Development of symptoms of oppositional defiant disorder from preschool to adolescence: the role of bullying victimization and emotion regulation

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Background: Childhood oppositional defiant disorder (ODD) is associated with adverse outcomes which can continue to impair life well into adulthood. Identifying modifiable etiological factors of ODD is therefore essential. Although bullying victimization and poor emotion regulation are assumed to be risk factors for the development of ODD symptoms, little research has been conducted to test this possibility. **Methods:** A sample (n = 1,042) from two birth cohorts of children in the city of Trondheim, Norway, was assessed biennially from age 4 to 14 years. Parents and children (from age 8) were assessed with clinical interviews to determine symptoms of ODD, children reported on their victimization from bullying, and teachers reported on children's emotion regulation. **Results:** Oppositional defiant disorder symptoms increased from age 4 to 6, from age 8 to 10, and then started to wane as children entered adolescence. A Random Intercept Cross-Lagged Panel Model revealed that increased emotion regulation predicted a reduced number of ODD symptoms across development (β = −.15 to −.13, p < .001). This prediction was equally strong for the angry/irritable and argumentative/defiant dimensions of ODD. No longitudinal links were observed between bullying victimization and ODD symptoms. **Conclusions:** Improving emotion regulation skills may protect against ODD symptoms throughout childhood and adolescence. **Keywords:** Bullying; emotion regulation; oppositional defiant disorder; prospective; random intercept; victimization; within-person.

Introduction

Oppositional defiant disorder (ODD) is characterized by a pattern of angry/irritable mood, argumentative/defiant behavior, or vindictiveness (American Psychiatric Association, 2013). It affects between 0.4% and 13.4% of children, with pooled prevalence ranging from 3.9% to 4.9% (Vasileva, Graf, Reinelt, Petermann, & Petermann, 2021). ODD is associated with decreased adjustment at home and school, adolescent delinquency (Christensen & Baker, 2020), later conduct disorder (Husby & Wichstrøm, 2017), and mental health difficulties in adulthood (Leadbeater, Thompson, & Gruppuso, 2012). Hence, if left unaddressed, ODD symptoms could persist and lead to severe problems with long-term costs to the person, their family, and society (Foster & Jones, 2005). Although a range of prevention programs and treatments exist for ODD and related disorders, their efficiency (Erford, Paul, Oncken, Kress, & Erford, 2014; Grove, Evans, Pastor, & Mack, 2008) and the durability of effects (Erford et al., 2014) are limited. The search for improvements in interventions should be based on etiological knowledge. Here, we examine the potential impact of two modifiable factors: emotion regulation and being a victim of bullying.

Multidimensionality of ODD symptomatology

The Diagnostic and Statistical Manual 5th edition (DSM-5; APA, 2013) conceptualizes ODD as consisting of three dimensions—angry/irritable mood (irritability), argumentative/defiant behavior (headstrongness), and vindictiveness. The number of identified factors varies between studies but always includes irritability and headstrongness (e.g., Burke et al., 2014; Ollendick, Booker, Ryan, & Greene, 2018). It is therefore viable that these two ODD dimensions have partly differing etiology (Ezpeleta, Penelo, Navarro, de la Osa, & Trepat, 2022; Stringaris & Goodman, 2009a, 2009b). Therefore, we examined whether bullying victimization and emotion regulation predict the irritability and headstrongness dimensions differently.

Bullying victimization and ODD

Firstly, because victimization forecasts negative affectivity (Evans & Smokowski, 2015), it is reasonable to assume that bullying victimization enhances the irritability dimension of ODD, as indicated in a recent study (Chen, Gardner, et al., 2022). Secondly, research shows that bullying is related to non-aggressive rule-breaking and aggressive behaviors such as bullying perpetration (Dugré, Potvin, Dellazizzo, & Dumais, 2021; Walters, 2021). It is thus plausible to assume that bullying victimization may also enhance the headstrong and vindictiveness dimensions of ODD. Moreover, a longitudinal study

(Tengesdal, 2016) also found some support for a path from bullying victimization to ODD symptoms among 6–8 years old children. However, whether these findings could be replicated when time-invariant confounding factors are accounted for is unknown.

Possibly though, the relation between bullying victimization and ODD symptoms may also working in the reverse direction. Even though displaying oppositional and defiant behaviors may deter others from bullying the child, such behaviors may also provoke interpersonal conflicts with peers and bullying victimization. In fact, ODD symptoms have been shown to concurrently predict bullying victimization and/or bullying perpetration (Fite, Evans, Cooley, & Rubens, 2014; Kokkinos & Panayiotou, 2004; Verlinden et al., 2015). However, these cross-sectional studies were not positioned to pin down the directionality. We therefore remain open to whether any unidirectional or bidirectional prospective links exist between ODD symptoms and bullying victimization.

Emotion regulation and ODD

Emotion Regulation (ER) enables individuals to monitor, evaluate, inhibit, and modify their emotional reactions to handle their internal mental states and the external world effectively (Thompson, 1994). The lack of adaptive emotion regulation skills—emotion dysregulation—has been considered to be a transdiagnostic factor in the development of internalizing and externalizing problems (Aldao, Gee, De Los Reyes, & Seager, 2016; Compas et al., 2017) and a core constituent of ODD symptomatology (Cavanagh, Quinn, Duncan, Graham, & Balbuena, 2017). Given the substantial manifestation of negative emotions in ODD, it is reasonable to assume that a child's ability to regulate emotions plays a role in ODD. First, children with difficulties regulating their emotions are more likely to evince irritability and vindictiveness (Herts, McLaughlin, & Hatzenbuehler, 2012; Yu, Goulter, & McMahon, 2021), two of the DSM-5-defined dimensions of ODD. Second, children with poor emotion regulation skills are more likely to experience high child–parent conflict (Marquis, Noroña, & Baker, 2022), which could predict the headstrongness dimension of ODD. Thus, being short of adaptive ways to deal with emotions could play an etiological role in developing ODD symptoms, a possibility we explore.

Despite the above reasoning and findings and the fact that the DSM-5-defined symptoms of ODD have a strong emotional component that points to a tenable link between emotion dysregulation and ODD, this possibility has—to the best of our knowledge—been explored in only two prospective studies with cross-lagged design. One found emotion regulation among children screened high on ODD at age 9 and 10 to be unpredictive of more ODD symptoms at age 10 and 11, respectively (Chen, He, et al., 2022). The other reported that poor emotion regulation in Grade 2 predicted more ODD symptoms in Grade 3 (Yu et al., 2021). Of note, earlier ODD symptoms were not adjusted for in this study, which may have increased the likelihood of this finding being attributable to continuity in ODD symptoms. However, in another longitudinal study with mediation analysis, affect regulation did not directly impact later ODD symptoms among adolescents (Craig, Sierra Hernanderz, Moretti, & Pepler, 2020).

Hence, the available evidence provides no clear answer to the hypothesis that poor emotion regulation predicts ODD symptoms. Given that both emotion regulation and ODD change in prevalence and form through childhood, one should remain open to the possibility that the relationship between ODD and emotion regulation also varies; thus, the above findings from the early school years may not generalize to early childhood or adolescence. Hence, although previous research lends some support to the hypothesis, the prospective link between emotion regulation and ODD symptoms has not been put to a strong test.

Within-person changes

Research on the predictive roles of victimization and emotion regulation in the development of ODD has so far asked whether those who have been victimized *more than others* or have poorer emotion regulation *than others* will have more symptoms of ODD *than others*; a between-person question. What happens to other children in the sample (between-person differences) should not impact the person in question but be reflected in the between-person population-level associations. As has been shown, traditional cross-lagged approach blends between- and within-person information, and findings from such approaches do not necessarily conform with results obtained from pure within-person analyses (Keijsers, 2016). To inform inferences on the etiology of ODD symptoms, it is essential to determine whether obtained results pertain to within-person or between-person associations, hence approaches that disentangle these sources of information are needed. Moreover, the threat from confounding factors should be considered. Nevertheless, even when a wide range of data is available and many potentially confounding variables can be accounted for, we cannot rule them all out. However, within-person analyses will, by design, adjust for all time-invariant effects of confounders (Hamaker, Kuiper, & Grasman, 2015; Orth, Clark, Donnellan, & Robins, 2021).

Developmental changes

Symptoms of ODD can be detected as early as age 2 years (Petitclerc & Tremblay, 2009), peak in middle

childhood, and then wanes from around the age of 10 (Ezpeleta et al., 2022). Moreover, the capacity for emotion regulation increases during early childhood (Blandon, Calkins, Keane, & O'Brien, 2008; Lucas-Molina, Quintanilla, Sarmento-Henrique, Babarro, & Giménez-Dasí, 2020) and middle childhood (Peisch, Dale, Parent, & Burt, 2020), but such developmental changes are not always found in adolescence (Herd, Brieant, King-Casas, & Kim-Spoon, 2022). Bullying victimization, however, shows a consistent pattern of decrease during adolescence (Sweeting, Young, West, & Der, 2006; Wendelborg, 2021). These developmental changes in prevalence make the question of whether there are also developmental changes in the effects of emotion regulation and bullying victimization on ODD symptoms a pertinent one (Aldao et al., 2016), a question of importance for when to implement which type of interventions—a hitherto unaddressed issue.

Aim of the present study

The transition from childhood into adolescence is characterized by significant changes in ODD, emotion regulation, and victimization, so research beyond middle childhood is needed. To inform treatment and preventive efforts to reduce ODD, we test the hypothesis that reduced emotion regulation and increased bullying victimization, which will predict an increased number of symptoms of ODD 2 years later throughout child development. We also examine whether increased ODD symptoms predict bullying victimization and emotion regulation but remain open to the direction of influence. Moreover, we examine the developmental changes in ODD symptoms, emotion regulation, and bullying victimization and test whether the cross-lagged relations differ between developmental periods and between two dimensions of ODD.

Methods
Participants

Data come from the Trondheim Early Secure Study (TESS; Wichstrøm et al., 2012), which has followed children from age 4–14 years with biennial assessments (Steinsbekk & Wichstrøm, 2018). Parents of all children born in Trondheim, Norway in 2003 and 2004 ($N = 3,456$) were invited. Among these, 176 families with parents with insufficient proficiency in Norwegian were excluded and 166 families were missed being asked to participate. Thus, 3,016 families were approached, and 2,477 consented (82.1%). To increase statistical power, the study oversampled for children with emotional or behavioral problems based on their scores on the Strengths and Difficulties Questionnaire (SDQ; Goodman, Ford, Simmons, Gatward, & Meltzer, 2000). Subsequently, 1,250 of the consenting families were drawn to participate in the study, and they were reassessed every second year. The details of recruitment and follow-up assessments are displayed in Figure 1.

In all, 1,042 participants provided data on at least one variable at least one time point, and thus formed the analytical

sample. The sample characteristics from Time points 1 (T1) through 6 (T6) are represented in Table 1. Retention of participants was calculated by regressing the retention status of participants (retention vs. attrition, coded 1 vs. 0) at a given assessment wave on gender and measurements made at the preceding wave. Retention at T2 was not predicted by gender or T1 variables. Retention at T3 was predicted by higher emotion regulation at T2 ($OR = 2.25$, $p = .001$); Retention at T4 was predicted by being a girl ($OR = 2.78$, $p = .021$) and less bullying victimization at T3 ($OR = 0.43$, $p = .023$); at T5 and T6 retention was not predicted by gender or T4 and T5 variables, respectively. Additionally, the retention of informants reporting on a particular variable was examined separately by regressing their retention status on the scores at the preceding wave. Retention of teachers' reports on children's emotion regulation was only predicted at T5, then by higher emotion regulation at T4 ($OR = 1.78$, $p = .021$). Retention of children's reports on their bullying victimization was only predicted at T4, then by lower bullying victimization at T3 ($OR = 0.48$, $p = .004$). Retention of parents and children's report of children's ODD symptoms was predicted at T4 by a lower number of ODD symptoms at T3 ($OR = 0.75$, $p = .003$) and at T6 by a lower number of ODD symptoms at T5 ($OR = 0.85$, $p = .030$). Even so, the combined effect of predictors of attrition was low, with Cox and Snell proxy R^2 varying between .001 and .025. The Little's Missingness Completely at Random (MCAR) test showed that the attrition was indeed not missing completely at random ($\chi^2 = 1743.14$, $df = 1,461$, $p < .001$). However, the normed test was 1.19, indicating that data was Missing at Random (MAR).

Ethical considerations

Ethical considerations and the procedures approved by the Regional Committee for Medical and Health Research Ethics were followed. Written informed consent was obtained from the parents. At age 12, children were informed directly about the study.

Measures

Symptoms of ODD, as defined by the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013) were measured biennially from age 4 to 14. The ODD symptoms were assessed by The Preschool Age Psychiatric Assessment (PAPA; Egger et al., 2006), a semi-structured parent interview shown to be a valid and reliable standardized measure of DSM-IV psychiatric symptoms in preschoolers (Egger et al., 2006). From age 8 onward, the Child and Adolescent Psychiatric Assessment (CAPA; Angold & Costello, 2000) was applied, where parents and children were interviewed separately. Similarly, CAPA has also been shown to be a valid and reliable instrument among children and adolescents (Angold & Costello, 2000). Although the PAPA and CAPA were developed to capture DSM-IV-defined diagnoses (American Psychiatric Association, 2000), both instruments ask for frequency and onset information so that they can accommodate the DSM-5 criteria of ODD. In PAPA and CAPA, the interviewer asks pre-defined questions and probes until she or he has enough information to decide whether a specific ODD symptom is present or not. An ODD symptom was considered present if reported by either the child or the parent. Blinded raters re-coded 9% of the PAPA and 15% of CAPA interview audio recordings. A sum of all eight ODD symptoms was created at each time point. Items number 1, 6, 7, and 8 were summed as a measure of angry/irritable mood (hereafter termed irritability), and items number 2, 3, 4, and 5 were summed as a measure of argumentative/defiant (hereafter termed headstrongness; Stringaris & Goodman, 2009b). Intra-class correlations indicated good inter-rater reliability for
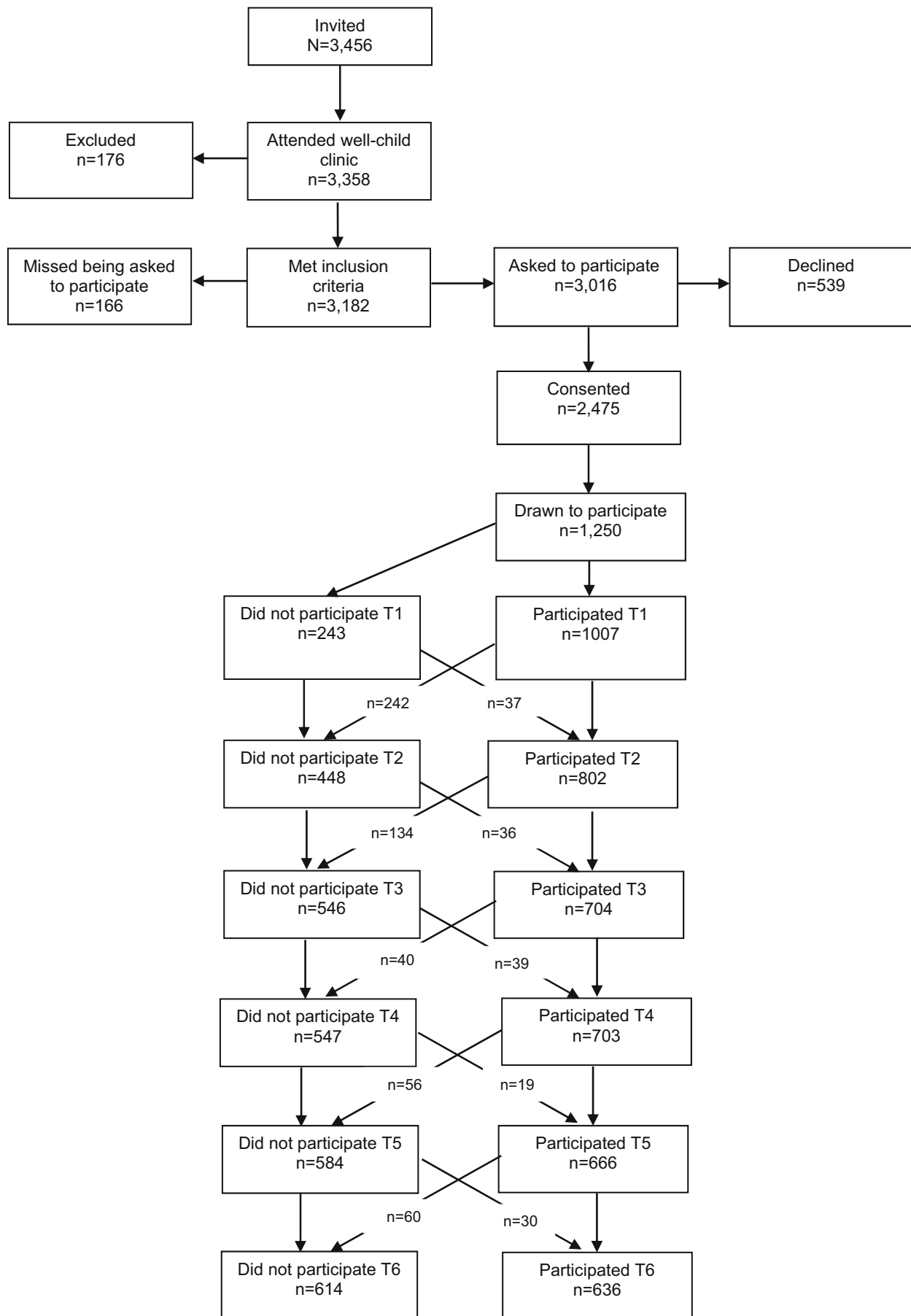
Figure 1 Flowchart of recruitment and follow-up

Table 1 Mean and standard deviation for scores on ODD symptoms, emotion regulation, and bullying victimization

Time point	T1	T2	T3	T4	T5	T6
Nominal age	4	6	8	10	12	14
Mean of age	4.4	6.7	8.8	10.5	12.5	14.4
SD of age	0.21	0.17	0.24	0.15	0.15	0.16
N	995	846	707	706	674	641
ODD symptoms						
Mean	0.90	1.18	1.19	1.39	1.15	1.07
SD	1.25	1.34	1.52	1.62	1.53	1.39
Emotion regulation						
Mean	n.a.	3.33	3.36	3.31	3.24	3.07
SD		0.44	0.44	0.44	0.48	0.51
Bullying victimization						
Mean	n.a.	n.a.	1.17	1.06	1.08	1.11
SD			0.38	0.21	0.24	0.25

*N*s vary depending on the availability of a given variable at each time point. n.a., not assessed.

the number of ODD symptoms in both PAPA (.97) and CAPA (.90; Husby & Wichstrøm, 2017).

Bullying Victimization (VIC) was reported by the children through the revised Olweus Bully Victimization Scale (Olweus, 1996) at each assessment point from age 8 to 14. The measure contains 10 items, of which 9 ask about the frequency of various types of bullying victimization, including direct and indirect aggression, social exclusion, and cyberbullying. Scores on each item range from 1 (*never*) to 5 (*every day*), and a mean score was calculated (α = .76–.84). Its validity and reliability are well-documented (Breivik & Olweus, 2015; Solberg & Olweus, 2003).

Emotion Regulation (ER) was biennially assessed by the teacher-reported Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1995) from ages 6 to 14. The ERC is a checklist derived from the original California Child Q-set (Block & Block, 1980), correlates highly with other indicators of emotion regulation and affectivity, and portrays good construct validity (Shields & Cicchetti, 1995). The questionnaire can be completed by parents, teachers, counselors, or anyone who knows the child well (Shields & Cicchetti, 1997). The ERC contains 24 items, rated along a 4-point scale ranging from 1 (*never*) to 4 (*almost always*). The ERC constitutes two subscales: Emotion Regulation (ER, 8 items) and Lability/Negativity (LN, 16 items). Because the authors judged the LN subscale to capture constructs closer to temperament, only the ER subscale was used here. The internal consistency of ER ranged from α = .64 to .74.

Analysis plan

Yearly changes between two adjacent waves of data collection were calculated using Mplus 8.5 (Muthén & Muthén, 1998–2017). To explore cross-lagged relations between emotion regulation, bullying victimization, and symptoms of ODD, a Random Intercept Cross-Lagged Panel Model (RI-CLPM; Hamaker et al., 2015) with maximum likelihood estimator (MLR) was employed. Missingness was handled according to a full information maximum likelihood procedure (FIML) under the assumption that data was missing MAR, as indicated by the attrition analyses. To adjust for the oversampling and arrive at correct and representative population estimates, population weights were included corresponding to the number of children in the population in a stratum divided by the number of children drawn to participate from that stratum.

The RI-CLPM consists of the following parts: One random intercept (time-invariant latent factor) for each of the three study variables, thus representing the person's average level

during the study period—the between-person information. The random intercepts were created with the loading to each observed variable set to 1, and they were allowed to correlate. These correlations represent the time-invariant associations at the population level (e.g., do children with better emotion regulation than others have fewer ODD symptoms than others?). One latent variable was created for each observed variable with loadings of 1 and the variance in the observed variable set to 0, thereby transferring the variance from the observed variable to its latent counterpart. In effect, the latent variables at each time point capture the change (increase or decrease) from the person's own overall mean value of the manifest scores during the study period (i.e., the random intercepts). Concurrent correlations were allowed between these latent changes. To capture prospective within-person associations, the latent changes were regressed on the changes in the study variables 2 years prior. The analytic model is depicted in Figure 2. When interpreting standardized estimates in terms of effect size, we followed recently developed guidelines for RI-CLPM, considering .03, .07, and .12 to represent small, medium, and large effects, respectively (Orth et al., 2022).

To examine age differences in predictor strengths, we examined if a series of constrained models where cross-lagged paths were set to be equal across time points would differ from those of a freely estimated model where paths were not constrained to be equal. Each group of prospective cross-lagged paths (e.g., ER to ODD, ODD to VIC), one by one, were set to be of equal strength. The model fits were compared using the Sattora-Bentler scaled chi-square test (Bryant & Satorra, 2012). This was repeated for each group of paths (e.g., all ER to ODD paths, all ODD to VIC paths), and subsequent—more constrained—models were compared to the freely estimated model. Finally, an optimal parsimonious model was reached in which the most group of paths could be fixed to be of equal strength without worsening the model fit.

To test whether the ODD dimensions of irritability and headstrongness were differently related to emotion regulation and bullying victimization across age, we compared three models to each other; (1) an unconstrained model where the relations between all four variables were estimated freely, (2) a constrained model with the maximal number of cross-lagged paths set equal across age, and (3) a constrained model where not only a maximal group of cross-lagged paths were set to be equal across age, but also paths from emotion regulation and/ or bullying victimization, to *both* irritability and headstrongness were set to be equal. The model fits of these three models were then compared to each other to examine whether the relations between emotion regulation, bullying victimization, and ODD dimensions of irritability and headstrongness are age- and dimension-dependent.

Results

Descriptive statistics for the study variables are presented in Table 1, and the yearly changes, assessed through change scores, are presented in Table 2. Symptoms of ODD increased from age 4 to 6, and 8 to 10. At ages 12 and 14, the adolescents displayed fewer symptoms of ODD than when aged 10. Emotion regulation decreased from age 8 onwards. Bullying victimization decreased from age 8 to 10 and then remained stable. Pearson's correlations between ODD symptoms, emotional regulation, and bullying victimization at each time point from age 4 to 14 is displayed in Table S1.

The freely estimated RI-CLPM, where no group of paths was set to be of equal strength, evinced a good model fit (χ^2 (51, $n = 1{,}042$) = 88.1, $p = .001$,
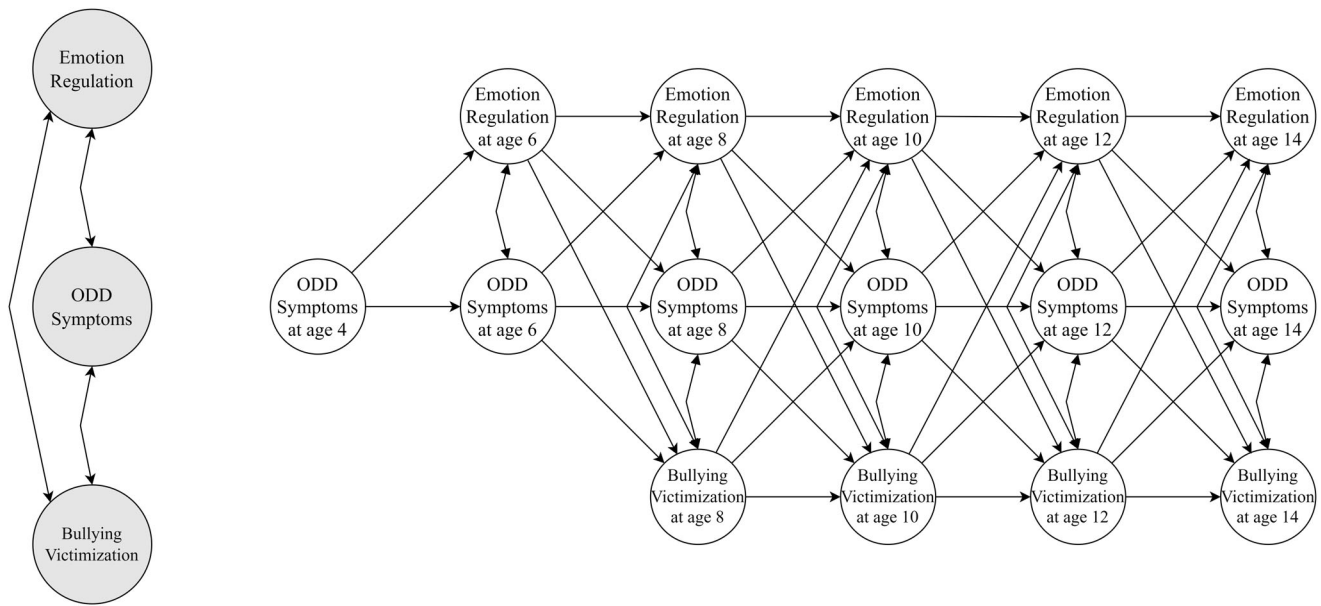
Figure 2 Analytic model displaying examined relations between random intercept estimates (bigger gray circles) and within-person estimates (smaller circles) of emotional regulation, ODD symptoms, and bullying victimization from age 4 to 14. Paths from random intercepts to their respective latent scores at each time point are examined but are not illustrated here to simplify the figure

Table 2 Yearly changes in ODD symptoms, emotion regulation, and bullying victimization

Variables		Age 4–6	Age 6–8	Age 8–10	Age 10–12	Age 12–14
ODD symptoms	Yearly change	.14	.01	.10	−.13	−.03
	SE	.034	.039	.038	.040	.041
	p	<.001	.87	.007	.002	.47
Emotion regulation	Yearly change	n.a.	.01	−.03	−.04	−.08
	SE		.012	.012	.013	.017
	p		.24	.03	.005	<.001
Bullying victimization	Yearly change	n.a.	n.a.	−.06	.01	.02
	SE			.010	.007	.009
	p			<.001	.17	.07

Yearly changes reflect unstandardized change in each respective score. n.a., not applicable.

RMSEA = 0.026, SRMR = 0.051, CFI = 0.952, TLI = 0.901). After several rounds of constraining different groups of paths and comparing their model fit to that of the freely estimated model using the Sattora-Bentler scaled chi-square test, a final parsimonious model was reached. In the final parsimonious model, all paths between ER and ODD, ER and VIC, and ODD and VIC could be fixed without any deterioration in model fit compared to the unconstrained model ($\Delta\chi^2$ ($\Delta df = 17$, $n = 1{,}042$) = 21.5, $p = .20$). The final model is depicted in Figure 3. It evinced good fit to the data (χ^2 (68, $n = 1{,}042$) = 109, $p = .001$, RMSEA = 0.024, SRMR = 0.060, CFI = 0.947, TLI = 0.917).

At the between-person level, the random intercepts of ODD symptoms and emotion regulation were modestly associated ($r = -.20$, $p = .041$), whereas ODD and bullying victimization and emotion regulation and bullying victimization were unrelated ($r = .47$, $p = .052$; $r = -.06$, $p = .77$, respectively). At the within-person level, reduced emotion regulation predicted an increased number of ODD symptoms 2 years later (Figure 3)—at all ages ($\beta = -.15$ to

−.13, $p < .001$). Changes in bullying victimization were not longitudinally related to changes in either emotion regulation or ODD symptoms. The results of RI-CLPM, where both dimensions of ODD were included showed that both irritability and headstrongness were to an equal extent predicted by emotion regulation across childhood with no significant difference between paths ($\beta = -.09$ to $-.08$, $p < .01$, see Appendix S1 and Figure S1).

Discussion

We addressed two under-researched potential factors in developing ODD symptoms, bullying victimization, and emotion regulation. We drew on a large community sample assessed biennially from age 4 to 14 years whose data were analyzed according to a within-person procedure. We hypothesized that reduced emotion regulation would predict an increased number of DSM-5-defined ODD symptoms while remaining open to both unidirectional or bidirectional links between bullying victimization and ODD symptoms. The results did indeed show
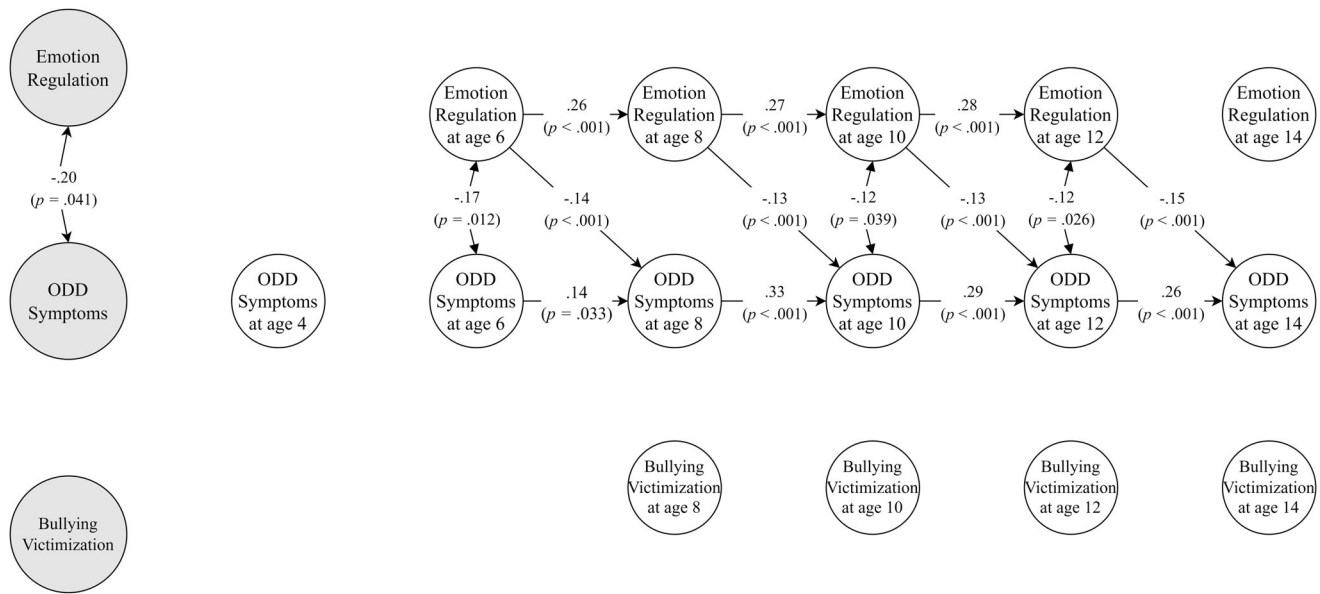
Figure 3 Relations between random intercept estimates (bigger gray circles) and within-person estimates (smaller circles) of emotional regulation, ODD symptoms, and bullying victimization from age 4 to 14 ($n = 1,042$). All arrows indicate significant paths. All values are standardized. Paths from random intercepts to their respective latent scores at each time point are significant but are not illustrated here to simplify the figure

that reduced emotion regulation predicted increased symptoms of ODD throughout child development, while bidirectional prospective links between bullying victimization and ODD symptoms were observed only between ages 8 and 10 years. The predictions from changes in emotion regulation to changes in the irritability and headstrong dimensions of ODD did not differ.

Finding decreased emotion regulation to predict more symptoms of oppositional defiant disorder from childhood to adolescence adds to two former investigations revealing such a relation (Mitchison, Liber, Hannesdottir, & Njardvik, 2020; Yu et al., 2021) but runs counter to the null results of two other studies (Chen, He, et al., 2022; Craig et al., 2020). Notably, the latter two had considerably fewer participants than the study by Yu et al. (2021) and the present study. So, the lack of statistical power may, to some extent, explain the discordant results. Moreover, all previous findings represent a mixture of within-person and between-person estimates. Hence, they are not directly comparable to the present results, which portray pure within-person effects where any impacts of time-invariant confounding effects are adjusted for, thereby positioning us better to aid causal inferences. We also found that generally—at the between-person level—children with lower ER had more symptoms of ODD. Of note, the prospective predictions emerged even when the between-person correlation was partialled out. Hence, our study expands current knowledge by finding that the impact of reduced emotion regulation on increased ODD symptoms is not only evident in middle childhood but is present throughout the period from preschool to adolescence—to an equal extent—and at the within-person level. In the context of RI-CLPM,

this effect should be considered large (Orth et al., 2022). Moreover, our study showed that an increased number of symptoms in both dimensions of ODD (irritability and headstrongness) were predicted to an equal extent by decreased emotion regulation. Hence, no differential prediction of irritability and headstrongness was detected.

The results further showed no cross-lagged longitudinal link between changes in the number of ODD symptoms and changes in bullying victimization. This contrasts with five former studies that have examined links between ODD symptoms and bullying victimization (Dugré et al., 2021; Fite et al., 2014; Kokkinos & Panayiotou, 2004; Tengesdal, 2016; Verlinden et al., 2015). However, these former findings did not separate between-person effects (which in the present study was strong, $r = .47$) and pure within-person effects. Indeed, if separated from each other, within-person estimates may not only be different in degree of statistical significance but may even be in different directions than the between-person estimates (Keijsers, 2016). This may explain why our last finding was in contrast of the above-mentioned previous studies.

Developmental changes

In line with the existing literature (Ezpeleta et al., 2022; Petitclerc & Tremblay, 2009), symptoms of ODD increased from early childhood until it peaked in middle childhood (age 10) and then waned. Partly in line with existing findings where the prevalence of bullying victimization has been reported to decrease as children enter adolescence (Sweeting et al., 2006; Wendelborg, 2021), our data showed that bullying victimization decreased from

age 8 to 10 and remained stable throughout adolescence. The observed increase in emotion regulation in early childhood (age 6–8 years) is in line with previous findings (Blandon et al., 2008; Lucas-Molina et al., 2020), whereas the decrease from age 8 onward is inconsistent with the literature (Herd et al., 2022; Peisch et al., 2020). This inconsistency may be due to the teacher-reported ERC used in our study not measuring emotion regulation on an absolute scale. On the contrary, teachers are likely to compare the child to other children; that is what they believe is typical of a child of a certain age. With the inherent, implicit age-specific norm, we did not expect the ERC score to change over time, although the behavior portrayed might do so.

Practical implications

We found reduced emotional regulation to forecast an increased risk of developing more ODD symptoms from ages 6 to 8, 8 to 10, 10 to 12, and 12 to 14. This indicates that efforts to prevent and treat ODD could include strategies to improve emotion regulation, although intervention studies are needed to test such an assumption. Existing interventions, such as The Incredible Years (Webster-Stratton & Reid, 2018), which targets behavioral problems and aims to enhance emotional and social skills, report favorable treatment outcomes in children with diagnosed ODD in terms of reduced ODD symptoms (Hobbel & Drugli, 2013). Targeting emotion regulation in general and irritability in particular, has been proposed as viable options to reduce the risk of behavioral problems (Zachary & Jones, 2019). For example, cognitive-behavioral group intervention for addressing irritability (Derella, Burke, Romano-Verthelyi, Butler, & Johnston, 2020) forecasted improved emotion regulation and reduced ODD symptoms. However, it is yet to be explored if these programs and interventions would be effective among children with no diagnosis but only symptoms of ODD and across various developmental periods.

Limitations

Although this study had many strengths, including employing multi-informant data from a relatively large sample from preschool to adolescence and employing a powerful statistical method to separate within-person predictions from between-person differences, we acknowledge some limitations. First, even though there was some selective attrition, the magnitude of this selectiveness was small. Moreover, given that we applied a Full Information Maximum Likelihood (FIML) method to handle missingness, the effect on the results was likely minor. Even so, we cannot rule out that the selective retention has not impacted the results. Second, we examined ODD symptoms, and although the DSM-5 duration and intensity criteria were applied, we did not examine

ODD as a disorder. Thus, although ODD is not categorical in nature, the generalizability of our results to children with an ODD diagnosis is yet to be seen. Third, our results pertain to the sources of information applied here; using other or additional informants may have altered the findings. For example, the teacher-reported scores on children's emotion regulation will predominantly reflect their perception of the child in school, not in other contexts (e.g., at home, during sports, and at community playgrounds). Indeed, some children might be better—or worse—regulated in other settings. Fourth, we relied on biennial assessments and were therefore not positioned to capture within shorter time intervals. If changes emerge rapidly in children and then reside, shorter lags would have been preferable. However, if changes are slower to develop, the downside of more intensive designs is that stability would dominate the results leaving little variation to be explained. In the present case, bullying victimization, emotion regulation, and the number of ODD symptoms evinced *moderate* stability, indicating that we were able to capture some changes that occurred between assessment points. Fifth, this study was conducted in Norway, a country where the prevalence of ODD is generally lower than in other countries (Heiervang et al., 2007; Vasileva et al., 2021; Wichstrøm et al., 2012). The findings may thus not generalize to more high-prevalence countries. Sixth, although the RI-CLPM adjusts for the time-invariant effects of potential confounders, time-varying effects of factors such as dysfunctional peer and family relationships (Li et al., 2018) could still influence the results.

Conclusion

The present results support the notion that improved emotion regulation may protect against increases in oppositional defiant disorder symptoms across child development, and challenge findings from previous studies by revealing that changes in bullying victimization are not longitudinally related to changes in the number of ODD symptoms. Throughout childhood and adolescence, interventions should consider including efforts to enhance emotion regulation skills.

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Key points

- Symptoms of oppositional defiant disorder (ODD) in childhood and adolescence predict behavioral disorders and adverse mental health in adulthood.
- Bullying victimization and poor emotion regulation are assumed to be risk factors for the development of ODD symptoms, but little research has been conducted to test this possibility.
- We found that ODD symptoms show an increasing trend from age 4 to 10 and then start to wane as children enter adolescence. The frequency of bullying victimization declines from age 8 to 10 and then remains stable.
- Increased emotion regulation predicts decreased number of ODD symptoms 2 years later throughout childhood, and this prediction was equally strong for the ODD dimensions of irritability and headstrongness.
- Changes in the frequency of bullying victimization are not longitudinally linked to changes in the number of ODD symptoms.
- Educational programs and psychological interventions targeting ODD symptoms should focus on improving emotion regulation skills.

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