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Locus of control, negative life events and psychopathological symptoms in
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Abstract

A current research trend is the identification of psychosocial variables that moderate and/or mediate the association between stressors and psychopathological symptoms. Research has shown Locus of Control (LoC) is a key cognitive component of this psychological process in adolescents from individualist cultures. It is unclear whether this finding can be generalized to collectivist adolescents given that LoC is argued to be a culturally relative construct. The study examined the moderating and mediating effects of LoC on the relationship between negative events and psychopathological symptoms (anxiety and depressive symptoms) in adolescents from collectivist countries ($n = 2800$). Consistent with prior research, negative life events and external LoC were associated with more psychopathological symptoms. Unlike past studies with samples from individualist countries, the study did not produce clear evidence that LoC moderated or mediated this relationship. Results are discussed in terms of cultural differences in the (un)desirability of external control.

Keywords: locus of control, symptoms, negative events, collectivism, adolescents

Abbreviations: LoC = Locus of Control; LMDLC = Levenson's Multiple Dimension Locus of Control scale; RCADS = Revised Child Anxiety and Depression Scale; LEC = Life Events Checklist

Locus of control, negative life events and psychopathological symptoms in collectivist adolescents

It is widely accepted that the experience of negative life events is linked to undesirable outcomes including emotional symptoms, behavioral problems and maladaptive psychological functioning in developed (Phillips, Carroll, & Der, 2015) and developing countries (Burger, Posel, & von Fintel, 2017). Given this consensus, a current research trend is the investigation of variables that influence the strength and nature of the relationship between negative events and psychopathological symptoms (a moderation hypothesis), and/or serve as a mechanism through which negative events leads to psychopathological symptoms (a mediation hypothesis) (Liu et al., 2000). The wide range of variables examined has been described by Grant et al. (2006) and includes age, gender, social support, family environment, academic competence, negative affect and self-esteem among others. Studies continue to examine the role of other variables such as emotional intelligence (Davis & Humphrey, 2012) and engagement/disengagement coping strategies (Kim, Neuendorf, Bianco, & Evans, 2016).

One variable that has received less attention is locus of control (LoC; Rotter, 1966): the degree to which one believes outcomes and events are attributable to external or internal factors. This variable is relevant in the context of child and adolescent functioning because psychological theories highlight the importance of perceived control for healthy psychological functioning (Deci & Ryan, 2012; Maier & Seligman, 1976). Studies have confirmed that LoC acts as a psychological mechanism for human agency with a major influence on individuals' constructions of reality, including self-concepts, representations about others, standards, values, and goals (Marr & Wilcox, 2015; Pagnini et al., 2016). Because adaptive agency mechanisms are important for

promoting wellbeing and associated long-term mental health benefits (Williams & Merten, 2014) developing a comprehensive understanding the role of LoC in child and adolescent functioning should be considered as a research imperative.

Low levels of perceived personal control (external LoC) have been linked to depression and psychotic experiences in English adolescents (Sullivan, Thompson, Kounali, Lewis, & Zammit, 2017). Conversely, high levels of perceived control (internal LoC) have been shown to be adaptive in adults from the UK and USA (Msetfi et al., 2015). Similar associations have been identified between LoC and indicators of physical wellbeing, such as improved immunity and better cardiovascular functioning (Pagnini et al., 2016). Theoretically, such associations exist because LoC influences individuals' appraisals of negative events and/or coping strategies, meaning that LoC serves to change the strength of the effect of negative events on psychopathological symptoms (stress-moderation hypothesis). Alternatively, research with American adults indicates that the experience of negative events can reduce perceptions of control (Gilman, Kawachi, Fitzmaurice, & Buka, 2003), which implies that stressors may influence psychopathological symptoms indirectly via their effect on LoC (stress-mediation hypothesis).

Studies that directly tested moderation and/or mediation hypotheses with LoC using child or adolescent samples are relatively scarce. Some studies have shown that LoC mediates the relationship between stressors and psychopathological symptoms in American children (L. S. Kim, Sandler, & Tein, 1997) and American (Deardorff, Gonzales, & Sandler, 2003) and English adolescents (Culpin, Stapinski, Miles, Araya, & Joinson, 2015). Other studies have shown that LoC moderates the effects of stressors on psychopathological symptoms in American children (L. S. Kim et al., 1997), American adolescents (Kliwer & Sandler, 1992) and English adolescents (Mynard,

Joseph, & Alexander, 2000). Other studies have failed to find evidence of mediating and moderating effects in American child and adolescent samples (Haine, Ayers, Sandler, Wolchik, & Weyer, 2003).

As well as being contradictory, this body of research has limitations. Several studies dealt with specific populations of adolescents, such as those who are bereaved or dealing with recently divorced parents, meaning that their conclusions are less applicable to the general population (Deardorff et al., 2003; Haine et al., 2003). Additionally, most of these studies tested participants from a relatively homogenous, typically individualistic¹, sample of countries (Liu et al., 2000). This limitation is important because research findings from adult samples suggest the LoC construct is sensitive to cultural influences on individuals' perceptions and beliefs about control (Cheng, Cheung, Chio, & Chan, 2013). Adults from collectivist cultures, where individuals value interdependence and communal goals, have been shown to score higher for external LoC than participants from individualistic cultures where individuals value autonomy and prioritize personal goals over communal goals (Lu, Kao, Cooper, & Spector, 2000; Spector et al., 2001). Further, a meta-analysis of 119 studies has shown the association between external LoC and psychopathological symptoms is weaker in adult samples from collectivist societies than those from individualist societies (Cheng et al., 2013). Studies have also struggled to establish cross-cultural equivalence of LoC measures (Huizing, 2015), implying that the construct may differ between countries. In sum, these findings imply that an external attribution of control may be maladaptive for individualistic adults, but less the case for collectivists. It remains unclear whether this finding can be generalized to adolescents.

¹ The reduction of countries into individualistic vs collectivistic is an oversimplification. Several frameworks characterize cultures in terms of multiple dimensions (Hofstede et al., 2010). Nonetheless, theoretical postulations about the cultural relativity of LoC have focused on individualism vs. collectivism, and we therefore focus uniquely on this dimension for the purpose of the present study.

Research Objectives

It is important to investigate the influence of LoC on the relationship between negative events and psychopathological symptoms in adolescents because the current body of research is small, contradictory, and biased towards individualistic samples. Given the limitations of the literature and theoretical and empirical evidence that LoC may not be equivalent across cultures (Cheng et al., 2013), the objective of the study was to explore the influence of LoC on the relationship between negative events and psychopathological symptoms in a sample of collectivist adolescents.

Method

Participants

The current study sample comprised 2,800 adolescents from 7 collectivist countries (Serbia, Montenegro, Portugal, Bulgaria, Romania, Croatia and Brazil). For all 7 countries, country-level individualism scores, which range from 0 (most collectivist) to 100 (most individualist), ranged between 25 and 38 (Hofstede, Hofstede, & Minkov, 2010).

The individual-level sample was a convenience sample from rural and urban communities near the locations of participating researchers. At all locations, researchers selected at least five schools, with the requirement that this selection included schools from rural and urban communities. Schools were selected from a pool of schools from a well-defined local, political, or administrative region. Researchers each recruited at least 250 students. Participants were not rewarded for their participation. Ethical approvals were obtained in all countries from the appropriate local authorities and/or ethical committees. Of all students contacted, only those who agreed to participate and returned written self/parent consent were included. The mean age of all participants was 15.4 years ($SD = 1.7$) and 57.4% were female.

Measures

Locus of control. Levenson's Multiple Dimension Locus of Control scale (LMDLC; Levenson, 1974) assesses personal perceptions of the cause of events. Its items are scored from 0 (*disagree strongly*) to 4 (*agree strongly*) and can be used to approximate an individual's generalized expectations of LoC over everyday life events.

There is little agreement on the dimensionality of LoC or measurement equivalence across cultures (Huizinga, 2015). It is unclear whether this measurement non-invariance can be attributed to measurement problems/translation issues or cultural differences in LoC (Suárez-Álvarez, García-Cueto, Pedrosa, & Muñiz, 2015). To use the LMDLC legitimately in our pooled sample it was necessary to establish its cross-cultural (scalar) invariance. This was achieved after the scale was shortened and after excluding participants from three additional countries (Nigeria, Philippines, and Indonesia; see Appendix A).

The shortened LMDLC had 13 items and a 2-factor structure (see Appendix B). The external LoC subscale had excellent reliability ($\omega = .83$). Reliability for the internal LoC subscale was weaker ($\omega = .64$), but this is expected when broad psychological constructs are captured by few items (Ziegler, Kemper, & Krueger, 2014).

Psychopathological symptoms. The Revised Child Anxiety and Depression Scale (RCADS; Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000) is a 47-item assessment of child anxiety and depressive symptoms. Respondents indicate how often each symptom occurs from 0 (*never*) to 3 (*always*). The RCADS yields a total anxiety score (range = 0-111) and total depression score (range = 0-30). A study using the same dataset as the current study has confirmed that the RCADS has cross-cultural measurement equivalence (Authors, 2017) and excellent reliability ($\alpha > .88$ in all countries tested).

Negative life events. The experience of negative life events was assessed using the Life Events Checklist (LEC; Johnson & McCutcheon, 1980). For 28 negative events, participants were asked if the event had occurred (e.g. “*Has any family member been seriously ill or injured?*”), scored as either yes (1) or no (0), and how severe this was from 0 (*not bad*) to 3 (*really bad*). From this data, the frequency of negative events experienced and the mean severity across events were calculated. A psychometric study of the LEC has shown this instrument has acceptable test-retest reliability and good convergent validity (Gray, Litz, Hsu, & Lombardo, 2004). In the study sample, alpha for the binary yes/no component of each event was greater than .70 for all countries except of Romania ($\alpha = .60$).

Statistical analyses

All analyses (conducted using R; R Core Team, 2017) were conducted using pooled data given the observed cross-cultural measurement invariance for the study measures, and because intraclass correlation coefficients (ICCs) were lower than .10 (Table 1).

We perform four moderated regression analyses using a residual-centering method to reduce the negative influence of variable collinearity. These models tested the moderating effects of LoC on the relationship between different indicators of negative events (frequency or severity) on anxiety and depression. All models included gender and age as control variables. We conducted SEM analysis to test the structural relationships between negative events (frequency and severity), LoC (external and internal), and psychopathological symptoms (anxiety and depression).

We interpreted effect sizes based on the recommendations of Ferguson (2009). Specifically, we considered $r < .20$, $R^2 < .04$, $\eta^2 < .04$ and $\beta < .20$ as not representing a practically significant effect. The magnitude of indirect effects identified in SEM were judged using standardized coefficients and the proportion mediated ratio, P_M .

Results

Descriptive Statistics

Table 1 presents scale descriptive statistics, correlations and ICCs for the pooled sample (see Appendix C for country values). Internal LoC did not present any practically significant correlations with negative events or psychopathological symptoms. Given its questionable reliability and high ICC ($> .10$), which indicates a large proportion of its variance is accounted for at the country-level, this variable was excluded from further analyses. Negative events had a weak positive correlation with psychopathological symptoms. External LoC had a weak, but practically significant positive correlation with psychopathological symptoms.

Table 1

Moderation

Anxiety. Model 1 tested the moderating effects of external LoC on the relationship between frequency of negative events and anxiety, $R^2 = .17$, $F(5, 2605) = 105.10$, $p < .001$ (see Table 2). This model had a weak but practically significant effect size, $\eta^2 = .17$. Frequency of negative events was significantly related to anxiety ($\beta = .25$) and external LoC moderated this relationship ($\beta = .04$). For this interaction $\eta^2 = .002$, suggesting that this finding was of little practical significance.

Model 2 was identical to model 1 with the exception that frequency of negative events was replaced by severity of negative life events. This model was statistically significant, $R^2 = .15$, $F(5, 2502) = 87.97$, $p < .001$, and had a weak but practically significant effect size, $\eta^2 = .15$. Severity of negative life events was significantly linked to anxiety ($\beta = .20$) and external LoC moderated this relationship ($\beta = .05$), although the η^2 for the interaction term was .004, indicating that it was of little practical significance.

Table 2

Depression. Model 3 was identical to Model 1 but the outcome variable was depression rather than anxiety, $R^2 = .18$, $F(5, 2605) = 116.40$, $p < .001$, $\eta^2 = .18$. Frequency of negative life events was linked to increased depression ($\beta = .30$). In this model, the interaction term failed to reach statistical significance. Model 4 was the same as Model 2 but with depression, $R^2 = .13$, $F(5, 2502) = 75.57$, $p < .001$, $\eta^2 = .13$. In this model, severity of negative life events has a significant positive association with depression ($b = .18$). The interaction term did not reach statistical significance.

Mediation

The SEM model shown in Figure 1 examined the structural relationships between negative life events, psychopathological symptoms, and external LoC. Frequency of negative life events had a positive association with anxiety (direct effect $c' = .231$) and there was a significant indirect effect of frequency of negative events on anxiety via external LoC (indirect effect $ab = .013$, $p < .001$). The magnitude of this mediation effect was small. Given the total effect $c = .243$ ($p < .001$), these results mean that for a 1 SD change in negative events, anxiety is expected to change by .243 SDs, of which just .013 would be the indirect effect of negative events on anxiety via external LoC and .231 the direct effect. The proportion mediated, $P_M = 5\%$, confirmed that the magnitude of this indirect effect was small. Frequency of negative life events also had a positive association with depression ($c' = .316$) and a significant indirect effect via external LoC ($ab = .007$, $p = .003$). Given the size of the total effect $c = .323$ ($p < .001$), the proportion mediated, $P_M = 2\%$, confirmed that the magnitude of this indirect effect was smaller than for anxiety. Severity of negative life events had a positive association with

anxiety ($c' = .206$) and depression ($c' = .172$). There was a significant indirect effect of severity of negative life events on anxiety via external LoC ($ab = .008, p = .025$), but given the total effect ($c = .214$) the proportion mediated was found to be small ($P_M = 4\%$). Finally, there was a significant indirect effect of severity of negative life events on depression ($ab = .005, p = .034$). Given the size of the total effect ($c = .177$), the proportion of total effect mediated was small ($P_M = 3\%$).

Figure 1

Discussion

Direct effects

Past research has demonstrated that negative life events are correlated with the experience of psychopathological symptoms in adolescents (Deardorff et al., 2003; Stikkelbroek, Bodden, Kleinjan, Reijnders, & van Baar, 2016). A large number of studies, the majority of which used samples from individualist countries, have also demonstrated a relationship between external LoC and psychopathological symptoms (Cheng et al., 2013). One contribution of the present paper is that it replicates these established findings in a large sample of adolescents from collectivist countries. This replication extends to the magnitude of the observed associations. The meta-analysis by Cheng et al. (2013) showed that the magnitude of the association between external LoC and anxiety was weak in collectivist countries (mean effect size = .20). Consistent with this analysis, the present study found a weak association between external LoC and anxiety.

Interaction effects

Several past studies of adolescents from individualistic countries have shown that the magnitude of the relationship between negative life events and emotional functioning is moderated by LoC (Deardorff et al., 2003; Mynard et al., 2000). This moderation effect

was identified in the current study, but was of such small magnitude that it could not be reasonably considered to be of practical significance. Research with adolescents from individualistic countries also suggests that negative events reduce individuals' perceptions of personal control, which in turn increases symptoms (a stress-mediation hypothesis; L. S. Kim et al., 1997). The present study showed that there was a weak, but ultimately statistically trivial, indirect effect of external LoC on the relationship between negative events and psychopathological symptoms.

One possible explanation for this pattern of results relates to cultural differences in the meaning given to external LoC. According to Cheng et al. (2013), external LoC may have a negative connotation in individualist societies - where individuals have a stronger independent self-identity - because the loss of control interferes with the pursuit of agentic goals and fulfillment of the psychological needs for autonomy and competence. In contrast, for collectivist societies, where individuals have a stronger interdependent self-identity, an external LoC is less undesirable because its members value communal over personal goals and are more accepting of external control. Moreover, because collectivist individuals construe themselves as being more interdependent, their sense of personal control may incorporate control originating from members of their social network. In short, while perceptions of external control may have a clear negative connotation in individualist cultures, thus leading to the robust interaction effects observed in prior studies with individualist samples, this may not be the case for collectivist cultures.

A second explanation for the study findings is that negative events may not share the same association with perceived control in collectivist societies as they do in individualist societies. This was supported in the present study by the weak association observed between negative events and external LoC. In contrast, longitudinal studies in

individualist cultures have shown that negative events in early life are associated with a more external LoC (Culpin et al., 2015) and cross-sectional studies have revealed correlations of a moderate effect size (Haine et al., 2003). This difference in association may be explained in terms of the cultural differences in the value ascribed to personal control. If personal control is of high value, as it is in individualist societies, then the impact of negative events on perceived control may be augmented compared to if personal control is of low importance (as it is in collectivist societies).

It is also important to acknowledge that the study findings might be explained by factors other than cultural differences in collectivism/individualism. For example, it is possible that the failure to replicate robust interaction effects was due to the use of a shortened measure of LoC. While the authors argue that the observed direct effects provide some evidence of construct validity, they advise caution when generalizing findings beyond the context of the study.

Study limitations

A strength of the study was the large sample comprising adolescents from multiple collectivist countries. Nonetheless, it is important to acknowledge that the seven countries from which adolescents were sampled, all but one of which were European, are a small and biased representation of the full ‘population’ of collectivist countries worldwide. Thus, it may be inappropriate to generalize the study findings to individuals from collectivist countries located in other geographical regions such as South East Asia.

Another study limitation was that students were clustered at the country-level and this was not considered in our analyses via the use of multi-level methods. However, such techniques could not be reliably used given that a larger number of cluster are required to generate stable parameter estimates (Stegmueller, 2013). Future

research on the association between negative life events and psychopathology should continue to describe its psychosocial moderators and mediators considering cultural differences. For this, longitudinal cross-cultural studies with sufficiently large country-level samples for multi-level methods are needed to fully elucidate the cultural and psychosocial mechanisms that lead to such differences.

Finally, it was necessary to exclude three subgroups of participants (the Nigerian, Indonesian and Filipino samples) to obtain a measure of LoC that was invariant across the pooled sample. It was unclear whether the noninvariance observed for these samples was due to differences in the LoC construct or potential biases due to methodological issues. However, research has shown that some cultures have a tendency for high acquiescence and extreme responding (Harzing, 2006), and such biases were evident for the Nigerian, Indonesian and Filipino samples in our data.

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Table 1.

Zero-order correlations and 95% confidence intervals for negative events, LoC and psychopathological symptoms (n = 2800).

Scale	1	2	3	4	5	6
1. NLE Frequency	1.00					
2. NLE Severity	.18*** [.14, .22]	1.00				
3. Internal LoC	.02 [-.02, .06]	.02 [-.02, .06]	1.00			
4. External LoC	.05 [.01, .08]	.03 [-.01, .07]	.11*** [.07, .14]	1.00		
5. Anxiety	.28*** [.24, .31]	.25*** [.21, .28]	.02 [-.02, .05]	.22*** [.19, .26]	1.00	
6. Depression	.34*** [.30, .37]	.23*** [.19, .26]	-.05 [-.08, -.01]	.16*** [.12, .19]	.76*** [.75, .78]	1.00
ICCs	.07	.06	.31	.02	.04	.08
Mean (SD)	5.58 (3.74)	1.15 (0.77)	15.48 (3.61)	25.77 (7.48)	28.43 (17.14)	6.39 (5.12)
Range	0-28	0-3	0-20	0-45	0-111	0-30
Skewness	0.83	0.11	-1.10	-0.01	0.95	1.12

Note: NLE = Negative Life Event; *** $p < .001$; ** $p < .01$; * $p < .05$. Values in **bold** correspond to correlations above recommended minimum effect size representing a practically significant effect (Ferguson, 2009).

Table 2.

Model summaries of moderated regression analyses.

	R^2	R^2_{adj}	F	β	p	η^2
Model 1. Anxiety	.168	.166	105.100		<.001	.168
Gender				-.224	<.001	
Age				.067	<.001	
NLE Frequency				.252	<.001	
External LoC				.181	<.001	
NLE Frequency \times External LoC				.044	.013	
Model 2. Anxiety	.150	.148	87.965		<.001	.150
Gender				-.201	<.001	
Age				.085	<.001	
NLE Severity				.202	<.001	
External LoC				.203	<.001	
NLE Severity \times External LoC				.048	.009	
Model 3. Depression	.183	.181	116.402		<.001	.183
Gender				-.149	<.001	
Age				.185	<.001	
NLE Frequency				.297	<.001	
External LoC				.119	<.001	
NLE Frequency \times External LoC				.030	.090	
Model 4. Depression	.131	.129	75.572		<.001	.131
Gender				-.129	<.001	
Age				.214	<.001	
NLE Severity				.183	<.001	
External LoC				.144	<.001	
NLE Severity \times External LoC				.033	.074	

Note. NLE = Negative Life Event; Standardized beta coefficients in **bold** are those considered above the minimum recommended threshold for practical significance.

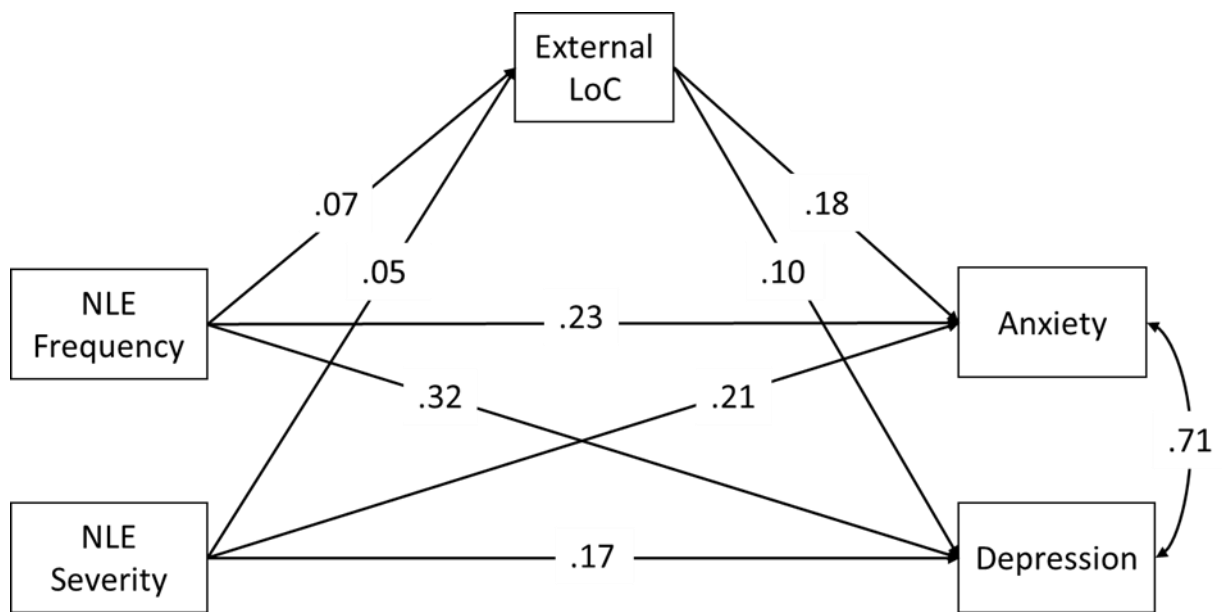


Figure 1. Standardized regression coefficients, β , for the relationships between negative events (negative life event [NLE] frequency and severity) and psychopathological symptoms (anxiety and depression) as mediated by external LoC. Solid arrows represent significant regression coefficients where $p < .05$. Double-headed arrow represents covariance between anxiety and depression.