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Refining the measurement of maximization: Gender invariance and relation to psychological well-being

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ABSTRACT

Maximization is a decision-making approach with the goal of obtaining the best available choice in a given situation. Although there are different ways to measure maximization, limitations in the measurement of maximization still exist. In the present studies, conceptual and statistical criteria guided an approach to refining the original Maximization Scale (Schwartz et al., 2002). In Study 1, a three-factor, 10-item Refined Maximization Scale (MS-R) emerged. Because prior research revealed gender differences in maximization, measurement invariance testing was conducted to ensure gender-equivalent functioning of the MS-R items. Study 2 replicated measurement invariance findings and examined associations between maximization and relevant outcomes. The "Regret" factor was positively associated with depression, and the "Want the Best" factor was positively associated with Happiness and Life Satisfaction. "Decisional Difficulty" was not associated with any constructs. Implications of these findings for basic and applied personality research are discussed.

1. Introduction

Numerous choices are made in daily life, ranging from small choices such as deciding what food to eat to major life choices such as which college major to pursue. One's characteristic choice-making style affects the choices made and shapes life outcomes. One such decision-making method, maximization, has attracted growing research interest in recent years. Drawing from the rational decision-making model by von Neumann and Morgenstern (1944), Schwartz et al. (2002) defined maximization or "maximizing" as a decision-making approach with the goal of obtaining the best available choice in a given situation. Individuals who maximize make efforts to expand their option pool and collect as much information as possible. They carefully weigh the costs and benefits of each option and then determine the choice most likely to result in the maximum benefits available. Although examining all possible options is seemingly beneficial, research suggests that maximizing is associated with higher depression and lower satisfaction with a decision, happiness, and life satisfaction (Schwartz et al., 2002).

Much of the research on maximization has been based on a multidimensional scale, the original and later short-form Maximization Scale (MS; Nenkov, Morrin, Ward, Schwartz, & Hulland, 2008; Schwartz et al., 2002), which measures three factors: alternative search, high standards, and indecision. However, this scale has been criticized for deviating from the core definition of maximization which is more focused on behavioral patterns such as purposeful exploration of the option pool and striving to get the best out of the situation (Diab, Gillespie, & Highhouse, 2008).

Another important consideration of measuring maximization that is lacking in the literature is measurement invariance across gender groups. Measurement invariance is the extent to which measurement properties for an instrument are comparable between groups. When supported, measurement invariance verifies that any group differences in scores between groups are due to real differences in factor means and not the result of differences in the psychometric properties of the measure (Millsap, 2010). Various studies have found that men reported higher levels of maximization than women (Iyengar, Wells, & Schwartz, 2006; Parker, Bruine de Bruin, & Fischhoff, 2007). At the same time, effect sizes are usually relatively small (e.g., $r = .17$; Iyengar et al., 2006) and do not appear in all studies (e.g., in only three of seven studies in Schwartz et al., 2002), suggesting inconsistent findings regarding maximization and gender. Lack of gender invariance may have limited the ability to detect dependable gender differences, or the

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small differences could have resulted because of limitations in measurement properties and therefore do not reflect actual gender differences in maximization. Since Schwartz et al.'s (2002) original article, several authors have tried to refine and update the original MS (Diab et al., 2008; Rim, Turner, Betz, & Nygren, 2011; Turner, Rim, Betz, & Nygren, 2012), although none of these studies examined whether the MS has the same measurement structure for both women and men. Without such evidence, interpreting the findings in maximization research, especially research testing gender differences, is compromised.

The present work has three goals. First, in Study 1, a conceptually- and methodologically-refined maximization scale will be created that is closely tied to the central conceptualization of maximization. Second, also in Study 1, consistent with the need to address gender differences in maximization and building upon other articles addressing measurement invariance (e.g., Tsaousis & Kazi, 2013), measurement invariance between genders for the newly developed scale will be tested. Third, Study 2 will replicate the measurement invariance findings from Study 1 and examine the association between maximization and psychological well-being for women and men. We predict that using the refined maximization scale with gender invariance will demonstrate no differences between men and women on well-being indicators. We also hypothesize that maximization will have both positive and negative factors that will be differentially related to depression, happiness, and life satisfaction.

2. Study 1

2.1. Method

2.1.1. Participants

The sample consisted of 2003 undergraduate students (69% women) recruited from the psychology participation pool at a large U.S. university. Ages ranged from 17 to 25 ($M = 18.77$, $SD = 1.17$). The racial/ethnic composition was 56.8% White/European American, 14.9% Black/African American, 14.5% Hispanic/Latino, 8.0% Asian/South Pacific Islander, 4.2% Biracial/Multiethnic, 0.4% Arab/Middle Eastern, 0.2% Native American, and 0.8% "Other."

2.1.2. Measures

In addition to the original 13-item Maximization Scale (MS; Schwartz et al., 2002), we administered five items measuring regret, as suggested in the original development of the MS. Additionally, three new maximization items were developed to provide further items reflecting the core definition of maximization. Two of the items addressed the attitudes and thoughts related to maximization that seemed underrepresented in the MS: "I always keep my options open so I will not miss the next best choice available in life;" and "Even if I see a choice I really like, I have a hard time making the decision if I do not have a chance to check out other possible options." One item offered a behavioral description: "When going to a new restaurant, I find myself reading the complete menu before narrowing down on what I want to eat." In addition, three items from the original MS relating to indecisiveness (Items 6, 7, and 8) were revised to better represent maximization and lessen confounding with the construct of indecisiveness. All items were responded to using a seven-point scale ranging from 1 = *Completely Disagree* through 7 = *Completely Agree*.

2.2. Results

2.2.1. Exploratory factor analysis

A series of Exploratory Factor Analyses (EFAs) were performed to evaluate the factor structure of the 21 maximization items using M*plus* (Version 7.2, Muthén & Muthén, 1998–2014). A robust weighted least squares estimator with Geomin oblique rotation was used. Based on previous research, we predicted the three-factor model would be the best fit although we explored models with one to six factors. To determine the most reasonable model both conceptually and statistically, we compared each less restrictive k factor model (H_1) to the more restrictive k-1 factor model (H_0) using the DIFFTEST χ^2 procedure in M*plus*. Significant differences in the DIFFTEST χ^2 meant that the more restrictive model produced a significantly worse fit. We also examined the CFI difference (ΔCFI) tests (see Cheung & Rensvold, 1999) and RMSEA to assess fit. These EFAs were conducted on data from half the sample (randomly selected, $N = 1001$), with the other half used subsequently for confirmatory factor analyses. Results of the EFA model comparisons appear in Table 1.

After taking into account model fit and interpretability, we concluded that the three- or four-factor models provided reasonably good representations of the data. The six-factor solution resulted in a negative variance estimate for one of the items and raised concerns about the interpretability of the resulting factors; the five-factor model yielded two factors with only two items loading substantially on each. The three-factor solution appeared to represent the joining of Factors 1 and 4 from the four-factor solution. Item content was similar between Factor 1 and Factor 4, and correlations between those two factors with Factors 2 and 3 were similar, respectively. Thus, the three-factor solution was preferred as a more parsimonious representation of the factor structure. Although this solution had a relatively lower CFI than the four-factor solution, item-level factor analyses are known to yield poorer CFIs, even for models that are accurately specified (Marsh, Hau, & Grayson, 2005). Factor loadings for the three-factor solution are displayed in Table 2. Three items with loadings <|.30| were dropped from the further consideration, leaving an initial total of 18 items. The factors were labeled as Regret (Factor 1; 6 items), Want the Best (Factor 2; 6 items), and Decisional Difficulty (Factor 3; 6 items).

2.2.2. Measurement invariance

Following several worked examples and programming recommendations (e.g., Bovaird & Koziol, 2012; Millsap, 2010; Millsap & Yun-Tein, 2004), tests of measurement invariance between genders were conducted using the newly created 18-items on the other randomly selected half of the sample ($N = 1002$). Confirmatory factor analysis models were compared using the DIFFTEST χ^2, MIs were examined, and additional model comparisons were conducted to determine sources of misfit. Procedures for dealing with noninvariance outlined by Sass (2011) were followed. Based on the EFA results, items were constrained to load only onto their expected factor, and loadings were constrained to zero for other factors. The seven-point responses for the scale were specified as ordered-categorical indicators in invariance testing. Six thresholds

Table 1
Summary of goodness of fit indices and model comparisons for exploratory factor analyses.

Model	NFParm	$\Delta\chi^2$	*df*	CFI	ΔCFI	RMSEA
One-factor	147			0.566		0.137
Two-factor	167	1237.75	20	0.805	−0.239	0.097
Three-factor	186	571.71	19	0.888	−0.083	0.078
Four-factor	204	326.14	18	0.930	−0.042	0.066
Five-factor	221	219.51	17	0.956	−0.026	0.056
Six-factor	237	135.20	16	0.971	−0.015	0.049

Note. NFParm = number of free parameters. CFI = Comparative Fit Index. All $\Delta\chi^2$ tests were significant, $p < .0001$. $\Delta\chi^2$ and ΔCFI values are based on the comparisons of the less constrained model to the more constrained model. For example, ΔCFI = −0.239 is based on the comparison between the two-factor and one-factor model. $\Delta\chi^2$ derived from DIFFTEST option for model comparisons in M*plus*.