



Integrative and suppressive emotion regulation differentially predict well-being through basic need satisfaction and frustration: A test of three countries

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Published online: 12 July 2019

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Abstract

Individuals' emotion regulatory styles are differentially related to well-being. Drawing on self-determination theory (Ryan and Deci 2017, *Self-determination theory: basic psychological needs in motivation, development, and wellness*, Guilford Press, New York), researchers have recently explored the concept of integrative emotion regulation (IER) as an adaptive emotion regulation style, contrasting it with the less adaptive style of suppressive emotion regulation (SER). This research studied the extent to which the relations between IER and SER and well-being are mediated by the satisfaction and frustration of individuals' basic psychological needs. Data were collected in three countries, Israel (n = 224), Peru (n = 304), and Brazil (n = 203). Participants filled in questionnaires assessing the study variables. Multi-group structural equation modeling (SEM) results showed that integrative emotion regulation positively predicted well-being, mediated by psychological need satisfaction, in all three countries. Moreover, psychological need frustration mediated the relationship between suppressive emotion regulation and well-being. The results support and extend recent findings demonstrating the adaptive outcomes of IER and the maladaptive outcomes of SER. The article concludes by discussing the implications and limitations of the research.

Keywords Integrative emotion regulation · Emotional suppression · Basic need satisfaction and frustration · Cross cultural research

Introduction

How individuals regulate their emotions affects their well-being (e.g., Brockman et al. 2017; Gross and John 2003; McRae et al. 2012). Although most research has focused on the adaptiveness of emotion regulation styles aimed at reducing the experience of emotions (Aldao et al. 2010), researchers are increasingly demonstrating that emotion regulation styles featuring an accepting stance towards emotions may also be adaptive (e.g., Benita et al. 2017; Ford et al. 2018). One such adaptive emotion regulation style is *integrative emotion regulation* (IER; Roth et al. in press;

Ryan et al. 2006a). Derived from self-determination theory (SDT; Ryan and Deci 2017), the concept posits that emotional experiences, whether pleasant or unpleasant, provide important information guiding personal growth and thriving, or experiences of well-being (Deci and Ryan 2000). Ryan et al. (2006a, b) contrasted IER with suppressive emotion regulation (SER), which entails avoidance and minimization of emotions. Brenning et al. (2015) demonstrated the two are oppositely related to well-being.

This research considers two important lacunae in the research on emotion regulation styles and well-being. First, little is known about the mechanisms underlying the relations between IER, SER and well-being. To explore these mechanisms, this research relied on *basic psychological needs theory* (Ryan and Deci 2017), an important mini-theory of SDT. According to this mini-theory, the satisfaction (or frustration) of three basic psychological needs (autonomy, competence, and relatedness) plays a key role in explaining why certain psychological processes predict well-being (Ryan et al. 2006b). However, no research has explored whether the satisfaction or frustration of these three

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basic needs mediates the relations between IER, SER and well-being. Second, while some research has explored cross-cultural differences in the relations between emotional regulation suppression and well-being (e.g., Butler et al. 2007; Soto et al. 2011), no research has explored whether the relations between IER and well-being vary between countries and cultures. Given these gaps, this study explored the mediating role of basic psychological need satisfaction and frustration in the relations of IER, SER and well-being in Israel, Peru and Brazil.

Emotion regulation and its relations to well-being

Emotion regulation refers to the processes by which individuals influence what emotions they have, when they have them and how they experience and express them (Gross 1998b). Over the years, researchers have identified several distinct ways in which individuals regulate emotions (for reviews, see Koole 2009; Webb et al. 2012). Emotions are often induced in lab experiments as state-level variables, or strategies, allowing researchers to explore their effect in the short-term (e.g., Gross 1998a; Roth et al. 2014). Another way to study how individuals regulate emotions is to see regulation as a trait-level variable, or a consistent style (e.g., Benita et al. 2017; John and Gross 2004). This method enables researchers to explore broader effects of emotion regulation styles, such as their effect on well-being. Researchers have consistently demonstrated that some emotion regulatory styles are more adaptive than others, and, hence, are differently related to well-being (e.g., Ben-Zur 2009; Brockman et al. 2017; Gross and John 2003; Haga et al. 2009; Shiota 2006).

The term emotion regulation mostly refers to ways of dealing with emotions that focus on minimizing the experience of negative emotions (Dunn et al. 2009). For example, a well-explored adaptive emotion regulation style is reappraisal, whereby individuals construe emotional events in non-emotional terms (Gross 1998b; Gross and John 2003). Thus, individuals who use reappraisal cope with emotional experiences by executing useful cognitive tactics to avoid experiencing them. Recently, however, researchers have claimed that adaptive emotion regulation can entail individuals' acceptance of an emotional experience rather than its minimization. Examples of such emotion regulation types are IER, defined as a differentiated awareness of one's emotional states and the capacity to use this sensitivity to regulate one's behavior volitionally (Roth et al. 2009; Ryan et al. 2006a, b), *mindfulness* (Brown and Ryan 2003; Chambers et al. 2009), defined as non-judgmental awareness of one's present moment experiences, and *acceptance*, defined as the tendency to accept emotions without judgment (Baer et al. 2004). While the relations between IER and well-being

have rarely been explored (Brenning et al. 2015), a growing body of research is showing that acceptance and mindfulness are positively associated with well-being (Baer et al. 2004; Brown and Ryan 2003; Ford et al. 2018; Kohls et al. 2009).

SDT-based differentiation of emotion regulation styles

SDT's (Ryan and Deci 2017) conceptualization of emotion regulation posits that emotion regulation can be either autonomous or controlled (Ryan et al. 2006a, b). Autonomous emotion regulation refers to the sense of choice and volition in emotional experiences. In contrast, controlled emotion regulation is characterized by feelings of internal compulsion to feel (or not to feel) in certain ways. IER belongs to the former and SER to the latter (for a recent review, see Roth et al., in press).

The concept of IER follows a eudemonic view of wellness (Ryan and Deci 2001), wherein emotions are viewed as neither good nor bad (Deci and Ryan 2000) but simply comprising informational inputs that guide action and growth (Roth et al., in press; Ryan et al. 2006a, b; Vansteenkiste et al. 2010). Emotions are seen as a feedback system, built into the organism, providing physiological, cognitive, and motivational signals that inform behaviors and goals to satisfy basic psychological needs (Ryan et al. 2006a, b). Thus, healthy emotion regulation implies an interested (intentional) attention and exploration of one's emotional experiences.

IER shares properties with other concepts, such as mindfulness, acceptance and reappraisal. The first aspect of SER is nonjudgmental receptive awareness of experience, and this corresponds with mindfulness. According to the theory (Roth et al., in press), this aspect may facilitate IER's second aspect, self-integration, by minimizing defensive, automatic and impulsive reactions. This second aspect corresponds with acceptance (Hayes et al. 1999). However, IER includes an additional aspect: an interested stance towards emotions (an intentional exploration of emotions; e.g., Roth et al. 2014), something that does not exist in other regulation styles. IER thus involves a more active capacity to learn from emotions and to use the resulting understanding to regulate the expression or withholding of emotions in a volitional way. In addition, although IER shares with reappraisal the cognitive aspect of thinking about the event or the emotion, the goal of each style is different. Individuals who use reappraisal try to change the way they think about an emotional event, so they won't feel it. Those who use IER think about an emotional event so they will gain knowledge from it (Roth et al., in press).

Research finds IER predicts positive outcomes, such as intimacy capacity (Roth and Assor 2012), empathy, and prosocial behavior, both in the school context (Benita et al. 2017) and in the context of intergroup violent conflicts

(Roth et al. 2017). Experimental studies inducing IER as state-level variable in the lab find this style predicts less defensive coping and lower emotional arousal in the face of emotionally eliciting stimuli than other emotion regulation styles, including SER (Roth et al. 2014, 2018). Exploring the relations between IER, well-being, and ill-being, Brenning et al. (2015) recently showed that adolescents' IER was related to concurrent and one-year later reports of self-esteem. It was also negatively related to concurrent reports of depression.

The concept of SER is, in many respects, similar to the long-explored concept of *emotional suppression* (Gross 1998b; Wegner 1994). Gross and his colleagues (Gross 1998b; Gross and John 2003) anchored the concept of emotional suppression in their influential process model of emotional regulation, defining it as a response-focused style, aimed at inhibiting ongoing emotion-expressive behavior. Another definition of emotional suppression refers to the minimization of the experience of an emotion or of thoughts about the negative event leading to that experience (Wegner 1994). Accordingly, several researchers have operationalized emotional suppression as the suppression of both the experience and the expression of emotions (Dalgleish et al. 2009; Dunn et al. 2009). However, these authors used lab manipulations to induce the use of emotional suppression and did not assess it as a trait-like emotion regulation style. The SDT concept of SER refers to the suppression of both the experience and the expression of emotions; it is measured as a trait-level construct (e.g., Roth et al. 2009). In this paper, we refer to suppression of expression as *expressive suppression* and to suppression of both emotional expression and experience as *SER*.

Unlike IER, SER is considered a maladaptive emotion regulation style (e.g., Roth and Assor 2012). According to SDT, the efforts to constrict emotional experience and expression typical of SER are maladaptive because they compartmentalize and distort emotional experiences (Ryan et al. 2006a, b). As noted above, SDT's view of well-being refers to emotions as important guides to action and growth (Ryan et al. 2006a, b; Vansteenkiste et al. 2010). SER is incongruent with such a view of well-being, because individuals who use this style feel pressured to consistently avoid such emotions. A handful of studies have found expressive suppression is negatively related to well-being (e.g., Gross and John 2003; Haga et al. 2009; Kao et al. 2017; Páez et al. 2013). Brenning et al. (2015) demonstrated SER is negatively related to adolescents' self-esteem and positively related to depression. We expand this line of research by introducing the concept of basic need satisfaction/frustration as a possible mechanism explaining the relations between IER, SER, and well-being.

Basic Need Satisfaction and Frustration

SDT comprises several mini-theories (Ryan and Deci 2017). *Basic psychological need theory*, the focus of the present special issue, is drawing increasing attention recently. According to this mini-theory, well-being is enhanced when one's behavioral regulations satisfy one's need for competence, relatedness, and autonomy (Ryan and Deci 2017). These needs are considered *basic* psychological needs, as they are seen as nutrients that are cross-developmentally and cross-culturally required for psychological growth, integrity, and well-being (Deci and Ryan 2000). Numerous studies indicate the satisfaction of needs is positively associated with well-being (Chen et al. 2015; Church et al. 2013; Collie et al. 2016; Cordeiro et al. 2016; DeHaan et al. 2016; Martela and Ryan 2016). Researchers have recently demonstrated that low levels of basic need satisfaction are not equivalent to frustration of those needs. They have explored the concept of *need frustration* as an independent construct, in which the basic needs are actively blocked or thwarted. Whereas low need fulfillment fails to foster the growth potential of individuals, the frustration of these needs can elicit defensiveness, ill-being, and even psychopathology (e.g., Bartholomew et al. 2011; Chen et al. 2015; Cordeiro et al. 2016).

SDT suggests that the satisfaction and frustration of the basic psychological needs play a mediating role between well-being and behavioral regulations (Ryan and Deci 2017). Thus, certain behaviors and experiences are considered adaptive and conducive to a sense of personal growth because they enable the basic needs to be satisfied, yet others are considered maladaptive because they are related to their frustration. This has been demonstrated in an abundance of studies for behaviors and experiences as wide as prosocial behaviors (Martela and Ryan 2016), self-regulatory skills (Orkibi and Ronen 2017), values (Unanue et al. 2014), job insecurity (Elst et al. 2012) and many others. Specifically, research anchored in SDT has demonstrated that behavior regulated autonomously (i.e., with a sense of choice and volition) is related to basic need satisfaction, while behavior regulated in a controlling way (i.e., with a sense of compulsion) is related to need frustration (Chen et al. 2013; Haerens et al. 2015; Weinstein and Ryan 2010).

Thus, how people regulate their behavior and motivation is likely to affect whether they experience need satisfaction or frustration. Similarly, how people regulate emotions may predict their need-based experiences. Accordingly, we suggest IER may be positively related to the satisfaction of the basic needs of autonomy, competence, and relatedness because people who use IER endorse and accept their emotional experiences (Roth

et al. 2009), feel more competent in regulating their emotions and emotion-related behaviors (Roth et al. 2014, 2018), and have better quality relationships (Benita et al. 2017; Roth and Assor 2012). For instance, students who use IER and are experiencing anxiety before an exam might tell themselves it is okay to be anxious and try to understand the source of their anxiety. Such students are likely to allow the anxiety to surface and be more curious about what it means; the openness may allow them to become more aware of their felt emotions such that they can authentically be themselves and hence experience greater volition with respect to the felt anxiety (autonomy satisfaction). They might feel competent in managing their emotions, as studying more might decrease their anxiety, making them also more likely to master the material (competence satisfaction). Finally, they might feel open to express their anxiety to their peers, seeking support and consultation, thus maintaining their long-term relationships (relatedness satisfaction).

In contrast, SER may be related to the frustration of the basic needs because individuals who use this style feel alienated from their emotions and view them as externally imposed (Roth et al. 2009), are less capable in regulating their emotions (Gross 1998a; Roth et al. 2014), and have poorer quality relationships (Low et al. 2017; Roth and Assor 2012). Thus, students who use SER and experience anxiety before an exam are likely to try to avoid thinking about how they feel or to hide their anxiety from others. Not understanding why they feel this way, they might deny the situation, telling themselves they have nothing to worry about. Such students are likely to feel pressure to appear calm, becoming alienated from the authentic experience (autonomy frustration). They are also likely to prepare less efficiently for the exam, thus feeling less competent to deal with the material and their emotions (competence frustration). Finally, they might feel ashamed to express their anxiety to their peers, not experiencing their relationships as potentially supportive (relatedness frustration).

Cultural considerations

A common assumption in emotion regulation research is that certain cultural rules lend meaning to the social functions of emotions (Mesquita et al. 2017; Matsumoto et al. 2008a, b). Hofstede (2003, 2011) offers a comprehensive taxonomy of cross-cultural dimensions distinguishing different countries. The dimensions are: power distance, individualism, masculinity, uncertainty avoidance, long term orientation and indulgence. In our comparative analysis, we focused on samples from three countries, Israel, Peru, and Brazil. While Israel, Peru, and Brazil score similarly on most dimensions, there are greater differences between Israel and the other

two countries in the dimensions of individualism and power distance (Hofstede 2011). Individualism refers to the degree of interdependence maintained by a society among its members. While Peru and Brazil are considered collectivistic, Israel is a mixture of individualistic and collectivistic cultures. Power distance is defined as the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally (Hofstede 2011). While Peru and Brazil are considered relatively high on this dimension, Israel is at the very low end.

The dimensions of individualism versus collectivism and power distance have been found relevant to emotion regulation. Emotion regulation researchers who refer to the former dimension (e.g., Butler et al. 2007; Soto et al. 2011) suggest that in individualistic cultures, emotional suppression is discouraged, as it may lead to feelings of inauthenticity. Meanwhile, a heightened awareness of and sensitivity to relational consequences typifies collectivistic cultures; a certain amount of expressive suppression is considered necessary to preserve social harmony. As a whole, the findings suggest the relations of expressive suppression with well-being are negative across cultures, but attenuated in collectivistic cultures (Tsai and Lu 2018).

Researchers examining the second dimension, power distance, suggest that cultures high on power distance discourage assertiveness and encourage self-regulation in interactions, while the opposite is true for cultures low on this dimension (Matsumoto 2007). For example, in a sample of participants from 23 countries, Matsumoto et al. (2008) showed that emotional suppression is more prevalent and less costly in terms of well-being in cultures with a greater need to maintain social order. Based on these findings, we assumed that the combination of higher collectivism and power distance typifying Peruvians and Brazilians relative to Israelis makes emotional suppression likely to be more mildly negatively related with well-being in Peru and Brazil than Israel.

According to SDT, the needs for autonomy, competence, and relatedness are universal (Ryan and Deci 2017). Therefore, their satisfaction predicts well-being across individualistic and collectivistic cultures (e.g., Ahmad et al. 2013; Chen et al. 2015; Church et al. 2013; Jang et al. 2009; Unanue et al. 2014). However, the conditions related to their satisfaction and frustration may vary by culture. For example, Chen et al. (2016) found that, although maladaptive parenting practices were positively related with psychological need frustration in both individualistic and collectivistic cultures (Belgian and Chinese), these relations were weaker for the latter. Along the same lines, and following Tsai and Lu (2018), we assumed Peruvians and Brazilians would show more attenuated relations between SER and psychological need frustration than Israelis.

The investigation

The purpose of this study was to investigate the relations between IER, SER, and well-being in Israel, Peru, and Brazil and to shed light on the mediating role of basic psychological need satisfaction and frustration in these relations. First, we expected that across cultures, IER would be positively related to well-being, and SER would be negatively related (Hypothesis 1). Second, we assumed that although the pathways towards need satisfaction and frustration are susceptible to cultural variation, the benefits associated with actual need satisfaction and frustration experiences are more culture-invariant (Chen et al. 2016). Specifically, we suggested that in cultures higher on the dimensions of collectivism and power distance (Peru and Brazil), SER would be less profoundly related to psychological need frustration and well-being (Hypothesis 2). To our knowledge, no study has explored cultural differences in the relations between IER and its outcomes; therefore, we did not formulate specific hypotheses on cultural differences in this type of emotion regulation. Third, we expected that basic need satisfaction would be positively related to well-being, and basic need frustration would be negatively related, and these relations would be invariant across cultures (Hypothesis 3). Finally, we hypothesized that despite cultural differences, basic need satisfaction would mediate the positive relations between IER and well-being across cultures, while basic need frustration would mediate the negative relations between SER and well-being (Hypothesis 4).

Method

Participants and procedure

Seven hundred and thirty-one college students participated in the research and received course credit for their participation; 224 were Israeli (95.5% females, mean age = 25.22, SD = 5.41) studying Education in a university in an Israeli city; 304 were Peruvian (89.8% females, mean = 24.72, SD = 5.75) studying Psychology in two private universities in a Peruvian city; 203 were Brazilian (57.1% females, mean = 26.39, SD = 5.30) studying Administration, Architecture and Psychology in three universities in two Brazilian cities. Israeli students filled in the questionnaires online in their free time using Qualtrics. Peruvian and Brazilian students filled in the questionnaires during class hours, using paper and pencil. In all cases, students needed to sign an informed consent form. In this, the purpose of the research was explained; they were told

their participation was anonymous and voluntary, and they could leave the research at any point without consequence.

Measures

Cronbach's alpha coefficients for the Israeli, Peruvian and Brazilian samples are shown in Table 1. This table also presents the number of items for each scale, the observed range, and descriptive statistics. When scales were not available in a certain language, they were translated from English using a back-translation process. First, they were translated from English by a bilingual translator/researcher; then, a second translator/researcher performed the back translation into English. Differences were addressed until agreement was reached on the meaning of the items of the scale.

Emotion regulation

We used the emotion regulation scale developed by Roth et al. (2009). The original scale refers to emotions of fear and anxiety. This research was part of a larger research project exploring the role of desired and undesired emotions in well-being. In the larger study, we wanted participants to think about emotions they don't want to feel. Therefore, they answered an open question asking which emotions they wished to avoid in their lives. The total list included 125 emotion categories (mean per participant = 3.08, SD = 1.83). Each emotion was coded as 0 (not indicated by the participant) or 1 (indicated by the participant). Some word categories referred to identical emotions, so we grouped these emotions together to create one emotion category. If a participant provided two different words for the same emotion, we only scored one of the words. Many participants mentioned idiosyncratic words as emotions. Therefore, in our final list (see appendix), we only included emotions mentioned by more than 1% of the sample of each participating country. In different countries, some word categories have different names. Therefore, the table includes translations of the word categories into the native languages in which they were indicated. As seen in the table, the list of the five most frequently mentioned emotions was identical for Israel and Peru, and included "anxiety", "fear", "stress", "anger" and "hate". In Brazil, instead of stress, the list included "sadness". In addition, in Israel and Brazil, the most frequently mentioned emotion was "anger", while in Peru it was "anxiety". Thus, with the exception of sadness, these findings suggest that across the three countries, the emotions participants were most likely to want to avoid were high arousal negative emotions (Fontaine et al. 2007).

After completing the list, participants filled in the items referring to the emotion regulation styles. The IER scale included items measuring a differentiated awareness of personal emotions and their active exploration (sample items:

Table 1 Descriptive statistics and internal consistencies for the study variables

Variable	Number of items	Observed range	<i>M (SD)</i>			Cronbach's alpha		
			Israel	Peru	Brazil	Israel	Peru	Brazil
Integrative emotion regulation	6	1.00–5.00	3.76 (.82)	3.95 (.69)	3.72 (.77)	.85	.85	.83
Suppressive emotion regulation	6	1.00–5.00	2.55 (.87)	3.11 (.84)	3.29 (.86)	.85	.83	.79
Autonomy need satisfaction	4	1.00–5.00	3.80 (.68)	3.94 (.68)	3.64 (.79)	.80	.75	.74
Autonomy need frustration	4	1.00–5.00	2.81 (.84)	2.61 (.88)	3.21 (.84)	.70	.79	.74
Competence need satisfaction	4	1.00–5.00	4.06 (.66)	4.19 (.70)	4.04 (.76)	.83	.86	.84
Competence need frustration	4	1.00–5.00	2.08 (.91)	2.38 (.95)	2.90 (.99)	.78	.82	.76
Relatedness need satisfaction	4	1.00–5.00	4.14 (.65)	4.19 (.67)	4.00 (.72)	.79	.82	.76
Relatedness need frustration	4	1.00–5.00	1.68 (.87)	1.98 (.84)	2.69 (1.01)	.84	.79	.53
Personal growth	9	1.00–6.00	4.81 (.78)	4.52 (.77)	4.38 (.81)	.75	.77	.76
Purpose in life	8	1.00–6.00	4.76 (.90)	4.51 (.87)	4.25 (.93)	.81	.81	.78
Self-acceptance	7	1.00–6.00	4.66 (.89)	4.27 (.89)	3.97 (1.03)	.77	.81	.82

“When I experience an emotion which I don’t want to feel, it is important for me to try to understand why I feel that way”; “In situations in which I experience unwanted emotions, I try to understand what this indicates (to me) about myself and my situation”). The SER scale included suppression of expression (sample item: “In any situation, I prefer not to express emotions which I don’t want to feel”) and of experience (sample item: “When I experience an emotion which I don’t want to feel, I try to ignore it”). Participants rated each item on a scale from 1 (*definitely false*) to 5 (*definitely true*).

Basic psychological needs

We used the Basic Psychological Need Satisfaction and Frustration Scale (Chen et al. 2015), a 24-item self-report questionnaire measuring the three psychological needs (autonomy, competence, relatedness). Participants rated each item on a scale from 1 (*definitely false*) to 5 (*definitely true*). We used 12 of the items to measure basic psychological need satisfaction (sample items: “I feel that my decisions reflect what I really want”; “I feel capable at what I do”; “I feel close and connected with other people who are important to me”). We used the remaining 12 items to measure need frustration (sample items: “I feel pressured to do too many things”; “I feel insecure about my abilities”; “I have the impression that people I spend time with dislike me”).

Well-being

We used three subscales from Ryff’s (1989) psychological well-being questionnaire. Participants rated each item on a scale from 1 (*totally disagree*) to 6 (*totally agree*). The *personal growth* subscale referred to the extent to which a person had a feeling of growth and development, had a

sense she was fulfilling her potential, and thought she could improve over time (sample item: “I think it is important to have new experiences that challenge how you think about yourself and the world”). The *purpose in life* subscale referred to the extent to which a person found meaning in her life, believed her life had a sense of purpose, and had a sense of direction (sample item: “I enjoy making plans for the future and working to make them a reality”). The *self-acceptance* subscale measured the extent to which a person had a positive attitude about himself, could accept his own positive and negative qualities, and had a positive feeling about his past life (sample item: “When I look at the story of my life, I am pleased with how things have turned out”).

Plan of analysis

First, we calculated correlations between the study variables across the three countries. We then examined cultural differences, testing the measurement equivalence of the scales tapping into emotion regulation, basic psychological need satisfaction, need frustration, and well-being. We examined metric equivalence by testing whether the item loadings onto their respective underlying constructs were equivalent across groups. To do this, we used multi-group Confirmatory Factor Analysis (CFA; e.g., Van De Schoot et al. 2015) using AMOS 21 (Arbuckle 2012). Each latent construct for IER and SER was indicated by the six original items. Following the recommendations of Little et al. (2002), the latent variables for basic need satisfaction and frustration, as well as the latent variables for well-being, were indicated by parcels. Because of the multidimensionality of the constructs, we used the internal-consistency approach (Kishton and Widaman 1994), in which each parcel was comprised of the mean of the items tapping its respective factor. Overall, we created nine parcels, comprised of the mean of the item for the

satisfaction or frustration of the needs of autonomy, competence and relatedness, and personal growth, purpose in life and self-acceptance. In the constrained model, we constrained the factor loadings of the indicators of each latent construct to be equal but allowed free intercepts, error variances, and factor covariances across the two groups. In the unconstrained baseline model, factor loadings, intercepts, and error variances were allowed to be free across the three groups.

Finally, we employed multigroup structural equation modeling (SEM) to assess the hypothesized associations between emotion regulation styles, need satisfaction and frustration, and well-being. In the constrained model, we constrained the factor loadings of the indicators to each latent construct and the structural paths to be equal. Because there were mean differences between cultures in the study variables, scalar (intercepts) invariance could not be achieved. However, the metric (loading) equivalence was sufficient to compare correlational relationships across cultures (Steenkamp and Baumgartner 1998). Therefore, we allowed free intercepts, error variances, and factor covariances across the groups. In the unconstrained baseline model, structural weights were allowed to be free across the three groups.

We assessed model fit using the root mean square error of approximation (RMSEA), the standardized root-mean-square residual (SRMR), the comparative fit index (CFI), and the Tucker–Lewis index (TLI). RMSEA values less than or equal to .05, SRMR values below .08, and CFI and TLI values greater than or equal to .90 were considered evidence of acceptable fit (Browne and Cudeck 1993; Hoyle 1995; Schumacker and Lomax 2010). Following the recommendations of Cheung and Rensvold (2002), we compared the constrained models and the unconstrained models by looking at the differences in CFI, Gamma hat, and McDonald’s NCI. Cheung and Rensvold (2002) suggest values of ΔCFI, ΔGamma hat, and ΔMcDonald’s NCI smaller than

or equal to − .01, − .001, and − .02, respectively, indicate invariance.

Results

Preliminary analysis

Table 2 shows the correlations between the study variables in the three countries explored. As seen, IER was positively related to basic need satisfaction across the three cultures. IER was negatively related to basic need frustration in Peru, but not in Israel or Brazil. SER was positively related to basic need satisfaction frustration across cultures. Results for well-being showed that across the three countries, IER was positively related while SER was negatively to well-being. When we looked at the relations between basic need satisfaction and frustration and well-being, we found that in all three countries, need satisfaction was positively related and frustration was negatively related to well-being.

Main analysis

Measurement model

CFA results indicated that the fit of the model in which measurement weights were unconstrained was adequate, $\chi^2_{(562)} = 1156.529$, $p < .001$; RMSEA = .038; SRMR = .059; CFI = .916, TLI = .906. The fit of the constrained model was also adequate, $\chi^2_{(582)} = 1180.269$, $p < .001$; RMSEA = .038; SRMR = .074; CFI = .916, TLI = .915. A Chi square difference test yielded non-significant differences between models, $\Delta\chi^2_{(20)} = 23.740$, $p < .254$. Tests of measurement equivalence yielded values of .000, -.0001, and -.002, for ΔCFI, ΔGamma hat, and ΔMcDonald’s NCI, respectively. Thus, the hypothesis of invariance was not rejected, and the

Table 2 Intercorrelations of types of emotion regulation, basic need satisfaction and frustration and well-being in Israel/Peru/Brazil respectively

Variable	1	2	3	4	5
1 Integrative emotion regulation	–				
2 Suppressive emotion regulation	-.08/- .23**/- .03	–			
3 Basic need satisfaction	.34**/.35**/.28**	-.15*/- .14*/- .08	–		
4 Basic need frustration	-.01/- .23**/- .08	.45**/.26**/.20**	-.39**/- .61**/- .57**	–	
5 Well-being	.24**/.34**/.34**	-.31**/- .28**/- .29**	.60**/.69**/.68**	-.72**/- .73**/- .71**	–

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

model's factor structure was equally acceptable for the three countries.

Structural model

Because the Israeli and Peruvian samples contained a very large proportion of female participants, we controlled for participants' gender in this model. We first tested the measurement equivalence of the model in which IER and SER directly predicted well-being. In line with Hypothesis 1, across the three countries, IER was positively related to well-being ($\beta = .30, p < .001$) and SER was negatively related ($\beta = -.29, p < .001$). Together, IER and SER explained 20% of the variance in well-being ($R^2 = .20$). Model fit of the unconstrained model was adequate, $\chi^2_{(329)} = 606.436, p < .001$; RMSEA = .034; SRMR = .058; CFI = .936; TLI = .930. We then assessed the fully constrained model. Model fit was also adequate, $\chi^2_{(334)} = 615.430, p < .001$; RMSEA = .034; SRMR = .065; CFI = .935; TLI = .930. A Chi square difference test yielded non-significant differences between models, $\Delta\chi^2_{(5)} = 8.994, p < .109$. Tests of measurement equivalence yielded values of $-.001, -.002$, and $.000$, for Δ CFI, Δ Gamma hat, and Δ McDonald's NCI, respectively. Contrary to Hypothesis 2, the relations of SER and well-being were not more attenuated in Peru and Brazil than Israel.

We then tested the mediation model in which basic need satisfaction and frustration mediated emotion regulation

styles and well-being (Fig. 1). As the initial model fitted the data poorly, we ran modification indices; these suggested that modeling the covariance between the error terms of the basic need satisfaction and frustration variables would improve the model fit. As these two constructs are closely related but distinct (e.g., Chen et al. 2015), we included this covariance in the model. We assumed that although these variables represent distinct theoretical constructs, they share a considerable amount of variance that should be modeled. After doing so, we obtained adequate model fit indices for the unconstrained model, $\chi^2_{(646)} = 1214.381, p < .001$; RMSEA = .035; SRMR = .059; CFI = .920; TLI = .914. We then assessed the fully constrained model. Model fit was also adequate, $\chi^2_{(657)} = 1241.601, p < .001$; RMSEA = .035; SRMR = .065; CFI = .918; TLI = .913. However, a Chi square difference test yielded a significant difference between models, $\Delta\chi^2_{(11)} = 27.220, p < .006$. Tests of measurement equivalence yielded values of $-.002, -.002$, and $-.01$, for Δ CFI, Δ Gamma hat, and Δ McDonald's NCI, respectively. As seen, Δ Gamma hat was below the recommended cutoff of $-.001$; therefore, model invariance was not supported by the data. Following Hypothesis 2, we freely estimated the paths from IER and SER to basic need frustration in Israel. Fit of this partially constrained model was adequate, $\chi^2_{(655)} = 1229.238, p < .001$; RMSEA = .035; SRMR = .065; CFI = .919; TLI = .914. A Chi square difference test yielded non-significant differences between models, $\Delta\chi^2_{(9)} = 14.857, p < .095$. Tests of measurement equivalence yielded values of $-.001, -.0001$, and $.003$, for

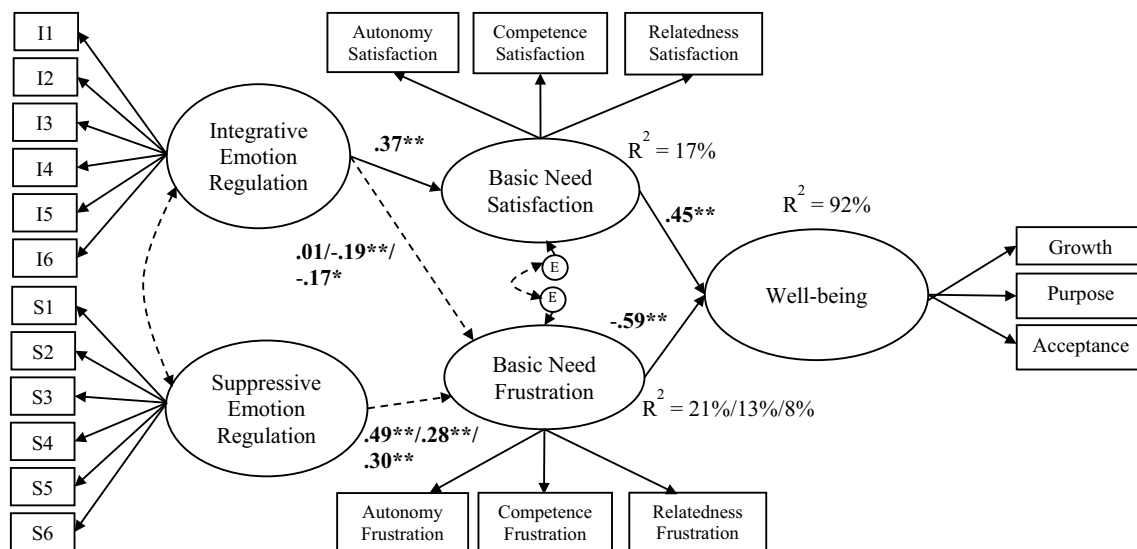


Fig. 1 Structural multi-group model for the associations between integrative and suppressive emotion regulation styles, need satisfaction, need frustration and well-being, controlling for gender (not shown for the sake of clarity). Regression standardized coefficients are bolded. Loadings and structural paths are constrained to be equal. Dashed

lines represent freely estimated paths. For the freely estimated paths, coefficients presented are for Israeli/Peruvian/Brazilian samples respectively. For the sake of clarity, non-significant paths and structural covariance coefficients are not presented. * $p < .05$. ** $p < .01$

Δ CFI, Δ Gamma hat, and Δ McDonald's NCI, respectively, indicating model invariance.

Taken together, the results partially supported Hypothesis 2, as the relations between IER, SER, and well-being were invariant across the three cultures, but attenuated relations between SER and basic need frustration were obtained in Peru and Brazil, but not Israel. The results supported Hypothesis 3, as the relations between basic need satisfaction and frustration and well-being were equivalent across countries.

Tests of mediation

To test the mediation hypothesis (Hypothesis 4), we used the bootstrapping procedure with 5000 bootstrap resampling. The 95% confidence intervals of the paths from IER to well-being through basic need satisfaction in Israel, Peru, and Brazil were $\{.03; .21\}$; $\{.11; .32\}$; $\{.08; .31\}$, respectively. That is, basic need satisfaction mediated the relations between IER and well-being in all the cultures. The 95% confidence intervals of the paths from SER to well-being through basic need frustration in Israel, Peru, and Brazil were $\{-.34; -.15\}$; $\{-.22; -.06\}$; $\{-.30; -.04\}$, respectively. That is, basic need frustration mediated the relations between SER and PWB in all the cultures. Because these intervals did not contain 0, the indirect effects significantly differed from 0, at $\alpha = .05$. The 95% confidence intervals of the paths from IER to well-being through basic need frustration in Peru and Brazil were $\{-.07; .06\}$; $\{-.03; .09\}$, respectively. Therefore, the indirect effect from IER to PWB through basic need frustration was non-significant. We did not test this mediation effect in Israel, as the path from IER to basic need frustration was non-significant in this country. The path from SER to psychological need satisfaction was non-significant in all three countries; therefore, we did not test mediation for the path from SER to well-being through need frustration.

Testing alternative models

To compare the goodness-of-fit of the full and partial mediation models, we compared the model fit with and without the direct paths from IER and SER to well-being. None of these direct paths was significant. Thus, basic need satisfaction and frustration fully mediated the relations between IER and SER and well-being.

Our correlational design cannot answer questions about causal direction. Nonetheless, it is possible to test whether some causal sequences are more likely than others by comparing alternative mediation models. We therefore compared our predicted causal sequence with an alternative model, in which types of emotion regulation mediated the relations between psychological need satisfaction and frustration

and well-being. Results showed that the fit of this alternative model was unacceptable, $\chi^2_{(628)} = 1794.24$, $p < .001$; RMSEA = .051; SRMR = .111; CFI = .836; TLI = .819. Therefore, our original model was preferable.

Discussion

IER and SER are two emotion regulation styles recently explored by researchers. While IER is considered adaptive, SER is considered maladaptive. In our research using samples from three countries, we extended the knowledge of the consequences of the use of these two types of emotion regulation.

Integrative emotion regulation and its relations to adaptive outcomes

Our results support the assumption that IER is an especially adaptive emotion regulation style (Ryan et al. 2006a, b) and extend previous findings demonstrating its relations to positive outcomes (e.g., Benita et al. 2017; Roth et al. 2017), specifically well-being (Brenning et al. 2015). For example, ours is the first study to demonstrate IER's positive relations to basic need satisfaction. The relations of IER with basic need satisfaction and well-being were consistent and robust in our results. In all three countries, IER was positively related to psychological need satisfaction, and in Peru and Brazil, it was negatively related to psychological need frustration. In addition, in all three countries, it was positively related to well-being. Finally, the relations between IER and well-being were mediated by basic need satisfaction in the three countries explored.

Previous studies (Benita et al. 2017; Roth et al. 2017) have shown that empathy plays a mediating role in the relations between IER and prosocial behavior. Although these explorations and ours were cross-sectional, they still trigger questions about the relative place of empathy and basic need satisfaction in the hypothetical chain linking IER to well-being. Martela and Ryan (2016) and Weinstein and Ryan (2010) showed that prosocial behaviors predict basic need satisfaction which, in turn, predicts well-being. Together with our research, these findings suggest that IER might instigate an upward spiral, in which people who use IER are more empathetic to others and therefore are more likely to help them. This, in turn, is likely to increase their sense of need satisfaction, leading to an enduring experience of well-being. Future research should explore this hypothetical causal chain using longitudinal and experimental designs.

According to SDT, the integrative process through which individuals assimilate experiences and synthesize them to achieve unified self-functioning underlies healthy development and adjustment (Ryan 1995). The experience of

psychological need satisfaction energizes this process, and, as our findings demonstrate, it is assisted by emotion regulation. According to Weinstein et al. (2013), two features of the integrative process are awareness of and a non-defensive stance to emotions. IER involves awareness of emotions and their active and receptive exploration (Roth et al. 2009, 2014). Thus, our results suggest IER is an important component of the integrative process, enabling individuals to assimilate and synthesize emotional experiences.

The findings join previous findings showing that mindfulness and acceptance positively predict well-being (e.g., Baer et al. 2004; Brown and Ryan 2003; Ford et al. 2018). Although there are some differences between IER, mindfulness, and acceptance, they also have certain similarities (Roth et al. in press). Receptive awareness and self-integration, like mindfulness and acceptance, are crucial to the experience of well-being. Future research should continue to explore the similarities and differences between the concepts.

Suppressive emotion regulation and its relations to maladaptive outcomes

Our study demonstrates that SER is positively related to psychological need frustration and negatively to well-being in three different cultures, supporting previous findings in emotion regulation research (e.g., Gross and John 2003). More importantly, our study is the first to show that psychological need frustration mediates the relations between SER and well-being.

Just as IER might serve a nurturing role in the integrative process, SER might play a toxic role. Recent explorations of the concept of basic psychological needs suggest that while need satisfaction facilitates integrative processes, need frustration may be harmful and forestall them (Chen et al. 2015; Vansteenkiste and Ryan 2013). Given the relations of SER to psychological need frustration, we suggest it is a type of emotion regulation that is likely to undermine the integrative process. Specifically, we argue that individuals who use SER actively compartmentalize and distort their experiences; thus, when they face emotional experiences, they feel reduced agency over and ownership of their emotions, reduced competence regulating them, and reduced ability to rely on others to help manage them (Ryan et al. 2006a, b).

Cross-cultural differences

In accordance with the predictions of cross-cultural research on emotion regulation (Matsumoto et al. 2008a, b; Tsai and Lu 2018), we found more attenuated relations between SER and basic need frustration in Peru and Brazil than Israel. Similarly, Chen et al. (2016) who demonstrated attenuated relations between maladaptive parenting practices and basic

need frustration in a collectivistic culture, relative to an individualistic one. However, as in previous work, the relations of basic need satisfaction and frustration with well-being did not vary across countries (e.g., Ahmad et al. 2013; Chen et al. 2015; Church et al. 2013). Taken together, the findings suggest that once individuals' needs are satisfied or frustrated, their well-being is likely to increase or decrease, respectively. Yet the extent to which certain psychosocial events support or frustrate the needs might differ between cultures. As collectivistic cultures and those high on power distance tolerate and sometimes promote a certain amount of emotional suppression, individuals in these societies may experience less need frustration when they use this way to regulate emotions.

Unexpectedly, there were no cultural differences in the negative relations of SER and well-being. Until now, studies finding cultural differences in these relations (e.g., Matsumoto et al. 2008; Soto et al. 2011) have assessed well-being using the satisfaction in life scale (Diener et al. 1985). We took a different approach, using three scales from the PWB questionnaire (Ryff 1989). These scales assess the content of eudemonic lifestyle as a dynamic process, instead of asking individuals whether they are content with what they have achieved (Ryan et al. 2006b; Ryff and Singer 1998). Importantly, like us, Gross and John (2003) did not find cultural differences in the relations between SER and well-being. It is possible that individuals who use SER and belong to a culture that values a certain amount of suppression are less likely to pay social costs for using it than those who belong to a culture that devalues emotional suppression. Thus, when the former look at what they have achieved in their lives (life satisfaction), they might not feel as dissatisfied as the latter. However, when well-being is regarded as an enduring sense of growth, SER is maladaptive across cultures, as it impedes people's tendency to assimilate new experiences, necessary for growth experiences, regardless of whether they feel life satisfaction or not. Future research should explore these tentative assumptions.

Limitations

This research has several limitations. To begin with, our samples comprised college students in the three target countries, so we should be cautious about generalizing the findings to older, poorer, and less educated groups. In addition, the Israeli and Peruvian samples contained a very large proportion of females. To overcome this bias, we controlled for gender in our final structural model. A support for the generalizability of the findings beyond gender is that in Brazil, where the sample was more balanced in terms of gender, the results were in line with our hypotheses.

Another limitation concerns the characteristics of the countries participating in this research. Although we based our distinctions on differences in the dimensions of individualism versus collectivism and power distance, we did not directly measure cultural markers, limiting our ability to gain certain knowledge of the actual cultural differences between the participating countries. Future research should do so by using Hofstede's (2003) measure of cultural dimension or by exploring individuals' values (Schwartz 1992). Past work (Chen et al. 2013; Chirkov et al. 2003) also shows there is considerable cultural diversity within any given culture, and this could be modeled by the use of cultural markers. Finally, future research should explore the outcomes of IER and SER on more prototypical individualistic cultures than Israel, such as North America and Western Europe, as well as on collectivistic cultures from other geographical areas, such as East Asia, Africa, East Europe, and the Pacific Islands.

A final limitation is that while the implied direction of causality in our study was consistent with SDT and was supported by the poor fit of the alternative model, causality remains ambiguous because of our correlational, cross-sectional data. Thus, future studies are required to examine causal questions.

Future directions

Past research has shown that autonomy supportive environments predict both psychological need satisfaction (e.g., Adie et al. 2012) and IER (e.g., Brenning et al. 2015; Roth et al. 2009), while controlling environments predict need frustration (e.g., Bartholomew et al. 2011) and SER (e.g., Brenning et al. 2015; Roth et al. 2009). When these results are added to ours, it seems likely that autonomy supportive and controlling environments affect the development of emotion regulation styles, and these styles predict experiences of psychological need satisfaction and frustration and well-being. However, more longitudinal research is needed to establish these relations.

An important avenue for future research is to continue to develop the measurement of IER. IER is conceptually defined as involving three elements: a differentiated awareness of one's emotions, an active interest in and exploration of one's emotions, and the possibility of using the sensitivity to emotional cues to regulate one's behavior (Ryan, et al. 2006a, b; Ryan et al. 2016). The six-item IER scale (Roth et al. 2009) contains items on the exploration of and interest in emotions and the ability to use emotional experiences for

self-regulation. However, it does not tap into the concept of receptive awareness of emotions.

Recent experimental research comparing IER to reappraisal has shown that, at least in the long term, IER is likely to be more adaptive than reappraisal, as it immunizes the individual against the long-term effects of unpleasant emotions (Roth et al. 2018). Future research should explore whether the relations of the trait-like styles of IER and SER with well-being hold even after controlling for reappraisal. As our research suggests IER is an important component of the integrative process, a plausible assumption is that the satisfaction of the needs will mediate the relations of IER and well-being, but not of reappraisal. Finally, the negative effects of SER on well-being may be overshadowed when other maladaptive emotion regulation types, such as emotion dysregulation (Shields and Cicchetti 1997), are considered.

Conclusion

Our results support and extend findings demonstrating the costs of emotional suppression, on the one hand (e.g., Brenning et al. 2015; Gross and John 2003), and the benefits of emotion regulation styles entailing acceptance and awareness to emotions, on the other (e.g., Benita et al. 2017; Brown and Ryan; 2003; Ford et al. 2018). Collectively, they suggest that in distinct cultures, people who take interest in their emotions and explore them volitionally are likely to experience heightened psychological health. On the other hand, those who ignore and hide their emotions are likely to experience reduced psychological health, and even increased ill-being. The results also suggest that basic need satisfaction and frustration is likely to play a key role in explaining why some emotion regulation styles are adaptive and others are not.

Compliance with ethical standards

Ethical approval This article does not contain any studies with animals performed by any of the authors. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent was obtained from all individual participants included in the study.

Appendix: Frequencies and proportions of undesired emotions across the three countries

Emotion	Israel (N = 224)			Peru (N = 304)			Brazil (N = 203)		
	Hebrew	N	%	Spanish	N	%	Portuguese	N	%
Anxiety	הדרח	51	23	Ansiedad	11	39	Ansiedade	44	22
Nervousness	עצבנות	31	14	Nerviosismo	52	17	Nerviosismo	3	2
Worry	דאגה	8	4	Preocupación	32	11	Preocupação	2	1
Fear	פחד	63	28	Miedo	80	26	Medo	40	20
Stress	לחץ	55	25	Estrés	77	24	Estresse	14	7
Anger	כעס	68	30	Enojo/Ira	56	18	Raiva/Ira	76	37
Hate	שנאה	52	23	Odio	78	26	Ódio	41	20
Despair	ייאוש	44	20	Desesperación	39	13	Desesperança	10	5
Sadness	עצב	43	19	Tristeza	33	11	Tristeza	52	26
Guilt	אשמה	6	3	Culpa	12	4	Culpa	3	2
Disappointment	אכזבה	23	10	Decepción	15	5	Desilusão	4	2
Resentment	טינה	5	2	Rencor	13	13	Ressentimento	1	0.5
Hostility	עוינות	14	6	Hostilidad	12	4	Hostilidade	3	2
Jealousy	קנאה	15	7	Celos	22	8	Inveja	12	6
Shame	בושה	3	1	Verguenza	18	6	Vergonha	1	1
Frustration	תסכול	11	5	Frustración	11	4	Frustração	6	3
Pride	גאווה	3	1	Orgullo	8	3	Orgulho	3	2
Contempt	בוז	5	2	Desprecio	25	8	Desprezo	5	7
Love	–	0	0	Amor	7	2	Amor	2	1

Note. Five most frequent undesired emotions and their percentages per country appear in bold

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