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Adolescents' Depression and Delinquency: The Effect of Distal Cumulative Risk (CCR) and the Mediating Role of Proximal CCR

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Abstract. The present study investigated the relationships between distal (happened before the past 12 months) cumulative contextual risk (CCR) and adolescents' maladjustments i.e., depression and delinquency, and how these relationships were mediated by proximal (happened in the past 12 months) CCR. Using structural equation modeling with a sample of 1935 school going adolescents, path analysis found that distal CCR was significantly related to adolescent delinquency but not to depression. Nevertheless, mediation analysis with Bootstrap methods found significant indirect effects from distal CCR to adolescents' depression and delinquency through proximal CCR. These findings are discussed in the context of cumulative risk theory to promote understanding of the conditions under which CCR influences adolescents' maladjustments.

Keywords: Adolescents, Cumulative contextual risk, Delinquency, Depression, Mediation.

1. Introduction

Cumulative contextual risk (CCR) is a measure of combined personal and social context threats that jeopardize children and adolescents' healthy development. According to cumulative risk theory, the conjugate effect of multiple risks rather than any single risk, is what lead to maladjustments [1]. These risks need not to be truly adverse in order to cause maladjustments for the reason: when a number of mixed affect or ambivalent risks are added up, they may produce greater stress than a single traumatic risk [2]. In empirical research, the use of CCR measure rewarded researchers in several ways. First, it is able to predict a wide range of dysfunctions from behavioural problems to psychopathology in the sense that they are 'nonspecific risks' [3]. Second, it gives a study more power to detect effects than in a single risk study because summated scores reduce measurement error [4]. Third, it explains larger variance in children or adolescents' outcomes than any single risk [5]. However, a moderate internal reliability may be reported due to some risks occur independently from the others [6-8]. Albeit the drawback, CCR is a reliable predictor for the occurrence of depression and delinquency in adolescence [9, 10]. Studies found that adolescents who reported high CCR were more depressed and reported more CCR in the future [10, 11]. Along the same direction, study also showed that adolescents who had high exposure to violence and stressful life events exhibited more delinquent behaviours [12]. In general, CCR is believed to have overwhelmed adolescents' capacity to maintain a state of equilibrium between their internal state and external threats [2], thus put them at high possibility to develop depressive and delinquent behaviours.

Despite this, few studies have examined the relationships between CCR and maladjustments with distal and proximal CCR measurements. It is important to evaluate the influence of CCR within a specific timeframe in order to understand how temporally distal and proximal CCR will condition later maladjustments. As postulated by cumulative risk theory, early experience of risk could leave an individual potentially more vulnerable to risk experienced at a later age [13]. Therefore, this study suggested that other than examining the direct pathway from distal CCR to adolescents' maladjustments, alternative pathway from distal CCR to maladjustments through proximal CCR should also be explored. Our concern on the alternative pathway is also based on the study by Fluori and Tzavidis [14] which found distal contextual risk became insignificant when proximal contextual risk was introduced in the full model of predicting adolescents' psychopathology. Guided by existing literature, this study aimed to address two issues. It assessed the overall fit of the CCR to maladjustments model with summated score of distal and proximal CCR measurements, and it explored how the relationships between distal CCR and maladjustments were mediated by proximal CCR.

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2. Methods

2.1. Participants and Procedure

Questionnaire data of 1935 school going adolescents, aged 13-17 from two-parent family were drawn from a national study [15]. The questionnaire was administered in Bahasa Malaysia or Chinese during school hour with the presence of a class teacher and a trained questionnaire administrator. The respondents of this study had diverse ethnic backgrounds (Malay, 61.1%; Chinese, 14.0%; Indian, 10.6%; Other, 14.4%). Of the 1935 respondents, 45.2% were male and 54.8% were female.

2.2. Measures

2.2.1. Cumulative Contextual Risk (CCR)

Proximal and distal CCR were assessed by Life Event Checklist (LEC) [16] which measured one's exposure to potentially traumatic events such as 'parental divorce', 'got seriously ill or injured', 'loss a close friend', and etc. It was originally developed at the National Center for Posttraumatic Stress Disorder (PTSD) and possessed good test-retest reliability [16]. The scale have been modified into 26 items by Tiet and colleagues (Tiet, Bird, Davies, Hoven, Cohen, Jensen, & Goodman, 1998), and later by Fluori and colleagues to measure 'distal' (happened before the past 12 months) and 'proximal' (happened in the past 12 months) CCR [1]. In this study, responses of the checklist was modified into “no” (0), “one time” (1) or “more than one time” (2). A high summated score indicated presence of greater CCR in adolescents' lives. Cronbach alpha for distal and proximal CCR were 0.73 and 0.69, respectively.

2.2.2. Depression

A 20-item Beck Depression Inventory for Malays (BDI-Malay) was used to assess the presence of depression in adolescents based on a scale of 0 to 3 with a series of four self-evaluative statements [17]. The statements were ranked to indicate the degree of severity. Sample items covered a broad range of depressive symptoms such as weight loss, insomnia, crying, indecisiveness and social withdrawal. A high summated score indicated more severe depressive symptoms. In this study, the scale revealed a coefficient alpha of 0.86.

2.2.3. Delinquency

Adolescents’ delinquency was assessed using a 15-items scale adapted from the In-Home Questionnaire by Add Health [18]. The items measured adolescents’ delinquent behaviors occurring over the past 12 months based on a scale ranked from 0 (never) to 3 (5 or more times). High summative score indicated more severe delinquent behaviours . Sample items of this scale included 'how often did you deliberately damage property that didn’t belong to you?', 'drive a car without its owner permission?', and 'take something from a store without paying for it?'. It yielded 0.83 cronbach alpha value for the sample of this study.

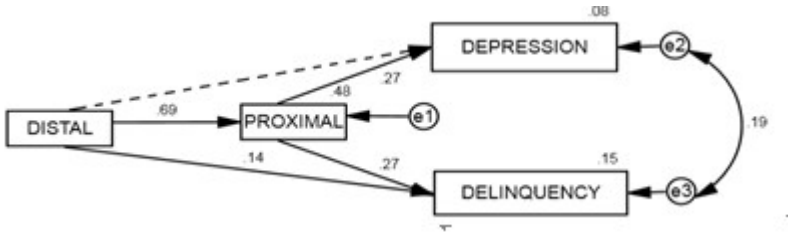
2.2.4. Statistical Analysis

AMOS 18.0 was used to evaluate the empirical fit of CCR-maladjustments model. Prior to the analysis, multivariate normality was assessed. Several fit indices were used in this study and their suggested cut-off values were as follows: cmin/*df* (< 3) [19], RMSEA(<0.05) [20], SRMR(<0.05) [21], GFI (>0.95) [22], CFI(>0.95) [23] and AIC (competing model with lower AIC is preferred) [24]. Mediation analysis was conducted with Bootstrap methods as recommended by Shrout and Bolger [25].

3. Results

Findings showed that multivariate kurtosis of the data was 23.305 with a critical value of 73.99. Judged by the case presented by Gao and colleagues [26], multivariate kurtosis in this study may lead to standard error estimates that departed slightly from their true values; nevertheless, it was expected to produce trustworthy parameter estimates while preserving the real characteristic of the data. Subsequently, this study used asymptotically distribution free (ADF) estimation to estimate the model as it would produce accurate model fit when a data is peaked and large [9]. The first stage of model fitting yielded a poor fit (cmin/*df*=43.13; RMSEA=0.15; SRMR=0.05; GFI=0.97; CFI=0.81; AIC=61.13). The estimate output showed parameters estimates from distal CCR to depression (β=0.05, p=0.12) was insignificant. On the other hand, modification indices (MI=36.32; Par Change=5.806) indicated that chi square could be reduced by at

least 36.32 by freeing the covariance between the disturbances of depression and delinquency. To obtain a more parsimonious model, a modified model was analyzed by removing the Distal-Depression parameter as well as freeing the covariance between the disturbances of depression and delinquency.



Note. Standardized parameter estimates are reported; dashed line indicates non significant parameter

Fig. 1: Structural model and its path estimates for CCR-maladjustments model.

Results (see Fig. 1 for the structural model) showed a good model fit for the modified model (cmin/*df*=2.514; RMSEA=0.03; SRMR=0.01; GFI=1.00; CFI=1.00; AIC=20.51). All parameters estimates, including covariance, were significant at p=0.001 level. To ensure that the model was correctly specified, the modified model was run using the triangulation approach. If ADF, Maximum Likelihood (ML) and General Least Square (GLS) estimations produce similar parameter estimates then a correct structure is identified [9]. Results from the follow-up test confirmed a correctly specified structure for the modified model.

The next step was to identify if proximal CCR mediates the relationships between distal CCR to depression and delinquency through proximal CCR. Results (refer to figure 1 for mediation results) indicated that distal CCR was positively significantly related to proximal CCR (β=0.69), which in turn lead to a positive and significant relationship with adolescents' depression (β=0.27). The significance of the standardized indirect effect observed here, i.e., 0.019 (*B*=0.31) was examined using bootstrap methodology. Five thousand bootstrap samples with 95% confidence interval bias correction did not include 0 in the lower (0.154) and upper (0.229) bounds, suggesting a significant indirect effect. Using the same procedure, the direct and indirect effects from distal CCR to delinquency was examined. Distal CCR was positively significantly related to delinquency (β=0.14) whereas distal CCR was related to higher proximal CCR (β=0.69) which resulted in greater delinquent behaviors in adolescents (β=0.27). The standardized indirect effect obtained was 0.190 (*B*=0.20, p<0.001). Bootstrap analysis showed that zero was outside of the lower (0.134) and upper (0.248) bounds, indicating a significant indirect effects. As observed, the indirect effects (β =0.19) is slightly higher than the direct effects (β =0.14). The standardized total effect from distal CCR to delinquency is 0.33; it was able to explain 15% of the total variance in delinquency. On the contrary, distal CCR only contributed to 0.19 standardized total effect to depression and explained 8% of the total variance.

4. Discussion

Cumulative risk theory has been widely used to assess the effect of conjugate risk on children and adolescents' maladjustments, but few cross-sectional studies specified the effect of the timing of risk, so much so to explore the mediation process involved. The model we presented here was evaluated with a causal inference statistic, our measurement of risk addressed the prerequisite of such statistic for temporal precedence of risk on maladjustment, it showed several worth noting findings supported by existing literature.

The present study found that distal CCR could lead to occurrence of more proximal CCR. The reason being, some risks measured in this study such as "parents argue more than previously" and 'family member has alcohol/drug/mental problem' are more recurrent than others, while some individual and environmental risks like 'breakup with boyfriend/girlfriend', and 'victimized by crime/violence/assault' may elicit occurrence of other contextual risks. Through the pattern shown in the finding, it seems logical to state that experiencing risk is a condition that put adolescents at greater risk, and that adolescents who reported experience CCR will tend to report more of them at a later time, unless a preventive measure has taken place.

Our findings showed that distal CCR was not suggested to have direct association with adolescents' depression. The absence of direct association here should be interpreted cautiously. We suspect distal risk has some but weak effect on later depression but because other unmeasured constructs such as coping behaviors may have intervened the association, its effect size becomes smaller and transient over time.

Another possible explanation is, some of the risks reported in this study may be those independent of adolescents' actions such as 'death in the family' and 'parental divorce', hence the results was not able to demonstrate distal CCR is related to adolescents' depression [27]. On the other hand, distal CCR continued to predict delinquent behavior years after its occurrence. One might ask why direct effect of distal CCR was significant in this context while they were not for depression. We believe it is because constant exposure to risks that were of no, or little control by children or adolescents could trigger frustration, anger [28], or even a negative cognitive representation of the world as a hostile place, hence fosters a lasting effect of CCR on aggressive, not-compliant, and risk taking behaviors .

Lastly, our findings suggest that distal CCR has significant effects on adolescents' depression and delinquency through the mediator of proximal CCR. This results provide support to the continuing role of past contextual risk experiences on the current lives of adolescents. One may notice we did not use the terms 'full mediation' or 'partial mediation' to describe a mediation process because indirect effect is more effective in conveying an effect size, specifically, its size can be directly computed, reported, and interpreted in its raw metric, regardless of the significance of the direct effect [29]. There was a covariance between the error terms for the depression and delinquency the model, suggesting that the variables beyond indexed by them potentially contribute to shared vulnerability process such as shared method variance or reciprocal influences [30]. Sharing the same vulnerability process may also be the reason why we obtained almost identical indirect effects (standardized) from distal CCR to depression and delinquency.

This study is not without its limitation. The psychometric properties of CCR was not been properly examined. Conducting a confirmatory factor analysis for this measurement will unveil its factor structure and enhance its convergent and discriminant validity. Besides, adolescents' self report on past experience of CCR may induce retrospective bias. Although the responses obtained may deviate slightly from adolescents' true experience, most of the responses are reliable and reflect adolescents' internal perception. Findings from this study have important implications on both theory development and intervention design. Our findings are theoretical evidences of cumulative contextual risk as exemplar of one of many early experience antecedents to adolescent adjustment. Intervention program can also benefit from this study by implementing timing-based intervention to minimize or remove early risks from children and adolescents' lives, as it can prevent occurrence of more risk in their lives and reduce the likelihood to develop depression and delinquency.

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6. References

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