A multi-process model of self-regulation: Influences of Mindfulness, Integrative Self-Knowledge and Self-Control in Iran

Nima Ghorbani[1], P.J. Watson[2], Mehran Farhadi[3], and Zhuo Chen[2]

[1]Department of Psychology, University of Tehran, Tehran, Iran
[2]Department of Psychology, University of Tennessee at Chattanooga, Chattanooga, TN, USA
[3]Department of Economics and Social Sciences, Bu-ali Sina University, Hamadan, Iran

*S*elf-regulation presumably rests upon multiple processes that include an awareness of ongoing self-experience, enduring self-knowledge and self-control. The present investigation tested this multi-process model using the Five-Facet Mindfulness Questionnaire (FFMQ) and the Integrative Self-Knowledge and Brief Self-Control Scales. Using a sample of 1162 Iranian university students, we confirmed the five-factor structure of the FFMQ in Iran and documented its factorial invariance across males and females. Self-regulatory variables correlated negatively with Perceived Stress, Depression, and Anxiety and positively with Self-Esteem and Satisfaction with Life. Partial mediation effects confirmed that self-regulatory measures ameliorated the disturbing effects of Perceived Stress. Integrative Self-Knowledge and Self-Control interacted to partially mediate the association of Perceived Stress with lower levels of Satisfaction with Life. Integrative Self-Knowledge, alone or in interaction with Self-Control, was the only self-regulation variable to display the expected mediation of Perceived Stress associations with all other measures. Self-Control failed to be implicated in self-regulation only in the mediation of Anxiety. These data confirmed the need to further examine this multi-process model of self-regulation.

Keywords: Self-regulation; Multi-process model; Integrative Self-Knowledge; Self-Control; Mindfulness; Stress and coping; Iran.

Active self-regulation presumably operates on the foundation of an intuitive awareness of the dynamic whole of self-experience across time (Iran-Nejad & Gregg, 2001). That experience must, nevertheless, rest upon multiple processes that support the psychological activity that allows the self as a whole to make, in turn, deliberate adjustments in holistic functioning (Iran-Nejad & Gregg, 2011). Regardless of cultural context, such processes presumably must include both ongoing awareness of the present along with enduring self-knowledge. This is so because self-regulation requires sensitivity to current experiences that then must be evaluated relative to internal standards of functioning. Attention to deviations between current states and internal standards is a necessity, but still not sufficient for self-regulation to occur. The self must also be able to control itself in order to adjust ongoing states to internal standards. In short, a multi-process model of self-regulation points towards the contribution of at least three broad types of psychological processes: awareness of present self-experience, enduring self-knowledge that reflects the operation of internal standards and an ability of the self to control itself, both actively and dynamically (Iran-Nejad & Chissom, 1992)

Steps towards examining this multi-process model of self-regulation began in a recent Iranian research programme. The first step involved the development of an Integrative Self-Knowledge Scale for measuring tendencies to assimilate past, present and desired future self-experience into a meaningful whole (Ghorbani, Watson, & Hargis, 2008). As a clear index of psychological adjustment (e.g., Ghorbani, Watson, Hamzavy, & Weathington, 2010), this instrument reflects the operation of internal, enduring self-standards of "integration." In addition, Integrative Self-Knowledge has correlated negatively with perceived stress and physical symptoms and

positively with vitality in university students coping with final examinations (Ghorbani, Cunningham, & Watson, 2010). A possible role in coping also appeared in samples that included patients suffering from autoimmune disorders (Ghorbani, Mousavi, Watson, & Chen, 2011) and from coronary heart disease and cancer (Ghorbani, Tahbaz, Watson, & Chen, 2012). Especially noteworthy in analyses that included these medical patients were demonstrations that Integrative Self-Knowledge partially mediated the disturbing effects of stress and negative emotional reactions on psychological functioning. Specifically, mediation results revealed that Integrative Self-Knowledge ameliorated the problematic influences of stress-related reactions, as would be expected of a self-regulatory process.

The second step towards testing the multi-process model involved an examination of mindfulness defined as an open and non-judgmental attention to and awareness of present self-experience (Brown, Ryan, & Creswell, 2007). Research demonstrates the important potentials of mindfulness in coping with stress (e.g., Creswell, Way, Eisenberger, & Lieberman, 2007). In Iran, previous examinations of mindfulness used the Mindful Attention Awareness Scale (MAAS: Brown & Ryan, 2003), and this scale did indeed predict adaptive self-functioning in three separate Iranian (and American) samples (Ghorbani, Watson, & Weathington, 2009). The MAAS also supplemented the Integrative Self-Knowledge Scale in predicting the success of Iranian students in coping with the stress of final examinations (Ghorbani, Cunningham, et al., 2010). One complexity, nevertheless, appeared when the MAAS proved to be multidimensional in Iranian (and also American) samples (Ghorbani et al., 2009), in contrast to previous American findings that it was unidimensional (e.g., Brown & Ryan, 2003).

Ambiguity in the MAAS factor structure had at least two implications. First, if mindfulness is not a unidimensional phenomenon, then a more comprehensive analysis of its role in self-regulation would seem to require use of a multidimensional measure. Second, conflicting findings about the factor structure of the MAAS suggested that it could not offer an unambiguous clarification of the issue. The Five-Facet Mindfulness Questionnaire (FFMQ: Baer, Hopkins, Krietemeyer, Smith & Toney, 2006) is now a well-established multidimensional operationalization of mindfulness, and research confirms that its factors are relevant to self-regulation (e.g., Carmody & Baer, 2008; Lykins & Baer, 2009). The obvious question, therefore, was whether the FFMQ would be useful in offering a more complete analysis of the multi-process model of self-regulation.

In the third and final step towards directly testing the multi-process model, a recent study began the process of examining the Brief Self-Control Scale (Tangney,

Baumeister, & Boone, 2004) within the Iranian Muslim cultural context (Ghorbani, Watson, Rezazadeh, & Cunningham, 2011). Self-Control correlated positively with Integrative Self-Knowledge and also predicted Muslim religious and spiritual adjustment. In line with suggestions from the Islamic philosophical literature, Self-Control also interacted with Integrative Self-Knowledge to suggest that a self-insightful self-control might lead to even greater religious and spiritual maturity. These results, therefore, identified the Brief Self-Control Scale as potentially useful in testing the multi-process model and also indicated that the interaction between Self-Control and Integrative Self-Knowledge may deserve analysis as well.

Present study

The present study used the Integrative Self-Knowledge, FFMQ and Brief Self-Control measures to explore the multi-process model of self-regulation. The FFMQ has not been examined previously in Iran; so, a preliminary task involved the necessity of confirming its factor structure within this new cultural context. In line with previous investigations, assessment of the multi-process model focused on issues related to stress and coping. Iranian research participants responded to the Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983) and to measures of Self-Esteem (Rosenberg, 1989), Satisfaction with Life (Diener, Emmons, Larsen, & Griffin, 1985) and Depression and Anxiety (Costello & Comrey, 1967). These procedures made it possible to test five most important sets of hypotheses:

First, the FFMQ will display a five-factor structure in Iran, just as it has in the United States.

Second, variables theoretically necessary for self-regulation (i.e., Integrative Self-Knowledge, the FFMQ and Self-Control) will correlate negatively with Perceived Stress, the proposed independent variable in mediation analyses.

Third, these self-regulation variables will also correlate negatively with Depression and Anxiety and positively with Self-Esteem and Satisfaction with Life, the presumed dependent variables in mediation analyses.

Fourth, Integrative Self-Knowledge, the FFMQ and Self-Control will at least partially mediate relationships of Perceived Stress with Depression, Anxiety, Self-Esteem and Satisfaction with Life. Mediation effects will more specifically demonstrate that these three self-regulatory processes help ameliorate the potentially disturbing influences of stress.

Fifth, in mediation analyses, Integrative Self-Knowledge and Self-Control will interact to help ameliorate at least some relationships of Perceived Stress with unhealthy self-functioning.

METHOD

Participants

Participants were 1162 undergraduate students from four different universities in Iran. These 494 men and 668 women had an average age of 23.3 years ($SD = 4.1$). Of this group, 10.7% were married. Educational programmes of students were 44.5% humanities, 24.2% basic studies, 18.4% engineering, 7.0% agriculture and 5.7% medicine.

Measures

Creation of a Persian Integrative Self-Knowledge measure occurred during initial scale development procedures (Ghorbani et al., 2008). Translation of all other instruments took place as preparations for the present or previous studies. One person translated each scale into Persian. Then a second individual translated it back into English. Discrepancies between original and back-translated measures were minor and easily resolved through revisions in the Persian translation. Previous Iranian investigations established the validity of all but the FFMQ translations of these measures (e.g., Ghorbani, Bing, Watson, Davison, & Mack, 2003; Ghorbani et al., 2008; Ghorbani et al., 2011). All scales appeared in a single questionnaire booklet in the order presented below.

Five Facets of Mindfulness Questionnaire

The Baer et al. (2006) FFMQ included 39 items defining five dimensions of mindfulness. Response options ranged from 1 "*almost never*" to 5 "*almost always*." Non-reactivity (NONR: 7 items) included such statements as, "I perceive my feelings and emotions without having to react to them." Representative of the Observing subscale (OBS: 8 items) was the claim, "I pay attention to sensations, such as the wind in my hair or sun on my face." Exemplifying the Acting with Awareness subscale (ACTA: 8 items) was the self-report, "I find it difficult to stay focused on what's happening in the present" (reverse scored). An illustrative statement from the Describing subscale (DES: 8 items) said, "I'm good at finding the words to describe my feelings." The Non-judging facet (NONJ: 8 items) appeared in such assertions as, "I tell myself that I shouldn't be feeling the way I'm feeling" (reverse scored).

Anxiety and Depression

Costello and Comrey (1967) scales measured dispositional Depression (14 items) and Anxiety (9 items). Response options ranged from 1 "*strongly disagree*" to 5 "*strongly agree*." "I feel sad and depressed" illustrated the self-report of Depression. "I'm a restless and tense person" was reflective of Anxiety.

Perceived Stress

The Perceived Stress Scale (Cohen et al., 1983) presented respondents with a series of questions asking how often they had experienced various stressful events during the past month. One question asked, for example, "In the last month, how often have you felt that you were unable to control the important things in your life?" Responses ranged from 1 "*never*" to 5 "*very often*." As with previous Iranian and American samples (e.g., Ghorbani et al., 2008), one question displayed a negative item-to-total correlation and was eliminated. The final measure, therefore, included 13 items.

Self-Esteem

Assessment of global self-esteem involved use of the well-established 10-item Rosenberg (1989) scale. Response options ranged from 1 "*mostly untrue*" to 5 "*mostly true*." Exemplifying self-esteem was the statement, "I take a positive attitude toward myself."

Satisfaction with Life

The Satisfaction with Life Scale (Diener et al., 1985) included five statements (e.g., "I am satisfied with my life"). This instrument also used 1 "*strongly disagree*" to 5 "*strongly agree*" response options.

Integrative Self-Knowledge Scale

The Integrative Self-Knowledge Scale included 12 items (e.g., "If I need to, I can reflect about myself and clearly understand the feelings and attitudes behind my past behaviours"). Responding occurred along a 1 "*largely untrue*" to 5 "*largely true*" Likert scale.

Self-Control

The Brief Self-Control Scale (Tangney et al., 2004) included 13 items. Reactions to each ranged from 1 "*never*" to 5 "*very often*." A representative expression of Self-Control said, "I refuse things that are bad for me."

Procedures

All research procedures conformed to institutional ethical guidelines. Research participation was voluntary and anonymous. Groups of varying size responded to the questionnaire booklet in a classroom setting.

Statistical procedures began with a confirmatory factor analysis (CFA) designed to determine if the five factors reported by Baer et al. (2006) would describe Iranian responding to the 39 FFMQ items. CFA models first tested two types of measurement invariance of the

five-factor model in a comparison between male and female responses (Meredith, 1993). Configural invariance involves the observation of the same factor structure of estimated parameters across genders without equality constraints. Failure to meet this criterion indicates that the structure is suitable for only one or neither group. Factorial invariance fixes indicator loadings on a single latent variable to be the same across groups. Establishment of factorial invariance suggests that variance of a latent variable is derived from the same metric of indicators under an identical structure across groups. After testing these models for the two gender groups, we combined data for the two genders and tested the overall fitness of the FFMQ factor structure.

All subsequent analyses controlled for the background characteristics of age and gender. The scoring of all instruments involved computation of the mean response per item. Examined first were partial correlations among measures with the significance level set at .01, given the large sample size and the consequent possibility of observing significance though trivial outcomes if .05 had been used instead.

Procedures then assessed whether variables included in the multi-process model would mediate the relationship of Perceived Stress with psychological functioning (Preacher & Hayes, 2008). Again, the self-regulatory mediating variables of this model included the FFMQ factors, Integrative Self-Knowledge, Self-Control and the interaction of Integrative Self-Knowledge with Self-Control. To control for multi-collinearity in tests of the interaction effect (Aiken & West, 1991), statistical procedures first transformed Integrative Self-Knowledge and Self-Control into Z-scores, with the product of these Z-scores computed for the interaction term. The independent variable in these mediation analyses was Perceived Stress, and the dependent variables were Self-Esteem, Satisfaction with Life, Depression and Anxiety.

RESULTS

Factor structure of FFMQ

CFA procedures used *Mplus* 6 (Muthén & Muthén, 2010). Based on the strategy recommended by Hu and Bentler (1999), acceptable fit appeared if at least two of three criteria were met: a root mean square error of approximation (RMSEA) of .06 or less, a standardized root mean square residual (SRMR) of .08 or less and a comparative fit index (CFI) of .90 or more. Comparison of model fit decay between two nested models used the chi-square difference test. Configural invariance examined the factor structure stability between male ($N = 486$) and female ($N = 663$) participants. Results suggested acceptable fit with $\chi 2$ $(1384) = 2841.29$, $p < .001$, RMSEA $= .043$, SRMR $= .065$ and CFI $= .768$. Factorial

invariance yielded fitness indices of $\chi 2$ $(1423) = 2884.27$, $p < .001$, RMSEA $= .042$, SRMR $= .066$ and CFI $= .767$. The chi-square difference test suggested that the increase in chi square did not significantly worsen the model with $\Delta \chi 2$ $(39) = 43$, *n*s. An omnibus test of the combined sample of both males and females suggested good fit with $\chi 2$ $(692) = 2462.15$, $p < .001$, RMSEA $= .047$, SRMR $= .061$ and CFI $= .760$. The relatively low CFI outcomes presumably reflected the fact that this statistic was biased by the large number of indicators and degrees of freedom associated with the large sample size (Kenny & McCoach, 2003).

Relationships among measures

As noted above, examination of all relationships focused on partial correlations controlling for age and gender. With regard to correlations among the hypothesized independent and dependent variables of the mediation analyses, Perceived Stress correlated positively with Depression (.54) and Anxiety (.36) and negatively with Self-Esteem (−.53) and Satisfaction with Life (−.41). Positive correlations appeared between Depression and Anxiety (.35) and between Self-Esteem and Satisfaction with Life (.52). Depression also correlated negatively with Self-Esteem (−.64) and Satisfaction with Life (−.50), and Anxiety predicted lower Self-Esteem (−.34, all *p*s < .01), but not lower Satisfaction with Life (−.03, $p = .67$).

With regard to mediators in the multi-process model, Integrative Self-Knowledge correlated positively with Self-Control (.53), Self-Esteem (.54) and Satisfaction with Life (.25), and negatively with Perceived Stress (−.48), Depression (−.51) and Anxiety (−.44, *p*s < .01). Self-Control displayed positive relationships with Self-Esteem (.41) and Satisfaction with Life (.25) and negative associations with Perceived Stress (−.43), Depression (−.44) and Anxiety (−.30, *p*s < .01).

Along with descriptive statistics and internal reliability data for all measures, Table 1 reviews the partial correlation findings for the FFMQ. All significant associations with other scales paralleled the results for Integrative Self-Knowledge and Self-Control, the other proposed self-regulatory variables. ACTA tended to display the most consistent and robust correlations with other measures. NONJ exhibited the least consistent and weakest pattern of relationships. No mindfulness facet correlated positively with all four other FFMQ factors. Perhaps noteworthy was the finding that NONJ correlated negatively rather than positively with OBS.

Mediation analyses

Tests of mediation require that the independent variable predict the dependent variable (Baron & Kenny, 1986). This condition was met in the present study when

Partial correlations of the Non-reactivity (NONR), Observing (OBS), Acting with Awareness (ACTA), Describing (DES) and Non-judging (NJ) factors with other measures and with each other

Measures	FFMQ factors					M	SD	α
	NONR	OBS	ACTA	DES	NONJ			
Scales								
Perceived Stress	−.22*	−.18*	−.35*	−.27*	−.12*	2.93	0.56	.71
ISK	.26*	.27*	.38*	.39*	.04	3.26	0.58	.71
Self-Control	.19*	.27*	.32*	.32*	.02	3.30	0.59	.72
Self-Esteem	.12*	.23*	.38*	.38*	.10*	3.32	0.74	.77
Satisfaction with Life	.05	.09*	.30*	.21*	.15*	2.99	0.87	.75
Depression	−.18*	−.30*	−.41*	−.35*	−.04	2.65	0.75	.84
Anxiety	−.30*	−.09*	−.19*	−.25*	−.10*	2.89	0.68	.67
FFMQ factors								
NONR	—	.20*	.00	.15*	−.06	3.18	0.63	.60
OBS		—	.14*	.26*	−.32*	3.45	0.71	.72
ACTA			—	.28*	.20*	3.11	0.71	.71
DES				—	.03	3.22	0.69	.72
NONJ					—	2.70	0.69	.73

Note. Partial correlations controlled for age and gender.
*$p < .01$.

the independent variable Perceived Stress displayed significant associations with each dependent variable (see below). For the sake of clarity, Table 2 reviews only significant mediation effects. This table presents indirect effects involving the β for the independent variable association with the mediator multiplied by the β observed for the mediator with the dependent variable. This test of the multi-process model first requires a negative β for the association of a mediator with Perceived stress. In addition, a mediator should exhibit a positive β for associations with Self-Esteem and Satisfaction with Life and a negative β for associations with Depression and Anxiety. Hence, support for the model appeared with indirect effects that were negative for Self-Esteem and Satisfaction with Life and positive for Depression and Anxiety. Each confidence interval (CI) was bias corrected and based on 5000 bootstrap samples.

Partial mediation appeared in the analysis of each dependent variable. The Perceived Stress association with Self-Esteem was reduced from β = −.70 to −.37 (*ps* < .001). All but the interaction between Integrative Self-Knowledge and Self-Control served as a significant mediator; however, the indirect effect for NONR proved to be positive rather than the expected negative result. For Satisfaction with Life, the association was β = −.63 before mediation and −.48 after (*ps* < .001). Three FFMQ measures served as significant negative mediators, and the Integrative Self-Knowledge interaction with Self-Control suggested that a self-insightful self-control also produced an amelioration effect. The Perceived Stress connection with Depression was β = .72, and mediators reduced the association to β = .41 (*ps* < .001). Significant mediators included Integrative Self-Knowledge, Self-Control, OBS, ACTA and DES. With regard to Anxiety, the β was .43

before mediation and 18 after (*ps* < .001). Integrative Self-Knowledge, NONR, DES and NONJ displayed the predicted positive indirect effects, but OBS instead exhibited an unexpected negative indirect effect.

DISCUSSION

Results of this investigation supported the multi-process model of self-regulation. Preliminary analyses confirmed the five-factor structure of the FFMQ in Iran and demonstrated its factorial invariance across males and females. As expected, Integrative Self-Knowledge, Self-Control and all five FFMQ measures displayed negative correlations with Perceived Stress. Integrative Self-Knowledge, Self-Control and at least four mindfulness factors correlated positively with Self-Esteem and Satisfaction with Life and negatively with Depression and Anxiety. Each mediation analysis uncovered partial mediation with almost all results pointing towards the hypothesized amelioration effect. Specifically, Integrative Self-Knowledge and Self-Control dampened Perceived Stress correlations with reduced Self-Esteem and greater Depression, and the two measures interacted to reduce the association of Perceived Stress with lower levels of Satisfaction with Life. Integrative Self-Knowledge also displayed the expected mediation effect on Anxiety. In various combinations, the ACTA, DES and NONJ factors from the FFMQ also produced unambiguous evidence of amelioration in all four mediation analyses.

FFMQ data also yielded a number of unexpected outcomes. All five factors failed to correlate positively with each other. ACTA displayed no relationship with a NONR factor that also appeared to amplify rather

TABLE 2
Significant mediation of the effect of the independent variable Perceived Stress on the dependent variables Self-Esteem, Satisfaction with Life (SWL), Depression and Anxiety through integrative self-knowledge, self-control and mindfulness factors

| | Self-esteem | | | SWL | | | Depression | | | Anxiety | | |
| | 95% CI | | | 95% CI | | | 95% CI | | | 95% CI | | |
Mediator	β	Lower	Upper	β	Lower	Upper	β	Lower	Upper	β	Lower	Upper
Integrative Self-Knowledge (ISK)	−.149	−.195	−.109				.118	.074	.167	.165	.120	.215
Self-Control (SC)	−.092	−.129	−.059				.056	.022	.092			
ISK × SC				−.014	−.035	−.003						
NONR	.018	.005	.034							.049	.032	.072
OBS	−.015	−.030	−.005				.029	.016	.048	−.013	−.030	−.001
ACTA	−.038	−.063	−.015	−.068	−.109	−.036	.075	.050	.103			
DES	−.044	−.067	−.025	−.028	−.057	−.033	.032	.013	.055	.024	.003	.048
NONJ	−.009	−.021	−.001	−.014	−.032	−.003				.009	.002	.023
Total	−.326	−.385	−.271	−.147	−.211	−.085	.309	.255	.366	.248	.194	.304

Note. All analyses controlled for gender and age.

than ameliorate the effects of Perceived Stress on Self-Esteem. A similar amplification effect appeared for OBS in the analysis of Depression. All significant FFMQ correlations with psychological scales were in line with theoretical expectations, confirming that each dimension of mindfulness operationalized an adjusted form of self-functioning when examined alone. Amplification rather than the expected amelioration effects, therefore, presumably reflected intricacies in the dynamic interactions among these proposed self-regulatory processes. In addition, the NONJ factor did not correlate with DES and, perhaps most surprisingly, displayed a negative correlation with OBS. Overall, such findings confirmed the need to further examine complexities in mindfulness that have already appeared in the recent research literature (e.g., Feltman, Robinson, & Ode, 2009).

Failure of all FFMQ factors to correlate positivity with each other suggested some degree of independence in how at least some aspects of mindfulness function in Iran. Baer et al. (2006) similarly reported no positive correlation between OBS and NONJ in one of their American samples. A negative NONJ correlation with OBS and its weaker and less consistent relationships with the other psychological scales indicated that this factor in particular may need to be the focus of future Iranian research. Specifically, items in this factor may express problematic ideas within the Iranian Muslim cultural context. Two NONJ statements say, for example, "I tend to evaluate whether my perceptions are right or wrong" (reverse scored) and "I make judgments about whether my thoughts are good or bad" (reverse scored). Muslim beliefs in, for example, self-control might make it difficult for Iranians to self-report the mindfulness of NONJ by rejecting such claims. In short, future research should examine the religious implications of NONJ in Iranian Muslims.

Integrative Self-Knowledge proved to be an especially noteworthy self-regulatory process. Only this measure,

alone or in interaction with Self-Control, displayed the expected mediation effects with all four dependent variables. Self-Control failed to be implicated in self-regulation only in the mediation of Anxiety. Additional studies clearly should analyse these two measures in further attempts to understand self-regulation. The one significant interaction between these two mediators did suggest that an especially self-insightful self-control might sometimes make unique contributions to self-regulation, but then again, the fact that only one such interaction proved to be significant also implied that any such contributions might be limited. That Integrative Self-Knowledge only sometimes interacts with Self-Control to produce significant effects was also apparent in the previous examination of Iranian religious and spiritual functioning (Ghorbani, Watson, Rezazadeh, & Cunningham, 2011).

Limitations and conclusions

Conclusions of this study must of course be conditioned by an awareness of its limitations. The focus of this investigation was on self-regulation broadly speaking, and statistical analyses consequently controlled for gender and age. Possible influences of these two controlled variables may be an important future research question.

In addition, the student research participants of this study were not representative of either the Iranian population or of other societies. In theory, the multi-process model of self-regulation should apply cross-culturally, and confirmation of that expectation will require testing in a broader range of cultural contexts. In such research, it presumably will be important to establish the measurement invariance of instruments across societies and not just across genders as was the case with the FFMQ in the present study. Previous findings have established the measurement invariance of the Integrative Self-Knowledge Scale across Iranian

and American samples (Ghorbani et al., 2008), but other instruments employed in testing the multi-process model will need to be examined across societies as well.

Further interpretative caution may be necessary based on the measures used in this study. This study examined only four dependent variables in the mediation analysis. Future investigations will need to examine other psychological factors that might be affected by stress. Moreover, in no analysis was full mediation observed. Such outcomes might validly reflect the limitations of self-regulation, but then again, such data might merely reveal that the mediating measures of this study were less than ideal. More stress-specific expressions of self-control or of mindfulness, for example, might yield stronger partial or even full mediation effects. A stress-specific statement of self-control might say, for instance, "I am able to control myself when under stress." Similarly, a stress-relevant NONR item might assert, "While experiencing stress, I am able to perceive my feelings and emotions without having to react to them."

Finally with regard to limitations, this study used self-report assessment and correlational procedures that can yield no definitive evidence about causality. A controlled experimental design that sought to selectively activate different self-regulatory processes might better spotlight the mechanisms that underlie attempts to cope with stress and could offer more compelling insights into the causal dynamics of self-regulation. Such research could also have an additional interpretative advantage in that presumably not all of the significant correlations observed with the large sample size of the present investigation had meaningful implications about causality.

In conclusion, this study sought to test a multi-process model of self-regulation. Results supported the prediction that self-regulation requires the contribution of at least three types of broad processes: awareness of ongoing self-experience (as measured by the FFMQ), enduring self-knowledge (as operationalized by the Integrative Self-Knowledge Scale) and an ability of the self to control itself (as recorded by the Brief Self-Control Scale). These data, therefore, confirmed the importance of further examining these measures and the multi-process model of self-regulation.

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