



Individualism, collectivism, and emotion regulation: a cross-cultural examination among young adults from seven countries

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Abstract

Individualism and collectivism are dimensions of cultural variation thought to shape differences in emotion regulation tendencies, yet research to date has examined these cultural dimensions as country-level features, emphasizing variability across nations. The present study takes the approach of examining cultural differences within nations as predictors of emotion regulation strategies, shifting the perspective instead to individual differences. This present study aimed to address how individual endorsement of individualism-collectivism (i.e. prioritizing individual versus group goals) and vertical-horizontal attitudes (preference for hierarchy versus equality) are associated with use of emotion regulation strategies (i.e., reappraisal and suppression) among college students from seven countries ($n=5,900$; female = 70.80%). Overall, we found that individual differences in individualism-collectivism and vertical-horizontal attitudes had strong connections with young adults' emotion regulation styles. Results of our multivariate (i.e., all variables were simultaneously examined) regression model revealed: a) higher endorsement of horizontal individualism and horizontal collectivism were associated with higher use of reappraisal strategies; b) higher endorsement of horizontal individualism and vertical collectivism were associated with higher use of suppression strategies; while higher endorsement of horizontal collectivism was associated with lower use of suppression strategies. A multi-group model supported the generalizability of these associations across countries. These findings demonstrate the value of approaching cultural differences in emotion regulation from an individual differences framework, and not assuming country-level differences are representative of individuals' affective experiences. Further work is needed examining models within-country to examine cultural variation in individualism vs collectivism compared to country-level norms.

Keywords Individualism · Collectivism · Emotion regulation · Cross-cultural · Young adults

Introduction

Cognitive reappraisal and expressive suppression are two emotion regulation strategies directly implicated in a variety of health outcomes. The former involves a reevaluation of

an emotion-eliciting stimulus to alter the emotional evaluation, while the latter focuses on inhibiting the behavioral expression of the evoked emotions (Gross & John, 2003). Within the emotion regulation literature, cognitive reappraisal (henceforth referred to as reappraisal) is generally

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considered an adaptive emotion regulation strategy, whereas expressive suppression (henceforth referred to as suppression) is generally considered a maladaptive strategy in regard to mental and physical health outcomes (Gross, 2014; Gross & John, 2003). Research in the United States has found reappraisal to be positively correlated with subjective well-being and positive affect, as well as negatively correlated with negative affect, depression, and anxiety; suppression on the other hand, has shown the opposite pattern of correlations and is positively linked (i.e., risk factor) to a variety of other psychological disorders (Webb et al., 2018). However, this pattern of results is not universal and identifying the social and cultural context in which processes such as emotion regulation strategies are most productive or maladaptive is critical to have a holistic understanding of how these strategies can influence emotional health.

Cultural differences in emotion and emotion regulation

Individualism and collectivism, often presented as two poles of cultural differences, have been conceptualized as prioritizing personal goals over group goals (individualism) or the opposite (collectivism) (Shavitt et al., 2006). Prior research documents that Western nations tend to be more individualistic, while Eastern nations lean more collectivistic, though there is also within-region variation along socioeconomic and religious lines (Basabe & Ros, 2005; Singelis et al., 1995). For example, Latin and South American countries have been divided into North (e.g., Mexico, Colombia) and South (e.g., Argentina, Brazil) on this scale, in which participants from northern countries have primarily individualistic characteristics while participants from the southern countries have a mix of individualistic and collectivistic characteristics (Greenwood et al., 2012). Much cross-national work has oversimplified the term “cultural differences” to be synonymous with differences in individualism and collectivism, especially when studying differences in emotion regulation. Indeed, much of the variability we see in cross-cultural differences in emotion regulation is likely due to cultural differences in the valuing and perceived utility of emotions expression, and differences in social goals, which appears to relate to the adaptivity of specific emotion regulation strategies.

There are also cross-national differences in the perceived utility of emotions. One example of this is a recent finding that positive emotions were perceived to have more utility and less harm by European Americans compared to Japanese individuals, such that European Americans generated fewer negative consequences to positive emotions and more situations in which positive emotions were beneficial than Japanese participants (Ma et al., 2018). Additionally, these investigators found cultural differences in the preference of

emotional valence, as European Americans reported a stronger relative preference for positive over negative emotions when compared to Asian individuals (Ma et al., 2018). Further research has found that Chinese participants had a more negative implicit evaluation of emotional expression than European Americans, and that the Chinese participants explicitly reported valuing emotional expression less than European Americans (Deng et al., 2019). Relatedly there is work suggesting that those from collectivist cultures were less accurate at recognizing the emotions of others than participants from individualistic cultures (Wood et al., 2016). Indeed, Ma et al. (2018) reasoned that while hedonic (i.e., motivated by feeling good) and instrumental motives to value positive emotions are often congruent, this is often not the case for Asian individuals who often do place some hedonic value on positive emotions but perceive less utility in positive emotion than Americans when pursuing a goal. When in contexts requiring high cognitive effort, Americans report more preference for positive emotions than Asian individuals, and report trying to increase rather than decrease their positive emotions more than Asian individuals (Ma et al., 2018). Despite individuals from both cultures endorsing hedonic goals, perceiving potential harm or utility when regulating these emotions is both contextually and culturally dependent. This pattern of results suggests a tendency of Western cultures to value positive emotions and the communication of emotions through expression more than Eastern cultures. Thus, it is unsurprising that differences in emotion regulation strategies have been found along these country lines, mirroring observed national differences in emotion regulation.

It is important to evaluate emotion regulation strategies in the social context in which they occur when making inferences about adaptivity. For example, Nozaki (2018) studied the relationship between trait emotional intelligence and emotion regulation strategies in Japanese populations and European American populations and discovered a positive relationship between reappraisal and emotional intelligence in both groups. However, a negative association between suppression and trait emotional intelligence was only found in the European American sample, showing that the view of suppression as maladaptive is specific to certain cultures (Nozaki, 2018). Why might this be? Suppression is thought to be more detrimental and more aversive to those who are largely individualistic due to suppression’s potential to stand in the way of self-expression and an individual’s sense of control (Matsumoto et al., 2008; Pisitsungkagarn & Busayaprateep, 2013). Those holding individualistic values may then be prompted to use other emotion regulation strategies, such as reappraisal, that do not conflict with their goals and values. Comparatively, suppression is in line with collectivist values of interdependence and maintaining social harmony, making it unsurprising that there are fewer negative

consequences associated with suppression in collectivist contexts (Butler et al., 2007; Pisitsungkagarn & Busayapra-teep, 2013; Soto et al., 2011). Matsumoto et al. (2008) posit that individuals determine which form of emotion regulation strategy would be the most socially advantageous based on their cultural context and attitudes. For example, Chiang (2012) reported that Chinese college students suppress their emotions for a variety of reasons including maintaining harmony in relationships, focusing on the emotions of others, and circumventing potential negative consequences of the expression depending on the context the individual finds themselves in. Huwaë and Schaafsma (2018) found that Chinese individuals reported more emotional suppression of both negative and positive emotions compared to Dutch and Moluccan individuals. Additionally, they found that Chinese individuals had less positive emotion suppression with close interaction partners, and Dutch individuals had more negative emotion suppression with non-close others (Huwaë & Schaafsma, 2018). Their findings support the claim that emotion regulation is highly contextualized with social goals. Further, cultural differences in display rules, such as the difference between American and Japanese cultures for emotions such as anger or happiness, show the appropriateness of emotional expressions to be dependent on social context among other factors (Matsumoto, 1990). Cultural differences underlying the motivation and cultural norms around emotional expressions provide a rationale for the abundance of literature reporting differences in emotion regulation and its adaptivity cross-culturally.

Need to examine individualism-collectivism at the individual level

While research has been conducted on cultural differences in emotion regulation and mainly found differences in the use and mechanism of suppression (Bebko et al., 2019; Matsumoto et al., 2008; Qu & Telzer, 2017) much of this research relied on cultural norm differences (i.e., country-level variables) instead of individual attitudes to account for individualistic and collectivistic attitudes. This is problematic as this assumes a cultural norm will be *uniformly* reflected in individual attitudes. It has been suggested that the way individuals regulate their emotions is not shaped by the membership of a particular cultural group or country, but instead the individual's orientation to particular cultural values (Ford & Mauss, 2015).

Moreover, vertical and horizontal dimensions were added to the concepts of individualism and collectivism to distinguish between patterns of attitudes prioritizing hierarchy or equality respectively within both individualistic and collectivistic beliefs (Triandis & Gelfand, 1998). As such, adding the dimensions of vertical and horizontal attitudes to

individualistic and collectivistic attitudes creates four patterns, or orientations as this manuscript will refer to them (vertical individualism [VI], horizontal individualism [HI], vertical collectivism [VC], and horizontal collectivism [HC]). Triandis and Gelfand's (1998) multinational validation of the vertical and horizontal dimensions of individualism and collectivism describes the horizontal orientation as emphasizing equality, while the vertical orientation as emphasizing hierarchy. In their conceptualizations, people high on HI value being "unique and distinct" without valuing having high status, in contrast to those high in HC, who view themselves as similar to others in their group and prioritize group-level goals, the distinction being conceptualizing oneself primarily as unique individual versus primarily a member of a group (Triandis & Gelfand, 1998). Individuals high on VI value individual competition and obtaining individual hierarchical status, while people high on VC value group-level competition with outgroups and value ingroup unity, with the distinction being whether individual or group-level status achievement is prioritized (Triandis & Gelfand, 1998). When examining these four orientations with social value orientation (i.e., one's tendencies towards competition or cooperation in interpersonal contexts, categorized as pro-self and prosocial respectively), Moon et al. (2018) found that pro-self individuals compared to prosocial individuals showed more vertical individualist attitudes, while pro-social individuals compared to pro-self individuals reported stronger endorsement of horizontal collectivism. Indeed, pro-self individuals, tending towards interpersonal competition, are more likely to view themselves primarily as a unique individual and value competition, while the pro-social individuals, tending towards cooperation, more strongly view themselves as group members and value equality.

In line with the country-level generalizations using individualism and collectivism as a dichotomy, the four orientations of individualism and collectivism are often applied on the national level, though the results do not always align with previous generalizations. One study reported that China was found to be a vertically individualist country, while the U.S. was more horizontally individualist (Sivadas et al., 2008), suggesting that a reconsideration of the previous literature based on the West as individualist, East as collectivist dichotomy is warranted (Shavitt et al., 2006). Indeed, country-level values likely do not directly translate into individual attitudes in a uniform manner. Relatedly, while countries are often generalized to be a single orientation (i.e., generalizing the U.S. as only vertical individualist) there is evidence that most cultures show some degree of each of the four orientations. For example, Denmark has been shown to be defined equally by both horizontal individualism and horizontal collectivism (Sivadas et al., 2008).

Cultural norms or generalizations may not always be reflected on the individual level, as an individual within a given culture may have attitudes deviating from their cultural context (i.e., a person strongly endorsing horizontal collectivist attitudes in the U.S.) (Shavitt et al., 2006; Triandis & Gelfand, 1998). Viewing these orientations as individual attitudes instead of cultural attitudes would address any misconceptions or cultural stereotypes that may be misrepresentative. Indeed, very little work has incorporated the horizontal and vertical dimensions on the individual level, which is necessary for a more nuanced understanding of the effects of individualist and collectivistic attitudes on emotion regulation. The motivation to study cultural differences using vertical and horizontal metrics in addition to individualist and collectivist measures derived from country-level differences, in which the individualism seen in the United States differed from individualism in Sweden, and similarly collectivism in Korea differed from that collectivism in Israeli kibbutz (Shavitt et al., 2006; Triandis & Gelfand, 1998). Oyserman et al. (2002) found that differences in American and Japanese participants in individualism disappeared when competition was included in the measure, indicating that the main country-level difference in this case is vertical attitudes rather than the previously seen individualistic attitudes. Young et al. (2021) contextualize their cross-national study on the vertical and horizontal dimensions of individualism and collectivism with guilt- and shame-related evaluations as highlighting the importance of looking at individuals and cultural values "types" (i.e., vertical and horizontal individualism and collectivism) rather than simplifying to country-level binaries in regard to emotions. Incorporating the vertical and horizontal measures on the individual level shows how collectivism can relate to concepts such as authoritarianism differently depending on if one were examining vertical or horizontal collectivism (Triandis & Gelfand, 1998) and how concepts such as Social Value Orientation are associated only with vertical individualism or horizontal collectivism; both meaningful nuances only discovered with this additional dimension. Moon et al. (2018) notes that while countries have been generalized by specific dimensions (i.e., the United States as a vertically individualist country), important within country variations occur that require attending to, such as their findings that Social Value Orientation was differently associated with cultural attitudes in South Korea compared to the United States. We argue that attending to these four dimensions of cultural attitudes on the individual level is necessary, as is attending to country-level differences in relationship, to best understand cultural differences in emotion regulation.

The present study

Much of the current literature on emotion regulation creates an East–West dichotomy when discussing cultural differences, which forces generalizations about individuals based on their cultural background. To better understand the association between cultural attitudes and emotion regulation, it is important to measure cultural orientation in participants from different countries (Ford & Mauss, 2015). Research has measured emotion regulation with the vertical and horizontal dimensions of individualism and collectivism as predictors and moderators of mental health outcomes rather than predictors of each other (Schunk et al., 2022). The purpose of the present study was to investigate the role of individual differences in individualism and collectivism and their effect on emotion regulation strategies across cultural contexts. Specifically, we measured individuals' attitudes, broken down into vertical and horizontal dimensions of individualism and collectivism, and examined their association with suppression and reappraisal across seven countries: Argentina, Canada, England, Spain, South Africa, the United States, and Uruguay.

Hypothesis 1: VI, VC, HI will be negatively associated with suppression. Individualism in general has been associated with general autonomy, affective autonomy, and hedonism (Shavitt et al., 2006; Sivadas et al., 2008; Singelis et al., 1995). Looking more specifically at VI, Moon et al. (2018) found that in both South Korea and the U.S. pro-self individuals (a combination of individualist and competitive values) are more likely to endorse VI attitudes than pro-social individuals, and previous research has shown that pro-self are more likely to express authentic emotions (Karagonlar & Kuhlman, 2013). In fact, VI has been instead associated with avoidance regulatory methods such as withdrawal and a lack of reparative action (Young et al., 2021). Looking to HI, those who score high on this measure have also scored high on hedonism (Triandis & Gelfand, 1998), and similarly affective autonomy (i.e., the pursuit of positive experiences) and egalitarianism (i.e., wanting power and status to be more evenly distributed; Matsumoto et al., 2008) have been negatively associated with suppression on the country-level (Matsumoto et al., 2008). Lastly, Pankratova and Osin (2020) found that VC was negatively associated with suppression in an Azerbaijani sample. Thus, and in line with previous cross-cultural work, we believe that individualism (both vertical and horizontal) as well as vertical collectivism will be associated with lower levels of suppression.

Hypothesis 2: We expect that collectivist attitudes will be associated with higher uses of reappraisal, while

individualist views will be negatively associated with reappraisal. The majority of cross-cultural emotion regulation work focuses on expressive suppression (Ramzan & Amjad, 2017). Previous research on the country-level finds no relationships between reappraisal and conceptions such as power distance, embeddedness, hierarchy, individualism/collectivism, and egalitarian values, which encompass the vertical and horizontal dimensions of individualism and collectivism (Matsumoto et al., 2008). Conversely the same study did find a positive relationship between Embeddedness and the relationship between reappraisal and suppression (Matsumoto et al., 2008). They also found a negative relationship between Affective Autonomy and the relationship between reappraisal and suppression, indicating that those in Embedded cultures tend have a stronger relationship between the two regulation strategies, while increased Affective autonomy is related to a weaker relationship between the regulation strategies (Matsumoto et al., 2008). On the individual level reappraisal has been shown to have positive effects on mental health cross culturally (Schunk et al., 2022; Sun & Nolan, 2021), and it has been shown that individuals from Asian countries (i.e. China and Malaysia) tend to use cognitive reappraisal more than those from countries traditionally viewed as individualist (Ireland and Australia).

Hypothesis 3: As an individual may have attitudes varying from the norms of their social context, we expected the relationship between the vertical and horizontal dimensions of individualism and collectivism to be invariant across countries.

To test our three hypotheses, we conducted a multivariate regression model to understand how the vertical and horizontal dimensions of individualism and collectivism predict use of cognitive reappraisal and expressive suppression (Hypotheses 1 and 2). Second, to examine if these effects exist cross-culturally or are culturally specific (Hypothesis 3), we examined the structural invariance of the model (i.e., multi-group model examining moderation) among young adults from seven countries.

Method

Participants and procedures

Participants were college students ($n=9171$) recruited from 12 universities spanning seven countries (U.S., Canada, Spain, England, Argentina, Uruguay, and South Africa) to complete an online survey exploring risk and protective factors of substance use and addictive behaviors (see Bravo et al., 2021, for more information). To minimize

Table 1 Descriptive of age and socioeconomic status by country

	Age		SES (range 1–5)	
	Mean	SD	Mean	SD
USA	19.67	1.74	3.02	0.88
Canada	19.93	4.29	3.03	0.80
South Africa	20.42	2.49	3.19	0.90
Spain	21.00	3.13	2.65	0.76
South America	23.31	6.34	2.63	0.77
UK	19.09	3.20	3.09	0.79
Total	20.23	4.11	2.97	0.86

Given the low number of participants from Uruguay ($n=93$), we combined these students with Argentinean students and labeled this group “South America”. SES was measured asking participants to report their socioeconomic status growing up and responded on a 1–5 scale: 1 = Poor or just barely making it, 2 = Working or labor class, 3 = Middle class, 4 = Upper middle class, 5 = Wealthy

participant burden, we used a planned missingness design (i.e., matrix sampling; Graham et al., 2006; Schafer, 1997) such that participants first completed demographic and substance use measures followed by a random selection of 12 measures from a larger pool (17 total measures). Due to our missing-data-by-design procedure, the analytic sample for the present study was 5,900 (70.80% female) students who completed the measure of individualism/collectivism (64% of total sample) (U.S., $n=2883$, 67.4% female; Canada $n=1147$, 67.8% female; South Africa, $n=471$, 82.8% female; Spain, $n=473$, 70.8% female; Uruguay $n=93$, 89.2% female; Argentina, $n=514$, 77.8% female; England, $n=319$, 78.4% female). See Table 1 for age and SES breakdown by country. Study procedures were approved by the institutional review boards (or the international equivalent) for each participating university.

Measures

Individualism and collectivism

Cultural attitudes were measured using the 32-item Vertical and Horizontal Individualism and Collectivism Scale (Singelis et al., 1995) for the English-speaking countries. The Spanish version of the Vertical and Horizontal Individualism and Collectivism Scale was used in Argentina, Spain and Uruguay, although two items were modified by bilingual experts to ensure that the content of the English and Spanish questionnaires was as closely matched as possible (Gouveia & Clemente, 1998; Gouveia et al., 2003). The measure assesses the degree of agreement of statements specifically aimed at each of the four orientations of vertical and horizontal individualism and collectivism. Participants respond to each item on a 9-point Likert scale (1 = *Strongly Disagree* to 9 = *Strongly Agree*). Example items include: “It is important that I do my job better than others” (VI), “I hate to disagree with others in my group” (VC), “One should live

one's life independently of others" (HI), and "It is important to maintain harmony within my group" (HC).

Emotion regulation

Emotion Regulation strategies were assessed using the 10-item Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) and the Spanish version (Cabello et al., 2013) for Spanish-speaking students. This scale uses six items to measure individual differences in cognitive reappraisal, and four items to measure expression suppression (Gross & John, 2003). Participants responded to items on a 7-point Likert scale (1 = *Strongly Disagree* to 7 = *Strongly Agree*). An example item assessing reappraisal use is "When I want to feel less negative emotion, I change the way I'm thinking about the situation", while a sample item on suppression is "I control my emotions by not expressing them" (Gross & John, 2003). The ERQ was chosen as our measure of emotion regulation to increase comparability, as it is a widely used measure of emotion regulation, often in tandem with cultural differences, in cross-cultural work (Matsumoto et al., 2008; Schunk et al., 2022; Sun & Nolan, 2021). It is important to note that based on our missing-data-by-design procedure, of the students that completed the measure of individualism/collectivism, only 3,946 (66.88% of 5,900) also completed the ERQ.

Measurement invariance analyses of measures

Before running our main analyses, a multigroup confirmatory factor analysis was run on our included scales to determine the factorial invariance of the questionnaires across countries. Specifically, we conducted multi-group confirmatory factor analyses (MG-CFA) using a diagonally weighted least squares (WLSMV) estimator in *Mplus 8.3* (Muthén & Muthén, 1998–2018) to determine the factorial invariance of the questionnaires assessing constructs in our model prior to our main analyses. Specifically, for each measure, we tested three levels of measurement invariance: configural (test whether factor structure is similar across groups), metric (test whether unstandardized factor loadings are similar across groups), and scalar (test whether the unstandardized item thresholds are similar across groups). Given that the χ^2 test statistic is sensitive to sample size (Brown, 2015), we used a model comparison criterion of $\Delta\text{CFI} \geq 0.01$ (reduction indicates worse fit; Cheung & Rensvold, 2002) to indicate significant decrement in fit when testing for measurement invariance. Given the smaller country-level sample sizes, we also tested measurement invariance of measures across the language in which the survey was administrated (i.e., combining English-language countries [USA, Canada, South Africa, England] together and Spanish-language

countries [Argentina, Spain, Uruguay] together). See Supplemental Table 1 for fit indices of models across language and country grouping (see supplemental outputs at <https://doi.org/10.17605/OSF.IO/86579>).

Individualism and collectivism

A 4-factor solution favored by the scale developers (Singelis et al., 1995) provided a poor fit to the data based on most fit indices in the English-speaking sample, Spanish-speaking samples, and country samples. A recent psychometric article on the measure also found poor fit with the 32-item version and they found a 21-item version that produced better fit (Bobbio & Sarrica, 2009). However, when testing Bobbio and Sarrica's (2009) 21-item version, we once again found poor fit within our samples. Given the poor fit of the configural models, we conducted post-hoc modifications to produce a better fitting version of the measure. According to model modification indices (modification indices > 100), 15 items had significant impact on model fit. Upon deleting these items, we found a 17-item, 4-factor model fit was acceptable on most indices. In examining measurement invariance, we found support for metric invariance but not scalar invariance of the modified measure across countries and language (see Supplemental Table 1). When analyzing the items we retained to versions from previous literature, while only six items overlapped our model and the 16-item version presented by Triandis and Gelfand (1998), all 17 items we retained were also used in the 21-item, 3-factor model established by Bobbio and Sarrica (2009). Reliability analyses of the subscales with reduced items (see Supplemental Table 2 for the items on the reduced measure) were as follows in the total sample: HI, 3 items, $\alpha = 0.65$; VI, 4 items, $\alpha = 0.78$; HC, 6 items, $\alpha = 0.80$; VC, 4 items, $\alpha = 0.58$ (see Supplemental Table 3 for reliability by country). All analyses presented were run using this 17-item measure. For comparability to previous literature utilizing the full measure, analyses were also run on the full 32-item measure (See Supplemental Table 4 for those results).

Emotion regulation

The 10-item, 2-factor solution provided a good fit to the data based on most fit indices in all our samples (see Supplemental Table 1). In examining measurement invariance, we found support for both metric invariance and scalar invariance of the measure across countries and language (see Supplemental Table 1). Reliability analyses of these subscales were acceptable to excellent in the total sample and across countries (ERS reappraisal $\alpha = 0.88$; ERS suppression $\alpha = 0.78$; see Supplemental Table 3 for internal consistency reliability values by country).

Table 2 Bivariate correlations among study variables in total sample (n=5,900)

	1	2	3	4	5	6	7	8	<i>M</i>	<i>SD</i>	Potential Range
1. Horizontal Individualism	—								6.56	1.50	1–9
2. Vertical Individualism	.13	—							4.42	1.81	1–9
3. Horizontal Collectivism	.15	.01	—						6.77	1.36	1–9
4. Vertical Collectivism	.04	.19	.34	—					5.23	1.52	1–9
5. ERQ—Reappraisal	.10	-.03	.23	.06	—				4.63	1.13	1–7
6. ERQ—Suppression	.21	.12	-.11	.10	.19	—			3.96	1.26	1–7
7. Gender	-.02	-.27	.10	.01	.05	-.11	—		0.71	0.45	—
8. Age	.04	-.14	.02	-.10	.04	-.06	.03	—	20.23	4.12	18–69
9. SES	-.07	.14	.03	.08	.01	-.07	.01	-.58	2.970	0.86	1–5

ERQ Emotion Regulation Questionnaire. Significant correlations are bolded for emphasis and were determined by a 99% bias-corrected standardized bootstrapped confidence interval (based on 10,000 bootstrapped samples) that does not contain zero

Statistical analyses

Study aims were tested within a multivariate regression model (i.e., all predictor and outcome variables simultaneously examined) using *Mplus 8.3* (Muthén & Muthén 1998–2018). Specifically, all four cultural orientations (VI, HI, VC, HC) were simultaneously specified as predictors of both suppression and reappraisal emotion regulation strategies. Gender, age, and socioeconomic status (SES) were included as covariates in light of their empirical associations with emotion regulation strategies (Nolen-Hoeksema & Aldao, 2011; Singelis et al., 1995; Zimmermann & Iwanski, 2014). Given the low number of participants from Uruguay ($n = 93$), we combined these students with Argentinean students for the regression analyses and labeled this group “South America”.¹ We examined the unique effects of each predictor variable on suppression/reappraisal strategies using bias-corrected bootstrapped estimates (Efron & Tibshirani, 1993) based on 10,000 bootstrapped samples. Parameters were estimated using maximum likelihood estimation, and missing data were handled using full information maximum likelihood. Given our large sample size, statistical significance was determined by 99% bias-corrected bootstrapped confidence intervals that do not contain zero.

To test for structural invariance of the model (i.e., whether country moderates the effect of individualism and collectivism on emotion regulation variables), we conducted χ^2 difference tests comparing an unconstrained model, in which regression effects were free to vary across country, to a constrained model, in which corresponding regression effects were forced to be equivalent across countries. Given that the χ^2 test statistic is sensitive to sample size (Brown, 2015), we also used a model comparison criterion of $\Delta CFI \geq 0.01$

¹ Independent t-test between Uruguay and Argentinian students revealed only two statistically significant ($p < .05$) mean differences: suppression strategies and vertical collectivism. However, these differences were not large (vertical collectivism, Cohen’s $d = 0.28$; suppression strategies, Cohen’s $d = 0.38$).

(Cheung & Rensvold, 2002) to indicate significant decrement in fit when testing for structural invariance.

Results

Bivariate correlations and descriptive statistics of all study variables in the total sample are presented in Table 2. On a bivariate level, HI and VC were statistically significantly positively correlated with reappraisal and suppression strategies. VI was significantly positively correlated with suppression strategies. Finally, HC was statistically significantly positively correlated with reappraisal and negatively correlated with suppression strategies.

Regression results are summarized in Table 3. Within our multivariate regression model, we found several unique effects. Specifically, we found that: a) higher endorsement of HI ($\beta = 0.07$) and HC ($\beta = 0.22$) was associated with higher use of reappraisal strategies; b) higher endorsement of HI ($\beta = 0.22$) and VC ($\beta = 0.14$) was associated with higher use of suppression strategies; while higher endorsement of HC ($\beta = -0.18$) was associated with lower use of suppression strategies. In this way, as we had initially predicted VI and HI to be associated with lower levels of suppression

Table 3 Summary of effects of individualism/collectivism orientations on emotion regulation strategies (n = 5,900)

Predictors	ERQ—Reappraisal		ERQ—Suppression	
	β	99% CI	β	99% CI
Horizontal Individualism	.073	0.03, 0.12	.223	0.18, 0.26
Vertical Individualism	-.034	-0.08, 0.01	.039	-0.004, 0.09*
Horizontal Collectivism	.218	0.17, 0.27	-.177	-0.22, -0.13
Vertical Collectivism	-.012	-0.06, 0.04	.139	0.09, 0.18

ERQ Emotion Regulation Questionnaire. Significant associations are in bold typeface for emphasis and were determined by a 99% bias-corrected standardized bootstrapped confidence interval (based on 10,000 bootstrapped samples) that does not contain zero. Associations with covariates (gender, age, and SES) are available upon request. *A moderation effect was found on the association between vertical individualism and suppression strategies across countries (see main text for further detail)

(Hypotheses 1), and collectivist attitudes to be associated with higher uses of reappraisal, while individualist views to be negatively associated with reappraisal (Hypothesis 2), our predictions were only partially supported, as they fail to capture this more complex pattern of relationships. It is important to note that we conducted analyses among a subsample of students that completed both measures (i.e., no missing data; $n = 3,946$) and results remained the same (See Supplemental Table 4 for those results).

In examining structural invariance across countries, our constrained multi-group models compared to the freely estimated model did not support model invariance across countries [$\Delta\chi^2[40] = 75.49, p < 0.001, \Delta CFI = -0.017$], indicating a moderation effect (of country) exists with respect to the regression paths. To identify where the lack of invariance in models arose, we identified the paths (freeing one path at a time in the model) with the greatest contribution to reducing model fit within the fully constrained model. In the final multi-group model [$\Delta\chi^2(35) = 59.99, p = 0.005, \Delta CFI \geq -0.009$], all associations were constrained to equality across countries except for one path: VI predicting suppression. Although the association between VI and suppression varied across countries with regards to direction (i.e., positive or negative association), the magnitude of the effect was not statistically significant in any country: Spain ($\beta = 0.086, 99\% \text{ CI} [-0.060, 0.226]$), South Africa ($\beta = -0.031, 99\% \text{ CI} [-0.181, 0.117]$), South America ($\beta = 0.120, 99\% \text{ CI} [-0.006, 0.243]$), England ($\beta = 0.098, 99\% \text{ CI} [-0.083, 0.268]$), Canada ($\beta = -0.061, 99\% \text{ CI} [-0.154, 0.034]$), U.S. ($\beta = 0.051, 99\% \text{ CI} [-0.014, 0.116]$). Thus, our prediction that the relationship between the vertical and horizontal dimensions of individualism and collectivism will be invariant across countries (Hypothesis 3) was largely supported.

Discussion

The present study examined the role of personal attitudes of vertical and horizontal individualism and collectivism, and their effects on emotion regulation strategies across cultural contexts. Additionally, we investigated the extent to which the relationship between emotion regulation and the four orientations of individualism and collectivism varied across countries. Our analysis revealed that the horizontal orientation uniquely predicted higher use of reappraisal across countries, but no consistent pattern of emotion regulation strategies use was found when collapsing across the vertical orientation. Additionally, higher suppression scores were related to higher scores of HI and VC. Finally, higher HC specifically was associated with *lower* use of suppression strategies. These findings reveal a nuanced pattern in cultural attitudes' relationship to emotion regulation that would

not be otherwise evident in the absences of the vertical and horizontal dimensions of cultural attitudes.

Pankratova and Osin (2020) had similar findings in their study with individuals in Russia and Azerbaijan in which an association between HC and authentic (i.e., no emotion regulating behavior, such as suppression) emotion expression was found, as well as associations of VC and HI and use of suppression and expression of inauthentic emotions respectively. The positive association between VC and greater use of suppression in the present study is consistent with findings showing that individuals higher on features of interdependence (i.e., collectivism) and hierarchy reported more use of suppression strategies (Matsumoto et al., 2008). This pattern of association has been interpreted as reflecting efforts to maintain group harmony (Butler et al., 2007) a highly valuable goal among interdependent individuals which, in turn, seems to increase psychological functioning and well-being compared to those with more individualist attitudes (Soto et al., 2011). In this context, the negative association between HC and suppression could have been seen as counterintuitive. Notably, previous longitudinal studies with college students found that higher levels of suppression were negatively associated with indicators of social connection like warmth and closeness (English et al., 2012) along with friendship quality and satisfaction (Srivastava et al., 2009). We can speculate that in more horizontal relationships those who value features of interdependence and social connection (which can be seen related to HC) are less likely to use suppression to regulate their emotions.

Our finding of a positive association between HI and suppression was somewhat unexpected as it is contrary to past research suggested that higher independence tend to be associated with lower use of suppression strategies (Ford & Mauss, 2015). Notably, cultural differences in reporting the use of suppression seem to depend on the emotion being targeted. For instance, at the country-level, college students from Korea and the U.S. did not differ in their use of reappraisal or expressive suppression, as measured by the ERQ; however, U.S. students reported higher use of anger suppression (Kwon et al., 2013), as measured by the STAXI-2 (Spielberger, 1999).

In examining if effects were culturally universal or culturally specific, we found a consistent pattern of associations between emotion regulation and vertical and horizontal individualism and collectivism across countries. The one exception was the relationship between VI and suppression. While those associations were trending positive for Spain, South America, England, and the United States, and trending negative for South Africa and Canada, these effects were not statistically significantly different from zero in any country. A similar pattern was reported in Moon et al. (2018), as social value orientation and VI were significantly associated

in their Korean sample, but not the American sample despite there being no significant differences between the groups on the vertical dimensions of individualism and collectivism. It is speculated that the strength of the cultural norms about both individualism and vertical values could underlie this finding (Moon et al., 2018).

Further research should investigate cultural differences in emotion regulation strategies on specific emotional experiences. For example, Huwaë and Schaafsma (2018) found that participants from China suppressed both positive and negative emotions more than Dutch or Moluccan participants, while participants in the U.S. (VI) compared to those in Belgium (HI) associated suppression rather than support seeking with shame, an emotion that is not considered beneficial in the U.S. (Boiger et al., 2013). Relatedly, it was also found that the extent to which participants associated anger with aggression versus distancing was moderated by the country of the participant, indicating that social views of emotions potentially influence regulatory strategies even within individualist cultures (Boiger et al., 2013).

Limitations & future research

It is important to mention the limitations of the present study. The cross-sectional design of this study does not allow us to make causal inferences based on this data. Further and despite obtaining a large sample size from seven countries, as our samples comprise of college students, often in psychology courses, they may not be representative of their national population; therefore, our generalizability is limited to an extent. Further cross-cultural research is needed to corroborate our findings in non-college samples. Future research should investigate within country variability by individual identities such as race, ethnicity, and nationality, as the relationship between cultural attitudes and emotion regulation may meaningfully differ as a function of these variables.

Another limitation of the current work is the measure of Vertical and Horizontal Individualism and Collectivism. Sivadas et al. (2008) notes that the original 32-item scale from Singelis et al. (1995) struggled to obtain robust results (i.e., similar 32-item 4-factor solution in following studies), resulting in a common practice to administer all items to participants, but discard many of them based on the factor analysis results, as done in this study. Future research should study if these results will replicate across other measures of individualism and collectivism. Additionally, considering cultural variation in preferring or avoiding particular emotions (Koopmann-Holm & Tsai, 2014), it will be valuable to examine the association between cultural attitudes and emotion regulation targeting different emotions.

While the present study represented countries often not sampled in cross-cultural research on emotion, our sample did not contain participants from East or South Asian countries, regions which are often treated as prototypes for vertical and horizontal collectivism (Sivadas et al., 2008). Pairing this data on underrepresented countries with research on regions considered benchmarks for these cultural differences is necessary for understanding if the relationships between individualism and collectivism with emotion regulation strategies are present across multiple cultures or culture specific. For example, Nozaki (2018) found that while reappraisal was positively associated with emotional intelligence in both Japanese and European American participants, suppression was only negatively associated with emotional intelligence for European Americans, indicating that the utility and consequences of different emotion regulation strategies likely vary by culture and cultural values. By examining a multitude of countries into analyses of individualism and collectivism, including those often considered to be the prototypes of these cultural differences, a deeper understanding of the influences of cultural values on individuals' emotion regulation strategies can be established without dependency on the East–West, individualism–collectivism dichotomy. Further research is needed to determine whether the concepts of horizontal and vertical individualism and collectivism exist on a continuum, wherein a shift in the benefits and consequences of emotion regulation strategies may exist.

Conclusions

Within the present study, we found that *individual* differences in the dimensions of individualism and collectivism, and vertical and horizontal attitudes have strong connections with young adults' emotion regulation styles. We extended prior research by measuring these orientations of individualism and collectivism at the person level while also comparing cross-culturally. Although there are reputable differences in these constructs in terms of cultural norms, there are considerable regional and individual differences beyond cultural norms. These are often lost in research that focuses on country-level information and Shavitt et al. (2006) warn against conflating the country-level norms to individual attitudes as they are statistically independent. Further, studying these relationships across a variety of underrepresented countries serves as a step past equating individualism and collectivism within the East/West dichotomy that is not representative of the world as a whole, nor all the individuals within these regions. These results, paired with cultural influences on mental health, can inform practitioners about

individual tendencies of emotion regulation and its relationship to patients' cultural backgrounds.

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Author contributions All authors contributed to the study conception and design. Material preparation and data collection were performed by Adrian J. Bravo, Christopher C. Conway, Matthew T. Keough, Angelina Pilatti, Laura Mezquita, and the Cross-Cultural Addictions Study Team. The data analyses and first draft of the manuscript were executed by Neelamberi D. Klein and Adrian J. Bravo, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

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Data availability The datasets generated during and/or analysed during the current study are available in the Open Science repository: <https://doi.org/10.17605/OSF.IO/86579>. For more information about the larger study, see Bravo et al. (2021): <https://doi.org/10.1016/j.abrep.2021.100373>.

Declarations

Research involving human participants This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of the College of William & Mary.

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

Conflicts of interest None of the authors have any conflicts of interest that could inappropriately influence, or be perceived to influence, our work.

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