The Longitudinal Association between Externalizing and Internalizing Problems: An Exploration of the Dual Failure Model

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Stéphanie Boutin, Ph.D. [a], Valérie Roy, M.A. [b], Renée A. St-Pierre, Ph.D.[b], Michèle Déry, Ph.D.[b], Jean-Pascal Lemelin, Ph.D.[b], Alexa Martin-Storey, Ph.D.[b], Martine Poirier, Ph.D.[c], Jean Toupin, Ph.D.[b], Pierrette Verlaan, Ph.D.[b], Caroline E. Temcheff, Ph.D. [a]

[a] Department of Educational and Counselling Psychology, McGill University

[b] Département de psychoéducation, Université de Sherbrooke

[c] Département des sciences de l'éducation, Université du Québec à Rimouski

Corresponding author:

Stephanie Boutin; stephanie.boutin@mail.mcgill.ca; 1-514-703-1463

Postdoctoral researcher at the Department of Educational and Counselling Psychology, Education Faculty, McGill University, 3700 McTavish, Montreal, H3A 1Y2

Acknowledgements:

This research was supported by grants from the Canadian Institutes of Health Research (grant number NRF 82694) and the Social Sciences and Humanities Research Council (grant number SSHRC 37890). The Université de Sherbrooke Longitudinal Study was initiated in 2008 by Michèle Déry, Jean Toupin and Pierrette Verlaan. The authors would like to thank France Girard, Mylene Villeneuve-Cyr, and the whole Université de Sherbrooke Longitudinal Project team for their assistance in data collection. The authors would also like to thank Annie Lemieux and El Hadj Touré for their assistance with data analysis. Finally, we are most indebted to the participants of our study.

Abstract

The Dual Failure Model suggests that peer victimization (social failure) and academic difficulties (academic failure) mediate the association between externalizing and later internalizing problems. The present study sought to better understand why children with externalizing problems develop later internalizing problems by testing the Dual Failure Model using a sample of 744 children (aged 6 to 10 at Time [T1]), of whom 434 (44.7 % girls) presented with high levels of conduct problems at study inception. Both parent and teacher ratings of externalizing and internalizing problems support the social failure pathway, but not the academic failure pathway. Children with externalizing behaviors at T1 who developed internalizing problems 2 years later did so via their experiences of peer victimization. These results apply for both boys and girls and do not vary according to child age at T1 or the level of conduct problems at study inception. These findings underscore the importance of early screening and intervention for externalizing behavioral problems in order to reduce subsequent peer victimization and internalizing problems. Findings regarding the consequences of internalizing are also discussed.

Keywords: Dual-Failure Model; Externalizing; Internalizing; Victimization; Academic performance

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Children with externalizing problems are at greater risk for a host of other difficulties (Bradshaw, Schaeffer, Petras, & Ialongo, 2010; Reef, Diamantopoulou, van Meurs, Verhulst, & van der Ende, 2011), including substance abuse, school dropout, low life satisfaction, and poor physical health outcomes (Bradshaw et al., 2010; Herrenkohl et al., 2010; Odgers et al., 2008; Reef et al., 2011; Wertz et al., 2018). In particular, children displaying externalizing behaviors are at greater risk of developing internalizing problems compared to their peers without externalizing behaviors (Boots, Wareham, & Weir, 2011; Déry et al., 2017; Gooren, van Lier, Stegge, Terwogt, & Koot, 2011; Klostermann, Connell, & Stormshak, 2016; Moilanen, Shaw, & Maxwell, 2010; Poirier et al., 2019; van Lier & Koot, 2010; van Lier et al., 2012; Wertz et al., 2015). As co-occurring externalizing and internalizing problems have more severe consequences than externalizing problems alone (Yoo, Brown, & Luthar, 2009) and as childhood internalizing problems are notably associated with poorer academic performance and the development of adult psychiatric disorders (Liu, Chen, & Lewis, 2011), it is crucial to understand why children with externalizing problems are at greater risk for developing internalizing problems.

Externalizing problems refer to patterns of aggressive and disruptive behaviors and children with externalizing problems are described as noncompliant, hostile, delinquent, or rude (Achenbach & Rescorla, 2001). Internalizing problems refer to symptoms of anxiety, depression and somatic complaints and describe children who are withdrawn, self-conscious, or sad (Achenbach & Rescorla, 2001). While the associations between internalizing and externalizing problems are bidirectional over time (Panayiotou & Humphrey, 2018; Weeks et al., 2016), many studies have found that internalizing problems emerge as sequelae of externalizing problems,

underscoring the importance of understanding the pathway from externalizing to internalizing problems (Moilanen et al., 2010; Vaillancourt, Brittain, McDougall, & Duku, 2013; Van der Ende, Verhulst, & Tiemeier, 2016; van Lier & Koot, 2010; van Lier et al., 2012; Wertz et al., 2015; Yong, Fleming, McCarty, & Catalano, 2014). Patterson and Capaldi (1990) propose a theoretical framework for understanding the longitudinal link between externalizing and internalizing behaviors, in that children with externalizing problems are more likely to experience social and academic failures (e.g., inability to accomplish typical developmental tasks), that create or reinforce vulnerabilities to internalizing problems. More specifically, externalizing behaviors increase the risk of peer conflict, rejection and subsequent victimization, thus increasing the likelihood of poor social integration (Patterson & Capaldi, 1990; Patterson & Stoolmiller, 1991; van Lier et al., 2012). Similarly, children with externalizing behaviors often experience difficulties in following instructions and classroom rules, and complying with teacher requests, increasing their likelihood of poor academic performance (Patterson & Capaldi, 1990; Patterson & Stoolmiller, 1991; van Lier et al., 2012). Social and school failures may cause youth to feel badly about themselves which in turn increases the likelihood of internalizing problems (Patterson & Capaldi, 1990; van Lier et al., 2012). This theoretical framework, known as the Dual Failure Model, suggests that both social failure and academic failure independently lead to internalizing symptoms among youth with higher levels of externalizing problems. The existing literature testing these two mediational pathways, however, shows inconsistent results.

Empirical Testing of the Dual Failure Model

Studies Assessing Academic Failure Only

One of the two pathways specified in the Dual Failure Model links externalizing behaviors to higher levels of academic failure, and subsequent internalizing problems. Both the

direct link between externalizing problems and academic failure (Burt & Roisman, 2010; Deighton et al., 2018; Masten et al., 2005; Moilanen et al., 2010; Obradovic et al., 2010; Van der Ende et al., 2016; Weeks et al., 2016), and the direct link between academic failure and internalizing problems (Burt & Roisman, 2010; Deighton et al., 2018; Englund & Siebenbruner, 2012; Masten et al., 2005; Moilanen et al., 2010; Obradovic et al., 2009; Van der Ende et al., 2016; Weeks et al., 2016), have been supported among boys and girls. However, van der Ende et al. (2016) only confirmed the path from academic difficulties to internalizing problems when externalizing and internalizing problems were teacher reported (not parent reported) and academic performance was parent reported (not teacher reported).

The above cited studies only examined the presence of direct paths, precluding empirical testing of the indirect path between externalizing problems and internalizing problems via low academic performance. In a sample including children presenting conduct problems (CP), Poirier and colleagues (2019), found that among girls, CP at 7-10 years of age were linked to lower academic skills 1 year later and these lower academic skills were linked to higher levels of depression 2 years later. However, no significant indirect link was shown between CP and depression via academic skills. In community samples of children, Panayiotou and Humphrey (2018) and Boots and colleagues (2011) found that externalizing problems were associated with subsequent lower academic performance for boys only. In the study by Panayiotou and Humphrey (2018), low academic performance was linked to higher internalizing problems, but only among girls. Both studies failed to show a significant indirect academic failure pathway for either boys or girls. Together, these findings show limited support for the academic failure pathway.

Studies Assessing Social Failure Only

The other pathway specified in the Dual Failure Model links externalizing problems to peer rejection or victimization in childhood and subsequent higher internalizing problems. Three studies have tested the social failure pathway in nonclinical samples. Gooren et al. (2011) studied trajectories of CP, social preference and depressive symptoms using four time points from kindergarten to 18 months later. Their results showed significant direct associations between the trajectory of CP and the trajectory of poor likability, and the trajectory of poor likability and the trajectory of depressive symptoms among both boys and girls. The indirect association between CP and depressive symptoms, through lower likability, was significant. Similarly, in a cascade model, van Lier and Koot (2010) showed that, for boys and girls, externalizing problems in kindergarten and first grade were directly linked to more victimization and lower likability 1 year later. Additionally, lower likability and victimization were interrelated throughout second and third grade, and lower likability was linked to more internalizing problems in fourth grade. The indirect association between externalizing problems in first grade and internalizing problems in fourth grade via interrelated experiences of low likability and victimization in second and third grade was significant. Even though lower social competence at 4 years of age was significantly related to higher internalizing problems at 10 years old, Bornstein, Hahn and Haynes (2010) did not show a significant association between externalizing behaviors and lower subsequent social competence, thus not supporting the social failure pathway. These findings suggest inconsistent support for the social failure pathway.

Studies Assessing the Complete Dual Failure Model

To our knowledge, seven studies have tested simultaneously both indirect pathways proposed in the Dual Failure Model, with four studies at least partly supporting the model. In

these studies, most of the direct paths were in the expected directions (e.g., higher externalizing linked to lower academic performance, higher peer victimization and higher internalizing; Martin-Storey et al., 2018; van Lier et al., 2012), except in Klostermann and colleagues (2016), who found that CP among boys in sixth grade were linked to lower victimization in seventh grade. These authors explored the developmental links between self-reports of CP and depressive symptoms in a community sample. They found that, for boys, CP in sixth grade were linked to depressive symptoms in ninth grade via lower academic performance in seventh and eighth grade, but they did not find support for the social failure pathway. For girls, neither the social nor the academic failure pathways were found to mediate between CP and depressive symptoms. In Martin-Storey and colleagues (2018), teacher reports showed a significant association between CP and concurrent levels of internalizing problems via lower academic achievement and higher peer rejection, whereas parental reports only showed an indirect association via peer rejection. Using teacher ratings in a community sample, van Lier and colleagues (2012) showed that for boys and girls, externalizing problems at age 6 were linked to internalizing problems at age 8 through poor academic achievement at age 7. Even though the direct paths were significant, the indirect social failure pathway did not reach significance. Lastly, Wertz and colleagues (2015) found that victimization and academic difficulties in elementary school were both significant mediators of the link between externalizing problems at age 5 and internalizing problems at age 12 for boys and girls in a community sample, according to a composite score of teacher and parental ratings.

Conversely, in three studies, neither peer rejection nor academic failure were significant mediators of the association between externalizing problems and internalizing problems (Vaillancourt et al., 2013), even though some direct paths were in the expected directions (e.g.,

externalizing problems were associated with lower social competence [or higher peer rejection] and lower academic achievement; Lapalme et al., 2018; Yong et al., 2014). The studies of Vaillancourt and colleagues (2013) and Yong and colleagues (2014) included children from community samples who were older at study inception (fourth and fifth grade respectively) than children in most of the studies supporting the Dual Failure Model. Moreover, self-reported measures of internalizing problems were used, while other studies relied on parent- and teacher-reported internalizing. These methodological differences may explain to some extent the divergent results. Lapalme and colleagues (2018) conducted a study with a sample of children with and without CP and included a total of five mediators in the model, possibly explaining why their results do not show the significant pathways depicted in the Dual Failure Model.

The Dual Failure Model and Gender

The Dual Failure Model was originally theorized and tested on boys with CP (Patterson & Stoolmiller, 1991; Patterson & Capaldi, 1990). As boys and girls might not experience and react to peer victimization and academic difficulties in the same way, and as girls are at greater risk for internalizing problems (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003), it is important to test the Dual Failure Model in samples of boys and girls to verify its applicability. Except for Bornstein et al. (2010) and Moilanen et al. (2010), who focused exclusively on boys, the studies cited above tested for gender differences and approximately half of them showed invariance between boys and girls (Burt & Roisman, 2010; Deighton et al., 2018; Englund & Siebenbruner, 2012; Gooren et al., 2011; Masten et al., 2005; Obradovic et al., 2009; Vaillancourt et al., 2013; Van der Ende et al., 2016; van Lier et al., 2012; Wertz et al., 2015). However, other studies showed significant gender differences, encouraging the researchers to analyze their models separately for boys and for girls (Boots et al., 2011; Klostermann et al.,

2016; Lapalme et al., 2018; Panayiotou & Humphrey, 2018; Poirier et al., 2019). Of particular interest is in understanding how these associations vary at the path level. Weeks et al. (2016) found that the path between externalizing problems to later depressive symptoms was stronger for girls. Contrarily, in Martin-Storey and colleagues (2018), the path from CP to later internalizing problems was significant for boys but not for girls, according to parent ratings. Finally, Yong and colleagues (2014) found that the path from academic difficulties to later internalizing problems was significant for boys but not for girls. Thus, previous findings show inconsistent gender differences suggesting the need to further examine these differences in Dual Failure pathways.

The Dual Failure Model in Children With and Without Identified CP

As mentioned, the Dual Failure Model was conceptualized and tested on youth with CP (Patterson & Capaldi, 1990). Accordingly, to test the model as conceived and in order to replicate initial findings, a sample in which a high proportion of children have significant CP is needed. However, most of the studies discussed here were conducted with community samples (e.g., Klostermann et al., 2016; Obradovic et al., 2009; Vaillancourt et al., 2013; van Lier et al., 2012; Yong et al., 2014). Three studies had children with and without identified CP (Lapalme et al., 2018; Martin-Storey et al., 2018; Poirier et al., 2019), but did not compare if their models functioned similarly for both groups of children. They either controlled for CP status or produced analyses separately, thus rendering the question on differences between children with and without CP unanswered in regard to the Dual Failure Model. A comparison of model results between children with and without CP would therefore allow to verify if model assumptions apply equally to children with and without early CP.

Dynamic Association Between Externalizing and Internalizing Problems

The Dual Failure Model was posited as a unidirectional model explaining vulnerability to internalizing problems among children with externalizing problems. Internalizing behaviors, however, may also lead to an increase in externalizing behaviors over time (Boots et al., 2011; Bornstein et al., 2010; Klostermann et al., 2016; Poirier et al., 2019; Weeks et al., 2016). Children who experience social difficulties or conflict because they are withdrawn, irritable and sad, might react and adopt aggressive and disruptive behaviors (Mesman, Bongers, & Koot, 2001). In addition, school failures due to similar behaviors may result in frustration and hostility. This suggests the importance of acknowledging the dynamic link between externalizing and internalizing problems, in which both mediators of the Dual Failure Model (i.e., social and school failure) may play a role. Moreover, internalizing and externalizing behaviors are both concurrently related and somewhat stable over time (Burt & Roisman, 2010; Weeks et al., 2016). To obtain interpretable conclusions from the analyses, it is important to also consider the pathways from internalizing problems to externalizing problems.

The Present Study

The existing research is mixed with regard to support for the Dual Failure Model. However, clarifying the applicability of this model to boys and girls with and without early CP is important as it will help guide clinicians toward effective prevention strategies to avoid the development of internalizing problems. The discrepancies of previous data may in part reflect differences in children's age, or the informant employed. As mentioned, the Dual Failure Model (Patterson & Capaldi, 1990) proposes that the association between externalizing problems and further internalizing problems via failures in two key developmental processes takes place in the elementary school period. The developmental nature of these processes highlights the importance of testing the model in the first years of elementary school, which was not the case in many of

the studies cited (e.g., Klostermann et al., 2016; Lapalme et al., 2018; Vaillancourt et al., 2013; Yong et al., 2014). Also, the majority of past research employs a single informant for externalizing and internalizing problems (e.g., Boots et al., 2011; Burt & Roisman, 2010; Klostermann et al., 2016; van Lier et al., 2012). A multirater approach, however, allows for comparisons of potential differences in the way internalizing problems develop in different contexts (Martin-Storey et al., 2018).

The discrepancies in the empirical data around the model may also reflect limitations in the statistical power of previous studies using cascade models (e.g., Bornstein et al., 2010; Englund & Siebenbruner, 2012; Masten et al., 2005; Obradovic et al., 2009). These types of models necessitate large sample sizes, increasing the likelihood of Type II error. A path model with the proposed mediational pathways of the Dual Failure Model appears to be a better choice of analytical strategy to ensure sufficient statistical power to detect the different relations and thus, reduce the possibility of Type II error. Furthermore, with the exception of Bornstein et al. (2010) and Weeks et al. (2016), previous studies using cascade models only investigated links between externalizing and internalizing problems measured at two consecutive time points, precluding the ability to test effects between two nonconsecutive time points. However, to be able to test for a temporal mediation, data over three time points need to be analyzed. Indeed, a significant mediation suggests a causal chain of effects where the direct association between the independent and dependent variables is better explained (i.e., decrease of the direct effect) by the influence of a mediator (Baron & Kenny, 1986). As such, mediation analysis is a strong approach to test the tenants of the Dual Failure Model to better understand the developmental nature of the association between externalizing problems and internalizing problems.

The present study focuses on why children with externalizing problems later develop internalizing problems employing a theory-driven design. It will advance knowledge on the Dual Failure Model by addressing discrepancies of the existing empirical data with sufficient statistical power to prospectively test for the mediation pathways proposed. Notably, boys and girls were selected in the first years of elementary school and oversampled when presenting with early CP to allow empirical testing of the Dual Failure Model in a sample corresponding to the authors' theory (Patterson & Capaldi, 1990), but also to allow for statistical comparison based on CP status and gender to better understand the applicability of the model. The study will also make use of a multirater approach to compare the results in different life contexts.

Objectives

The first objective is to test the Dual Failure Model in a sample of 744 children (46.8 % girls), where a high proportion of the participants were presenting a high level of CP (n = 434; 44.7 % girls), and data were collected over three time points starting in early elementary school. Considering the mixed empirical data for both the academic failure and social failure pathways, we did not make any hypotheses. The second objective is to examine if the pathways proposed in the Dual Failure Model vary between boys and girls. We anticipate that the direct and indirect pathways will not vary according to gender. The third objective is to examine if the pathways vary between children with and without early CP. Considering the original conceptualization of the Dual Failure Model (Patterson & Capaldi, 1990), we believe we might find support for both failure pathways for children with CP.

METHOD

Participants

The present study uses data from an ongoing longitudinal study on boys and girls (6.3 to 10.6 years of age at Time 1) with and without CP in early primary school (N = 744): 434 children with CP (44.7 % girls), and 310 children without (comparison group; 49.7 % girls). Recruitment took place from 2008 to 2010 in eight French speaking school boards from four regions of Québec (Eastern Townships, Montérégie, Montréal, and Québec City). To recruit a relatively large number of children (particularly girls) with CP before age 10, two strategies were used. The majority of the CP sample (n = 339) was recruited based on receiving services for CP in public schools. This is an ecologically valid method of participant recruitment as 95% of children in Québec attend public elementary schools (Gouvernement of Quebec, 2013a), and the identification of childhood CP for reception of services at school is typically related to teacher observations of child behavior across a variety of contexts. Children are admitted to behavioral services at school by professionals (e.g., school psychologists), only after a formal assessment revealed the presence of CP. Additionally, in order to be included in the CP group, children had to score above the threshold of elevated risk (above the 93th percentile) on the DSM-oriented scales for conduct problems or for oppositional defiant problems of the Achenbach System of Empirically Based Assessment (ASEBA; Achenbach & Rescorla, 2001) based on parent or teacher report. All girls less than 10 years of age receiving behavioral services at school, and approximately one out of four boys receiving these services (randomly selected) were invited to participate in the study. The participation rate was 75.1 % and is comparable to previous studies of antisocial behavior during childhood (Capaldi & Patterson, 1987). More than two thirds of children attended a school in high poverty neighborhoods. No differences emerged in rates of participation of boys and girls, grade level, or poverty level of the school attended (Gouvernement of Quebec, 2013b).

To address potential biases in teacher referrals for CP, a complementary strategy for recruitment of participants with CP was employed, where systematic classroom-based screenings were used to identify children who present CP symptomatology but who were not signaled to school professionals by teachers. A multi-gated method of screening was used to detect children with CP and was applied to 881 students (first to third grade) from schools of low income neighborhoods (participation rate = 71.5 %). As above, no differences emerged in rates of participation of boys and girls, nor in grade level. Parents and teachers also completed the conduct problems and the oppositional defiant problems DSM-oriented scales of the ASEBA (Achenbach & Rescorla, 2001). This strategy revealed that 95 children (57.9 % girls) had a score above the threshold of elevated risk on the scales and were therefore included in the study.

Children in the comparison group were selected among boys and girls who did not meet the risk threshold on the scales. Roughly one out of three children was randomly recruited for the study. This study used Waves 1 to 3 of the longitudinal study (attrition rate of 5.4 %), which employed a repeated measures design at 12-month intervals. Most of the children in the sample were born in Quebec (93.5 %) and 29.5 % of them lived in a single parent-headed family at study inception.

Measures

Internalizing problems

Internalizing problems at Time 1 and Time 3 were assessed using the composite scale of the ASEBA (Achenbach & Rescorla, 2001) which includes items assessing symptoms of anxiety (e.g., “Nervous, high-strung, or tense”), depression (e.g., “There is very little that he/she enjoys”), social withdrawal (e.g., “Would rather be alone than with others”), and somatic complaints (e.g., “Has nausea, feels sick, without known medical cause”). Items were rated on a

3-point scale ranging from 0 (*not true*) to 2 (*very true or often true*). Both parental report (Child Behavior Checklist [CBCL]; 32 items) and teacher report were used separately (Teacher Report Form [TRF]*;* 33 items). Raw scores were summed and then transformed into *T* scores. Higher *T* scores indicate higher level of internalizing problems. The scale demonstrated good internal consistency (Parent ratings: Time 1 α = .87, Time 3 α = .88; Teacher ratings: Time 1 α = .88, Time 3 α = .89).

Externalizing problems

Externalizing problems at Time 1 and Time 3 were also assessed using the composite scale of the ASEBA in both parental and teacher reports separately (Achenbach & Rescorla, 2001). This scale includes rule-breaking behaviors (e.g., "Steals outside the home") and aggressive behaviors (e.g., "Cruelty, bullying, or meanness") for a total of 35 items in the CBCL and 32 items in the TRF. Items were scored on the same 3-point scale and then summed. Again, we used *T* scores: a higher score indicates higher level of externalizing problems. The scale demonstrated good internal consistency (Parent ratings: Time 1 α = .93, Time 3 α = .93; Teacher ratings: Time 1 α = .96, Time 3 α = .95).

Conduct problems

CP were evaluated at study inception using the DSM-oriented scales for oppositional problems and conduct problems from the parent and teacher versions of the ASEBA (Achenbach & Rescorla, 2001). The oppositional problems scale (e.g., "Argues a lot") has five items for both parent and teacher versions and the conduct problems scale (e.g., "Breaks rules at home, school, or elsewhere") has 17 items in the parent version and 13 items in the teacher version. Items were scored on the same 3-point scale, summed and transformed in *T* scores. Children with *T* scores of

≥ 65, as reported by either the parent or the teacher, were included in the CP group. Cronbach's alphas varied from .85 to .93 in this sample.

Dual failure variables

Peer victimization. At Time 1 and Time 2, peer victimization was assessed by 16 items on physical victimization (e.g., "Gets hit by another child"), verbal victimization (e.g., "Gets called names by another child") and indirect victimization (e.g., "Another child tells lies or false stories about him") from an adapted version of the Direct and Indirect Aggression Scales (DIAS; Björkqvist, Lagerspetz, & Osterman, 1992). Parents were asked to rate how frequently their child was victimized on a 5-point scale ranging from 0 (*never*) to 4 (*very often*). A mean score of victimization was used. Higher scores on this measure indicate higher levels of peer victimization, and the measures showed good reliability (T1 α = .93; T2 α = .94).

Academic performance. Time 1 and Time 2 academic performance was assessed by teachers using nine items of the Academic Performance Rating Scale (DuPaul, Rapport, & Perriello, 1991). The scales vary according to the question asked but are all 5-point scales, with a higher score reflecting higher academic skills. For example, "evaluate the quality of the child's work in mathematics" was answered with a scale ranging from scores 0-64% to scores 90-100%. "With what ease does the child master a new subject?" was answered with a scale ranging from "very slow" to "very fast." "What is the level of legibility (cleanliness) of the child's writing?" was answered with a scale ranging from "illegible" to "excellent." Items were summed to create a total score. In the current study, the Cronbach alphas were excellent (T1 α = .90; T2 α = .88).

Control variables

Child age. Child age at Time 1 was calculated from the child's date of birth and interview date.

Family income. Family income at Time 1 was assessed using an ordinal scale from the Quebec Child Mental Health Survey (Valla et al., 1997) by which the parent classifies the family income in categories starting at less than C$6,000 to more than C$160,000. This variable was weighted to create a normal distribution, and the median family income was between C$60,000 and C$69,999.

Procedure

Data used in this study were collected annually via in-home interviews where parents were presented with a full description of the study and a consent form, which authorized the research team to contact the child's classroom teacher in order to solicit his or her participation in the study. Interviews were performed by graduate-level research assistants having received a three-day formal training. The mean duration of parental interviews was 90 min. The teachers participated in a structured interview over the telephone (with a mean duration of 30 min.). Parents and teachers received appropriate compensation for their participation (C$60 and C$30 respectively). The study "*Troubles de comportement au féminin : évolution, facteurs de persistence et de rémission, et contribution des services* [Girls' behavioral problems: evolution, factors related to persistence and remission, and service effects]" was approved by the University of Sherbrooke ethics committee.

Analytical Strategies

Our analytic plan tested the proposed path model shown in Figure 1, using longitudinal path analysis with Mplus, Version 8.1 (Muthén & Muthén, 1998-2018). To consider the abnormal distribution of the data, a more robust estimator was chosen to estimate the models (maximum likelihood estimation with robust standard errors [MLR]). Missing data, which are considered by the MLR estimator, were treated as missing at random to maintain a high power.

Due to the use of MLR, chi-square differences test between models were conducted using the Satorra-Bentler scaled chi-square. To evaluate the adequacy of the models proposed, a number of fit indices were analyzed following the benchmarks proposed by Kline (2011): (a) the overall χ^2 (ideally a non-significant value; however χ^2 is affected by large samples and often comes out significant); (b) the comparative fit index (CFI; a value of .90 or higher); (c) the Tucker-Lewis index (TLI; a value of .90 or higher); (d) the root mean square error of approximation (RMSEA; a value of .08 or lower); and (e) the standardized root mean squared residual (SRMR; a value of .05 or lower).

Two path models were estimated to evaluate the links proposed in the Dual Failure Model while also including the pathways from internalizing problems to externalizing problems. Our sample size assured sufficient analytical power with over 20 cases per free parameter, which is considered ideal (Kline, 2011). In the first model, parent evaluations of internalizing and externalizing problems (at Time 1 and Time 3) were used, while in the second model, teacher evaluations of internalizing and externalizing problems at the same time points were used. In both models, parent report of peer victimization (Time 1 and Time 2) and teacher report of academic performance (Time 1 and Time 2) were used. In each path model, we tested if there was a significant mediational link between Time 1 externalizing problems, Time 2 dual failure variables, and Time 3 internalizing problems (and vice versa). We did so by (1) including an indirect model in Mplus, (2) checking if the value of the direct pathway between externalizing problems in Time 1 and internalizing problems in Time 3 decreased when considering the mediational variables, and also (3) rerunning the models using bootstrapping (n = 5,000) to confirm our results with confidence intervals. In accordance with our second objective, we evaluated if the models were gender invariant by using model constraints to test if the release of

an individual path would significantly improve the fully constrained model using the Satorra-Bentler scaled chi-square difference test. This procedure was repeated for our third objective to test for differences in the paths between children with and without CP. In every model estimated, the effect of child age and family income on the mediators at Time 2 and the dependent variables at Time 3 was controlled. Since child age was not significantly associated with peer victimization nor academic performance at Time 2, nor with internalizing problems nor externalizing problems at Time 3, this covariate was removed.

Insert Figure 1 here

RESULTS

Descriptive Results

The correlation matrix is found in Table 1. Results showed significant correlations between all variables of the Dual Failure Model in the expected directions according to both parent and teacher reports.

Insert Table 1 here

Objective 1

The first objective of this study was to test both pathways proposed in the Dual Failure Model, namely the social failure and the academic failure, to explain why children with externalizing problems present with later internalizing problems. As a multi-informant design was chosen to test the model in two life contexts (i.e., home and school), two models were

tested: one using parent ratings of externalizing and internalizing problems, and the other one using teacher ratings of externalizing and internalizing problems. Both models had excellent fit to the data (see Figures 2 and 3), with the parent model explaining a higher percentage of the variance of internalizing problems in Time 3 ($R^2 = .52$, $p < .001$) than the teacher model ($R^2 = .24$, $p < .001$).

Academic Failure

According to parent ratings, but not teacher ratings, having more externalizing problems at study inception was significantly associated to weaker academic performance 1 year later, while having internalizing problems was not (in both parent and teacher models). Performing less well in school (Time 2) was associated to more internalizing problems (Time 3), but only according to teacher ratings. In both models however, performing less well in school at Time 2 was linked to more externalizing problems one year later. Also, as shown in the two models, more externalizing problems at study inception were significantly associated with more internalizing problems 2 years later. As for the reverse link, only the teacher model showed that having more internalizing problems in Time 1 was associated to having fewer externalizing problems in Time 3. Unsurprisingly, the indirect pathway involving academic performance was nonsignificant (from externalizing problems Time 1 to internalizing problems Time 3: parent model, β = .00, $p = .89$, 95% Bootstrapped CI [-.00, .01], and teacher model, β = .01, $p = .18$, 95% Bootstrapped CI [-.00, .02]; From internalizing problems Time 1 to externalizing problems Time 3: parent model, β = .00, $p = .74$, 95% Bootstrapped CI [-.00, .01], and teacher model, β = .00, $p = .32$, 95% Bootstrapped CI [-.00, .02]). As such, even though the parent model showed a link between externalizing problems in Time 1 and academic performance in Time 2 and the teacher model showed a link between academic performance in Time 2 and internalizing

problems in Time 3, no support for the academic failure pathway was found in either the parent or the teacher ratings model.

Social Failure

According to both models, having externalizing problems at study inception was significantly associated with being more victimized by peers 1 year later, while having internalizing problems was significantly associated with peer victimization only in the teacher model. Again, according to both models, being frequently victimized by peers in Time 2 was significantly linked to having more externalizing and internalizing problems at Time 3. The indirect pathway linking externalizing problems in Time 1 to internalizing problems in Time 3 via peer victimization in Time 2 was significant in both the parent model, $\beta = .02$, $p < .01$, 95% Bootstrapped CI [.01, .04], and teacher model, $\beta = .01$, $p < .05$, 95% Bootstrapped CI [.00, .03]. The indirect pathway from internalizing problems in Time 1 to externalizing problems in Time 3 via peer victimization in Time 2 was not significant in either model (parent model, $\beta = .01$, $p = .16$, 95% Bootstrapped CI [-.00, .02], and teacher model, $\beta = .01$, $p = .08$, 95% Bootstrapped CI [.00, .02]). In brief, our results showed that both the direct paths and indirect pathway of the social failure were significant in both parent ratings and teacher ratings models, thus supporting this pathway of the Dual Failure Model.

Insert Figure 2 and 3 here

Objective 2

The second objective of the study was to compare the models according to gender in order to identify if differences would emerge at the path level. Comparisons using the Satorra-

Bentler scaled chi-square difference test showed that there were no differences between boys and girls regarding the direct and indirect paths of the Dual Failure Model. There was however a significant difference regarding the path between family income at Time 1 and academic performance at Time 2, which was significant for boys only (see Table 2). There was also a difference in the stability path of Time 1 academic performance to Time 2 academic performance. This path was stronger for girls than for boys. Finally, according to parent ratings, the path between Time 1 internalizing problems and Time 2 peer victimization was significant for boys only. As such, longitudinal paths from externalizing problems to later internalizing problems by the mediators are not significantly different between boys and girls.

Insert Table 2 here

Objective 3

The final objective of the study was to compare the models according to CP status to evaluate if the Dual Failure Model could be applied to both children with early identified CP and children with low to subclinical levels of CP. Analyses showed that the correlational path between internalizing problems at Time 1 and externalizing problems at Time 1 was stronger for children without CP than children with CP according to parent ratings ($\chi^2 = 4.24(1, N = 744)$, $p = .04$; CP children: $\beta = .49$, $p < .001$; Without CP children: $\beta = .56$, $p < .001$). Still according to parent reports, the correlational path between internalizing problems at Time 1 and academic performance at Time 1 was significant only for children without CP ($\chi^2 = 6.02(1, N = 744)$, $p = .01$; CP children: $\beta = -.07$, n.s.; Without CP children: $\beta = -.20$, $p < .001$). Finally, both parent and teacher reports (parent ratings: $\chi^2 = 5.67(1, N = 744)$, $p = .02$; teacher ratings: $\chi^2 = 5.62(1, N =$

744), $p = .02$) showed that the stability path between Time 1 academic performance and Time 2 academic performance was stronger for children without CP (parent reports: $\beta = .72$, $p < .001$; teacher reports: $\beta = .71$, $p < .001$) than children with CP (both reports: $\beta = .61$, $p < .001$). As such, longitudinal paths from externalizing problems to later internalizing problems via the mediators are not significantly different between children with and without CP.

DISCUSSION

This study carefully planned the empirical testing of the Dual Failure Model to address the discrepancies of past studies in order to better inform clinicians on its applicability for boys and girls, but also for children with and without CP with the overarching goal to prevent the development of internalizing problems and associated consequences. According to both parents and teachers, our results support the direct and indirect paths of the social failure, which suggests that children having early externalizing behaviors and developing internalizing problems may do so due to experiences of peer victimization. However, we found no support for the academic failure pathway. Specifically, the path from externalizing problems to later academic difficulties was only identified in the parent model, and the path from academic difficulties to later internalizing problems was only identified in the teacher model. These longitudinal results did not vary between boys and girls nor between children with and without CP at study inception. As for the paths linking internalizing problems to later externalizing problems, no indirect pathway was identified, but both models showed that victimization and academic difficulties were linked to later externalizing problems. Internalizing problems were only linked to later academic difficulties and externalizing problems in the teacher model.

Academic Failure

The first objective pursued was to evaluate the direct paths and indirect pathways of the Dual Failure Model. Starting with the academic failure, as in previous studies, both the direct path from externalizing problems to later academic difficulties (e.g., Deighton et al., 2018; Masten et al., 2005; Moilanen et al., 2010) and the direct path from academic difficulties to later internalizing problems (e.g., Englund & Siebenbruner, 2012; Obradovic et al., 2009; Van der Ende et al., 2016) found support in our study. However, the two paths were not found in the same model. In Van der Ende et al. (2016), the association between academic difficulties and later internalizing problems was also identified only in a model using teacher-reported externalizing and internalizing problems. Considering the indirect pathway between externalizing problems and internalizing problems via low academic performance, it has been illustrated by previous work (e.g., Martin-Storey et al., 2018; van Lier et al., 2012; Wertz et al., 2015) only according to teacher reports. When another rater was used to assess either behavior problems or academic achievement (Panayiotou & Humphrey, 2018; Poirier et al., 2019; Vaillancourt et al., 2013; Yong et al., 2014), the indirect relation was not found to be significant or was significant for boys only (Klostermann et al., 2016). Since academic failure is linked with having trouble adjusting to new demands associated with knowledge acquisition and can be induced by new contexts in children's lives, the mediating role of academic failure may be more apparent to those in the classroom environment (i.e., teachers). Furthermore, teachers are particularly sensitive to children's externalizing problems, and these problems may influence teachers' ratings of academic performance, when compared to standardized achievement tests (Zimmermann, Schütte, Taskinen, & Köller, 2013). Interestingly and in accordance with this hypothesis, when standardized testing is used as a measure of academic performance as opposed to teacher reports, the academic failure pathway has not been supported (Panayiotou &

Humphrey, 2018; Vaillancourt et al., 2013; Yong et al., 2014). Also, the significant academic failure pathway using only teacher ratings may be an artifact of shared-rater variance. In sum, the support for academic failure seems linked to the measure used and does not appear unequivocal.

Indeed, as in multiple past studies (Boots et al., 2011; Lapalme et al., 2018; Panayiotou & Humphrey, 2018; Poirier et al., 2019; Vaillancourt et al., 2013; Yong et al., 2014), our results did not support the academic failure pathway. This may not be surprising considering that the first studies conducted to validate the Dual Failure Model by its authors (Patterson & Capaldi, 1990; Patterson & Stoolmiller, 1991) also obtained inconsistent results regarding this pathway, and that this situation led the authors to qualify academic difficulties as potentially having a significant but secondary role. In sum, very few studies supported both direct and indirect paths of the academic failure pathway over time, and our results tend to add greater doubt around the role of this pathway.

Social Failure

In our study, both parent and teacher models supported the direct and indirect paths implicated in the social failure pathway, as was the case in multiple previous studies (Gooren et al., 2011; Martin-Storey et al., 2018 [for both teacher and parent ratings]; van Lier & Koot, 2010; Wertz et al., 2015). However, as discussed in the introduction, past empirical support for this pathway has been mixed. van Lier and colleagues (2012) identified both direct paths but obtained a nonsignificant indirect pathway. Other studies supported only one of the direct paths (Bornstein et al., 2010; Klostermann et al., 2016; Lapalme et al., 2018; Yong et al., 2014) or neither (Vaillancourt et al., 2013). One explanation for this mixed support may have to do with child age, as some studies that failed to support the social failure pathway included older children than those that did support this pathway (Klostermann et al., 2016; Vaillancourt et al., 2013;

Yong et al., 2014). The Dual Failure Model suggests that internalizing problems emerge as a result of the social challenges induced by experiences in the new and more demanding context of elementary school (Patterson & Capaldi, 1990). As such, it could be possible that the mediational pathway of social failure takes place only in the first years after school entry. Future research comparing Dual Failure processes early versus later in childhood may help to clarify these findings.

Overall, even though results for the social failure pathway are inconsistent in the extant literature, this pathway seems to be more supported than the academic failure and appears to be less linked to the school context, as it has been supported by both parent and teacher ratings. Additionally, in the current study, we found a significant partial *mediation* which suggests that the association between externalizing problems and internalizing problems 2 years later is better explained by the influence of peer victimization experiences, which provides stronger support for the theoretical model of Patterson and Capaldi (1990) than the sole identification of an indirect link.

Children thus seem to be more affected by experiences of peer victimization than by not performing well in school. Perhaps interpersonal difficulties are what is associated to the development of later internalizing symptomatology. If so, future studies could look into the potential role of the student-teacher relationship as a mediator between externalizing and internalizing problems, especially considering that student-teacher relationships are greatly affected by children's behavioral difficulties (Crum, Waschbusch, & Willoughby, 2016).

The second objective pursued was to evaluate if the paths of the Dual Failure Model were different between boys and girls. As in our study, most of the studies showed gender invariance when it comes to the social failure paths (e.g., Burt & Roisman, 2010; Gooren et al., 2011;

Martin-Storey et al., 2018; van Lier & Koot, 2010; van Lier et al., 2012; Wertz et al., 2015). With respect to the academic failure paths, some studies showed differences between boys and girls (Boots et al., 2011; Klostermann et al., 2016; Panayiotou & Humphrey, 2018), and in line with our results, some other studies showed no differences between boys and girls (Burt & Roisman, 2010; Deighton et al., 2018; Martin-Storey et al., 2018; Masten et al., 2005; Obradovic et al., 2009; Poirier et al., 2019; Van der Ende et al., 2016; van Lier et al., 2012; Weeks et al., 2016; Wertz et al., 2015). Since the Dual Failure Model was conceptualized to explain depressive symptoms among youth with CP (Patterson & Capaldi, 1990), it was important to test this model among a sample in which a high proportion of boys and girls had significant CP. The potentially limited number of girls with CP in other studies employing more general samples could explain the discrepancies found. Our sample, which contains as many girls and boys with CP, thus allowed us to test the gender invariance of the model more confidently and our results suggest that this model may function equally well among boys and girls, as hypothesized. This assumption is also supported by the fact that we tested for differences at the path level, which has rarely been done before. As such, we could presume that peer victimization and academic difficulties have a similar role in boys' and girls' development of internalizing problems in association with their earlier externalizing problems in the first elementary school years. It could thus be possible that girls' greater vulnerability to internalizing problems compared to that of boys (Costello et al., 2003) is not explained by these mediators.

The third and final objective of our study was to evaluate if the Dual Failure Model was different according to CP status by comparing individual path differences, which had not been done by previous studies. Our sample allowed for replication of the model as it has been conceptualized, namely in youth with CP (Patterson & Capaldi, 1990). As in the first empirical

studies on the model (Patterson & Capaldi ,1990; Patterson & Stoolmiller, 1991), we found evidence for the social failure pathway. However, we did not find evidence for the academic failure pathway, contrary to our hypothesis. As mentioned, academic difficulties may thus play a secondary role in the development of internalizing problems.

Our study also allowed to verify the applicability of the Dual Failure Model for children presenting with low to subclinical levels of CP in the early elementary school years. Since no differences emerged regarding the paths of the Dual Failure Model between children with CP and without CP, we can assume that peer victimization has a similar endangering effect for the development of internalizing problems regardless of the initial level of CP. As such, even if some children do not present high risk/clinical levels of CP, displaying externalizing behaviors may place them at risk for experiencing peer victimization and subsequent internalizing problems. Finally, since academic expectations can be lower for children with CP than for children without CP (Gut, Reimann, & Grob, 2013; Rutchick, Smyth, Lopoo, & Dusek, 2009), we could have assumed that children without CP would have been more emotionally affected by lower academic performance. However, even if children without CP were more emotionally affected by their academic difficulties than children with CP, it did not appear to lead to internalizing problems. In sum, our study showed that peer victimization, but not academic difficulties, mediated the association between externalizing problems and later internalizing problems for children with significant CP levels and also for children with lower CP levels.

Study Strengths and Limitations

The composition of the sample, namely approximately half of the sample presenting with CP, allowed for empirical testing of potential differences in the Dual Failure Model according to CP status, which is a novel contribution to the literature. Our analytical strategies also allowed to

keep a maximum of statistical power, in order to test for mediation, instead of only indirect association, and to consider the potential dynamic effects of pathways from internalizing problems to later externalizing problems. Additionally, our multi-informant design allowed us to verify if our results were context dependent. Another strength of the study is that children were selected in the elementary school years, a developmental period more in-line with the original theory of Patterson and Capaldi (1990).

However, in order to recruit a large enough sample of boys and girls with early CP, the age range of recruited children spanned from 6 to 10 years (between first to third grade) at study inception. This age span could have resulted in lower effect sizes since the effects of the mechanisms may have been diluted. This may explain why our effect sizes were small for our mediational pathways. However, age was not a significant covariate in our models and small effect sizes are more often the norm than the exception in past studies testing the Dual Failure Model (e.g., Burt & Roisman, 2010; Klostermann et al., 2016; van Lier et al., 2012).

Conclusions

The present study provides important empirical data on the Dual Failure Model, a theoretical model proposed to explain why children with externalizing problems develop internalizing problems later on. The results generally suggest that children with higher externalizing problems were more likely to develop internalizing problems as a result of experiencing a higher frequency of peer victimization, but not of having lower levels of academic performance. Thus, it provides support for the social failure pathway proposed in the Dual Failure Model, but not the academic failure pathway. To conclude, the current study is relevant for clinicians as it shows that boys and girls with externalizing behavioral problems seem particularly at risk of having social difficulties that are, at least partly, responsible for their

future internalizing problems, regardless of if they present with high levels of CP or not. These findings suggest that even among children whose level of CP might not warrant psychosocial services, higher externalizing tendencies are associated with risks of developing problems with peers and an internalizing symptomatology. This also applies for girls who are less likely than boys to receive psychosocial services and to be considered at-risk of presenting externalizing behaviors. Accordingly, proactive preventive interventions, aiming at problem solving skills, social skills and emotional regulation, for boys and girls presenting externalizing behaviors would be a promising venue to prevent or reduce peer victimization and the subsequent development of internalizing problems in order to avoid the negative consequences that this comorbidity can have later on in life.

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Table 1

Correlations and descriptive statistics of study variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. P Int1	-															
2. P Int3	.70**	-														
3. T Int1	.35**	.35**	-													
4. T In3	.31**	.34**	.41**	-												
5. P Ext1	.56**	.51**	.36**	.35**	-											
6. P Ext3	.45**	.63**	.35**	.34**	.81**	-										
7. T Ext1	.23**	.26**	.54**	.39**	.61**	.56**	-									
8. T Ext3	.18**	.23**	.34**	.57**	.53**	.55**	.67**	-								
9. Victi1	.39**	.37**	.23**	.24**	.49**	.45**	.38**	.32**	-							
10. Victi2	.36**	.41**	.26**	.31**	.46**	.47**	.36**	.37**	.64**	-						
11. Acad1	-.23**	-.24**	-.44**	-.36**	-.43**	-.41**	-.54**	-.42**	-.27**	-.29**	-					
12. Acad2	-.23**	-.24**	-.38**	-.34**	-.38**	-.39**	-.44**	-.40**	-.24**	-.30**	.72**	-				
13. Age1	.06	.04	.11**	.06	-.04	-.04	.04	.04	.10**	.07	-.07	-.10*	-			
14. SES1	-.17**	-.18**	-.19**	-.20**	-.29**	-.30**	-.25**	-.26**	-.23**	-.20**	.27**	.25**	.03	-		
15. Gender	-.14**	-.10*	-.14**	-.12**	-.08*	-.07	-.03	-.04	-.02	-.02	.10*	.18**	-.01	-.09*	-	
16. CP1	.29**	.32**	.36**	.39**	.72**	.63**	.70**	.61**	.39**	.39**	-.42**	-.39**	.01	-.26**	-.05	-
Mean	59.27	58.49	58.89	58.40	62.88	59.98	61.54	59.29	0.96	0.94	3.20	3.18	8.39	5.51	-	-
S.D.	10.42	10.76	10.01	10.63	10.56	11.23	12.28	11.37	0.68	0.71	0.89	0.81	0.93	3.40	-	-
Min, Max	33, 85	33, 86	37, 88	37, 90	33, 86	33, 84	41, 90	41, 88	0, 4	1, 3.8	1.1, 5	1.2, 5	6.3, 10.6	0.5, 15	-	-

Note. 1 =Time 1. 2 = Time 2. 3 = Time 3. P = Parental ratings. T = Teacher ratings. Int = Internalizing problems. Ext = Externalizing problems. Victi = Peer victimization. Acad = Academic performance. SES = Family income. CP = Conduct problems. Min, Max = Minimum and maximum values.

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

Table 2

Paths moderated by gender

	Boys (β)	Girls (β)	Chi-square difference testing
T1 family income to T2 academic performance			
Parent ratings	.10**	-.04	$\chi^2 = 6.22(1, N = 744), p = .01$
Teacher ratings	.10**	-.03	$\chi^2 = 5.89(1, N = 744), p = .02$
T1 academic performance to T2 academic performance			
Parent ratings	.63***	.73***	$\chi^2 = 8.29(1, N = 744), p = .004$
Teacher ratings	.62***	.72***	$\chi^2 = 7.87(1, N = 744), p = .005$
T1 internalizing problems to T2 peer victimization			
Parent ratings	.11*	-.01	$\chi^2 = 4.80(1, N = 744), p = .03$

Note. Differences between the models were evaluated using the Satorra-Bentler scaled chi-square difference test.
* = $p < .05$. ** = $p < .01$. *** = $p < .001$

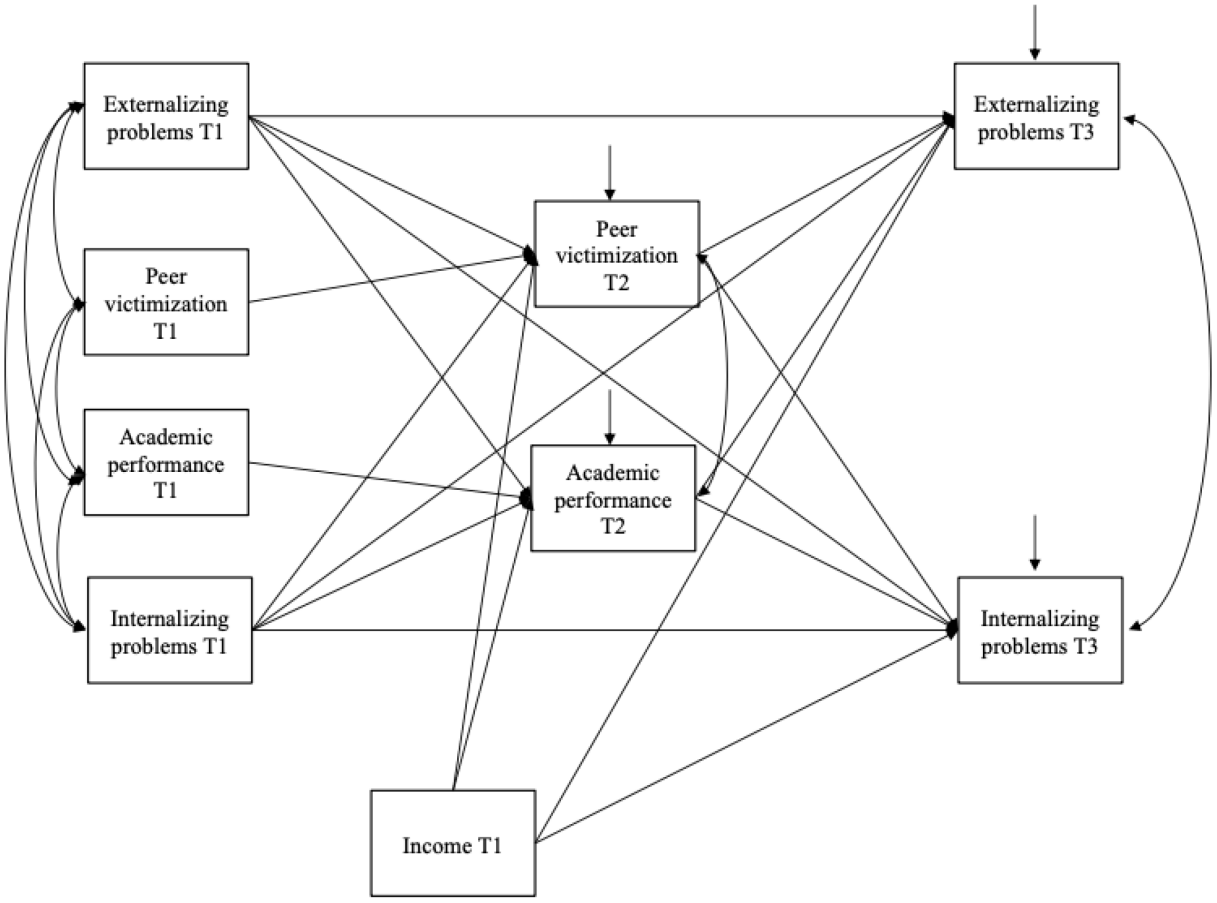

Figure 1. Proposed path model for testing the Dual Failure Model while considering pathways from internalizing problems to externalizing problems and controlling for income at study inception.

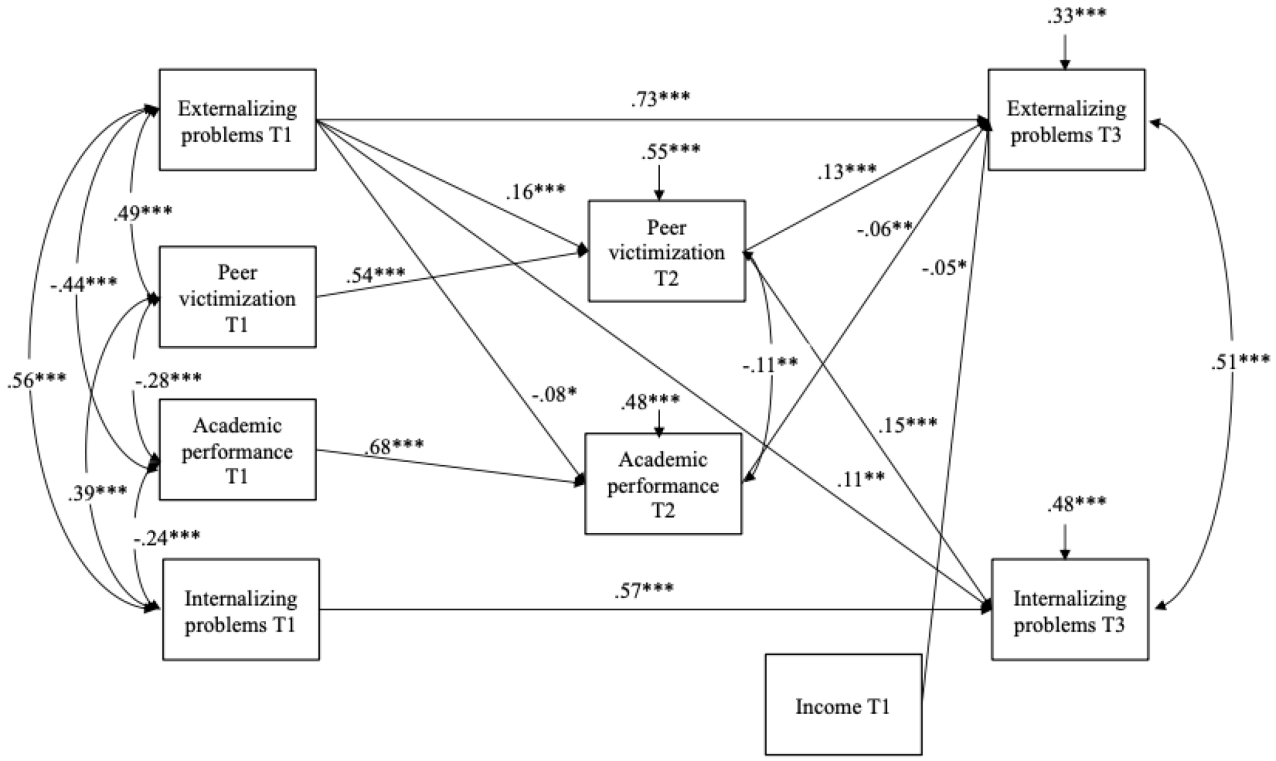

Figure 2. Estimated model for parent ratings.

Note. Entries are standardized coefficients. Only significant paths are shown ($p < .05$; two-tailed tests). Within-time correlations with Income T1 were controlled but are not displayed in the figure for clarity. They were all significant and varying from -.29 to .27.
* = $p < .05$; ** = $p < .01$; *** = $p < .001$.
$\chi^2 = 6.15$, $df = 6$, n.s.; RMSEA [90 % CI] = .01 [0, .05]; SRMR = .01; CFI = 1; TLI = 1.

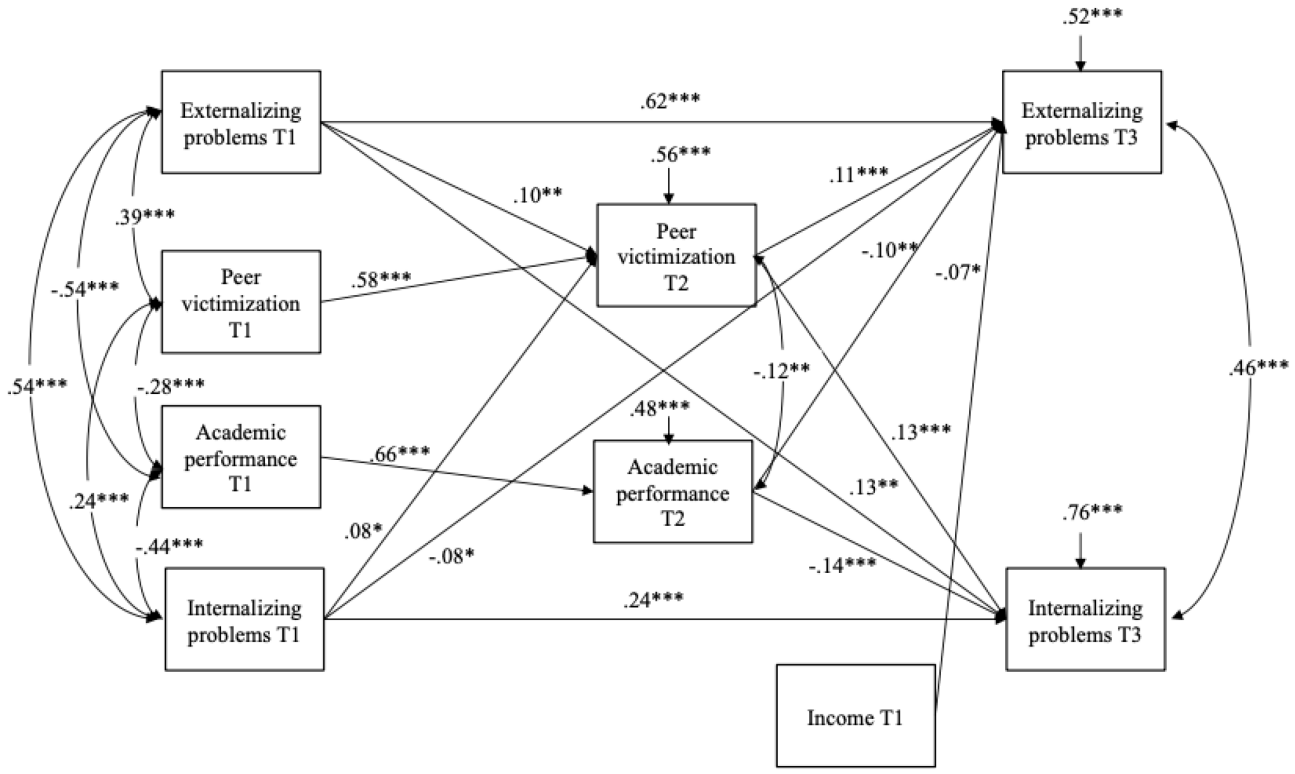

Figure 3. Estimated model for teacher ratings.

Note. Entries are standardized coefficients. Only significant paths are shown ($p < .05$; two-tailed tests). Within-time correlations with Income T1 were controlled but are not displayed in the figure for clarity. They were all significant and varying from -.26 to .27.
* = $p < .05$. ** = $p < .01$. *** = $p < .001$.
$\chi^2 = 6.79$, $df = 6$, n.s.; RMSEA [90 % CI] = .01 [0, .05]; SRMR = .01; CFI = 1; TLI = 1.