

Educational and Psychological Measurement

<http://epm.sagepub.com/>

The Motivation at Work Scale: Validation Evidence in Two Languages

Marylène Gagné, Jacques Forest, Marie-Hélène Gilbert, Caroline Aubé, Estelle Morin
and Angela Malorni

Educational and Psychological Measurement 2010 70: 628 originally published online
21 January 2010

DOI: 10.1177/0013164409355698

The online version of this article can be found at:

<http://epm.sagepub.com/content/70/4/628>

Published by:



<http://www.sagepublications.com>

Additional services and information for *Educational and Psychological Measurement* can be found
at:

Email Alerts: <http://epm.sagepub.com/cgi/alerts>

Subscriptions: <http://epm.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

Citations: <http://epm.sagepub.com/content/70/4/628.refs.html>

>> [Version of Record](#) - Jul 15, 2010

[Proof](#) - Jan 21, 2010

[What is This?](#)

The Motivation at Work Scale: Validation Evidence in Two Languages

Marylène Gagné,¹ Jacques Forest,²
Marie-Hélène Gilbert,³ Caroline Aubé,⁴
Estelle Morin,⁴ and Angela Malorni¹

Abstract

The Motivation at Work Scale (MAWS) was developed in accordance with the multi-dimensional conceptualization of motivation postulated in self-determination theory. The authors examined the structure of the MAWS in a group of 1,644 workers in two different languages, English and French. Results obtained from these samples suggested that the structure of motivation at work across languages is consistently organized into four different types: intrinsic motivation, identified regulation, introjected regulation, and external regulation. The MAWS subscales were predictably associated with organizational behavior constructs. The importance of this new multidimensional scale to the development of new work motivation research is discussed.

Keywords

scale, work motivation, self-determination theory, intrinsic motivation, extrinsic motivation

Despite the fact that work motivation is one of the major topics in organizational behavior, not many work motivation surveys exist. Exceptions include an individual difference measure by Amabile, Hill, Hennessey, and Tighe (1994) and a measure of goal orientations by VandeWalle (1997). We developed and validated scores on the Motivation at Work Scale (MAWS) based on the framework of self-determination theory (SDT; Deci & Ryan, 1985b, 2000). SDT offers a multidimensional conceptualization of

¹Concordia University, Montreal, Quebec, Canada

²Université du Québec à Montréal, Montreal, Quebec, Canada

³Université de Montréal, Montreal, Quebec, Canada

⁴École des Hautes Études Commerciales, Montreal, Quebec, Canada

Corresponding Author:

Marylène Gagné, Department of Management, John Molson School of Business, Concordia University,
1455 de Maisonneuve West, Montreal, Quebec H3G 1M8, Canada
Email: mgagne@jmsb.concordia.ca

motivation that allows the assessment of level of motivation *and* type of motivation. Following the SDT tradition (Grolnick & Ryan, 1987; Guay, Vallerand, & Blanchard, 2000; Pelletier et al., 1995; Ryan & Connell, 1989; Vallerand, Blais, Brière, & Pelletier, 1989; Vallerand et al., 1992), we created the MAWS in two different languages, assessed its structure using confirmatory factor analysis with invariance tests, and examined its links to antecedents and outcomes that are relevant to organizational behavior (Gagné & Deci, 2005).

The Continuum of Motivation

SDT proposes two overarching types of motivation: intrinsic and extrinsic. **Intrinsic motivation is defined as doing something for its own sake because it is interesting and enjoyable.** **Extrinsic motivation is defined as doing something for instrumental reasons.** These instrumental reasons can differ, depending on how internalized the motivation is. Internalization refers to taking in a regulation that was initially regulated by external factors, such as rewards or punishments, so that it becomes internally regulated (Ryan, 1995). **Internalization can vary in terms of how well it is assimilated with a person's existing self-regulations,** such as values and interests that this person already holds. The degree to which a regulation is internalized gives rise to different types of regulations or motivations, so that extrinsic motivation can be completely externally regulated, or can be partially or fully internally regulated.

At the low end lies **external regulation, which refers to doing an activity in order to obtain rewards or avoid punishments.** Behavior so regulated is therefore completely noninternalized. Next, **introjected regulation refers to the regulation of behavior through self-worth contingencies such as ego-involvement and guilt.** It involves taking in a regulation so that it becomes internally pressuring, and thus implies partial internalization that remains controlling. Introjected people engage in a behavior or commit to an activity out of guilt or compulsion, or to maintain their self-worth (Koestner & Losier, 2002). Next, **identified regulation refers to doing an activity because one identifies with its value or meaning,** and accepts it as one's own, which means that it is autonomously regulated. Identified people engage in a behavior or commit to an activity based on its perceived meaning or its relation to personal goals (Koestner & Losier, 2002). Finally, **integrated regulation refers to identifying with the value of an activity to the point that it becomes part of a person's habitual functioning and part of the person's sense of self.** **This is the form of extrinsic motivation** that is most autonomous. We would say that a nurse is identified if she fully endorses cleaning a patient to improve his health, even though it may not be an enjoyable task (thus not intrinsically motivated), but the motivation would be integrated if the nurse goes further to say that her job is a "vocation." Integration and identification differ from intrinsic motivation in that the activity is done not so much for its own sake (because it is interesting and fun), but for the instrumental value it represents. Identification and integration are driven by values and goals, whereas **intrinsic motivation is driven by emotions that emerge while engaging in the activity.**

Research in different domains, such as education (Williams & Deci, 1996), sports (Li & Harmer, 1996; Vallerand & Fortier, 1998), work (Blais, Brière, Lachance, Riddle, & Vallerand, 1993), and health care (Williams, Grow, Freedman, Ryan, & Deci, 1996), has supported that the types of motivation form a simplex-like pattern (Guttman, 1954) that represents variation in the underlying degree of internalization, which means that each subscale correlates most positively with adjacent subscales (e.g., intrinsic and identified regulation) and less positively or more negatively with non-adjacent subscales (e.g., intrinsic and external regulation). However, even if they are on one continuum, research has repeatedly shown that there is a clear break in the consequences of each type of motivation. If we break the continuum down the middle, we can recategorize the types of motivation such that external regulation and introjection represent *controlled motivation*, and identification, integration, and intrinsic motivation represent *autonomous motivation*. Depending on the research question of interest, we can sometimes use these aggregates, and sometimes use the discrete types of motivation. Koestner and Losier (2002) have shown that we can find different behavioral and attitudinal differences between introjection, identification, and intrinsic motivation in certain domains, such as environmental behavior (Pelletier, Tuson, Greene-Demers, Noels, & Beaton, 1998) and political behavior (Koestner, Losier, Vallerand, & Carducci, 1996).

Creation of the Motivation at Work Scale

Across psychology fields, SDT has yielded more than 400 empirical publications since the early 1980s. It is a dominant theory of motivation in social, education, and sport psychology. In these fields, validated measures of motivation already exist (Grolnick & Ryan, 1987; Guay et al., 2000; Pelletier et al., 1995; Ryan & Connell, 1989; Vallerand et al., 1989; Vallerand et al., 1992), but we do not have a practical measure of work motivation that yields reliable and valid scores and that follows the tradition of SDT in the field of organizational behavior. Blais et al. (1993) published a French measure of work motivation that was grounded in SDT but there have been low internal consistency problems (Cronbach's alpha in the .50s) in many samples of workers with some of the subscales (especially the external regulation subscale) as well as face validity problems with some of the items (Gagné, Bérubé, Donia, Houltfort, & Koestner, 2007; Gagné, Boies, Koestner, & Martens, 2004, 2005; Gagné, Chemolli, Forest, & Koestner, 2008). For example, an intrinsic motivation item in the Blais et al. scale is "Because of the pleasurable experience of learning new things at this job." It is difficult to know if this should represent identified or intrinsic motivation. In addition, the Blais et al. (1993) scale is a long 31-item scale and has not been developed in English.

Intrinsic motivation and each type of extrinsic motivation are reflected in different reasons for behaving, and these reasons provide a means for assessing the types of motivation (Ryan & Connell, 1989). Incumbents rate various reasons for doing a particular behavior or activity that reflect intrinsic motivation or one of the types of

extrinsic motivation in terms of how true they are for them. Motivation can be assessed at different levels of analysis. Vallerand (1997) suggested that motivation can be measured at the life or global level, at the domain level (e.g., work, education, leisure), and at the state level (e.g., specific task, specific period of time). The MAWS assesses work motivation at the domain level, but other scales exist to measure, for example, teachers' work motivation for specific job tasks (Fernet, Senécal, Guay, Marsh, & Dowson, 2008).

We created items to measure different work-related behavioral regulations that represent the range of the continuum of motivation to do a particular job. We chose to focus on specific types of motivation that we thought were most useful to assess in the work domain. For the sake of creating a brief and practical measure, we made the choice to omit some subscales. We did not include amotivation (i.e., lack of any type of motivation) items to focus instead on active types of motivation. We also did not include integration items as it has typically been very difficult to psychometrically distinguish integration from identification (Vallerand et al., 1992). We therefore created five items for each of the following subscales: external regulation, introjection, identification, and intrinsic motivation. Six of the items were taken from the Blais et al. (1993) scale, reworded for simplification, and translated into English. The other items were created simultaneously in French and English by the first author.

Testing the Motivation at Work Scale

We administered the MAWS along with other scales described below to various samples of French- and English-speaking Canadian workers. We conducted confirmatory factor analyses to trim down the MAWS to 12 items and test its invariance across the two languages. To test the validity of the MAWS, we used the model depicted in Gagné and Deci (2005), whereby managers, job design, and rewards affect the satisfaction of three basic psychological needs for competence, autonomy, and relatedness, which in turn influence autonomous motivation. SDT suggests that intrinsic motivation and the internalization of extrinsic motivation are determined by the degree to which people can satisfy three basic psychological needs for autonomy, competence, and relatedness in the environment in which the activity takes place. The satisfaction of these needs can be affected by environmental pressures, such as deadlines, surveillance, and contingent rewards (Amabile, DeJong, & Lepper, 1976; Deci, Koestner, & Ryan, 1999; Fernet et al., 2008; Lepper & Greene, 1975). It can also be affected by interpersonally controlling or supportive behavior of an authority figure, such as a teacher or a manager (Deci et al., 2001; Koestner, Ryan, Bernieri, & Holt, 1984; Lepper & Greene, 1975). Finally, it can be affected by the design of tasks and jobs (Gagné, Senécal, & Koestner, 1997). To test some of these premises, we included a measure of need satisfaction in one of the samples, expecting that need satisfaction would be positively related to intrinsic motivation and identified regulation, and negatively related to introjected and external regulation. We also used a popular measure of perceived organizational support (Eisenberger, Huntington, Hutchison, & Sowa, 1986), expecting that it would be positively related to autonomous motivation and

unrelated to controlled motivation. SDT also proposes that certain individual differences or dispositions can influence the type of adopted motivation, such as *causality orientations* (Deci & Ryan, 1985a). We chose not to test causality orientations because the scale has consistently showed psychometric problems, such as low internal consistency and factor structure problems, which makes it difficult to use. Because Deci and Ryan (1985a) found that being high on the autonomous causality orientation was positively associated with self-esteem and negatively with self-derogation, we examined links between work motivation and trait optimism, a stable disposition that we think can also influence the degree of internalization of an activity.

We also examined links between the different types of motivation and some of the outcomes that have been studied in other validations of similar SDT-based scales, as well as some organizationally relevant outcomes: work satisfaction, organizational commitment, turnover intentions, well-being, and psychological distress. Again, we expected that intrinsic and identified motivation would be positively correlated to positive outcomes (i.e., work satisfaction, affective commitment, and well-being), and negatively to negative outcomes (i.e., turnover intentions and psychological distress), and that the opposite pattern would be found with external and introjected regulation. Finally, we compared the motivation scores of employees in different types of jobs to see if we could find motivation differences based on the type of work they do. Workers in jobs that typically have low autonomy or low decision-making power, poor relationships, or low competence would be expected to score higher on controlled motivation and lower on autonomous motivation.

Method

Participants and Measures

Data were collected from convenience samples of Canadian workers in different industries, in two different languages.

English version. First, we contacted 2,795 pilots from a commercial airline company by e-mail through their union to complete a Web survey. Measures included the MAWS, a short eight-item version of the perceived organizational support scale (Eisenberger et al., 1986) on a 1 (*completely disagree*) to 7 (*completely agree*) scale ($\alpha = .86$ in this sample), and a five-item satisfaction with work scale (Gagné et al., 2007) on a 1 (*completely disagree*) to 7 (*completely agree*) scale ($\alpha = .71$ in this sample). Eisenberger et al. (1986) reported equivalent results using the short eight-item version of the perceived organization support scale and the previously longer version. Gagné et al. (2007) demonstrated the validity of scores on the adapted Diener, Emmons, Larson, and Griffin's (1985) life satisfaction scale to the work domain as a measure of work-related well-being. A total of 881 pilots completed the survey (32% response rate), out of which 98% were men with an average age of 52 years.

Second, 55 middle managers out of 66 who were contacted in four different ground transportation companies also completed the MAWS, 69% of which were men with an

average age of 43.91 years and 3.5 years of tenure in the company. Finally, 130 undergraduate commerce students who worked part-time (86%) or full-time completed a Web survey that comprised the MAWS as well as the measure of work satisfaction (Gagné et al., 2007) in exchange for extra credit. A total of 53% were men with an average age of 22 years.

French version. Twenty-three advanced undergraduate students distributed paper surveys to 285 French Canadian workers who were categorized to work in one of four employment sectors: technical/manual jobs, sales/service jobs, health/education jobs, and managerial/professional jobs. The survey included the MAWS, measures of the satisfaction of the needs for autonomy (three items, $\alpha = .87$ in this sample), competence (five items, $\alpha = .70$), and relatedness (three items, $\alpha = .79$), total $\alpha = .84$ (Morin, 2003), as well as a 10-item measure of trait optimism ($\alpha = .70$ in this sample; Scheier, Carver, & Bridges, 1994; Trottier, 1999), measured using a 1 (*strongly disagree*) to 4 (*strongly agree*) scale (this scale was mistakenly used for the MAWS also, so we z-scored all French data for analyses). A total of 63% were men with an average age of 39 years and 7.5 years of tenure at their work.

A total of 249 correctional officers and conditional liberation officers working at a maximum security Canadian prison (out of 398 workers) completed a paper survey comprising the MAWS, affective ($\alpha = .83$ in this sample), normative ($\alpha = .73$), and continuance ($\alpha = .89$) organizational commitment (Allen & Meyer, 1996), turnover intentions (created for this survey; "It is highly probable that I will leave this job," "I will very likely look for a new job this year," $r = .62, p < .001$), and workplace well-being (23 items, $\alpha = .97$ in this sample), psychological distress (25 items, $\alpha = .98$), and self-reported physical health (five items, $\alpha = .87$) from Massé et al. (1998), who have shown evidence for the factorial structure of their scales. In all, 63% were men with an average age of 42.43 years and 11.5 years of tenure in the organization.

Statistical Analysis Strategy

We conducted confirmatory factor analysis using a robust maximum likelihood estimation method on each of the samples' covariance matrices because the normalized Mardia's coefficient for multivariate kurtosis was 33.00 in the English sample and 50.31 in the French sample. We found no outliers, and residuals were within bounds and normally distributed. We eliminated items that had a low pattern coefficient on their own latent factor and cross-loadings across all of the samples (based on Lagrange multiplier tests). We eliminated two items per subscale to bring the MAWS down to three items per factor to make it parsimonious (from 20 to 12 items) while maintaining reliability, stability, and interpretability (Tabachnick & Fidell, 2006). Once 12 items were selected, we proceeded to test the factorial invariance of the MAWS across the two languages. To test the factorial invariance of a measuring instrument implies testing different models that become more stringent each time (Byrne, 2006; Cheung & Rensvold, 1999, 2002; Steenkamp & Baumgartner, 1998; Vandenberg & Lance, 2000). We tested whether the pattern coefficients, and then whether the factor structure (i.e.,

correlations between latent factors), were invariant across languages. We did not test whether the latent factor means were invariant across languages because we consider it normal for means to vary within and across groups, as variation would depend on job type, managerial styles, and work-related factors.

To assess the fit of the model, goodness-of-fit indices were used in combination with the Satorra–Bentler χ^2 statistic. We used the comparative fit index (CFI; Bentler, 1990), the root mean square error of approximation (RMSEA; Steiger, 1990), and the RMSEA 90% confidence interval (Cheung & Rensvold, 2002). Values between 0.90 and 0.94 for the CFI indicate adequate fit, whereas values of 0.95 and higher indicate excellent fit. Values smaller than 0.10 for the RMSEA indicate acceptable fit, values smaller than 0.08 indicates good fit, and values lower than 0.05 indicate excellent fit. RMSEA 90% confidence interval (CI) was also used to assess hypotheses of very close fit (RMSEA < 0.05) and no fit (McCallum, Browne, & Sugawara, 1996).

We then examined the validity of the MAWS by examining correlations between the motivation subscales with antecedents and outcomes. We also tested for differences in motivation orientation between groups of workers that would be expected to differ based on the type of work they do and their hierarchical level.

Results

Factorial Structure

Table 1 presents latent correlations between the different motivation subscales in English and French. The factorial structure of the MAWS was assessed through confirmatory factor analysis. For each of the two languages, an initial model with four factors was postulated. These factors correspond to the four subscales and were made up of the three corresponding items for each subscale. No cross-loadings were hypothesized and the covariance between the intrinsic motivation latent factor and the external regulation latent factor was fixed at 0 because SDT postulates through the simplex-like pattern that their correlation should be close to zero or nonsignificant. The fit of this initial model was within acceptable range in English and French (see Table 2). We chose this model as our baseline model for invariance analyses (Byrne, 2006).

Invariance Analyses

When using data from both languages to test the baseline model, the model fit the data acceptably well (see Table 2). We tested the factorial invariance of the MAWS using the procedure outlined in Byrne (2006). After testing a baseline model, the second step is to verify if the measurement model (pattern coefficients) is group invariant (i.e., language invariant) whereas the third step entails examining if the structural model (correlations between latent factors) is also language invariant (Byrne, 2006). By constraining the pattern coefficients to be equal across the English- and French-speaking samples, the model still fit the data well, albeit with a negligible deterioration in model

Table 1. Intercorrelations Between the Latent Variables Representing Subscales of the Motivation at Work Scale, Alpha Coefficients and 95% Confidence Intervals (CIs)

					α Coefficients (95% CI)	
	Intrinsic	Identified	Introjected	Extrinsic	English	French
Intrinsic		.76*	.50*	.21*	.89 (.88, .95)	.93 (.92, .94)
Identified	.83*		.67*	.33*	.83 (.81, .84)	.87 (.85, .89)
Introjected	.36*	.55*		.41*	.75 (.72, .77)	.81 (.78, .84)
Extrinsic	.04	.24*	.26*		.69 (.65, .72)	.91 (.89, .92)

Note: $N = 1,644$. English correlations are below the diagonal and French correlations above the diagonal and were taken from the confirmatory factor analyses conducted on each sample separately.

* $p < .001$.

fit (see Table 2). A statistically significant deterioration in fit would imply a ΔCFI larger than -0.01 (Cheung & Rensvold, 2002). The final step entails the verification of the structural model invariance where all pattern coefficients as well as correlations between the latent factors are constrained to be equal across languages (apart from the correlation between intrinsic motivation and external regulation, which was already constrained at 0). This final invariant structural model had slightly lower fit indices than the previous model, with a statistically significant deterioration in fit (see Table 2).

It is not often the case that models succeed in going through all invariance tests and that is why Byrne (2006) suggests testing partial-measurement invariance where only specific parts of the model are verified. In this logic, she suggests identifying correlations between latent factors that are not invariant across groups. Investigation of model misspecification with the maximum likelihood Lagrange multiplier test for releasing constraints revealed that one constraint did not behave the same way in the two samples (i.e., intrinsic motivation with identified regulation). Releasing this constraint represented an improvement in chi-square that was four times larger than the one for the next suggested constraint release. Inspection of Table 1 reveals indeed that whereas the latent correlation between identified regulation and intrinsic motivation was .83 in English, it was .55 in French. Although both these correlations are still considered moderate to high, and concur with the simplex-like pattern postulated in the theory, they still differ in magnitude. By releasing this constraint, the overall fit was better and closer to the generally recognized boundary (see Table 2). Because the improvement in fit over the previous fully constrained model was greater than the recommended cut-off (see Table 2), we decided to keep this model as our final one.

As can be seen in Table 3, the MAWS is best represented through four latent factors representing intrinsic motivation, identified regulation, introjected regulation, and external regulation. Standardized pattern coefficients ranged from 0.61 to 0.95 across the two languages. This structure was invariant across English and French versions. Correlations between the latent variables ranged from .12 to .83 in the English sample,

Table 2. Fit Statistics for Each Language Separately, Languages Combined, and for Invariance Tests

Model	N	S-B χ^2	df	CFI	RMSEA	RMSEA 90% CI	Model Comparison	$\Delta\chi^2$	Δdf	ΔCFI
English only	1,115	450.43***	49	.920	.086	.079, .093				
French only	529	166.56***	49	.963	.067	.056, .079				
Baseline	1,644	803.92***	98	.910	.094	.088, .100				
model – Two languages combined										
Measurement	1,644	840.74***	106	.906	.092	.086, .098	Baseline vs. measurement	37.82***	8	-.004
model invariant (pattern coefficients)										
Structural	1,644	1032.35***	111	.882	.101	.095, .106	Measurement vs. structural	217.51***	5	-.024
model invariant (latent factor covariances and pattern coefficients)										
Structural model	1,644	916.35***	110	.897	.094	.089, .100	Structural vs. structural – I	-134.59***	1	.015
invariant (all except covariance between intrinsic and identified regulation)										
Second-order model	1,644	511.20***	49	.941	.076	.070, .082				

Note: S-B = Satorra-Bentler; df = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation; CI = confidence interval. The change in chi-square test was conducted using the standard chi-square values, as the S-B chi-square does not have the same type of distribution. *** $p < .001$.

Table 3. Unstandardized Pattern and Structure Coefficients for the Final Invariance Model

	Intrinsic Motivation			Identified Regulation			Introjected Regulation			External Regulation		
	Pattern	Str. (E)	Str. (F)	Pattern	Str. (E)	Str. (F)	Pattern	Str. (E)	Str. (F)	Pattern	Str. (E)	Str. (F)
Intri 1	1.00	6.12	2.46	0.00	3.10	0.99	0.00	2.05	0.68	0.00	0.92	0.42
Intri 2	1.06	6.01	2.54	0.00	2.50	1.16	0.00	1.81	0.93	0.00	0.80	0.71
Intri 3	0.93	5.36	2.38	0.00	2.50	0.87	0.00	1.59	0.44	0.00	0.47	0.25
Ident 1	0.00	2.39	0.87	1.00	6.12	2.23	0.00	3.53	1.42	0.00	0.98	1.21
Ident 2	0.00	2.69	1.04	1.09	5.99	2.38	0.00	4.71	1.13	0.00	0.08	0.93
Ident 3	0.00	2.57	0.94	1.09	6.58	2.27	0.00	4.59	1.11	0.00	0.60	0.76
Intro 1	0.00	1.83	0.76	0.00	4.44	1.39	1.00	6.30	2.42	0.00	0.00	1.71
Intro 2	0.00	1.73	0.68	0.00	4.29	1.26	1.04	6.48	2.46	0.00	-0.41	1.79
Intro 3	0.00	1.78	0.60	0.00	4.68	1.15	1.02	6.10	2.38	0.00	-0.28	1.83
Ext 1	0.00	1.00	0.55	0.00	1.39	1.08	0.00	0.65	1.97	1.00	3.69	2.64
Ext 2	0.00	-0.22	0.55	0.00	-1.24	1.06	0.00	-2.16	1.76	1.02	4.03	2.68
Ext 3	0.00	1.48	0.34	0.00	1.66	0.92	0.00	0.88	1.73	0.96	3.71	1.71

Note: Str.(E) = structure coefficients, English sample; Str.(F) = structure coefficients, French sample.

and from .14 to .62 in the French sample. Looking at the structure coefficients for each language in Table 3, we can see that item coefficients ranged from 3.69 to 6.58 for the target factors, and from -2.16 to 4.71 for nontarget factors in the English sample. These same item coefficients ranged from 1.71 to 2.68 for target factors and from 0.25 to 1.97 for nontarget factors in the French sample. Interestingly, the coefficients mimicked a quasi-simplex pattern as has been shown by Li and Harmer (1996) with a sport motivation scale. We finally found support for a second-order model using the overall sample, where external and introjected regulation load on a second-order latent factor labeled controlled motivation, and where identified and intrinsic motivation load on a second-order factor labeled autonomous motivation (see Table 2).

Reliabilities and Simplex Pattern

Alpha coefficients for the MAWS subscales are provided in Table 1. Out of eight alpha coefficients (four subscales in two languages), only two (introjected and extrinsic subscales in English) are below the standard of .80 (Henson, 2001; Nunally and Bernstein, 1994) but near the standard of .70 provided by Nunally (1978). Standardized correlations between the latent factors followed the hypothesized simplex pattern whereby adjacent scales are more strongly and positively related than nonadjacent scales, except that external regulation was not as strongly related to introjected regulation as expected.

Links to Hypothesized Antecedents and Outcomes

Correlations with hypothesized antecedents and outcomes are presented in Table 4. Autonomous types of motivation were related more strongly with reports of the satisfaction of the needs for autonomy, competence, and relatedness than controlled

Table 4. Correlations Between Subscales With Antecedents and Consequences

	External Regulation	Introjected Regulation	Identified Regulation	Intrinsic Motivation
Need for autonomy	.17**	.36***	.60***	.55***
Need for competence	.09	.08	.27***	.25***
Need for relatedness	.01	.07	.28***	.35***
Need satisfaction total (285 varied workers)	.12	.23***	.52***	.51***
Perceived organizational support (881 pilots)	.04	.12**	.21***	.20***
Optimism (285 workers)	.07	.06	.35***	.35***
Job satisfaction				
881 Pilots	.13***	.27***	.53***	.58***
130 Students	.14	.42***	.60***	.60***
Turnover intentions (249 COs)	-.03	-.12	-.27***	-.26***
Affective OC (249 COs)	-.18**	.38***	.64***	.59***
Normative OC (249 COs)	-.24***	.36***	.47***	.41***
Continuance OC (249 COs)	.26***	.15*	-.04	-.11
Well-being (249 COs)	-.09	.14*	.43***	.54***
Psychological distress (249 COs)	.20**	-.06	-.34***	-.48***
Self-reported physical health (249 COs)	.06	.10	.19**	.26***

Note: CO = correctional officer; OC = organizational commitment.

* $p < .05$. ** $p < .01$. *** $p < .001$.

types of motivation. Autonomous motivation was also more strongly related to perceived organizational support and optimism than controlled motivation. Autonomous motivation was also more strongly and positively related to job satisfaction, well-being, and self-reported health than controlled motivation. It was also more strongly and negatively related to turnover intentions and psychological distress. In line with Meyer, Becker, and Vandenberghe (2004), affective commitment was positively related to autonomous motivation, and continuance commitment was positively related to controlled motivation. Normative commitment was positively related to both autonomous motivation and introjected regulation.

Mean Differences on the Motivation at Work Scale

We compared the 285 French workers from the five different sectors of employment on mean subscale scores on the MAWS, similar to what Blais et al. (1993) reported in their validation study of a French-only work motivation scale. Based on the assumption that some types of work may have lower potential to satisfy basic psychological needs (i.e., some jobs typically involve lower levels of autonomy or decision making power, are likely to involve comparatively poorer relationships with managers and peers, e.g., competitive atmosphere in sales, and require lower levels of education), we

Table 5. Mean Differences on Subscales Between Work Sectors

	External Regulation	Introjected Regulation	Identified Regulation	Intrinsic Motivation
Technical/manual (<i>n</i> = 45)	2.88 ^a	2.30 ^a	2.64 ^a	2.84 ^a
Sales/service (<i>n</i> = 133)	2.68 ^{ab}	1.97 ^a	2.42 ^{ab}	2.81 ^{ab}
Health/education (<i>n</i> = 71)	2.43 ^b	1.96 ^a	2.96 ^b	3.21 ^b
Management/professional (<i>n</i> = 27)	2.67 ^{ab}	2.25 ^a	3.06 ^b	3.17 ^{ab}

Note: Different superscripts within a column denote a statistically significant difference in means. In this sample, a scale from 1 to 4 was used instead of a scale from 1 to 7.

hypothesized that some types of jobs will foster lower levels of autonomous motivation and higher levels of controlled motivation. We had four categories of (hypothetically) increasingly autonomous jobs: technical/manual jobs, sales/service jobs, health/education jobs, and managerial/professional jobs. Five respondents did not indicate their employment sector. Analysis of variance (ANOVA) tests were conducted on each subscale of the MAWS (see Table 5 for means). The ANOVAs were all statistically significant, albeit with small effect sizes: external regulation $F(3, 272) = 3.34, p < .05, f^2 = .035$; introjection $F(3, 267) = 2.68, p < .05, f^2 = .03$; identification $F(3, 270) = 9.56, p < .001, f^2 = .10$; and intrinsic motivation $F(3, 271) = 5.17, p < .01, f^2 = .05$. Scheffé tests showed that service workers were more externally regulated than health/education workers, Scheffé = .45, $p < .05, d = .18$. Manual/technical workers were less identified (Scheffé = $-.54, p < .001, d = -.68$) and intrinsically motivated (Scheffé = $-.41, p < .01, d = -.52$) than health/education workers. Manual/technical workers were also less identified than managerial/professional workers (Scheffé = $-.64, p < .01, d = -.76$). It is worth noting that the effect sizes for some of the comparisons are moderate to high.

To test whether need satisfaction could explain motivation differences across these job sectors, we repeated the ANOVAs adding an aggregate of the three needs as a covariate (homogeneity of regression tests were all nonsignificant; Tabachnick & Fidell, 2006). For external regulation, the effect of job sector actually increased slightly to $F(3, 270) = 3.43, p < .05, f^2 = .04$, when need satisfaction was taken into account, $F(1, 270) = 7.24, p < .01, f^2 = .03$. For introjected regulation, the effect of job sector dropped slightly to $F(3, 265) = 2.26, p < .10, f^2 = .025$, when need satisfaction was taken into account, $F(1, 265) = 18.83, p < .001, f^2 = .07$. For identified regulation, the effect of job sector dropped to $F(3, 268) = 7.62, p < .001, f^2 = .08$, when need satisfaction was taken into account, $F(1, 268) = 89.35, p < .001, f^2 = .25$. For intrinsic motivation, the effect of job sector dropped to $F(3, 269) = 4.06, p < .05, f^2 = .04$, when need satisfaction was taken into account, $F(1, 269) = 100.01, p < .001, f^2 = .27$. Therefore, need satisfaction was more strongly related to identified regulation and intrinsic motivation, and this effect explains the effects of working in job sectors that may differentially influence need satisfaction. Interestingly, need satisfaction was not strongly related to external and introjected regulation. Therefore, in the case where we found that external regulation differed in manual/technical versus health/education jobs, it

was not because people's needs were less satisfied in manual professions, but probably because of other job differences.

Discussion

We developed the MAWS and tested its factorial structure and validity in two languages: French and English. The MAWS was related in expected directions with other constructs that are relevant to the domain of organizational behavior. Autonomous motivation was related to hypothesized antecedents, such as the satisfaction of the psychological needs for competence, relatedness, and autonomy as well as with perceived organizational support and optimism. Controlled motivation was unrelated to these antecedents. Autonomous motivation was also positively related to hypothesized outcomes, such as job satisfaction, well-being, and affective commitment, and negatively related to turnover intentions and psychological distress. Although we had expected controlled motivation to be negatively related to the outcomes, we found instead that it was unrelated to them. The only outcome that controlled motivation was related to, as expected in Meyer et al. (2004), was continuance commitment. This supports SDT's assertion that autonomous motivation yields more positive outcomes than controlled motivation and concurs with a number of studies that have shown the advantage of using a more differentiated assessment of motivation, as different forms of motivation yield different consequences (Deci & Ryan, 2000; Koestner & Losier, 2002).

Mean differences between scores of workers employed in different sectors demonstrated how we can expect work motivation to vary as a function of the extent to which work makes employees feel autonomous, competent, and related to others. Analyses of covariance concurred with the premises of self-determination theory, and also with the premises of the Job Characteristics Model (Hackman & Oldham, 1975), whereby jobs with different characteristics afford the satisfaction of basic psychological needs differently, thereby influencing the type of motivation people will adopt at work. Specifically, jobs that influence the satisfaction of psychological needs are especially likely to foster autonomous motivation, but not to change levels of controlled motivation.

Overall, what the present research shows is that we get much better outcomes with autonomous than with controlled motivation. Controlled motivation is not necessarily bad, it just does not have much of an effect on outcomes that are valued by organizations. It is possible that controlled motivation will be linked positively to unwanted organizational outcomes, such as deviant behavior. We still need research to extend our finding that promoting autonomous motivation is the path to successful organizational outcomes. For example, Kacmar, Andrews, Van Rooy, Steilberg, and Cerrone (2006) recently showed that turnover rates can influence sales and profits. Since need satisfaction has been shown to influence actual turnover in volunteer workers (Gagné, 2003), it seems plausible that autonomous motivation would provide a useful mechanism to influence actual turnover and organizational financial success. (Forest, Gilbert, Beaulieu, LeBrock, & Gagné, 2009).

There are some limitations to the present research. First, all data were collected cross-sectionally using self-reports, which could lead to common method variance

issues. However, by looking at Table 2, we can see that not all correlations are statistically significant, which indicates that the relationships we found are less likely to be spurious (Spector, 2006). Further validation work should test the MAWS in longitudinal designs and with multiple reports (e.g., managers and colleagues) or more behavioral and objective measures (e.g., performance appraisals). We also used convenience samples of Canadian workers, so further work will need to validate the MAWS scores in other cultures and languages as well as with other types of jobs and organizations. We did not test the social desirability of the MAWS, but other similar scales, such as the Blais et al. (1993) scale on which the present scale is partly based, found very low relationships between the motivation subscales and the Marlowe–Crowne scale.

As proposed in Gagné and Deci (2005), work motivation is under the influence of both dispositional and situational factors. Dispositional factors can include personality traits such as optimism, as well as deeply ingrained *causality orientations* (Deci & Ryan, 1985b) that may influence people's reactions to work-relevant events and circumstances. Situational factors may include the way the work is divided, organized, and designed, as well as the quality of relationships with superiors, peers, subordinates, and clients. Reward and recognition systems are also likely to influence work motivation (Gagné & Forest, 2008). The MAWS can serve as a useful tool to conduct research that examines how different types of work motivation may be influenced by these factors. The MAWS can also be used to study different outcomes associated with different types of motivation. It has even been argued that autonomous motivation is equivalent to measuring work engagement (Meyer & Gagné, 2008). The different subscales of the MAWS can be used separately to examine their discrete effects (Koestner & Losier, 2002), or they can be aggregated into autonomous and controlled types to simplify analyses. These aggregates can also serve to test possible interaction effects. We advise this technique over using the *self-determination index* (Ryan & Connell, 1989), which consists of subtracting controlled motivation from autonomous motivation. The use of difference scores has been heavily criticized (Zuckerman, Gagné, Nafshi, Knee, & Kieffer, 2002) for masking the effects of their respective variables. We hope the MAWS will help the proliferation of organizational research that uses the self-determination theory framework, which has yielded very useful results in other fields.

Appendix

The Motivation at Work Scale (MAWS)

Intrins1	Because I enjoy this work very much
Intrins2	Because I have fun doing my job
Intrins3	For the moments of pleasure that this job brings me
Ident1	I chose this job because it allows me to reach my life goals
Ident2	Because this job fulfills my career plans
Ident3	Because this job fits my personal values
Intro1	Because I have to be the best in my job, I have to be a "winner"

(continued)

Appendix (continued)

Intro2	Because my work is my life and I don't want to fail
Intro3	Because my reputation depends on it
Ext1	Because this job affords me a certain standard of living
Ext2	Because it allows me to make a lot of money
Ext3	I do this job for the paycheck

Note: The stem is "Using the scale below, please indicate for each of the following statements to what degree they presently correspond to one of the reasons for which you are doing this specific job" and is accompanied by the scale 1 = *not at all*; 2 = *very little*; 3 = *a little*; 4 = *moderately*; 5 = *strongly*; 6 = *very strongly*; 7 = *exactly*. The French version of the scale is available on request from the first author.

Acknowledgments

Special thanks to David Goodridge for helping with data collection, and to Roger Millsap for helping with some analyses.

Declaration of Conflicting Interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The authors disclosed receipt of the following financial support for the research and/or authorship of this article: Fonds Québécois de la Recherche sur la Société et la Culture (to Marylène Gagné, Estelle Morin, Caroline Aubé, and Marie-Hélène Gilbert); Institut de Recherche Robert-Sauvé en Santé et Sécurité au Travail (IRSST; postdoctoral fellowship to Jacques Forest)

References

- Allen, N. J., & Meyer, J. P. (1996). Affective, continuance, and normative commitment to the organization: An examination of construct validity. *Journal of Vocational Behavior, 49*, 252-276.
- Amabile, T. M., DeJong, W., & Lepper, M. R. (1976). Effects of externally imposed deadlines on subsequent intrinsic motivation. *Journal of Personality and Social Psychology, 34*, 92-98.
- Amabile, T. M., Hill, K. G., Hennessey, B. A., & Tighe, E. M. (1994). The work preference inventory: Assessing intrinsic and extrinsic motivational orientations. *Journal of Personality and Social Psychology, 66*, 950-967.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 117*, 497-529.
- Blais, M. R., Brière, N. M., Lachance, L., Riddle, A. S., & Vallerand, R. J. (1993). L'inventaire des motivations au travail de Blais [Blais's work motivation inventory]. *Revue Québécoise de psychologie, 14*, 185-215.
- Byrne, B. M. (2006). *Structural equation modeling with EQS: Basic concepts, applications, and programming*. Mahwah, NJ: Lawrence Erlbaum.

- Cheung, G. W., & Rensvold, R. B. (1999). Testing factorial invariance across groups: A reconceptualization and proposed new model. *Journal of Management*, 25, 1-27.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9, 233-255.
- Deci, E. L., Gagné, M., Ryan, R. M., Leone, D. L., Usunov, J., & Kornazheva, B. P. (2001). Need satisfaction, motivation and well-being in the work organizations of a former eastern bloc country: A cross-cultural study of self-determination. *Personality and Social Psychology Bulletin*, 27, 930-942.
- Deci, E. L., Koestner, R., & Ryan, R. M. (1999). A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation. *Psychological Bulletin*, 125, 627-668.
- Deci, E. L., & Ryan, R. M. (1985a). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, 19, 109-134.
- Deci, E. L., & Ryan, R. M. (1985b). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268.
- Diener, E., Emmons, R. A., Larson, R., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, 49, 71-75.
- Eisenberger, R., Huntington, R., Hutchison, S., & Sowa, D. (1986). Perceived organizational support. *Journal of Applied Psychology*, 71, 500-507.
- Fernet, C., Senécal, C., Guay, F., Marsh, H., & Dowson, M. (2008). The work tasks motivation scale for teachers (WTMST). *Journal of Career Assessment*, 16, 256-279.
- Forest, J., Gilbert, M.-H., Beaulieu, G., LeBrock, P., & Gagné, M. (2009). *The theoretical and economic utility of self-determined motivation for mental health at work*. Unpublished manuscript, Université du Québec à Montréal.
- Gagné, M. (2003). The role of autonomy support and autonomy orientation in prosocial behavior engagement. *Motivation and Emotion*, 27, 199-223.
- Gagné, M., Bérubé, N., Donia, M., Houliort, N., & Koestner, R. (2007). *Validation of the Satisfaction with Work Scale*. Paper presented at the annual meeting of the Administrative Sciences Association of Canada, Ottawa, Ontario, Canada.
- Gagné, M., Boies, K., Koestner, R., & Martens, M. L. (2004). *How work motivation is related to organizational commitment: A series of organizational studies*. Unpublished manuscript, Montreal, Concordia University.
- Gagné, M., Boies, K., Koestner, R., & Martens, M. L. (2005). *Why I work determines my attachment to my employer: Using self-determination theory to understand the relationship between work motivation and organizational commitment*. Paper presented at the annual meeting of the Administrative Sciences Association of Canada, Toronto, Ontario, Canada.
- Gagné, M., Chemolli, E., Forest, J., & Koestner, R. (2008). The temporal relations between work motivation and organizational commitment. *Psychologica Belgica*, 48, 219-241.
- Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26, 331-362.
- Gagné, M., & Forest, J. (2008). The study of compensation systems through the lens of self-determination theory: Reconciling 35 years of debate. *Canadian Psychology*, 49, 225-232.

- Gagné, M., Sénécal, C., & Koestner, R. (1997). Proximal job characteristics, feelings of empowerment, and intrinsic motivation: A multidimensional model. *Journal of Applied Social Psychology, 27*, 1222-1240.
- Grolnick, W. S., & Ryan, R. M. (1987). Autonomy in children's learning: An experimental and individual differences investigation. *Journal of Personality and Social Psychology, 52*, 890-898.
- Guay, F., Vallerand, R. J., & Blanchard, C. (2000). On the assessment of situational intrinsic and extrinsic motivation: The situational motivation scale. *Motivation and Emotion, 24*, 175-213.
- Guttman, L. (1954). A new approach to factor analysis: The radex. In P. Lazarfeld (Ed.), *Mathematical thinking in the social sciences* (pp. 258-348). New York: Free Press of Glencoe.
- Hackman, J. R., & Oldham, G. R. (1975). Development of the job diagnostics survey. *Journal of Applied Psychology, 60*, 159-170.
- Henson, R. K. (2001). Understanding internal consistency reliability estimates: A conceptual primer on coefficient alpha. *Measurement and Evaluation in Counseling and Development, 34*, 177-189.
- Kacmar, C. M., Andrews, M. C., Van Rooy, D. L., Steilberg, R. C., & Cerrone, S. (2006). Sure everyone can be replaced. But at what cost? Turnover as a predictor of unit-level performance. *Academy of Management Journal, 49*, 133-144.
- Koestner, R., & Losier, G. F. (2002). Distinguishing three ways of being internally motivated: A closer look at introjection, identification, and intrinsic motivation. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 101-121). Rochester, NY: University of Rochester Press.
- Koestner, R., Losier, G. F., Vallerand, R. J., & Carducci, D. (1996). Identified and introjected forms of political internalization: Extending self-determination theory. *Journal of Personality and Social Psychology, 70*, 1025-1036.
- Koestner, R., Ryan, R. M., Bernieri, F., & Holt, K. (1984). Setting limits on children's behavior: The differential effects of controlling vs informational styles on intrinsic motivation and creativity. *Journal of Personality, 52*, 231-248.
- Lepper, M. R., & Greene, D. (1975). Turning play into work: Effects of adult surveillance and extrinsic rewards on children's intrinsic motivation. *Journal of Personality and Social Psychology, 31*, 479-486.
- Li, F., & Harmer, P. (1996). Testing the simplex assumption underlying the sport motivation scale: A structural equation modeling analysis. *Research Quarterly for Exercise and Sport, 67*, 396-405.
- Massé, R., Poulin, C., Dassa, C., Lambert, J., Bélair, S., & Battaglini, A. (1998). The structure of mental health: Higher order confirmatory factor analyses of psychological distress and well-being measures. *Social Indicators Research, 45*, 475-504.
- McCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structural modelling. *Psychological Methods, 1*, 130-149.
- Meyer, J. P., Becker, T. E., & Vandenberghe, C. (2004). Employee commitment and motivation: A conceptual analysis and integrative model. *Journal of Applied Psychology, 89*, 991-1007.
- Meyer, J. P., & Gagné, M. (2008). Employee engagement from a self-determination theory perspective. *Industrial and Organizational Perspectives, 1*, 60-62.

- Morin, E. M. (2003). Stimuler la santé par le travail: Est-ce possible? [Stimulate health through work: Is it possible?]. In R. Foucher, A. Savoie, & L. Brunet (Eds.), *Concilier performance organisationnelle et santé psychologique au travail* [Reconciling organizational performance and work psychological health]. Montreal, Quebec, Canada: Editions Nouvelles AMS.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.
- Pelletier, L. G., Fortier, M. S., Vallerand, R. J., Tuson, K. M., Brière, N. M., & Blais, M. R. (1995). Toward a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: The Sport Motivation Scale (SMS). *Journal of Sport & Exercise Psychology*, 17, 35-53.
- Pelletier, L. G., Tuson, K. M., Greene-Demers, I., Noels, K., & Beaton, A. M. (1998). Why are you doing things for the environment? The Motivation Toward the Environment Scale (MTES). *Journal of Applied Social Psychology*, 28, 437-468.
- Ryan, R. M. (1995). Psychological needs and the facilitation of intrinsic motivation, social development and well being. *American Psychologist*, 63, 397-427.
- Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, 57, 749-761.
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A reevaluation of the life orientation test. *Journal of Personality and Social Psychology*, 67, 1063-1078.
- Spector, P. E. (2006). Method variance in organizational research. *Organizational Research Methods*, 9, 221-232.
- Steenkamp, J.-B. E. M., & Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research. *Journal of Consumer Research*, 25, 78-90.
- Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research*, 25, 173-180.
- Tabachnick, B. G., & Fidell, L. S. (2006). *Using multivariate statistics* (6th ed.). Boston: Allyn & Bacon.
- Trottier, C. (1999). *Équivalence et validation transculturelles de questionnaires psychologiques mesurant l'optimisme auprès d'une population Canadienne-Française*. [Equivalence and cross-cultural validation of psychological questionnaires to measure optimism in a French Canadian population]. Unpublished master's thesis, Université de Montréal, Quebec, Canada.
- Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29, pp. 271-360). San Diego, CA: Academic Press.
- Vallerand, R. J., Blais, M. R., Brière, N. M., & Pelletier, L. G. (1989). Construction et validation de l'échelle de motivation en éducation (EME) [Construction and validation of the academic motivation scale in French (EME)]. *Canadian Journal of Behavioral Science*, 21, 323-349.
- Vallerand, R. J., & Fortier, M. S. (1998). Measures of intrinsic and extrinsic motivation in sport and physical activity: A review and critique. In J. Duda (Ed.), *Advancements in sport*

- and exercise psychology measurement (pp. 83-100). Morgantown, WV: Fitness Information Technology.
- Vallerand, R. J., Pelletier, L. G., Blais, M. R., Brière, N. M., Sénécal, C., & Vallières, E. F. (1992). The academic motivation scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement*, 52, 1003-1017.
- Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 3, 4-70.
- VandeWalle, D. (1997). Development and validation of a work domain goal orientation instrument. *Educational and Psychological Measurement*, 57, 995-1015.
- Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology*, 70, 767-779.
- Williams, G. C., Grow, V. M., Freedman, Z. R., Ryan, R. M., & Deci, E. L. (1996). Motivational predictors of weight loss and weight-loss maintenance. *Journal of Personality and Social Psychology*, 70, 115-126.
- Zuckerman, M., Gagné, M., Nafshi, I., Knee, C. R., & Kieffer, S. C. (2002). Testing discrepancy effects: A critique, a suggestion, and an illustration. *Behavior Research Methods, Instruments, and Computers*, 34, 291-303.