before and with above average scores on external motivation types. Profile 4 (*Neutral;* 23% of sample) was least expected, characterized by close to average scores on amotivation and external material, slightly below average external social and introjected, and below average identified regulation and

intrinsic motivation. Profile 5 (*Fully motivated;* 33% of sample) was the largest, marked by below average amotivation and above average scores on all other motivation types. The appearance of such a profile partially supports Hypothesis 1a. Finally, Profile 6 (*Autonomous*; 17% of sample) had above average scores on identified regulation and intrinsic motivation, with below average scores on all other types. The overall profile structure of MWMS closely resembles the findings of Meyer et al. (2022), with reasons for exerting effort gradually appearing as levels of amotivation decrease.

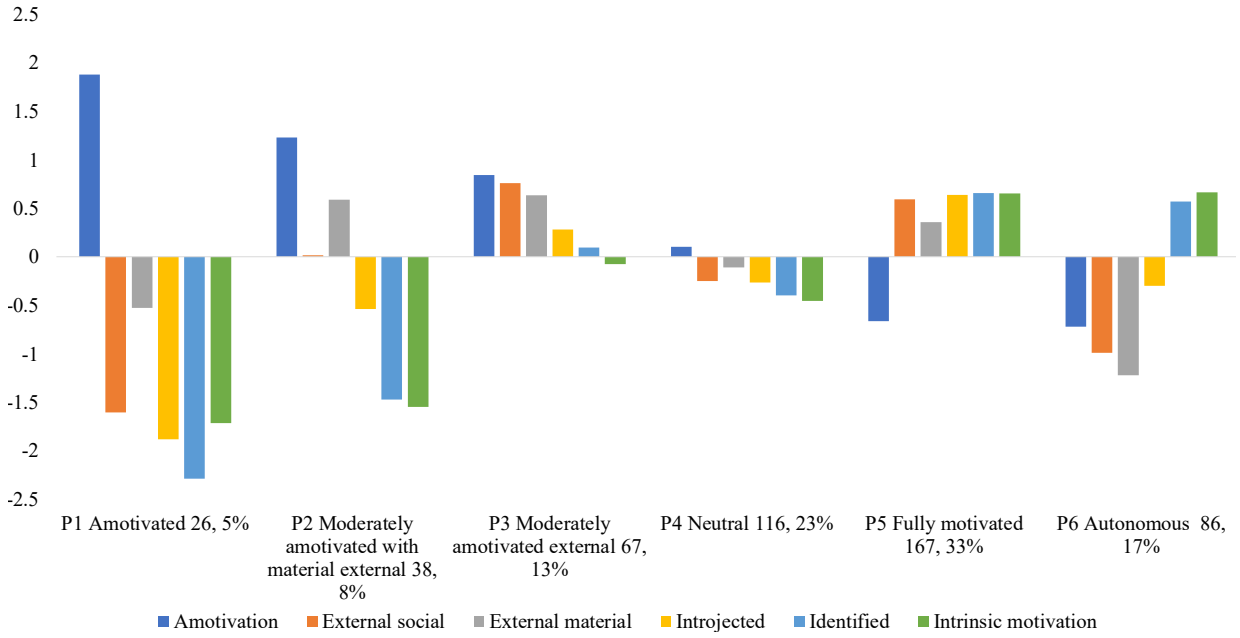


*Figure 4.* Chosen 6-profile LPA solution for the MWMS. Y-axis values represent mean factor scores. Number and percentage proportion of participants in each profile are indicated respectively.

### *MWMS Profile Comparisons*

Results of the BCH mean equality test for reason profiles are reported in Appendix G.

***Global mindsets (perceived autonomy, external control, motivation strength).*** Overall, the pattern of outcome means for the MWMS profiles on the Meyer et al. (2022) global mindset measures reflect the expected pattern. Perceived autonomy increased with profile desirability, and perceived external control decreases with profile desirability. Replicating Meyer and colleagues (2022), having external reasons for exerting effort seem to only be associated with perceived external control when not combined with internal reasons. Motivation strength is also highest in the *Fully motivated* and *Autonomous* profiles.

***Organizational outcomes (engagement, affective commitment, self-rated performance, turnover intentions).*** The pattern of outcome means offer support for Hypothesis 1b, whereby profiles 5 (*Fully motivated*) and 6 (*Autonomous*) were generally associated with the most desirable outcome scores. As expected (Hypothesis 1b), the *Fully motivated* and *Autonomous* profiles were characterized by very similar scores on organizational outcomes. Of the externally dominant profiles, Profile 3 (*Moderately amotivated external*) stands out from the general pattern in scoring higher than Profile 4 (neutral) on affective commitment and engagement, despite having higher amotivation scores. Overall, the pattern of results offers partial support for Hypothesis 1b and 4.

***Well-being outcomes (need satisfaction and frustration, physical health complaints, work stress).*** Again, as expected, profiles characterized by the presence of more desirable motivation types were associated with higher means on well-being outcomes (H1b). Interestingly, the *Moderately amotivated external* profile at times fell out of order on outcome measures, particularly with physical health complaints and frustration of competence and

relatedness. However, these comparisons were not all significant, with significance most consistently achieved when comparing profiles that are more discrepant. Self-rated work performance appears to have generated the weakest mean differentiation between profiles.

***Mindset Profile Structure***

As described above, factor scores from the 9-factor ESEM model (omitting integrated regulation) were used for input into LPA (ESEM loadings in Appendix D). Statistical indicators appear in Figure 5 with a table in Appendix F. Using the same judgement procedure as with the MWMS, we retained a 6-profile solution, which is presented in Figure 6 with a table in Appendix E. The general shape, ordering, and outcomes of the mindset profiles are very similar to the chosen profile solution for the MWMS. Additionally, they appear to better-resemble the theoretical simplex structure, supporting Hypothesis 2. Approach and avoidance subscales appear to play a meaningful role as well, with approach motivation being generally more desirable than its avoidance counterpart. Accordingly, we named the profiles in order of increasing desirability: *Amotivated* (6% of sample), *Amotivated socially avoidant* (14%), *Avoidance motivated* (20%), *Neutral* (24%), *Approach motivated* (25%), and *Autonomous* (11%). In the extrinsic-dominated profiles, social avoidance motivation appears to play a large role, whereas social approach motivation is particularly elevated in the *Approach motivated* profile.

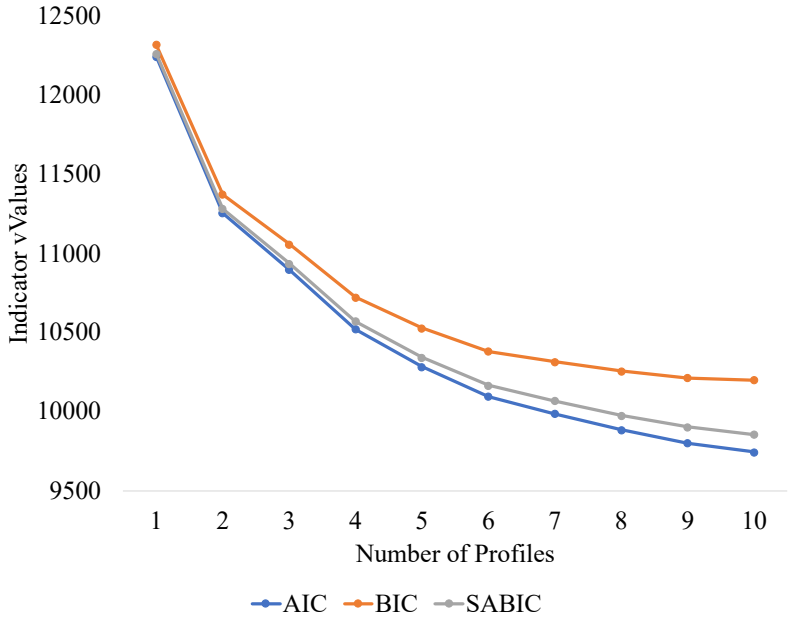


*Figure 5 Statistical indicators for the mindset profile solutions*

*Note.* AIC = Akaïke information criterion; BIC = Bayesian information criterion; SABIC = Sample-size adjusted BIC.

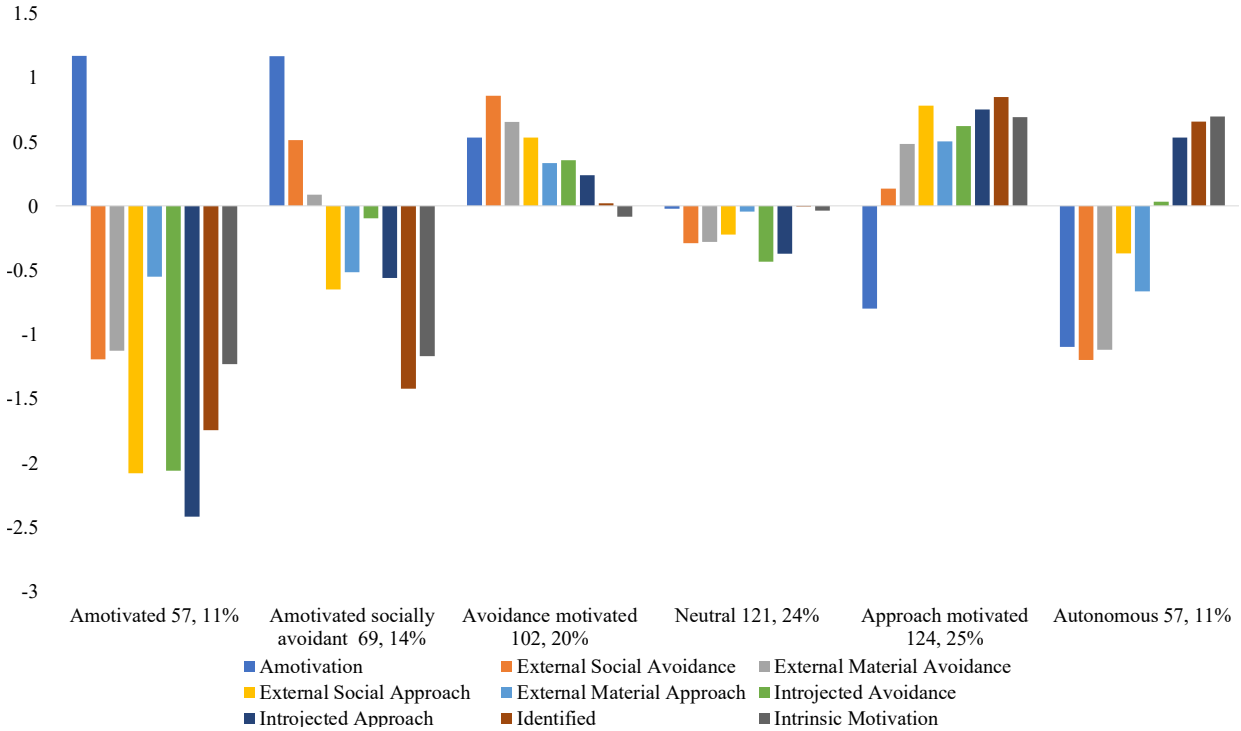


*Figure 6.* Chosen 6-profile LPA solution for the mindset measure. Y-axis values represent mean factor scores. Number and percentage proportion of participants in each profile are indicated respectively.

***Mindset Profile Comparisons***

Results of the BCH mean equality test for mindset profiles are reported in Appendix H.

Interestingly, the *Avoidance motivated* profile did just as poorly or worse with respect to several well-being outcomes than the amotivated profiles (e.g. need frustration, physical health complaints). A somewhat similar pattern also emerged with the MWMS, minus the separation of approach and avoidance motivation. With the mindset profiles, we see the potential unsalutary influence of avoidance motivation (the social variety in particular). On organizational outcomes, the *Avoidance motivated* profile did not produce such an out-of-order result, suggesting that perhaps it characterizes a particularly unsustainable and unpleasant motivational state.

The *Approach motivated* and *Autonomous* profiles fared similarly on a wide variety of outcome measures, making it difficult to classify either as necessarily superior to the other. Both profiles characterized by elevated autonomous and internalized forms of motivation were associated with greater autonomy and motivation strength, supporting Hypothesis 3a and c. While the *Amotivated*, *Amotivated socially avoidant*, and *Avoidance motivated* profiles did not differ significantly on perceived external control, the *Neutral*, *Approach motivated*, and *Autonomous* profiles exhibited progressively lower perceived external control, supporting Hypothesis 3b.

As expected, the overall pattern of outcomes suggests that profiles characterized by more autonomous forms of motivation are superior, offering additional partial support for Hypothesis 4. However, the mindset profile solution did produce a profile with elevated scores on all motivation types (*Approach motivated*), which does not fully support Hypothesis 1a. In this case, it is noteworthy that in the *Approach motivated* profile, desirable forms of motivation were

elevated relative to less desirable forms (e.g., avoidance). This differs slightly from the MWMS, where the *fully motivated* profile appears more level.

### *Incremental predictive validity over the MWMS*

We conducted hierarchical regressions for exploratory purposes to assess the incremental contributions of the MWMS and mindset measures in outcome prediction. Overall, the proportion of variance explained by the MWMS ranged from .09 to .76, while the proportion of variance explained by the mindset measures ranged from .16 to .77. Combined, the measures explained .17 to .80. When entered in Step 2, the MWMS accounted for an additional .01 to .06 of the outcome variance and the mindset measures accounted for an additional .03 to .18 of the variance. Across nearly all outcomes, with the exception of turnover intentions, the mindset measures accounted for greater additional variance. This difference was particularly apparent for need frustration and perceived external control.

## Discussion

The present study was designed to replicate the findings of Meyer et al. (2022), as well as incrementally build upon their findings by measuring the specific mindsets associated with motivation types posited by SDT. Much like prior studies, we found MWMS profiles characterized by varying levels of motivational types and differing on organizational/well-being outcomes. Importantly, consistent with Meyer et al. (2022), we found that some employees identify both internal and external reasons for exerting effort on their job. Individuals with such a *Full motivation* profile were found to report higher perceived motivation strength and autonomy, lower external control, as well as more positive work- and well-being-relevant outcomes than those in profiles with dominant external reasons. Analysis of scores on the new mindset measure revealed a set of profiles consistent with the simplex-like structure, with internally driven

motivation types becoming more prominent as levels of amotivation decreased. However, the inclusion of subscales measuring avoidance and approach motivation for external and introjected regulations allowed for finer-grained insight into motivational states. When examining both variable-centered and profile analysis results, approach motivation was associated more strongly with positive outcomes while avoidance motivation was more strongly associated with undesirable outcomes. Consistent with theory and the findings of Meyer et al. (2022), profiles characterized by dominant internal motivation types were associated with greater perceived autonomy and those characterized by external forms were associated with greater perceived external control. Theoretically desirable profiles were also positively associated with experienced motivation strength. Much like the profile analyses of the reason-based measure, we found that outcomes improved as profile desirability increased (decreasing amotivation, increasing internal motivation). Finally, we found that, although both the reason and mindset measures largely overlapped with respect to variance explained on outcomes of interest, the new measure accounted for additional unique variance and provided added value by disaggregating the approach and avoidance varieties of external and introjected motivation.

**Implications for theory and research**

The findings of the present study provide support for the structure and conceptualization of motivation in accordance with SDT. Specifically, we see evidence for meaningfully distinct motivation types, as well as an underlying autonomy continuum represented by perceived autonomy as well as a simplex-like structure. Like Meyer et al. (2022), our findings suggest that an index computed by subtracting scores on external motivation from internal motivation cannot be interpreted unambiguously. For such a purpose, the use of the Meyer et al. (2022) global mindset measures may be preferable. Since perceived autonomy and external control are not

perfectly negatively correlated, a subtraction the latter from the former as an index of relative autonomy may not be justifiable. Rather the two scales should be treated independently.

Like previous attempts by researchers to measure integrated regulation in a work context (e.g. Gagné et al., 2015), we found that despite good internal consistency and face validity, it did not separate empirically from identified regulation and intrinsic motivation. While in this particular context and sample we elected to remove the subscale due to multicollinearity concerns, measurement difficulty does not imply irrelevance to theory. Perhaps integrated regulation may be useful when measured on its own, and its distinctiveness seems to arise in other domains where SDT relevant (e.g. physical activity, charitable cause support; Miquelon et al., 2017; Schattke et al., 2018). In any case, despite our findings, it would be premature to dismiss integrated regulation as a practically irrelevant construct. However, it is important to highlight that even without integrated regulation, the mindset measures generally accounted for additional variance when compared to the reason measure. Thus, reasons for exerting effort and the motivational experience while engaging in an activity are related but not identical.

Using the measurement of motivational mindsets, we found an *Approach motivated* profile (P5) with elevated levels of both internal and external motivation types. This suggests that individuals can experience a combination of both internal and external regulations. While similar to the equivalent profile identified for the reason measure, our inclusion of separate approach and avoidance mindset measures provides additional insight into what characterizes these profiles. When examining mindset profiles, approach motivation tends to be elevated relative to avoidance motivation, while the reverse appears to be the case for less desirable profiles. Therefore, it is possible that approach varieties of external regulations are experienced as more autonomous than avoidance varieties of external regulations, which would help explain

the findings of Meyer et al. (2022). It is also interesting to note that introjected approach motivation and not introjected avoidance is elevated in the *Autonomous* profile, suggesting that these individuals take pride in their work and are not necessarily motivated by avoiding personal disappointment. This observation lends further credence to the approach/avoidance distinction. The distinction between approach and avoidance could be useful for gaining insight into individuals' motivational states by filling in additional details about how external regulations are being experienced, which is not possible using the MWMS. Researchers may wish to maintain this distinction and examine whether it is meaningful in the context of other life domains, samples, and outcomes. This could be done whether motivation is being measured using mindsets or reasons, though additional items may have to be developed in the latter case.

As an additional note, in the case of both the MWMS and the mindset profiles, the "neutral" profiles were difficult to interpret theoretically. Because these profiles were quite large and appeared consistently, they were retained in the profile solutions, though it is unclear whether they reflect a unique motivational state or are an artefact of sampling or inattentive responding. With that said, this profile fits logically in the desirability sequence both in terms of amotivation level and outcomes.

**Implications for practitioners**

As our study focused on the measurement of motivation and outcomes, we did not include measures of theoretical antecedents that might be deemed precursors of desirable or undesirable motivational states. In this regard, we can rely on the wealth of literature regarding factors that can contribute to high-quality employee motivation. For example, Graves et al., (2015) find that managers who experience higher levels of supervisor support and lower organizational politics had a higher likelihood of membership in desirable motivational profiles.

For a review of how SDT principles can be utilized to promote wellness and performance, see Deci et al. (2017).

We also found that measuring employee motivation accounts for the vast majority of variance in engagement scores, suggesting that perhaps measuring motivation may be a viable alternative that provides additional information about the employee experience. For example, gauging relative levels of internal and external motivational mindsets as well as avoidance and approach motivation may shed light on both engagement drivers and the climate within the organization. With the rise of SDT research, organizations could use the mindset measure to identify how their employees feel about the work they are doing, what is driving their engagement, and identify areas where the work environment could be improved to foster high-quality, sustainable motivational states. Such interventions could be informed by SDT (Meyer & Gagné, 2008; Meyer et al., 2010), in combination with existing frameworks such as the job demands-resources (JD-R) model which is arguably limited in its standalone ability to explain the engagement process. While informative from a practical standpoint, researchers note that the JD-R relies on other theories for mechanistic explanation of engagement (e.g., Schaufeli & Taris, 2014). As noted in our results, while the new mindset measure generally predicted slightly more variance in outcomes of interest than the reason-based measure, this was particularly apparent for need frustration and external control. This might suggest that the measurement of workers' motivational mindsets is well-suited for the purpose of diagnosing the presence of environmental and contextual deficiencies.

Practitioners might also find scores from the mindset measure more readily interpretable from an autonomy perspective than interpreting reasons. This might be the case particularly when evaluating external incentives, which Meyer et al. (2022) have shown to not necessarily

been experienced as controlling when 'buffered' with reasons for action that are autonomy supportive. Furthermore, the findings of the present study highlight the possible superiority of positive material and social incentives (approach-oriented motivation) over the threats of sanctions in the form of losses or reprimands (avoidance). As such, managers may wish to structure their practices to emphasize approach aspects of motivation when implementing external incentives and controls in an effort to preserve the experienced autonomy of employees. For example, a pay increase is likely to have differential effects depending on whether an employee's basic needs (autonomy, competence, relatedness) are being supported to begin with. In situations where the working environment is contributing to need frustration, a pay raise might be more of a temporary 'band-aid' fix than a reward that will effectively incentivize sustainable performance and retention.

**Limitations and future research**

The most significant limitation of the present research is that it is informed by a single study with participants recruited from a single online platform. However, the essential replication of profiles from prior studies (such as Meyer et al., 2022), expected relationships between motivation types/profiles and outcomes, as well as alignment with theoretical structure alleviates these concerns to some extent. Profile analyses also appear robust to common method bias (Morin, 2016). One might also raise a concern that disaggregating scales and increasing the number of variables within the SDT system could lead to multicollinearity concerns. However, both the factor structure analyses and correlations with outcomes suggest that the addition of approach and avoidance scales did not contribute to such issues, unlike the inclusion of the integrated regulation scale.

Of course, results produced from scores on the new mindset measure require replication. It remains to be seen whether similar results emerge in additional work-context studies or in other domains, such as educational settings or sports performance research. As the items were designed to be context-free with a modifiable stem, we invite researchers to test this measure for their own purposes and examine whether similar profile structures and relationships with outcomes emerge. Future research might also incorporate antecedents into study design, such as factors falling into the categories of demands and resources within the JD-R model (Schaufeli & Taris, 2014).

**Conclusion**

The measurement and conceptualization of human motivation is a challenging undertaking. However, evidence continues to support theoretical tenets of SDT and the emergence of associated constructs and outcomes. Our study both helps to confirm previous findings and provides an incremental improvement to tools at researchers' disposal for measurement purposes. The person-centered approach continues to demonstrate its promise as a rigorous yet holistic method for testing the complex interplay of variables within a closed system, in this case to examine the theoretical structure of motivational constructs. Future research efforts might continue to improve upon our measurement and modelling, advancing our understanding of how humans function and thrive in various life domains.

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# Appendix A:

## Sample item-construction materials

| Motivation Type/Construct | Literature description of motivation experience, reason, process, or origin |
|---|---|
| *Intrinsic Motivation* | *"SDT research began with a focus on intrinsic motivation, which is a prototypical expression of the active integrative tendencies in human nature assumed by SDT. Technically intrinsic motivation pertains to activities done "for their own sake," or for their inherent interest and enjoyment* Ryan & Deci (2020) p.2<br><br>*"The term extrinsic motivation refers to the performance of an activity in order to attain some separable outcome and, thus, contrasts with intrinsic motivation, which refers to doing an activity for the inherent satisfaction of the activity itself*<br>Ryan & Deci (2000) p.70-71<br><br>*"Intrinsically motivated behavior, which is propelled by people's interest in the activity itself, is prototypically autonomous."*<br>Gagné & Deci (2005), p.334<br><br>"spontaneous feelings of effectance and enjoyment"<br>Ryan & Deci (2020) p.2<br><br>*Intrinsically motivated behavior, which is propelled by people's interest in the activity itself, is prototypically autonomous*<br>Gagné & Deci (2005), p.334<br><br>*"Perhaps no single phenomenon reflects the positive potential of human nature as much as intrinsic motivation, the inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn."*<br>Ryan & Deci (2000) p.70-71<br><br>*"...prototypical expression of the active integrative tendencies in human nature assumed by SDT."*<br>Ryan & Deci (2020) p.2 |
| *Integrated Regulation* | *"Yet the most autonomous form of extrinsic motivation is integrated regulation in which the person not only recognizes and identifies with the value of the activity, but also finds it to be congruent with other core interests and values."*<br>Ryan & Deci (2020) p.3<br><br>*"The most autonomous form of extrinsic motivations"*<br>Ryan & Deci (2017)<br><br>*"...are done to attain separable outcomes rather than for their inherent enjoyment."*<br>Ryan & Deci (2000) p.73<br><br>*"With integrated regulation, people have a full sense that the behavior is an integral part of who they are, that it emanates from their sense of self and is thus self-determined."Gagné &*<br>Deci (2005), p.335<br><br>*"...recognizes and identifies with the value of the activity, but also finds it to be congruent with other core interests and values."* |

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| | Ryan & Deci (2020) p.3<br><br>*"Integration occurs when identified regulations are fully assimilated to the self, which means they have been evaluated and brought into congruence with one's other values and needs."*<br>Ryan & Deci (2000) p.73<br><br>*"The integration of behaviours with one's values and beliefs"*<br>Ryan & Deci (2017, handbook introduction)<br><br>*"The fullest type of internalization, which allows extrinsic motivation to be truly autonomous or volitional, involves the integration of an identification with other aspects of oneself—that is, with other identifications, interests, and values."*<br>Gagné & Deci (2005), p.335 |
| *Identified Regulation* | *"Consider, for example, a woman who would enjoy nothing more than tending her garden, but instead spends her time indoors at her computer. In finding the energy to engage in her work at the computer volitionally, she might well focus, even if only in passing, on her reasons for working: its utility for her long-term goals. Being mindful of her purpose provides a rationale that supports her identified regulation of an activity that may not be as inherently interesting to her in that moment as gardening."*<br>(Ryan & Deci, 2017 handbook, p.198)<br><br>*"In identified regulation, the person consciously identifies with, or personally endorses, the value of an activity, and thus experiences a relatively high degree of volition or willingness to act."*<br>Ryan & Deci (2020) p.3<br><br>*"Identification with and acceptance of the value of extrinsic behaviour"*<br>Ryan & Deci (introduction, 2017)<br><br>*"A more autonomous, or self-determined, form of extrinsic motivation is regulation through identification. Identification reflects a conscious valuing of a behavioral goal or regulation, such that the action is accepted or owned as personally important."*<br>Ryan & Deci (2000) p.72<br><br>*"With identified regulation, people feel greater freedom and volition because the behavior is more congruent with their personal goals and identities. They perceive the cause of their behavior to have an internal PLOC—that is, to reflect an aspect of themselves."*<br>Gagné & Deci (2005), p.334-335 |
| *Introjected Regulation* | *"Introjected regulation concerns extrinsic motivation that has been partially internalized…"*<br>Ryan & Deci (2020) p.2<br><br>*"Introjection involves taking in a regulation but not fully accepting it as one's own."*<br>Ryan & Deci (2000) p.72<br><br>*"A regulation that has been taken in by the person but has not been accepted as his or her own is said to be introjected and provides the basis for introjected regulation."*<br>Gagné & Deci (2005), p.334<br><br>*"Behavior is regulated by the internal rewards of self-esteem for success and by avoidance of anxiety, shame, or guilt for failure."*<br>Ryan & Deci (2020) p.2 |

| | |
|---|---|
| | *"It is a relatively controlled form of regulation in which behaviors are performed to avoid guilt or anxiety or to attain ego enhancements such as pride. Put differently, introjection represents regulation by contingent self-esteem."*<br>Ryan & Deci (2000) p.72<br><br>*"Examples of introjected regulation include contingent self- esteem, which pressures people to behave in order to feel worthy, and ego involvement, which pressures people to behave in order to buttress their fragile egos"* Gagné & Deci (2005), p.334<br><br>*"The experience when one has "taken in" but not fully accepted (integrated) external controls imposed upon them.*<br>*Motivation comes from guilt, shame, contingent self-esteem, fear of disapproval*<br>*Experienced as "internally controlling"*<br>SDT handbook, introduction section (2017)<br><br>*"With this type of regulation, it is as if the regulation were controlling the person"*<br>Gagné & Deci (2005), p334<br><br>*"Introjection involves taking in a regulation but not fully accepting it as one's own"*<br>Ryan & Deci (2000) p.72<br><br>*"Behavior is regulated by the internal rewards of self-esteem for success and by avoidance of anxiety, shame, or guilt for failure."*<br>Ryan & Deci (2020) p.2<br><br>"It is a relatively controlled form of regulation in which behaviors are performed to avoid guilt or anxiety or to attain ego enhancements such as pride. Put differently, introjection represents regulation by contingent self-esteem."<br>Ryan & Deci (2000) p.72<br><br>*"Examples of introjected regulation include contingent self- esteem, which pressures people to behave in order to feel worthy, and ego involvement, which pressures people to behave in order* to buttress their fragile egos"<br>Gagné & Deci (2005), p.334 |
| *Extrinsic Motivation / Regulation* | *"...greater internalization leading to greater experiences of autonomy (even if the motivation is still extrinsic"*<br>Ryan & Deci (introduction, 2017)<br><br>*"External regulation concerns behaviors driven by externally imposed rewards and punishments."*<br>Ryan & Deci (2020) p.2<br><br>*"Represented by behaviours that are completed for the obtainment of some external reward, be it monetary, social, etc."*<br>SDT handbook, introduction section (2017)<br><br>*"Within SDT, when a behavior is so motivated it is said to be externally regulated—that is, initiated and maintained by contingencies external to the person."*<br>Gagné & Deci (2005), p.334<br><br>*"...is a form of motivation typically experienced as controlled and non-autonomous."*<br>Ryan & Deci (2020) p.2 |

| | |
|---|---|
| | *"Contrasting with intrinsically motivated behaviours, extrinsic motivations can vary in the extent to which they are controlled or autonomous…"*<br>Ryan & Deci (introduction, 2017)<br><br>*"SDT proposes that extrinsic motivation can vary greatly in its relative autonomy."*<br>Ryan & Deci (2000) p.71<br><br>*"This is the classic type of extrinsic motivation and is a prototype of controlled motivation."*<br>Gagné & Deci (2005), p.334<br><br>*"Often contrasted with intrinsic motivation is the heterogeneous category of extrinsic motivation, which concerns behaviors done for reasons other than their inherent satisfactions."*<br><br>*"External regulation concerns behaviors driven by externally imposed rewards and punishments."*<br>Ryan & Deci (2020) p.2<br><br>*"Represented by behaviours that are completed for the obtainment of some external reward, be it monetary, social, etc."*<br>Ryan & Deci (introduction, 2017)<br><br>*"Within SDT, when a behavior is so motivated it is said to be externally regulated—that is, initiated and maintained by contingencies external to the person."*<br>Gagné & Deci (2005), p.334 |
| *Amotivation* | *"Amotivation results from not valuing an activity"*<br>Ryan & Deci (2000) p.72<br><br>*"…lacking intentionality."*<br>Ryan & Deci (2020) p.3<br><br>*Characterized by lack of intentionality and motivation, "passive, ineffective, without purpose"*<br>*Several types of amotivation*<br>*1) Feeling of incompetence, inadequacy, helplessness*<br>*2) Lack of interest, not seeing value or relevance*<br>*3) Defiance or resistance to being influenced*<br>Ryan & Deci (introduction, 2017)<br><br>*"At the far left of the self-determination continuum is amotivation, the state of lacking the intention to act. When amotivated, people either do not act at all or act without intent--they just go through the motions."*<br>Ryan & Deci (2000) p.72<br><br>*"not feeling competent to do it (Bandura, 1986), or not expecting it to yield a desired outcome (Seligman, 1975)."*<br>Ryan & Deci (2000) p.72<br><br>*"…amotivation involves having no intentions for the behavior and not really knowing why one is doing it."*<br>Gagné & Deci (2005), p.336 |

# Appendix B:

## Specific Motivation Mindset Measure

Think about the primary activities you engage in while (at work, at school, exercising, parenting). Read each of the following statements and indicate how strongly you agree or disagree with the statement as it pertains to your frame of mind as you engage in these activities.

1 – Completely disagree 7 – Agree Completely

When I am engaged in [work, school, exercise, parenting, etc.] -related activities…

**Amotivation**

1. AmotMI1 My mind often wanders, and I struggle to keep going.
2. AmotMI2 I find myself wondering why I am doing this.
3. AmotMI3 I feel I am simply "going through the motions."
4. AmotMI4 I feel aimless.
5. AmotMI5 I feel that what I am doing is pointless.

**External Social (Avoidance)**

6. ExSocAvMI1 I want to avoid letting others down.
7. ExSocAvMI2 I worry that others might think less of me if I don't do well.
8. ExSocAvMI3 I worry about what others will think of me.
9. ExSocAvMI4 I feel I am being judged by others.

**External Material (Avoidance)**

10. ExMatAvMI1 I fear what might happen if I don't put in my best effort.
11. ExMatAvMI2 I think about the negative consequences of not doing well.
12. ExMatAvMI3 I worry about what I might lose if I don't put in effort.
13. ExMatAvMI4 I think about the rewards I could lose if I don't put in effort.

**External Social (Approach)**

14. ExSocApMI1 I hope that others will appreciate what I do.
15. ExSocApMI2 I look forward to the appreciation I will receive from others.
16. ExSocApMI3 I want to make a good impression.
17. ExSocApMI4 I look forward to showing/telling others what I've done.

**External Material (Approach)**

18. ExMatApMI1 I keep myself motivated by thinking of the rewards I stand to gain.
19. ExMatApMI2 It is the tangible rewards I stand to gain that keeps me going.
20. ExMatApMI3 I keep my 'eye on the prize', realizing that I will be rewarded for my efforts.
21. ExMatApMI4 I focus on what I need to do to be rewarded for my efforts.

**Introjected Regulation (Avoidance)**

22. IntrAvMI1 My conscience bothers me when I feel I am doing less than my best.

23. IntrAvMI2 I know I will be disappointed in myself if I don't do well.
24. IntrAvMI3 I recognize that, at the end of the day, I'll feel guilty if I haven't done my best.
25. IntrAvMI4 I don't want to let myself down by doing less than my best.

**Introjected Regulation (Approach)**

26. IntrApMI1 I want to do a good job so I can take pride in my accomplishments.
27. IntrApMI2 I feel good about myself when I'm doing my best.
28. IntrApMI3 I know I can take pride in a job well done.
29. IntrApMI4 I know I will feel good about myself if I do well.

**Identified Regulation**

30. IdenMI1 I feel that I'm doing what I want.
31. IdenMI2 I feel that what I am doing will make a difference.
32. IdenMI3 I believe that what I am doing has value.
33. IdenMI4 I feel that I am accomplishing something worthwhile.

**Integrated Regulation**

34. IntegMI1 I feel that what I am doing is a good reflection of who I am as a person.
35. IntegMI2 I feel that I was meant to do this.
36. IntegMI3 I feel like I am being myself while engaging in the activity.
37. IntegMI4 The activity feels completely natural to me.

**Intrinsic Motivation**

38. IntMotMI1 I really enjoy what I am doing.
39. IntMotMI2 I feel I am having fun.
40. IntMotMI3 I get totally absorbed in what I am doing.
41. IntMotMI4 I get real pleasure from what I am doing.

# Appendix C:

## ESEM factor structure for MWMS

*Standardized Factor Loadings (λ) for the 6-Factor ESEM Solution of the MWMS*

| | λ | | | | | | δ |
|---|---|---|---|---|---|---|---|
| Items | AM | EXSOC | EXMAT | IJ | ID | IM | |
| Amotivation | | | | | | | |
| 1 | **.862*** ** | .030 | .003 | .020 | -.038 | .066 | .293 |
| 2 | **.817*** ** | .024 | -.016 | -.050 | -.017 | .105* | .380 |
| 3 | **.716*** ** | -.063 | .017 | .041 | .020 | -.222*** | .292 |
| Extrinsic Regulation - Social | | | | | | | |
| 4 | -.043 | **.982*** ** | -.060 | -.041 | -.054 | -.024 | .165 |
| 5 | -.025 | **.706*** ** | .080 | .045 | .058 | .072 | .331 |
| 6 | .098* | **.608*** ** | .140* | . 203*** | -.104 | -.121 | .372 |
| Extrinsic Regulation - Material | | | | | | | |
| 7 | .071 | .159 | **. 504*** ** | -.154** | .001 | .040 | .651 |
| 8 | -.017 | .191* | **. 577*** ** | -.042 | .084 | .074 | .505 |
| 9 | -.048 | -.190*** | **. 845*** ** | .096 | -.059 | -.061 | .387 |
| Introjected Regulation | | | | | | | |
| 10 | .006 | .102 | .051 | **.332*** ** | .415*** | .058 | .490 |
| 11 | -.139** | .103* | -.028 | **.118*** | .482*** ** | .217*** | .276 |
| 12 | .043 | .019 | .029 | **.916*** ** | -.106 | .026 | .229 |
| 13 | -.057 | .076 | -.041 | **.777*** ** | .008 | -.035 | .330 |
| Identified Regulation | | | | | | | |
| 14 | .261*** | .051 | .017 | .153* | **.554*** ** | .021 | .258 |
| 15 | -.041 | .003 | -.066 | .129 | **.685** ** | .069 | .292 |
| 16 | -.089 | -.034 | .020 | .164* | **.489** ** | .245** | .316 |
| Intrinsic Motivation | | | | | | | |
| 17 | .020 | -.008 | -.040 | .015 | .018 | **.915*** ** | .145 |
| 18 | .017 | -.035 | .045 | .026 | .016 | **.917*** ** | .158 |
| 19 | -.107*** | .008 | -.011 | .026 | -.025 | **.868*** ** | .143 |

*Note*. λ = standardized loading; δ = uniqueness; bold = ESEM target factor loadings.
* $p < .05$; ** $p < .01$; ***$p < .001$.

# Appendix D:

## ESEM factor structure for the Mindset Measure

*Standardized Factor Loadings (λ) for the 9-Factor ESEM Solution of the Mindset Measure*

| | λ | | | | | | | | δ |
|---|---|---|---|---|---|---|---|---|---|
| Items | Amot | ExSocAv | ExMaAv | ExSocAp | ExMatAp | IntrAv | IntrAp | Iden | IntMot | |
| Amotivation | | | | | | | | | | |
| 1 | **.676*** ** | .173 | .136 | -.054 | -.060 | -.117 | -.015 | .243* | -.055 | .459 |
| 2 | **.792*** ** | -.073 | .008 | .140 | -.040 | -.043 | .091 | -.063 | -.050 | .398 |
| 3 | **.651*** ** | -.053 | -.012 | .080 | .030 | -.008 | .051 | -.044 | -.064 | .572 |
| 4 | **.808*** ** | -.061 | -.072 | -.073 | .014 | .042 | -.034 | -.029 | -.016 | .300 |
| 5 | **.684*** ** | -.006 | -.026 | -.078 | .040 | .101 | -.066 | -.273*** | .115* | .276 |
| Extrinsic Social - Avoidance | | | | | | | | | | |
| 6 | -.050 | **.310** ** | -.091 | .173 | .066 | .332 | .096 | .052 | -.136 | .554 |
| 7 | -.006 | **.617*** ** | .196* | .114 | -.036 | .061 | .003 | -.060 | .021 | .347 |
| 8 | .101 | **.764*** ** | .082 | .103 | .026 | -.079 | -.041 | -.004 | .112** | .268 |
| 9 | .106 | **.581*** ** | .070 | -.012 | .038 | -.039 | -.098 | -.038 | .003 | .554 |
| Extrinsic Material - Avoidance | | | | | | | | | | |
| 10 | .017 | .003 | **.679*** ** | .147 | -.067 | .157 | -.035 | -.016 | -.064 | .394 |
| 11 | .020 | .185 | **.680*** ** | -.058 | -.115 | .028 | .154* | -.185* | .066 | .390 |
| 12 | -.033 | -.010 | **.818*** ** | -.079 | .032 | .018 | .032 | .111 | -.068 | .308 |
| 13 | .039 | .008 | **.386*** ** | .038 | .508*** | -.015 | -.107* | .131* | -.051 | .380 |
| Extrinsic Social - Approach | | | | | | | | | | |
| 14 | -.058 | .219 | -.056 | **.458** ** | -.016 | .093 | .213* | .009 | -.068 | .455 |
| 15 | -.091 | -.189 | .020 | **.751*** ** | .077 | -.144* | -.071 | .033 | -.039 | .341 |
| 16 | .011 | .205* | -.042 | **.292** ** | .066 | .295*** | .186* | .035 | -.013 | .429 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 17 | .116* | -.174 | .094 | **.702*** ** | .017 | -.023 | -.024 | .077 | .171 | .411 |
| Extrinsic Material - Approach | | | | | | | | | | |
| 18 | -.023 | -.085 | .081 | .045 | **.807*** ** | .001 | .060 | -.027 | .080 | .225 |
| 19 | .037 | .008 | .053 | -.058 | **.743*** ** | .002 | .001 | .033 | -.104* | .437 |
| 20 | -.027 | .022 | .060 | .104 | **.736*** ** | .014 | .038 | .035 | .071 | .269 |
| 21 | -.015 | .129* | .032 | .050 | **.694*** ** | .002 | .047 | .077 | .025 | .413 |
| Introjected - Avoidance | | | | | | | | | | |
| 22 | .001 | .063 | .093 | .040 | -.038 | **.682*** ** | -.040 | -.027 | -.015 | .429 |
| 23 | -.013 | .125 | -.020 | -.046 | .079 | **.666*** ** | .171* | .033 | -.027 | .308 |
| 24 | .000 | -.032 | .146 | .048 | -.003 | **.782*** ** | -.060 | .011 | .054 | .319 |
| 25 | -.081 | -.045 | .058 | .006 | -.013 | **.705*** ** | .074 | -.059 | .076 | .284 |
| Introjected - Approach | | | | | | | | | | |
| 26 | .029 | -.009 | .004 | .164 | -.010 | .141 | **.578*** ** | .063 | .038 | .290 |
| 27 | .016 | .006 | .035 | -.082 | .037 | .009 | **.829*** ** | .040 | .028 | .317 |
| 28 | -.115* | -.084 | .050 | .127 | .023 | -.052 | **.746*** ** | -.032 | .054 | .248 |
| 29 | .012 | .009 | .034 | -.027 | .088 | .024 | **.724*** ** | .114 | .046 | .296 |
| Identified | | | | | | | | | | |
| 30 | -.082 | -.051 | .020 | .054 | .045 | .060 | .025 | **.299*** ** | .523*** | .232 |
| 31 | -.075 | -.042 | .012 | .135 | -.011 | .045 | .117 | **.605*** ** | .017 | .298 |
| 32 | -.121 | .050 | -.011 | -.025 | -.023 | .015 | .132 | **.748*** ** | .031 | .162 |
| 33 | -.103 | -.094 | .056 | .148 | -.011 | .079 | .018 | **.512*** ** | .201*** | .253 |
| Intrinsic Motivation | | | | | | | | | | |
| 38 | -.189*** | .025 | .013 | .015 | .020 | .047 | .053 | .129* | **.668*** ** | .143 |
| 39 | -.076 | .023 | -.083 | .072 | .047 | -.016 | .078 | .053 | **.716*** ** | .254 |
| 40 | -.132 | -.034 | .060 | .102 | .019 | .032 | .241** | .112 | **.306*** ** | .468 |
| 41 | -.027 | .076 | -.052 | .075 | .041 | .107* | .020 | .310 | **.569*** ** | .247 |

*Note*. λ = standardized loading; δ = uniqueness; bold = ESEM target factor loadings.
* $p < .05$; ** $p < .01$; ***$p < .001$.

# Appendix E:

## Means for the chosen 6-profile MWMS and Mindset Measure solution

*MWMS 6-profile solution means*

| Motivation type | P1 Amotivated (26, 5%) | P2 Moderately amotivated with material external (38, 8%) | P3 Moderately amotivated external (67, 13%) | P4 Neutral (116, 23%) | P5 Fully motivated (167, 33%) | P6 Autonomous (86, 17%) |
|---|---|---|---|---|---|---|
| Amotivation | 1.879 | 1.231 | 0.844 | 0.103 | -0.663 | -0.719 |
| External social | -1.605 | 0.017 | 0.759 | -0.249 | 0.594 | -0.988 |
| External material | -0.526 | 0.588 | 0.636 | -0.107 | 0.358 | -1.22 |
| Introjected | -1.88 | -0.538 | 0.281 | -0.266 | 0.64 | -0.3 |
| Identified | -2.285 | -1.469 | 0.095 | -0.396 | 0.658 | 0.572 |
| Intrinsic motivation | -1.712 | -1.545 | -0.074 | -0.455 | 0.654 | 0.665 |

*Note:* Numbers in parentheses are class counts and sample percentages respectively.

*Mindset 6-profile solution means*

| Motivation type | P1 Amotivated (57, 11%) | P2 Amotivated socially avoidant (69, 14%) | P3 Avoidance motivated (102, 20%) | P4 Neutral (121, 24%) | P5 Approach motivated (124, 25%) | P6 Autonomous (57, 11%) |
|---|---|---|---|---|---|---|
| Amotivation | 1.168 | 1.167 | 0.532 | -0.022 | -0.798 | -1.098 |
| External Social Avoidance | -1.193 | 0.513 | 0.857 | -0.29 | 0.136 | -1.2 |
| External Material Avoidance | -1.126 | 0.089 | 0.655 | -0.281 | 0.482 | -1.119 |
| External Social Approach | -2.082 | -0.649 | 0.533 | -0.223 | 0.781 | -0.37 |
| External Material Approach | -0.551 | -0.515 | 0.335 | -0.045 | 0.504 | -0.664 |
| Introjected Avoidance | -2.061 | -0.096 | 0.357 | -0.433 | 0.622 | 0.032 |
| Introjected Approach | -2.418 | -0.56 | 0.24 | -0.373 | 0.751 | 0.533 |
| Identified | -1.746 | -1.424 | 0.021 | -0.004 | 0.847 | 0.658 |
| Intrinsic Motivation | -1.232 | -1.17 | -0.084 | -0.037 | 0.691 | 0.697 |

*Note:* Numbers in parentheses are class counts and sample percentages respectively.

# Appendix F:

## Statistical indicators for MWMS and mindset profiles

*Statistical indicators for 1-10 profile solutions for the MWMS*

| Number of profiles | AIC | BIC | SABIC | Entropy |
|---|---|---|---|---|
| 1 | 8138.297 | 8188.873 | 8150.784 | |
| 2 | 7378.747 | 7458.825 | 7398.518 | 0.917 |
| 3 | 7080.226 | 7189.806 | 7107.28 | 0.853 |
| 4 | 6835.181 | 6974.263 | 6869.519 | 0.844 |
| 5 | 6691.333 | 6859.918 | 6732.955 | 0.866 |
| 6 | 6609.168 | 6807.255 | 6658.074 | 0.854 |
| 7 | 6544.96 | 6772.549 | 6601.15 | 0.837 |
| 8 | 6500.529 | 6757.62 | 6564.002 | 0.834 |
| 9 | 6461.752 | 6748.345 | 6532.509 | 0.85 |
| 10 | 6420.145 | 6736.24 | 6498.186 | 0.845 |

*Note.* AIC = Akaïke information criterion; BIC = Bayesian information criterion; SABIC = Sample-size adjusted BIC.

*Statistical indicators for 1-10 profile solutions for the Mindset Measure*

| Number of profiles | AIC | BIC | SABIC | Entropy |
|---|---|---|---|---|
| 1 | 12244.066 | 12319.928 | 12262.795 | |
| 2 | 11254.594 | 11372.603 | 11283.729 | 0.914 |
| 3 | 10897.698 | 11057.854 | 10937.239 | 0.878 |
| 4 | 10521.109 | 10723.41 | 10571.055 | 0.853 |
| 5 | 10283.936 | 10528.384 | 10344.288 | 0.86 |
| 6 | 10096.034 | 10382.627 | 10166.791 | 0.865 |
| 7 | 9987.21 | 10315.95 | 10068.373 | 0.874 |
| 8 | 9885.626 | 10256.511 | 9977.194 | 0.886 |
| 9 | 9801.862 | 10214.894 | 9903.836 | 0.888 |
| 10 | 9745.4 | 10200.578 | 9857.779 | 0.892 |

*Note.* AIC = Akaïke information criterion; BIC = Bayesian information criterion; SABIC = Sample-size adjusted BIC.

# Appendix G:

## BCH mean-equality tests for the MWMS

*Results from the BCH Chi-Square Tests of Mean Equality for the 6-Profile Solution of the MWMS*

| Variable | Profile Outcome Means | | | | | | Comparisons |
|---|---|---|---|---|---|---|---|
| | P1. | P2. | P3. | P4. | P5. | P6. | |
| Engagement | 0.89 | 1.604 | 3.303 | 2.883 | 4.589 | 4.785 | P6 = P5 > P3 > P4 > P2 > P1 |
| Affective Commitment | 1.539 | 1.79 | 3.482 | 2.83 | 4.483 | 4.08 | P5 > P6 > P3 > P4 > P2 = P1 |
| Work Performance | 4.466 | 4.811 | 5.089 | 5.135 | 5.835 | 5.906 | P6 = P5 > P4 = P3 = P2 = P1<br>P4 > P1 |
| Turnover Intentions | 5.726 | 4.507 | 4.46 | 3.668 | 2.601 | 3.099 | P1 > P2 = P3 > P4 > P5 =P6 |
| Autonomy Satisfaction | 2.286 | 2.086 | 3.213 | 3.064 | 4.049 | 4.083 | P6 = P5 > P3 = P4 > P1 = P2 |
| Competence Satisfaction | 3.447 | 3.311 | 3.579 | 3.78 | 4.383 | 4.58 | P6 > P5 > P4 = P3 = P2 = P1<br>P4 > P2 |
| Relatedness Satisfaction | 3.056 | 3.077 | 3.446 | 3.443 | 4.253 | 4.153 | P5 = P6 > P4 > P3 = P2 = P1 |
| Autonomy Frustration | 3.528 | 3.802 | 3.363 | 3.023 | 2.406 | 2.124 | P2 = P1 = P3 > P4 > P5 > P6<br>P2 > P3 |
| Competence Frustration | 2.421 | 3.181 | 3.22 | 2.266 | 1.993 | 1.473 | P3 = P2 > P1 = P4 > P5 > P6 |
| Relatedness Frustration | 2.384 | 2.64 | 2.966 | 2.199 | 1.642 | 1.482 | P3 = P2 = P1 = P4 > P5 = P6<br>P3 > P1 |
| Physical Health Complaints | 9.486 | 7.154 | 9.961 | 5.657 | 5.569 | 4.017 | P3 = P1 = P2 = P4 = P5 > P6<br>P3 > P2 / P1 > P4 |
| Work Stress | 5.314 | 6.087 | 6.428 | 5.877 | 5.682 | 5.065 | P3 = P2 = P4 = P5 = P1 = P6<br>P3 > P5 / P4 > P6 |
| Global Autonomy | 3.56 | 4.406 | 4.846 | 4.743 | 5.417 | 5.794 | P6 > P5 > P3 = P4 = P2 > P1<br>P3 > P2 |
| Global Control | 4.389 | 4.536 | 4.298 | 3.801 | 3.333 | 2.886 | P2 = P1 = P3 > P4 > P5 > P6 |
| Global Motivation Strength | 1.706 | 2.57 | 3.415 | 3.164 | 3.915 | 4.038 | P6 = P5 > P3 = P4 > P2 > P1 |

*Note*. = indicates no significant difference between the profiles on the outcomes; > indicates a significant difference between the profiles on the variable and the direction of the relationship.

# Appendix H:

## BCH mean equality tests for the mindset measure

*Results from the BCH Chi-Square Tests of Mean Equality for the 6-Profile Solution of the Mindset Measure*

| Variable | Profile Outcome Means | | | | | | Comparisons |
|---|---|---|---|---|---|---|---|
| | P1. | P2. | P3. | P4. | P5. | P6. | |
| Engagement | 1.012 | 1.915 | 3.378 | 3.407 | 4.946 | 4.877 | P5 = P6 > P4 = P3 > P2 > P1 |
| Affective Commitment | 1.57 | 2.016 | 3.409 | 3.295 | 4.773 | 4.262 | P5 > P6 > P4 = P3 > P2 = P1 |
| Work Performance | 4.567 | 4.989 | 5.04 | 5.227 | 6.093 | 6.039 | P5 = P6 > P4 = P3 = P2 = P1<br>P4 > P2 |
| Turnover Intentions | 5.403 | 4.665 | 4.103 | 3.277 | 2.559 | 2.689 | P1 = P2 = P3 > P4 > P5 = P6<br>P1 > P3 |
| Autonomy Satisfaction | 2.133 | 2.374 | 3.221 | 3.36 | 4.347 | 4.115 | P5 > P6 > P4 = P3 > P2 = P1 |
| Competence Satisfaction | 3.481 | 3.413 | 3.602 | 3.935 | 4.656 | 4.634 | P5 = P6 > P4 > P3 = P1 = P2 |
| Relatedness Satisfaction | 2.846 | 3.197 | 3.585 | 3.555 | 4.481 | 4.23 | P5 = P6 > P3 = P4 > P2 = P1 |
| Autonomy Frustration | 3.64 | 3.786 | 3.365 | 2.604 | 2.22 | 1.954 | P2 = P1 = P3 > P4 > P5 = P6<br>P2 > P3 |
| Competence Frustration | 2.326 | 3.041 | 3.278 | 2.139 | 1.556 | 1.277 | P3 = P2 > P1 = P4 > P5 > P6 |
| Relatedness Frustration | 2.435 | 2.501 | 2.664 | 2.104 | 1.468 | 1.375 | P3 = P2 = P1 = P4 > P5 = P6<br>P3 > P4 |
| Physical Health Complaints | 9.319 | 8.491 | 9.733 | 4.724 | 4.096 | 3.993 | P3 = P1 = P2 > P4 = P5 = P6 |
| Work Stress | 5.057 | 6.513 | 6.86 | 5.466 | 5.356 | 4.598 | P3 = P2 > P4 = P5 = P1 > P6 |
| Global Autonomy | 3.776 | 4.458 | 5.05 | 4.851 | 5.591 | 5.76 | P6 = P5 > P3 = P4 > P2 > P1 |
| Global Control | 4.06 | 4.616 | 4.339 | 3.521 | 3.072 | 2.649 | P2 = P3 = P1 = P4 > P5 > P6<br>P2, P3 > P4 |
| Global Motivation Strength | 1.963 | 2.724 | 3.327 | 3.319 | 4.191 | 4.095 | P5 = P6 > P3 = P4 > P2 > P1 |

*Note*. = indicates no significant difference between the profiles on the outcomes; > indicates a significant difference between the profiles on the variable and the direction of the relationship.

Western Research

**Date:** 25 May 2022

**To:** Prof. John Meyer

**Project ID:** 119792

**Study Title:** Motivation and Well-Being at Work

**Short Title:** Motivation and Well-Being at Work

**Application Type:** NMREB Initial Application

**Review Type:** Delegated

**Full Board Reporting Date:** 03/Jun/2022

**Date Approval Issued:** 25/May/2022 15:48

**REB Approval Expiry Date:** 25/May/2023

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Dear Prof. John Meyer

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the above mentioned study, as of the date noted above. NMREB approval for this study remains valid until the expiry date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

This research study is to be conducted by the investigator noted above. **All other required institutional approvals and mandated training must also be obtained prior to the conduct of the study.**

**Documents Approved:**

| Document Name | Document Type | Document Date | Document Version |
|---|---|---|---|
| Recruitment Posting for Prolific | Recruitment Materials | 29/Apr/2022 | 1 |
| LOI and consent CLEAN | Implied Consent/Assent | 20/May/2022 | 2 |
| Motivation and Well-Being at Work survey | Online Survey | 20/May/2022 | 2 |

No deviations from, or changes to the protocol should be initiated without prior written approval from the NMREB, except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the trial.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Please do not hesitate to contact us if you have any questions.

Sincerely,

Ms. Zoë Levi, Research Ethics Officer on behalf of Dr. Randal Graham, NMREB Chair

***Note: This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).***

Leonid V. Beletski
Graduate student
Department of Psychology, Western University

## Education

MSc, Industrial/Organizational Psychology — 2020 - 2022
Western University — (Expected)
Supervisor: Dr. John Meyer

BA, Honours Specialization in Psychology, Minor in Philosophy — 2015 - 2019
Huron University at Western
Thesis Supervisor: Dr. Irene Cheung

## Refereed Publications

Meyer, J. P., Espinoza, J. A., Vaters, C., Anderson, B. K., & Beletski, L. V. (2022). Motivational mindsets versus reasons for action: implications for the dimensionality debate in self-determination theory. *Motivation and Emotion*, 1-22.

## Conference Publications

Daljeet, K., Moon, B., Harwood, H., Awad, W., Beletski, L. V., & O'Neill, T. (2021, June 7-25). *A Pairwise Meta-Analysis of Faking Warnings* [Poster presentation]. 82nd Annual Convention for the Canadian Psychological Association.

Moon, B., Daljeet, K., Awad, W., Harwood, H., Beletski, L. V, & O'Neill, T. (2021, June 7-25). *Comparing the effectiveness of faking warning types within pre-employment personality tests: A Network Meta-Analysis* [Poster presentation]. 82nd Annual Convention for the Canadian Psychological Association.

## Forthcoming Contributions

Meyer, J. P., & Beletski, L. V. (Accepted) Building Commitment to Organizational Change: The Important Role of Change Leadership. In Oreg, S., Michel, A., & Todnem By, R. (Eds.) *The Psychology of Organizational Change: New Insights on the Antecedents and Consequences of Individuals' Responses to Change.* Cambridge University Press.

## Relevant Experience

*Ahria Consulting*
Associate – Personnel Assessment — 2021-Present

*Western University Psychology Department*
Graduate Research Assistant – Meyer Lab — 2020 - Present
Graduate Teaching Assistant, Psychology 2800E – Research Methods in Psychology — 2020 - Present

| | |
|---|---|
| Undergraduate Research Assistant – Allen Lab | 2019 - 2020 |

*Ivey Business School*

| | |
|---|---|
| Internal Research Ethics Review Coordinator | 2021 - 2022 |
| Behavioural Lab Coordinator | 2019 - 2020 |
| Undergraduate Research Assistant | 2018 - 2019 |

*Huron University at Western*

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|---|---|
| Educational Development Intern | 2019 - 2020 |
| Psychology Program Research and Teaching Intern | 2019 - 2020 |
| Grading Assistant – Psychology 2830, Statistics in Psychology | 2019 - 2020 |
| Writing Services Fellow – Library and Learning Services | 2018 - 2019 |
| Research Assistant – Cheung Lab | 2017 - 2019 |

## Recognition, Awards, Scholarships

| | |
|---|---|
| Joseph Armand Bombardier Canada Graduate Scholarship-Master's CGS-M | 2020 |
| Alberta Graduate Excellence Scholarships (AGES) - Master's Research (Declined) | 2020 |
| CPA Certificate of Academic Excellence | 2019 |
| Graduation with Distinction | 2019 |
| Centre for Undergraduate Research Learning fellowship | 2019 |
| Dr. Nelson Heapy Award in Social Psychology | 2018 |
| Professor Frederick Walter Burd Prize in Psychology | 2018 |
| Huron Achievement Award | 2015 - 2019 |
| Deans Honour List | 2015 - 2019 |

## Memberships and Committee Service

| | |
|---|---|
| Psychology Graduate Affairs Committee – Student Representative | 2021 - Present |
| IO Psychology Website and Social Media Committee – Co-Chair | 2021 - Present |
| Huron Psychology Association Executive Member – Vice President, Finance | 2019 |