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ABSTRACT

The current study investigates how internalizing and externalizing problems develop reciprocally across infancy to middle childhood, in relation to children's gender, cognitive functioning, socioeconomic status, and parental stress. The study also examines the impact of the developmental cascade of internalizing and externalizing problems on bullying and victimization in middle childhood. The total sample comprised 11,134 participants studied across 9-months, 3-years, 5-years, 7/8-years and 9-years of age, from the Infant Cohort of the Growing Up in Ireland study (50.6% male). Using structural equation modeling, we discovered that externalizing problems predicted internalizing problems across time for both genders. However, internalizing problems predicted externalizing problems consistently across time for girls and not for boys. Furthermore, girls' internalizing and externalizing problems were much more strongly predicted by socioeconomic status than boys' problems were, suggesting a greater sensitivity to context for girls. Bullying in middle childhood was predicted by cognitive ability for both genders, and by externalizing problems for boys. In comparison, victimization was predicted by externalizing and internalizing problems for both genders. Theoretical and practical implications are discussed.

In childhood, behavioral problems are often conceptualized along two broad spectra: (1) internalizing problems that are expressed as intrapersonal manifestations, such as anxiety, depression, and social withdrawal; and (2) externalizing problems that are related to interpersonal manifestation, such as hyperactivity and peer aggression (e.g., Dearing et al., 2006). The developmental cascades perspective highlights how internalizing and externalizing problems can influence each other over time (Masten et al., 2009). Following the adjustment erosion hypothesis, internalizing and externalizing problems therefore become chronologically linked, and this cascade can impact other domains of development such as socioemotional functioning (Kochel et al. (2012).

During childhood, internalizing and externalizing problems can act as risk factors for bullying others and for being victimized by peers (Schultze-Krumbholz et al., 2012). Studies have observed associations between bullying and victimization with internalizing and externalizing problems, longitudinally (e.g., e.g., Boyes et al., 2014, Ttofi et al., 2014) and cross-sectionally (e.g., Kelly et al., 2015). The strength of the effects across time are still undetermined, although a meta-analysis identified a stronger association between earlier peer victimization and later internalizing problems, compared to earlier internalizing problems and later peer victimization (Reijntjes et al. 2010). From a developmental cascades perspective, the development of peer-oriented social difficulties, such as bullying and victimization, can be conceptualized as resulting from a cumulative effect of deficits in children's social-relational functioning (Masten & Cicchetti, 2010).

Other key factors have emerged in the research as being of importance in the development of internalizing and externalizing problems. Higher levels of internalizing and externalizing problems have been associated with lower socioeconomic status (Amone-P'Olak et al., 2009; Girard, 2021; Huisman et al., 2010) and lower cognitive ability (Einfeld et al., 2006; Flouri et al., 2019; Huisman et al., 2010). The literature also suggests a link between internalizing and externalizing problems and parental stress (e.g., Girard, 2021; Linden et al., 2015; Bayer & Rozkiewicz, 2015) and being male (Bayer et al., 2015).

The aim of the current study, using large-scale, Irish nationally representative data from Growing up in Ireland, was to explore the concurrent development of internalizing and externalizing problems across infancy to middle childhood and to examine the impact of these problems on bullying and victimization in middle childhood. This examination extends the literature by identifying developmental reciprocal relations in an Irish sample, and their relationship with sociocultural and personal factors in childhood including socioeconomic status, parental stress, and child gender and cognitive ability. Furthermore, the examination of the impact of internalizing and externalizing problems on bullying and victimization provides a direct assessment of a specific psychosocial risk associated with these pathways. By creating our models separately for boys and girls, we tested both the universality of these associations and the influence of gender on the plasticity of the development of problems across time.

Developmental cascade of internalizing and externalizing problems

Developmental cascades are conceptualized as "the cumulative consequences for development of the many interactions and transactions occurring in developing systems that result in spreading effects across levels, among domains at the same level, and across different systems or generations" (Masten & Cicchetti, 2010, p. 491). This perspective aims to understand the processes by which the development of social skills and maladaptive functioning between development domains are connected over time with developmental effects; whereby problems in one area may affect other functional domains and important consequences for psychological well-being or function in other domains (Masten et al., 2009, 2005). Developmental cascades refer to the cumulative development consequences of the many interactions and transactions that occur in developing systems that result in diffusion effects between developmental milestones, domains at the same level, and different systems. Theoretically, these effects can be direct and unidirectional, direct, and bidirectional, or indirect through various pathways, but the consequences are not transitory: developmental cascades alter the lifespan (Cicchetti & Cannon, 1999; Cicchetti & Tucker, 1994; Dodge et al., 2009; Masten, 2006).

The developmental cascade perspective has been applied by researchers to the association between externalizing and internalizing problems in childhood (e.g., Moilanen et al., 2010; Murray et al., 2020). Longitudinal studies from the US have found reciprocal longitudinal associations between internalizing and externalizing problems (e.g., Achenbach & Rescorla, 2000; Mesman et al., 2001), and cross-sectional associations with higher internalizing problems associating with higher externalizing problems within time (Achenbach & Rescorla, 2000). These longitudinal associations can impact different areas of children's social and emotional functioning.

The conceptualization of a developmental cascade of internalizing and externalizing problems and associations with childhood bullying and victimization assumes that success or failure within one developmental domain can impact future success or failure through other salient domains (Masten & Cicchetti, 2010). Within this process, the key to identifying the developmental pathways that lead to bullying and victimization in children is to analyze how children internalize and externalize their behaviors across time and to identify how this can help individuals avoid maladaptive social outcomes in early childhood and across the lifespan (Farmer et al., 2015). Having greater control over their problematic behaviors can help children to promote well-being, especially in schools where bullying and victimization are prevalent, which is true of Irish primary schools (e.g., Foody et al., 2017). In comparison, having little control over their own problem behaviors can be a risk factor for the

development of personal and social skills in early and late adolescence (e.g., Callaghan et al., 2019; D'Urso et al., 2021). Therefore, it is important to study how this process unfolds across development stages and by using a cascade perspective to identify a satisfactory pathway toward avoiding bullying and victimization.

In Ireland, already the developmental cascade perspective has been applied to study adaptive and maladaptive outcomes in the early phases of the life cycle (Neville et al., 2021). Here, the authors examined the longitudinal relations between internalizing and externalizing problems and screen time using the same dataset as the current study (Growing Up in Ireland infant cohort; Neville et al., 2021). They modeled the associations between each problem behavior and screen time across the five waves of data. Associations between the overall growth of externalizing/internalizing problems and screen time were positive, with additional cross-lagged pathways from earlier internalizing problems to later screen time use, suggesting that internalizing problems are especially influential in the development of screen time usage across childhood (Neville et al., 2021). However, this analysis did not account for potential confounding factors for example, socioeconomic status and gender, meaning that the observed associations could have resulted from the influence of a third, unmeasured variable.

One mechanism of association between internalizing problems with earlier externalizing problems is proposed by Patterson and Capaldi (1990), who hypothesized that children with externalizing problems could be more likely to have depressive symptoms since their behavioral problems would interfere with various developmental milestones. Examples of developmental milestones include those concerning social skills necessary to have good relationships with peers or emotional skills useful for manage stressful situations.

The current study builds on this work by further establishing the reciprocal relations between internalizing and externalizing problems across time, in relation to the outcomes of bullying and victimization. Furthermore, we establish the role of gender in these developmental pathways. Understanding gender differences and similarities in the developmental pathways of internalizing and externalizing problems is important for the advancement of effective assessment and treatment methods, as well as the development of comprehensive etiological models to explain children's mental functions (Rutter et al., 2003).

Internalizing and externalizing problems, and bullying and victimization

Bullying among school children is a form of relational and interpersonal violence based on the abuse of power. This power can come from physical strength (e.g., resulting from relative size, strength) and mental domination (Salmivalli & Peets, 2018). Children are victimized when they are repeatedly and consistently exposed to negative actions of one or more stronger subjects, thus creating an imbalance of power (Olweus et al., 2019). Bullying and victimization experiences have consistently been demonstrated to peak in middle childhood, a developmental stage during which children spend increasing amounts of time with their peers (Ghoul et al., 2013). Several studies have highlighted how internalizing and externalizing problems can be risk factors connected with bullying for boys as well as girls (Arseneault et al., 2010; Coelho & Romão, 2018; D'Urso et al., 2020; Schultze-Krumbholz et al., 2012). Internalizing and externalizing problems can lead to frustration and isolation which can translate in the course of childhood development into aggressive behavior toward peers as children use violence as a maladaptive way of managing their mental states (Girard et al., 2019).

Victimization can be considered as a traumatic event and may have significant impacts on social development (Pace et al., 2020). Many studies have highlight how internalizing problems can increase the risk of victimization throughout the life cycle (Reijntjes, Kamphuis et al., 2010, Reijntjes et al., 2011; Van der Wal et al., 2003; Yen et al., 2013; Zhang et al., 2019). Following the perspective of risk factors, internalizing and externalizing behaviors may affect the mental states of children as well as formulate deficits related to the management of emotions (Di Blasio, 2005; Grumi et al., 2017). These problems can increase children's emotional fragility and decrease their ability to cope with repeated episodes of victimization (D'Urso et al., 2021).

Regarding gender, it is unclear whether victimization and bullying can result from internalizing as well as externalizing problems among boys and girls separately. Several studies have showed stronger relationship between victimization and internalization problems for girls compared to boys (Kim et al., 2005; Van der Wal et al., 2003; Yen et al., 2013). However, the results for differential mental health outcomes, as a function of gender, have been mixed (Kaltiala-Heino et al., 2010).

The current study

The current study aims to explore the longitudinal reciprocal relations between internalizing and externalizing disorders, using a developmental cascades perspective (Masten & Cicchetti, 2010). Furthermore, the study examines the relations between internalizing and externalizing problems and bullying, situated as an outcome of this longitudinal process. Extending the literature, the study also situates this longitudinal process in the context of children's cognitive ability, socioeconomic status, and parental stress. Using these variables as controls means that the observed longitudinal associations between study variables in the models are less likely to be attributable to unmeasured factors. We also examined the impact of gender on the developmental process, given that there are commonly observed gender differences in internalizing and externalizing behaviors in childhood (Kaltiala-Heino et al., 2010).

The aims are operationalized as two research questions (RQs). First, RQ1 asks how internalizing and externalizing problems relate to each other developmentally what course they have for boys and girls? The rationale for RQ1 is to identify the cascades in a new cultural (Irish) sample since results on the strength of the reciprocal relations and subsequent direction of the cascade have been mixed in studies (Murray et al., 2020). Second, RQ2 inquires as to how internalizing and externalizing problems are connected with victimization and bullying for boys and girls? The rationale for RQ2 is to identify which kind of risk factors connect with bullying and victimization over time. Internalizing and externalizing behaviors may cause or trigger frustration which can turn into victimization and bullying depending on how the adolescent experiences/interprets their socio-emotional experiences across their life span (Schultze-Krumbholz et al., 2012).

Method

Participants

The Growing Up in Ireland (GUI) study is a multi-informant, longitudinal, nationally representative cohort study. In the GUI, children, primary caregivers, school principals, and teachers, were surveyed across time using home interviews for children and caregivers, and postal surveys for principals and teachers. Data collection for the Infant Cohort started in 2008 with approximately 11,000 9-month-olds and their families. Follow-up waves were completed when the children were aged 3-years, 5-years, 7/8 years and 9-years old. All five waves of data were included in this study.

The children of the Infant Cohort were born between 1st December 2007 and 30th June 2008. All were aged 9 months at the time of the first data collection between September 2008 and April 2009. Data collection for the second wave at age 3 years took place between December 2010 and July 2011. The third wave of data collection took place between March and September 2013, when the cohort were 5 years of age. The current fourth wave of data collection, a postal questionnaire, took place in the spring of 2016, when the cohort was 7/8 years of age. The current fifth wave of data collection, took place in between June 2017 and February 2018, when the cohort was 9 years of age. At this age, the samples were in primary schools. The individual children were randomly sampled within those schools to represent the broader population of same aged children in Ireland. School principals acted as gatekeepers for the consent process. Consent/assent to participate was collected from all participants in the study (parents, children, school principals, and teachers).

The recruited samples were representative of the broader Irish population at 9 months and at the subsequent waves. Below we report on the sample characteristics at the age of 9 months (Williams et al., 2009). The total sample used is composed of 11,134 participants (50.6% male). Most of the child participants were born in Ireland (99%) and had Irish citizenship (95.3%). At Wave 5, approximately, 37% of children reported victimization episodes, and 14% reported being bullied.

The primary caregivers interviewed for the study were mostly female (99.7%). Moreover, 73.5% were born in Ireland and 80.5% had Irish citizenship at the time of interview. The religion declared by most primary caregivers was Christian-catholic (97.0%). Regarding educational level, 30.9% of mothers had completed primary level education, 50.5% had completed secondary education, and 18.6% had completed tertiary education. A similar proportion of fathers had completed primary level education (34.4%), secondary education (48.5%) and tertiary education (17.1%). The average family income average was € 21,464.

Measures

Gender
This variable was coded as female (1) and male (2) for the current analysis.

Socioeconomic status
We used three items from the parent questionnaires to represent family socioeconomic status at the start of the developmental process: father and mother educational level (from 1 = no formal education to 13 = doctorate) and family income (from 1 = < 6702.3695 to 8 = > 43,718.8442) collected at Wave 1.

Parental stress
The Parental Stress Scale (PSS; Berry & Jones, 1995) is a self-report scale used to assess both the positive and negative aspects of parenthood. It comprises 18 items that measure parental stress across the domains of rewards (6 items), stressors (6 items), loss of control (3 items), and satisfaction (3 items). Example items include "I enjoy spending time with my children" (rewards), "The major source of stress in my life is my child(ren)" (stressors), "I feel overwhelmed by the responsibility of being a parent" (loss of control), and "I am happy in my role as a parent" (satisfaction). Response options range from strongly disagree (scored as 1) to strongly agree (5). Higher scores indicate more parental stress.

For the current study we used the parental stressors scale scores ($\alpha = 0.70$). The sum scores range from 18 to 90; higher scores indicate more parental stress. These data were collected at wave 1.

Cognitive abilities
The Picture Similarities and Naming Vocabulary scales from the British Abilities Scales (Elliott et al., 1997) are standardized cognitive tests which were administered directly by the interviewer, in the home, measuring reasoning/problem solving and vocabulary respectively. In addition, the interviewer asked the child to demonstrate gross and fine motor skills by standing on one leg, throwing a ball overhand, and copying a vertical line drawn by the parent. Higher t scores indicate more developed skills. In terms of reliability, Elliott et al. (1997) report coefficient alphas of .78 and .86 for the Naming Vocabulary test for children aged 2:6–2:11, 3:0–3:5 years respectively. The corresponding alphas for the Picture Similarities test were .87 and .82 for the respective age bands. The alpha for the Picture Similarities test is .75 and for the Naming Vocabulary is .74. These data were collected at Wave 2.

Internalizing and externalizing problems
The Strengths and Difficulties Questionnaire (SDQ; Goodman, 2001) is a brief behavioral screening self-report questionnaire for 3–16-year-old children. There are 3 versions: teacher-report, parent-report, and child-report. In the present study we used the parent-report version. Parents are asked to consider the child's behavior over the last six months of the current school year. The SDQ has 25-items and five subscales: emotional problems (e.g., often complains of headaches, stomach-aches or

sickness), peer problems (e.g., rather solitary, prefers to play alone), conduct problems (e.g., lies or cheats) hyperactivity (e.g., constantly fidgeting or squirming) and prosocial behavior (e.g., often volunteers to help others (parents, teachers, other children). Each scale comprises five questions with 3-point response scales (1 = "not true" to 3 = "certainly true"). Scores on four of the five subscales can be combined to create externalizing (conduct problems and hyperactivity) and internalizing (emotional and peer problems) categories, which have been recommended for use in research with community samples (Goodman et al., 2010). A previous study with GUI data suggested a good reliability for the subscales (Nixon, 2021). The Cronbach alphas for internalizing problems ranged from .60 to 72 across the waves. The Cronbach alphas for externalizing problems ranged from .61 to 75 across the waves. These data were collected at Waves 2, 3, 4, and 5.

School disadvantage (DEIS)

Schools with a high proportion of low-income students in Ireland are given the government classification of Delivering Equality of Opportunity in Schools (DEIS). In Wave 5, school principals were asked "Does your school take part in the DEIS Support Program?" Participant responded using a dichotomous scale of yes (1) and no (0).

Victimization

Victimization was measured using a 5-point Likert scale, ranging from never having picked on over the last year (0) to having picked on over the last year almost every day (4). Two variables were merged to create the victimization variable: (i) a dichotomous scale of whether children had every being bullied by someone, and (ii) a 4-point scale of how often they had been bullied by someone for children who replied yes to the dichotomous scale.

Bullying

Bullying was measured using a 4-point Likert scale, ranging from never having picked on someone over the last year (0) to having picked on someone over the last year almost every day (4). Two variables were merged to create the bullying variable: (i) a dichotomous scale of whether children had ever bullied someone, and (ii) a 4-point scale of how often they had bullied someone for children who replied yes to the dichotomous scale.

Descriptive statistics are show in Table 1.

Table 1. Descriptive statistics.

Variable	M	SD
Parental stress (wave 1)	14.67	4.10
Cognitive abilities-Picture Similarity (wave 2)	53.12	10.20
Cognitive abilities-Name Vocabulary (wave 2)	50.90	12.87
Social advantage	5.77	2.03
Externalization problems (wave 2)	2.65	1.66
Internalization problems (wave 2)	1.30	1.10
Externalization problems (wave 3)	2.35	1.67
Internalization problems (wave 3)	1.23	1.20
Externalization problems (wave 4)	2.10	1.20
Internalization problems (wave 4)	1.50	1.63
Externalization problems (wave 5)	1.97	1.64
Internalization problems (wave 5)	1.41	1.40
Bullying (wave 5)	0.13	0.39
Victimization (wave 5)	0.71	1.10
	Percentages	
School Disadvantage (DEIS)	17.3%	
Female	49.6%	

Missing data

Missing data within waves increased across time. In Wave 5, 3803 cases had some missing data (34%). Little's MCAR was significant for the set of Waves 5 variables, $\chi^2(11) = 333.74$, $p = .000$, indicating that the data were not missing completely at random. Given that there was almost complete data on Wave 1, 2, 3 and 4, analysis of missing data was conducted on Waves 5 through an attrition analysis only.

A binary logistic regression model was used to test whether having any missing cases at Wave 5 (1 = yes, 0 = no) was systematically related to child gender, parental stress, family income, mother educational level and father educational level. The model was significant, $\chi^2(4) = 33.37$, $p = < .001$, with only family income significantly predicting missingness ($b = .78$; $p < .001$).

Analysis plan

Preliminarily, we conducted a correlation analysis in SPSS version 26 to identify the network of associations between the study variables (Table 2). For the main analysis we computed a multigroup structural equation model (SEM) in Mplus version 8.1, using the grouping variable of gender. In the model (with main types of pathways represented in Figure 1), to answer RQ1, we associated the internalizing and externalizing problem variables with each other using cross-lagged regression, controlling for parental stress, socioeconomic status, and cognitive ability. Within the same model, to answer RQ2, we regressed bullying and victimization at Wave 5 on internalizing and externalizing problems at Wave 5, controlling for parental stress, socioeconomic status, cognitive ability, and school social disadvantage. To ensure that the results were statistically representative to the population, we applied the weighting variable from Wave 1 of the GUI in the variable command of Mplus.

Results

SEM fit

Model-fit statistics indicated that the SEM fit the data well, with a root mean square error of approximation (RMSEA) of .05, and a comparative fit index (CFI) of .90. The chi-square test of model fit was significant, $\chi^2(125) = 10,371.12$, $p = < .001$, likely owing in part to the large sample size. The three items modeled to represent socioeconomic status all loaded onto their respective latent variable at .63 ($p = < .001$) or above for boys and at .30 ($p = < .001$) or above, for girls. Because of the large sample size, many of the test results were small but significant. In the text, we focus on explaining the test results that were a standardized beta weight of .05 or above. All these test statistics of $b < .49$ were statistically representative to the wider population of children, as indicated by significant tests of probability.

Predictors of internalizing problems across waves for boys

As displayed in Table 3, boys' internalizing problems were related to parental stress at Waves 2 ($b = 0.17$, $p < .001$), 3 ($b = 0.08$, $p < .01$), and 5 ($b = 0.08$, p < .01). Internalizing problems were also related to socioeconomic status at Waves 2 ($b = -0.16$, $p < .001$), 3 ($b = -0.13$, $p < .001$), and 4 ($b = -0.10$, p < .01). Boys' internalizing problems were related to cognitive ability (naming vocabulary) at Wave 2 only ($b = -0.06$, $p < .05$). Across all waves of available data, internalizing problems were connected to earlier externalizing problems (Wave 3: $b = 0.08$, $p < .01$; Wave 4: $b = 0.15$, p < .001; Wave 5: $b = 0.12$, p < .001) and to earlier internalizing problems (Wave 3: $b = 0.40$, $p < .001$; Wave 4: $b = 0.40$, p < .001; Wave 5: $b = 0.60$, $p < .001$).

Table 2. Correlations among variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Victimization	1															
2. Bullying	.260**	1														
3. Female vs. male	−.031**	−.080***	1													
4. Parental stress	.015	.022	−.021	1												
5. Cognitive abilities NV	−.013	−.043**	.138**	−.054**	1											
6. Cognitive abilities PS	.023	.013	.094**	−.057**	.401***	1										
7. Externalizing problems (wave 2)	.050***	.021	−.105***	.191***	−.133***	−.150***	1									
8. Internalizing problems (wave 2)	.052***	.019	−.051**	.158***	−.112***	−.115***	.333***	1								
9. Externalizing problems (wave 3)	.098***	.043**	−.151***	.167***	−.126***	−.108***	.545***	.228***	1							
10. Internalizing problems (wave 3)	.051***	.035**	−.025	.160***	−.092***	−.082***	.244***	.438**	.350***	1						
11. Externalizing problems (wave 4)	.119***	.096***	−.187***	.125***	−.101***	−.115***	.422***	.165***	.575***	.246***	1					
12. Internalizing problems (wave 4)	.122***	.061***	−.035**	.138***	−.100***	−.084***	.231***	.321***	.275***	.447***	.448***	1				
13. Externalizing problems (wave 5)	.143***	.098***	−.195***	.149***	−.123**	−.126**	.421**	.169**	.598***	.258***	.719***	.335***	1			
14. Internalizing problems (wave 5)	.176***	.065**	−.025	.150**	−.094***	−.069***	.259***	.323***	.309***	.475***	.361***	.631***	.423***	1		
15. School Social Disadvantage	.011	.005	.004	.030**	−.028*	−.074***	.064**	.067***	.057***	.069***	.045***	.074**	.044***	.066***	1	
16. Social Advantage	−0.57***	0.20	.007	−0.40***	.120***	.179***	−176***	−.130***	−.168***	−.111***	−.142***	−.153***	−.131***	−.129***	−.217***	1

Note: * *p* <. 05, ** *p* <. 05, *** *p* < .001
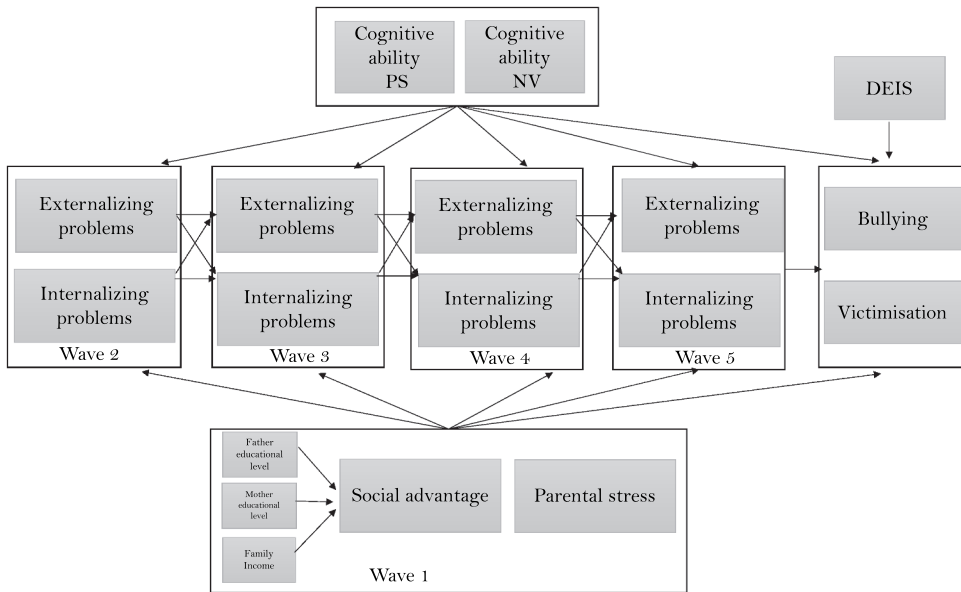
Figure 1. Developmental model.

Table 3. Internalizing problems for boys.

Predictor	Wave 2	Wave 3	Wave 4	Wave 5
Parental stress	0.17 (0.02)***	0.08 (0.02)**	0.03 (0.02)	0.08 (0.02)**
Social advantage	−0.16 (0.03)***	−0.13 (0.03)***	−0.10 (0.04)**	−0.05(0.03)
Cognitive ability (Picture Similarities)	−0.04 (0.02)	−0.05 (0.03)	−0.02 (0.02)	−0.02 (0.02)
Cognitive ability (Naming Vocabulary)	−0.06 (0.02)*	−0.02 (0.02)	−0.02 (0.02)	−0.01 (0.02)
Externalizing Problems (wave 2)		0.08 (0.02)**		
Internalizing Problems (wave 2)		0.40 (0.02)***		
Externalizing Problems (wave 3)			0.15 (0.02)***	
Internalizing Problems (wave 3)			0.40 (0.03)***	
Externalizing Problems (wave 4)				0.12 (0.02)***
Internalizing Problems (wave 4)				0.60 (0.02)***

Note: *$p < .05$ ** $p < .01$ *** $p < .001$

Predictors of externalizing problems across waves for boys

Boys' externalizing problems were predicted by parental stress at Waves 2 ($b = 0.15$, p < .001) and 3 ($b = 0.06$, p < .01), and by socioeconomic status at Waves 2 ($b = −0.20$, p < .001) and 3 ($b = −0.10$, p < .01). Externalizing problems were also predicted by cognitive ability at Wave 2 (naming vocabulary: $b = −0.09$, p < .01; picture similarities: $b = −0.20$, p < .001). Boys' externalizing problems were predicted by earlier externalizing problems across all waves (Wave 3: $b = 0.50$, p < .001; Wave 4: $b = 0.60$, p < .001; Wave 5: $b = 0.70$, p < .001) but were only predicted by internalizing problems at Wave 4 ($b = 0.06$, p < .01). The beta weights their significance for these pathways are displayed in Table 4.

Table 4. Externalizing problems for boys.

Predictor	Wave 2	Wave 3	Wave 4	Wave 5
Parental stress	0.15 (0.03)***	0.06 (0.02)**	0.03 (0.02)	0.02 (0.02)
Social advantage	−0.20 (0.03)***	−0.10 (0.03)**	−0.04 (0.03)	−0.05(0.04)
Cognitive ability (Picture Similarities)	−0.11 (0.02)***	−0.03 (0.03)	−0.03 (0.02)	−0.02 (0.02)
Cognitive ability (Naming Vocabulary)	−0.09 (0.02)**	−0.02 (0.02)	−0.02 (0.02)	−0.04 (0.02)
Externalizing Problems (wave 2)		0.50 (0.02)***		
Internalizing Problems (wave 2)		0.02 (0.02)		
Externalizing Problems (wave 3)			0.60 (0.02)***	
Internalizing Problems (wave 3)			0.06 (0.02)**	
Externalizing Problems (wave 4)				0.70 (0.01)***
Internalizing Problems (wave 4)				0.03 (0.02)

Note: *$p < .05$ ** $p < .01$ *** $p < .001$

Predictors of bullying and victimization for boys

Bullying for boys was predicted by externalizing problems at wave 5 ($b = 0.07$, p < .001), cognitive abilities: picture similarities ($b = 0.08$, p < .05) and naming vocabulary ($b = −0.08$, p < .01), as displayed in Table 5. Boys' reports of victimization were predicted by externalizing problems ($b = 0.15$, p < .001) and internalizing problems ($b = 0.12$, $p < .001$) at wave 5.

Predictors of internalizing problems across waves for girls

Girls' internalizing problems were predicted across all waves by socioeconomic status (Wave 2: $b = −0.40$, $p < .001$; Wave 3: $b = −0.50$, $p < .001$; Wave 4: $b = − 0.60$, $p < .001$; Wave 5: $b = −0.60$, $p < .001$), unlike for boys. These results are displayed in Table 6. Also dissimilarly to boys, there was no impact of parental stress on girls' internalizing problems. Girls' internalizing problems were predicted by cognitive ability (picture similarities) at Waves 2 ($b = − 0.08$, $p < .01$); 3 ($b = − 0.05$, $p < .05$), and 4 ($b = − 0.07$, $p < .01$). Their internalizing problems were also predicted by earlier internalizing problems across waves (Wave 3: $b = 0.30$, $p < .001$; Wave 4: $b = 0.18$, $p < .001$; Wave 5: $b = 0.40$, $p < .001$). Interestingly their internalizing problems had a negative association with earlier externalizing problems across waves (Wave 3: $b = −0.13$, $p < .001$; Wave 4: $b = −0.25$, $p < .001$; Wave 5: $b = −0.30$, $p < .001$), whereas this association was positive for boys. In other words, having higher externalizing problems for girls predicted subsequent lower internalizing problems.

Predictors of externalizing problems across waves for girls

Girls' externalizing problems were predicted by parental stress at Wave 2 only ($b = 0.11$, $p < .05$) and had no associations with cognitive abilities. Similar to their internalizing problems, girls' externalizing problems were predicted across waves by socioeconomic status (Wave 2: $b = −0.47$, $p < .001$; Wave 3:

Table 5. Bullying and victimization at wave 5 for boys.

Predictor	Bullying	Victimization
Externalizing Problems (wave 5)	0.07 (0.04)*	0.15 (0.01)***
Internalizing Problems (wave 5)	0.04 (0.02)	0.12 (0.02)***
School disadvantage	−0.01 (0.02)	−0.01 (0.03)
Cognitive ability (Picture Similarities)	0.08 (0.03)*	0.02 (0.03)
Cognitive ability (Naming Vocabulary)	−0.08 (0.02)**	−0.01 (0.03)
Parental Stress	−0.02 (0.03)	−0.03 (0.02)
Social advantage	−0.05 (0.04)	0.01 (0.02)

Note: *$p < .05$ ** $p < .01$ *** $p < .001$

Table 6. Internalizing problems for girls.

Predictor	Wave 2	Wave 3	Wave 4	Wave 5
Parental stress	0.11 (0.04)	0.08 (0.03)	0.04 (0.06)	0.06 (0.06)
Social advantage	−0.40 (0.02)***	−0.50 (0.04)***	−0.60 (0.07)***	−0.60 (0.07)***
Cognitive ability (Picture Similarities)	−0.08 (0.02)**	−0.05 (0.02)*	−0.07 (0.03)**	−0.04 (0.03)
Cognitive ability (Naming Vocabulary)	0.01 (0.03)	0.02 (0.02)	0.01 (0.02)	0.01 (0.03)
Externalizing Problems (wave 2)		−0.13 (0.02)***		
Internalizing Problems (wave 2)		0.30 (0.02)***		
Externalizing Problems (wave 3)			−0.25 (0.04)***	
Internalizing Problems (wave 3)			0.18 (0.05)***	
Externalizing Problems (wave 4)				−0.30 (0.06)***
Internalizing Problems (wave 4)				0.40 (0.05)***

Note: *p < .05 ** p < .01 *** p < .001

$b = -0.50$, $p < .001$; Wave 4: $b = -0.70$, $p < .001$; Wave 5: $b = -0.70$, $p < .001$). There was also a positive impact of earlier externalizing problems on later externalizing problems across waves (Wave 2: $b = 0.30$, $p < .001$; Wave 3: $b = -0.17$, $p < .001$; Wave 4: $b = 0.30$, $p < .001$), and a negative impact of earlier internalizing problems across waves (Wave 2: $b = - 0.08$, $p < .01$; Wave 3: $b = -0.12$, $p < .05$; Wave 4: $b = -0.25$, $p < .001$). These results are displayed in Table 7.

Predictors of bullying and victimization for girls

As displayed in Table 8, for girls, bullying others was negatively associated with cognitive ability – picture similarities ($b = -0.09$, $p < .01$), but not with externalizing or internalizing problems. Being victimized was positive associated with externalizing problems ($b = 0.11$, $p < .01$) and internalizing problems ($b = 0.14$, $p < .01$) at Wave 5.

Discussion

The study examined, in line with a developmental cascade perspective (Lin et al., 2020), how internalizing and externalizing problems were connected to each other across infancy and childhood, in an Irish nationally representative sample. The impact of these pathways on bullying and victimization in middle childhood was also investigated. This study substantially highlights how the developmental cascade perspective can be applied to the study of youth deviance and victimization, also considering family and cognitive aspects that can influence the child across the lifespan, and the key

Table 7. Externalizing problems for girls.

Predictor	Wave 2	Wave 3	Wave 4	Wave 5
Parental stress	0.11 (0.04)*	0.05 (0.05)	0.02 (0.06)	0.06 (0.03)
Social advantage	−0.47 (0.03)***	−0.50 (0.04)***	−0.70 (0.7)***	−0.70 (0.6)***
Cognitive ability (Picture Similarities)	−0.04 (0.02)	−0.04 (0.02)	−0.04 (0.03)	−0.04 (0.03)
Cognitive ability (Naming Vocabulary)	−0.05 (0.02)	0.00 (0.02)	−0.02 (0.03)	0.01 (0.03)
Externalizing Problems (wave 2)		0.30 (0.03)***		
Internalizing Problems (wave 2)		−0.08(0.02)**		
Externalizing Problems (wave 3)			0.12 (0.06)*	
Internalizing Problems (wave 3)			−0.17 (0.04)***	
Externalizing Problems (wave 4)				0.30 (0.6)***
Internalizing Problems (wave 4)				−0.25 (0.05)***

Note: *p < .05 ** p < .01 *** p < .001

Table 8. Bullying and victimization at wave 5 for girls.

Predictor	Bullying	Victimization
Externalizing Problems (wave 5)	0.05 (0.06)	0.11 (0.05)**
Internalizing Problems (wave 5)	0.00 (0.05)	0.14 (0.04)**
School disadvantage	−0.01 (0.02)	−0.03 (0.02)
Cognitive ability (Picture Similarities)	0.01 (0.02)	−0.01 (0.03)
Cognitive ability (Naming Vocabulary)	−0.09 (0.02)**	0.00 (0.03)
Parental Stress	−0.02 (0.03)	−0.04 (0.03)
Social advantage	−0.05 (0.04)	0.01 (0.02)

Note: *$p < .05$ ** $p < .01$ *** $p < .001$

role of the child's gender during development. In this sense, gender and internalizing and externalizing problems may be configured as risk factors during development in a cumulative way in relation to youth deviance and victimization. The analyses accounted for childhood socioeconomic status, parental stress, and childhood cognitive ability, and the pathways were modeled separately for boys and girls to investigate the potential salience of gender.

Using longitudinal structural equation models, we found similarities across gender; that cognitive ability in early childhood predicted bullying others in middle childhood, that internalizing and externalizing problems predicted being victimized in middle childhood, and that socioeconomic status in infancy predicted internalizing and externalizing problems in early childhood. However, for girls, socioeconomic status had a longer-term impact, predicting internalizing and externalizing problems into middle childhood. Another unique finding for girls was that higher levels of externalizing problems predicted lower levels of internalizing problems across time. These findings are discussed below, beginning with an examination of the developmental cascades.

Extending previous studies, we found that the longitudinal reciprocal relations of internalizing and externalizing problems followed a different pathway for boys and girls. A key finding was that girls' internalizing problems negatively predicted their externalizing problems across childhood however this did not happen for boys. Boys' internalizing problems positively predicted their externalizing problems across time. These results highlight two different scenarios for the functioning of internalizing and externalizing problems between boys and girls. Boys' internalizing and externalizing problems appeared to mutually reinforce each other over time. In girls, however, the trend of the two types of problems was opposite: if they suffered from internalizing problems, they had reduced externalizing problems. This finding underlines the complexity of the trend of problematic behaviors between boys and girls in a developmental cascade perspective (Masten & Cicchetti, 2010). In male children, problems of an internalizing nature can translate into problems of an externalizing nature, probably because they are not able to adequately monitor their own behaviors. The frustration associated with the difficulty of managing internalizing problems can lead to externalizing behaviors that represent a maladaptive outcome of a dysfunctional process (e.g., Bayer et al., 2012).

We also found that, in line with previous findings that used developmental cascade perspective (Flouri et al., 2010), socioeconomic status was connected to internalizing and externalizing problems. A notable contribution of our analysis was that socioeconomic status was a stronger predictor of internalizing and externalizing problems for girls across time, compared to boys. This finding suggests that girls possibly are more sensitive to the impact of family socioeconomic strain than boys, in line with their sensitivity to family relational context (e.g., Sourander & Helstelä, 2005; Vahedi et al., 2018). This finding was independent of the impact of parental stress on internalizing and externalizing problems, indicating that there was something particular about the parental educational levels and family income, over and above associated parental stress, that had a particular influence for girls.

Another key result was that both boys and girls were more likely to be victimized if they had higher levels of internalizing and externalizing problems (Schultze-Krumbholz et al., 2012). Internalizing problems can represent a risk factor that hinders children from effectively coping with victimization if

the children do not have sufficient emotional skills to manage and control the situation or leave the situation. Externalizing problems can also predict victimization at school (Sampasa-Kanyinga et al., 2020), when aggression and socio-relational difficulties act as risk factors, leading other peers to exclude children with these problematic behaviors.

We also found that boys and girls bullied others more if they had lower vocabulary ability in early childhood (e.g., Jenkins et al., 2017). This result suggests that deficiencies in communicative cognitive skills can make children more vulnerable since they have probably not yet developed an adequate social and cognitive structure that allows them to adequately manage relationships with peers at primary school.

This study highlights how gender plays a central role in shaping the developmental cascade of internalizing and externalizing behaviors, and how this cascade is related to bullying and victimization. In the Irish socio-cultural context, male children might be more inclined to externalize their experiences and consequently socially affirm the power and strength that is stereotypically connected to the male gender (Adshead, 2022). On the contrary, girls who tend to internalize experiences related to themselves and others are also more prone to be victims because they remain stuck in a vicious circle that leads them not to act, despite the frustration experienced due to problematic conditions, or the experiences considered as such, during development. Gender socialization can therefore affect children's future behaviors and sometimes appear as a risk (e.g., Solbes-Canales et al., 2020).

Limitations

Despite the strengths of this study, some limitations should also be considered when interpreting the results. First, the use of self-report questionnaires is subject to social desirability effects. Future studies could investigate the same research questions using peer nominations to get more accurate information on bullying and victimization (Almeida et al., 2021). Second, it is possible that the effects of variables on outcomes are overestimated or underestimated. This risk is created through measurement decisions and contextual factors relating to implementation, meaning that replicas of the same study with different tools, informants and sample could achieve slightly different models. This is a different type of risk from modeling inaccuracy that generates a causal error. Another limitation regards measuring bullying and victimization with a nonspecific questionnaire but with the tool provided by Growing up in Ireland. Models generated using secondary data are always subject to the limitation of using the available data, rather than being able to plan at the outset how variables will be measured. Having shorter or single measures is typical, because nationally representative longitudinal studies as Growing Up in Ireland (e.g., Growing Up in Scotland and the Millennium Cohort Study) are created to evaluate the highest number of factors for scientific and political purposes. The use of brief measures is often favored over longer measures, to create the maximum possible value of the cohort study for policy and research stakeholders. When using secondary data analysis, researchers should evaluate these measurement limitations against the strengths of using large-scale, nationally representative data sets for identifying robust patterns of child functioning within populations. In addition, information about family structure (including examination of single parent families, and siblings) could be used in future studies, along with gender, to further examine how different social experiences impact the developmental cascade of internalizing and externalizing behaviors across childhood and adolescence. Studying gender, youth violence, and developmental cascades of internalizing and externalizing problems across the lifespan should yield information that can be used to improve the educational school system and avoid the dysfunctional social and relational problems that occur in young adulthood among men and women.

Conclusions

Using a large-scale nationally representative sample, the study identified that bullying and victimization connected to a longitudinal reciprocal process of internalizing and externalizing problems that develops from infancy, as well as to cognitive functioning in early childhood. This work highlighted the fragility of the cultural and socio- relational system, and, consequently, those individual and social factors which are useful for including in individual and group clinical and prevention work. The Irish policy context for anti-bullying in schools in Ireland centers around the Department for Education's 2013 anti-bullying programme: Anti-Bullying Procedures for Primary And Post-Primary Schools that focuses on the consequences of bullying and building a positive school culture and climate for inclusion. Also supported by the Irish Government, The State Safe programme focuses on the consequences of bullying and the prevention of bullying, with school-based education for children on relationships, bullying, and mental health. The current study uncovers additional factors for consideration in future versions of these policies and programmes, to help prevent school- based bullying in Ireland.

This study also identified key gender differences in the influences on the development of internalizing and externalizing problems across infancy to childhood, mainly that socioeconomic status and externalizing problems operated at different intensities and in different directions for girls versus boys. The findings indicate that it is relevant to intervene in early childhood to prevent internalizing and externalizing problems from cascading and from influencing later bullying and victimization. Monitoring the child's mental health and family context is relevant to avoiding the child becoming more socio-emotionally fragile and less aware of the skills as well as protective factors that they can "exploit" to become resilient. Designing support networks and monitoring the mental health of children is a necessity so that once children move into school contexts, they have the necessary skills to be able to interact with others in a functional way, including managing themselves well in situations that could otherwise facilitate bullying and victimization.

This study also signals how past and cumulative stressful experiences related to internalized and externalizing behaviors can shape the changes in the processing of social information of children over time as a function of social experiences and behavioral adaptation (Masten & Cicchetti, 2010). Following the developmental cascade perspective, bullying and victimization are dysfunctional responses that are the result of cumulative dysfunctional behaviors. Furthermore, this modeled sequence is consistent with models of dynamical systems (e.g., Granic & Patterson, 2006), and provides a coherent evolutionary history of how violent behavior augmented in childhood in a dynamic cascade. Youth deviance involves the mutual impact of social and cognitive skills with constant interactions between the self and the environment as the child enters the classroom and early peer relationships begin to develop.

From a development in sociocultural context perspective, the research also highlights how the early risk of deviance is realized over time, and how each new period of development can entail a new risk, especially in a globalized social context. Globalization makes knowledge and opportunities available to children and adolescents grow exponentially in an increasingly confused and indecipherable framework. This kind of society can aggravate gender inequities, exacerbate social roles and models, relaunch paradigms where those who dominate prevail, and increase forms of violence (Khan, 2005; Rao & Kelleher, 2003). Therefore, externalizing and internalizing problems may be the result and spread in a globalized society because they satisfy need frustration or feed forms of aggression. In any case, this entails an enormous risk in terms of mental suffering for society itself (Salmivalli, 2018), because they undermine the protective factors, and children, not finding connections to develop resilience, vent their frustration on others and/or do not find the strength to cope with episodes of victimization (D'Urso et al., 2020).

In the complexity of today's society, the cumulative effect of internalizing and externalizing problems may also influence the perception of oneself and of others to the point of considering the other as something to be annihilated and derided. These forms of violence risk becoming the

maladaptive response to a discomfort in society that tends toward individualism and globalization by increasing and emphasizing social inequalities, exacerbating social roles through force and the abuse of power over others. In this sense, the cascade effect of externalizing dysfunctional behaviors may translate into equally dysfunctional forms relating to affirming superiority over the other. At the same time, those who have internalizing frailties sometimes do not find the strength to face future events of violence, risking becoming the target not only of others but of society itself which does not protect them. Sometimes bullies, in fact, choose fragile persons as victims (Lindsay & McPherson, 2012), whom they see as introverted, not considering – because they do not have the appropriate reflective functioning – the emotional constellation of victims lives and the internal frailties that could influence the victims' current condition. Accordingly, it is critical that we generate clear knowledge on how bullying and victimization develop during childhood and into adolescence, within sociocultural context and in relation to gender and family functioning. Although there may be some historically enduring protective and risk factors for bullying and victimization, children's lives are constantly being shaped in response to the pressures of globalization which in turn requires us to maintain a steady flow of research that can both deepen and modernize our understanding of how to intervene and prevent peer violence.

Disclosure statement

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Ethical approval

All procedures which involved human participants were performed by Growing Up in Ireland in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent

A informed consent was obtained for all participants by Growing Up in Ireland team.

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