

Ecological Correlates of Adolescents' Sense of Agency: Are there differences for boys and girls?

Filipa Nunes (filipasantosnunes@gmail.com)^{1,2}, Paula Mena Matos (pmmatos@fpce.up.pt)^{1,2},
Tiago Ferreira (tiagodsferreira@gmail.com)^{1,2}, Ingrid Schoon (i.schoon@ucl.ac.uk)³, &
Catarina Pinheiro Mota (catppmota@utad.pt)^{2,4}

¹Faculty of Psychology and Education Sciences, University of Porto. R. Alfredo, Allen, 4200-135 Porto.

²Center for Psychology, University of Porto. R. Alfredo Allen, 4200-135 Porto.

³University College London (UCL), Social Research Institute, 55-56 Gordon Square, London WC1H 0AL, United Kingdom.

⁴University of Trás-os-Montes and Alto Douro – UTAD, Edifício da Escola de Ciências Humanas e Sociais – Polo I. Quinta dos Prados - UTAD, 5000-801 Vila Real, Portugal.

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Highlights

- Trustful peers' relationships linked to a stronger sense of agency for boys.
- Schools with a high student-teacher ratio and a strong focus on performance can undermine girls' sense of agency.
- Family disadvantage and peer alienation were associated with a lower sense of agency regardless of sex.

Abstract

Although the literature recognizes the relevance of sense of agency during adolescence, little is known about which factors can promote or undermine this belief. Identifying the factors that determine adolescents' sense of agency is a challenging task that must consider influences assessed at both the individual and structural levels for a more comprehensive understanding. Guided by assumptions of the ecological model of human development, this study analyzes the contribution of adolescents' age, cumulative family disadvantage, peer relationships, student-teacher ratio, and school's goal structure to adolescents' sense of agency and explore if these links vary according to their sex. The sample comprised 1189 adolescents (15-18 years) and 18 school heads. Family disadvantage and peer alienation were associated with a lower sense of agency regardless of sex. Trustful peer relationships were linked to a stronger sense of agency for boys. Schools with a high student-teacher ratio and a strong focus on performance can undermine girls' sense of agency. Regardless of sex, adolescents who attended schools with lower performance and higher mastery goals showed a stronger sense of agency than adolescents who attended schools with both low performance and mastery. Findings are discussed based on ecological approach of human agency and attachment theory.

Keywords: sense of personal agency; sex differences; adolescents; ecological approach.

Ecological Correlates of Adolescents' Sense of Agency: Are there differences for boys and girls?

Sense of agency is the perception of one's capacity to optimize resources and overcome obstacles in order to achieve self-determined goals (Schoon & Cook, 2021). Adolescents with a strong sense of agency believe that they are effective actors in directing their life course. The current study is based on an integrative approach that recognizes that the agency's beliefs are a dynamic and relational process that emerges from the interaction between the individual characteristics of young people and the characteristics of their immediate social contexts (Bandura, 2001; Hitlin & Elder, 2007; Hitlin & Long 2009; Schoon & Heckhausen 2019). This perspective suggests that sense of agency is shaped by both individual characteristics and their immediate social contexts, namely family, peers, school, and community (Schoon & Heckhausen 2019). Guided by Bronfenbrenner's ecological systems theory (Bronfenbrenner, 1986, 1989, 1994), this study explores sex differences in a range of ecological predictors of adolescent sense of agency, namely characteristics of the immediate family context, peer relationships, and the school context (Figure 1).

INSERT FIGURE 1

Sex Differences in Sense of Personal Agency

Sex has been suggested as an important predictor of sense of agency, as boys are likelier to report a stronger sense of agency than girls (Hurault et al., 2020). Although both theory and empirical evidence recognize the importance of individuals' sex in shaping sense of agency, there is still a lack of understanding to what extent different predictors vary according to sex. In the current study, we sought to directly address this gap, exploring sex differences in a range of ecological predictors of adolescent sense of agency, focusing on indicators characterizing the immediate family context, peer relationships and the school context. The study of this issue is relevant in adolescence because in this developmental stage

there is an increasing socialization pressure to adopt traditional gender roles (Korlat et al., 2021).

Family Context and Sense of Agency

At a family's micro-context level, we address the importance of multiple family disadvantages for adolescents' sense of agency. Previous research has highlighted that family disadvantage, characterized by indicators such as low parental education, unskilled parental occupations, and low family income, tend to undermine young people's efforts to shape their life (Salmela-Aro & Upadyay, 2017; Schoon & Cook, 2021; Schoon & Heckhausen, 2019). These indicators rarely occur in isolation, and their independent effects on adolescents' outcomes tend to be weak (Hitlin & Johnson, 2015). The effective risk arises from accumulating these three risk situations within the same individual. Empirical evidence has shown that family disadvantage moderately impacts sense of agency; and that young people from families with cumulative disadvantages tend to need more support to maintain their agentic efforts (Salmela-Aro & Upadyay, 2017; Schoon & Cook, 2021). Moreover, empirical evidence has shown that family disadvantage tends to impact more strongly some outcomes of boys than girls, such as their academic aspirations (Brenøe & Lundberg, 2016). In the current study, we seek to take a first step towards clarifying whether the contribution of family disadvantage to agency is similar for boys and girls.

Peers Context and Sense of Agency

According to attachment theory, individuals begin to develop internal representations of themselves, others, and their world in childhood, based on the availability and sensitivity of primary caregivers (Bowlby, 1982). Adolescence, as the transition stage between childhood and adulthood, brings new opportunities to establish relationships outside the family circle. Relationships with peers begin to play a fundamental role in the lives of adolescents as a source of affiliation and emotional security. When stable, lasting, and consistent, relationships

with peers are characterized by the reciprocal search for comfort and support and may be perceived as attachment bonds (Ainsworth, 1969; Bowlby, 1982; Furman et al., 2002).

Peer relationships might have implications for adolescents' sense of agency. Young people acquire a broader range of skills and experiences through peer interactions. Peer relationships characterized by trust, understanding, and mutual respect, will foster adolescents' perspective of their peers as available and accessible resources to help them transform and/or overcome adversities. On the other hand, if peer relationships are characterized by isolation and alienation, adolescents tend not to ask for help, facing constraints and difficulties alone. Some evidence corroborates this perspective (e.g., Gurdal & Sorbring, 2019). A prior qualitative study involving 103 preadolescents found that perceived agency arose in peer interactions (Gurdal & Sorbring, 2019). Peer relationships characterized by trustfulness can foster adolescents' perception of their peers as available resources to help them transform/overcome adversities. This can strengthen their autonomy and the express a stronger sense of agency (Schoon, 2018). On the other hand, alienated peer relationships can lead to adolescents' tendency to face life constraints and difficulties alone (Bowlby, 1982). When studying close relationships, it is crucial to consider sex differences, since the socialization processes are not necessarily equal for boys and girls (Gorrese, & Ruggieri, 2012). In the current study, we seek to gather preliminary evidence on this research topic, analyzing the combined role of peer relationships and adolescent sex in conjunction with the sense of agency.

School's Context and Sense of Agency

School is another crucial context for shaping adolescents' sense of agency. For the current study we were specifically focused on examining the contributions of the student-teacher ratio and school's goal structure to adolescents' agency. The student-teacher ratio is often considered a general indicator of the individualized attention that teachers can provide

to students (Blatchford & Lai, 2012). The smaller the student-teacher ratio, the more easily schools can identify and satisfy the needs of each student (Koc & Celik, 2015). Schools can better develop individualized mentoring relationships, more effectively helping young people pursue their self-determined goals (Blatchford & Lai, 2012). When the proportion increases, the teacher tends to face difficulties in meeting the needs of each student that does not facilitate the student's autonomy process (Blatchford & Lai, 2012). Empirical evidence has revealed that students who attended schools with a higher student-teacher ratio show less self-efficacy than students who attended schools with a lower ratio (Usta, 2015). Based on this evidence, we consider it important to inspect the contribution of the student-teacher ratio within the school on students' sense of agency and assess potential sex differences in the association.

Another school-related variable that can shape adolescents' sense of agency is the school's goal structure, here defined as the goals and values that schools pass on to their community through educational practices (Midgley, 2000). For this study, we focus on two goal structures: mastery and performance. Schools with a mastery goal value their students' personal growth, learning, and skills development. In turn, schools more focused on performance goals tend to promote comparisons and competition among students, classes, and schools. Previous studies have established the connection between the school's goal structure and distinct components of sense of personal agency. For instance, Madjar and Chohat (2016), in a two-year longitudinal study with 128 adolescents, found a positive link between mastery goal structure and student self-efficacy. In another study, Gonida et al. (2009), drawing on a sample of 271 adolescents, found that a mastery goal school structure was positively linked to their students' volitional goals. Notwithstanding that this evidence does not analyze the broader concept of sense of agency, its conclusions support our initial hypotheses.

Although most of the prior studies focused on contrasting the effects of mastery and performance goals on students' outcomes, these two orientations are not mutually exclusive, as a school can convey mastery and performance goals simultaneously and at different levels (Midgley, 2000). Despite the relevance of this evidence, no study has examined whether the combination of different levels of mastery and performance goals have different contributions for girls' or boys' agency.

Current Study

The current study has two main goals: (1) to examine the relative links of multiple family disadvantages, peer relationships, the school's student-teacher ratio, and goals structure on adolescents' sense of agency; and (2) to analyze whether adolescents' sex moderates these links. We expected that adolescents from families facing multiple disadvantages, who had distanced relationships with their peers and attended performance-oriented schools, would be less likely to report a positive sense of agency. We also hypothesized that having trusting relationships with peers, a lower student-teacher ratio in school, and attending schools emphasizing mastery would positively associate with adolescents' sense of agency. Finally, we expected that adolescents' sex would moderate the links between predictors and sense of agency.

Method

Participants

The sample included 1189 adolescents recruited from 18 public secondary schools from the North of Portugal. Adolescents (55.9% girls) ranged from 14 to 19 years ($M = 15.92$, $SD = 0.93$). Approximately 39.6% of adolescents attended year 10, 42.4% attended year 11, and 18.0% attended year 12. Their level of education corresponds to level 3 (upper secondary) of the International Standard Classification of Education (ISCED) (UNESCO, 2011).

Measures

Sense of agency.

Assessment model of sense of agency included four dimensions: goal-setting, decision-making, optimism and self-efficacy (Authors, 2022). Goal-setting (GS, seven items) and decision-making (DM, five items) were analyzed through Short Self-Regulation Questionnaire (SSRQ; Carey et al., 2004; Del Castillo & Dias, 2009). Adolescents also answered the optimism (OPT, seven items) dimension of Vision About Future (VAF; Ginevra et al., 2016, Authors, 2018a). Items of GS, DM, and OPT dimensions are rated on a five-point scale. Further, self-efficacy (SE, 10 items) was analyzed through General Self-Efficacy Scale (GSE; Schwarzer & Jerusalém, 1995, Nunes et al., 1999). Items are rated on a four-point scale. This response scale was converted to a five-point scale to express all dimension in the same measuring scale.

All scales revealed adequate consistency ($\alpha = .78 / .71 / .88 / .74$). The Confirmatory Factor Analysis (CFA) indicated that the measurement model had acceptable fit to the data ($\chi^2_{(178)} = 737.04, p = .001, CFI = .94, TLI = .92, RMSEA = .05, SRMR = .05$). Metric invariance among adolescents' sex was also established ($\Delta\chi^2_{(17)} = 14.91, p = .602$).

Family disadvantage.

Adolescents also reported on their family disadvantage. Cumulative family disadvantage considering three risk factors:

Low parental education. Education equal to or lower than the 6th grade. Scores: 0 – No Risk; 1 – Risk associated with one parent; 2 – Risk associated with both parents.

Unskilled parental occupations. Unemployment, retirement, and unskilled works. 0- No Risk; 1 – Risk associated with one parent; 2 – Risk associated with both parents.

Low family income. Families with incomes below the minimum wage. Scores: 0 – No Risk, 1 – Risk.

We summed the scores obtained on the three risks factors into a Composite Risk Index (CRI), which varies on a scale from 0 to 5. Higher score indicate high risk accumulation. Approximately 70.9% of adolescents experienced two or more multiple risks (Table S1).

Attachment to peers.

Adolescents answered to trust (10 items) and alienation (7 items) dimensions from the Inventory of Parents and Peers Attachment (IPPA; Armsden & Greenberg, 1987; Ferreira & Costa, 1998). Items are rated based on a six-point scale. The IPPA presented adequate consistency ($\alpha = .88$ for trust; $\alpha = .76$ for alienation), acceptable fit to the data ($\chi^2_{(117)} = 523.68, p = .001, CFI = .93, TLI = .91, RMSEA = .07, SRMR = .07$), and metric invariance among adolescents' sex ($\Delta\chi^2_{(15)} = 23.23, p = .794$).

School context.

The school heads answered a questionnaire on the structural and functional characteristics of the school. The questionnaire collected the number of students enrolled and the number of teachers working in the school. The school head were also ask to report the school's goal structure by completing the Mastery Goal Structure (MGS, five items) and Performance Goal Structure scales (PGS, five items) (Midgley et al., 2000; Portuguese version by Authors, 2018b). Items were rated using a five-point scale. The two scales present acceptable consistency ($\alpha = .70$ for MGS; $\alpha = .69$ for PGS).

Procedures

Data from adolescents and their schools were collected within a broader research project focusing on understanding the contributions of individual, family, school, and social factors to adolescents' sense of agency. We obtained authorizations from the authors' institutional Ethics Committee, the data protection officer and the Ministry of Education to administer the questionnaires in the school context. We obtained approval to conduct the project in 18 schools. Each student (under age) was given informed consent to be completed

by their parents authorizing participation. Adolescents who agreed to participate completed a questionnaire under the supervision of the main researcher. Adolescents and schools did not receive any reward for participation. The datasets are available from the corresponding author upon reasonable request.

Data analysis

The statistical analysis did not consider participants identified as outliers ($N = 19$). Missing values in adolescents' reports (11%) and school head' reports (5.6%) were completely at random: ($\chi^2_{(637)} = 632.03, p = .548$; $\chi^2_{(1)} = 462, p = .497$) respectively. We used full information maximum likelihood (FIML) to deal with missing data. The results intraclass correlations (ICCs) indicated that a very low proportion of variance in adolescents' sense of agency was related to the class (ICC = .08) and school levels (ICC = .04). We adopted a design-based estimation approach to correct standard errors for potential nonindependence of observations (Muthén & Satorra, 1995). We used structural equation modeling to address the research questions (SEM). All analyses were conducted in R (R Core Team, 2020), using the *lavaan* (Rosseel, 2012) and the *semTools* packages (Jorgensen et al., 2019). We tested the factorial structure of measures through CFA; and the following cut-offs were adopted: CFI and TLI $\geq .90$, RMSEA and SRMR $< .10$ to indicate an acceptable fit (Kline, 2015). Further, we tested the invariance of sense of agency and IPPA among adolescents' sex and examined possible sex differences through multigroup analysis.

Results

The correlations among variable by adolescent sex are presented in Table S2.

Multigroup Analysis by Adolescent's Sex

Unconstrained (M_0) and constrained (M_1) models were tested and compared. The description of these models is presented in Table S3. The constrained model had a significantly worse fit to the data than the unconstrained model.

Guided by the regression weights provided by the unconstrained model and the correlations by sex, we test a final model (M_2), freeing the links from trust in peers, student-teacher ratio, and the schools' performance goal structure to sense of agency. This final model did not show a significantly worse fit to the data than the unconstrained model, indicating that only these three regression weights were significantly different across boys and girls.

The final model (M_2) revealed a good fit to the data ($\chi^2_{(85)} = 171.56, p = .001, CFI = .97, TLI = .96, RMSEA = .05, SRMR = .03$), explaining 18% and 13% of the variability of boys and girls sense of agency, respectively (Figure 2). Multiple family disadvantage are associated with a lower sense of agency regardless of adolescents' sex. Trustful relationships with peers are positively associated with boys, but not girls', sense of agency. In turn, peer relationships characterized by alienation were negatively associated with boys' and girls' sense of agency. Student-teacher ratio negatively affected girls' sense of agency, but not boys. Performance school's goal was negatively associated with the sense of agency for girls but not for boys. Results also indicated that the interaction between levels of performance and mastery of school was an important correlate of the adolescents' sense of agency, regardless of their sex. Young people who attend schools with low performance and high mastery goals revealed a stronger sense of agency than adolescents who attend schools with both low performance and mastery goals. In turn, schools focused on performance seem to suppress the mastery's contribution to sense of agency (Figure 3).

INSERT FIGURE 2

INSERT FIGURE 3

Discussion

We analyzed the contributions of adolescents' characteristics and their immediate social contexts to sense of agency, examining possible sex differences. Our study is the first to analyze the relative importance of family-, peer- and school-level factors in shaping sense

of agency, and to address the role of sex in moderating the impact of these factors on adolescents' agency beliefs.

Findings indicated that adolescents who experience higher multiple family disadvantages showed a lower sense of agency, regardless of sex. These findings are in agreement with literature and confirm previous evidence pointing out that family background can limit individuals' pursuit of their self-determined goals (Hitlin & Johnson, 2015; Schoon & Cook, 2021). This finding also expands the previous evidence by clarifying that adolescent sex does not moderate this association.

Our findings suggest that trustful relationships are positively associated with boys' sense of agency, not girls'. Guided by previous evidence (Gurdal & Sorbring, 2019), we expected that trustful relationships with peers would contribute to a strong sense of agency, as adolescents would perceive peers as a resource that supports and helps them in guiding their lives. Nevertheless, no hypothesis about moderation by sex was anticipated. The findings indicate that trust relationships contribute to boys perceiving themselves as more capable of shaping their lives. Peers, more specifically trust relationships with peers, seem to establish an important resource for boys' sense of agency. In turn, girls' trust relationships seem to be associated with other developmental dimensions being less evident in agency.

Furthermore, we find that peer relationships characterized by alienation undermine both boys' and girls' sense of agency. These findings show that peer relationships characterized by a sense of separation and "being left out" are associated with a lower perception of agency. Although boys report greater alienation to peers than girls, distrustful peer relationships can undermine the sense of agency for adolescents of both sexes. Results partly corroborate previous studies pointing out the association between peer attachment and key dimensions of sense of agency, namely decision making (Kvitkovičová et al., 2017).

We anticipated that schools with lower student-teacher ratio would provide their students with more individualized mentoring programs, supporting them in pursuing their self-determined goals. This was not entirely confirmed as we found that, compared to boys, girls seem to benefit more from a school context characterized by a lower student-teacher. The more positive educational trajectories of girls (fewer retentions and behavior problems compared to boys, Marcenaro-Gutierrez et al., 2017) can offer an angle to interpret this result. Girls may receive less individualized attention and support in schools with a high student-teacher ratio than boys because of their generally more positive educational trajectory. Therefore, in the school contexts with a higher student-teacher ratio, girls may feel less supported in their process of autonomy and construction of a sense of agency. Despite this preliminary hypothesis, further studies would be valuable for a deeper understanding of this differential pattern between boys and girls.

The results indicated that high-performance-focused schools were negatively associated with girls, but not boys', sense of agency. The goals of boys and girls themselves can explain these findings. Previous studies have shown that girls have more mastery-oriented goals, while boys have more performance-oriented goals (Bugler et al., 2015). Thus, girls can more easily perceive a mismatch between their mastery-oriented goals and the school-promoted goals more oriented toward performance and competition among students.

Finally, we found that young people attending schools with lower levels of performance and higher levels of mastery reveal a stronger sense of agency than those attending schools with low performance and mastery goals. These findings suggest that schools can improve adolescents' capabilities of resisting, transforming, or overcoming adversities when focusing on mastery goals and valuing students' development. In turn, when schools have high levels of performance goals, the negative contribution of these goals seems to suppress the positive role that the appreciation and validation of mastery development

could play in agency beliefs. These results partly align with earlier evidence that schools with high mastery and low performance goals are associated with more positive developmental outcomes (Harackiewicz et al., 2004). Our findings expand previous evidence, clarifying that this contribution is independent of adolescents' sex.

This study provides novel evidence on the contributions of person-context interactions to adolescents' sense of agency, clarifying sex differences. Nevertheless, the implications arising from the current study need to be considered in light of its cross-sectional nature, as this design does not allow inferring the direction of the paths between the variables. Additional longitudinal research is needed. The exclusive use of self-report measures is also a limitation of the current study. Future studies should examine the ecological correlates of sense of agency, considering both adolescents' self-reports and reports from other important figures. For instance, it would be valuable in future studies for family context variables to be reported by both father and mother. Further, the variables included in the model under study reveal low effect sizes. It would be valuable in future studies to examine the contribution of other variables in the youth life contexts to their sense of agency, namely attachment to parents, classroom climate, and teacher-student relationships. Moreover, this study is based on a sample of secondary students in the North of Portugal, and future studies should investigate the generalizability of findings across different cultural contexts.

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Figure 1

Individual, Family, Peers and School Correlates of Girls' and Boys' Sense of Personal Agency.

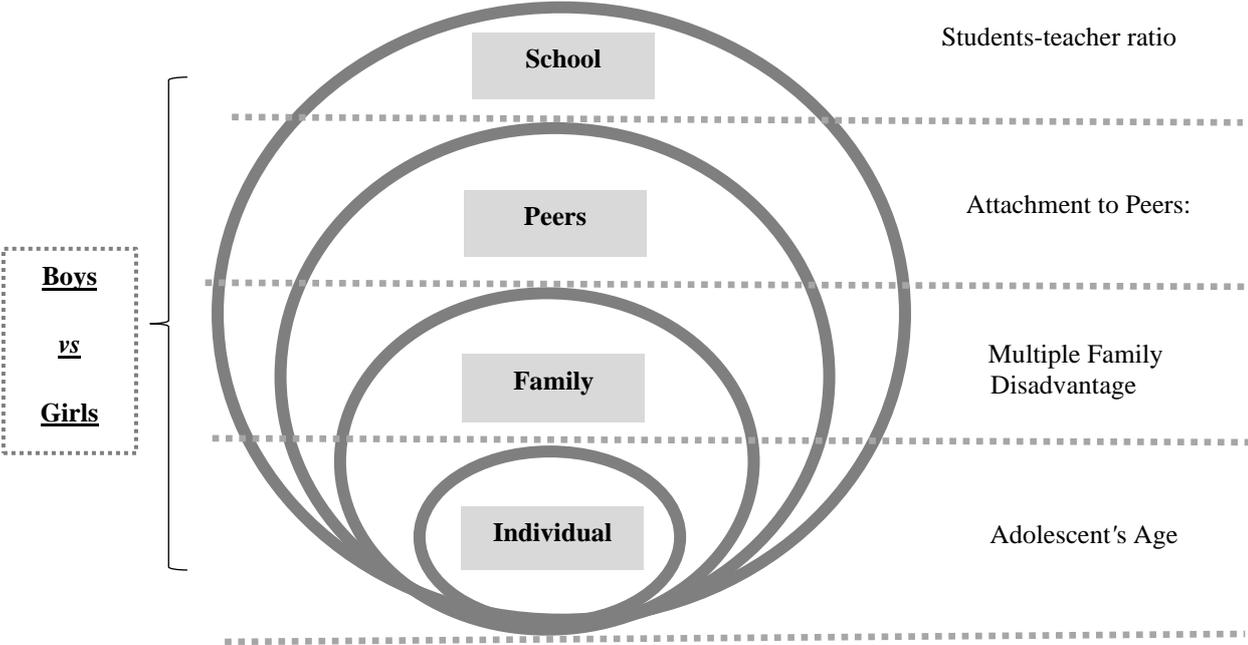
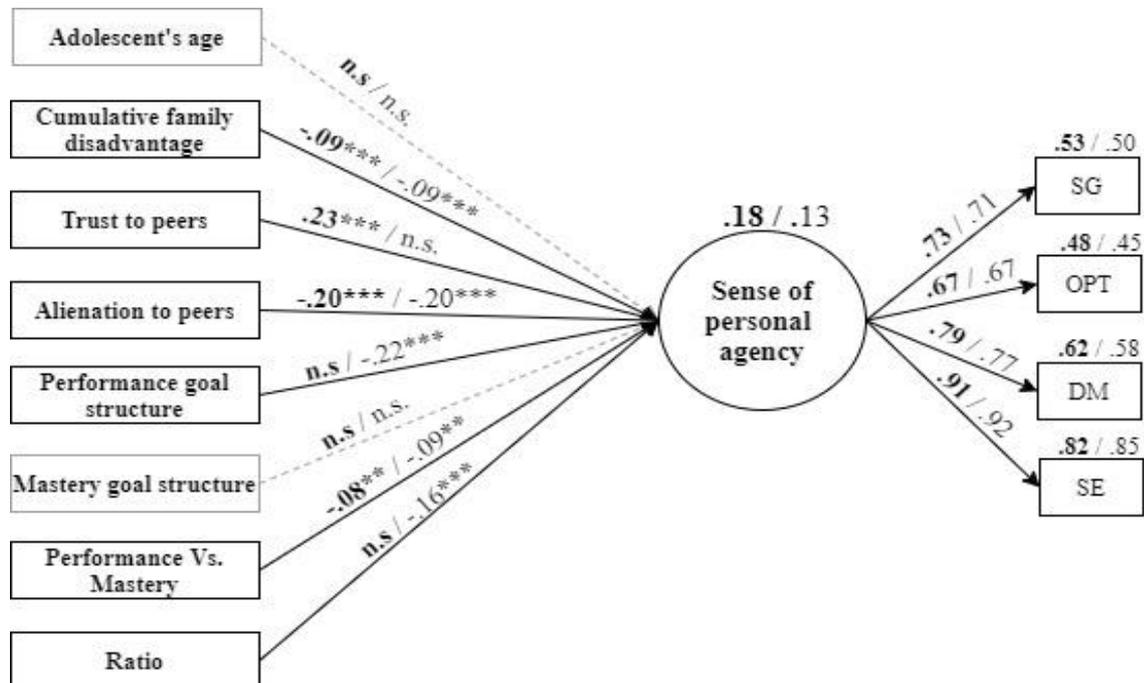
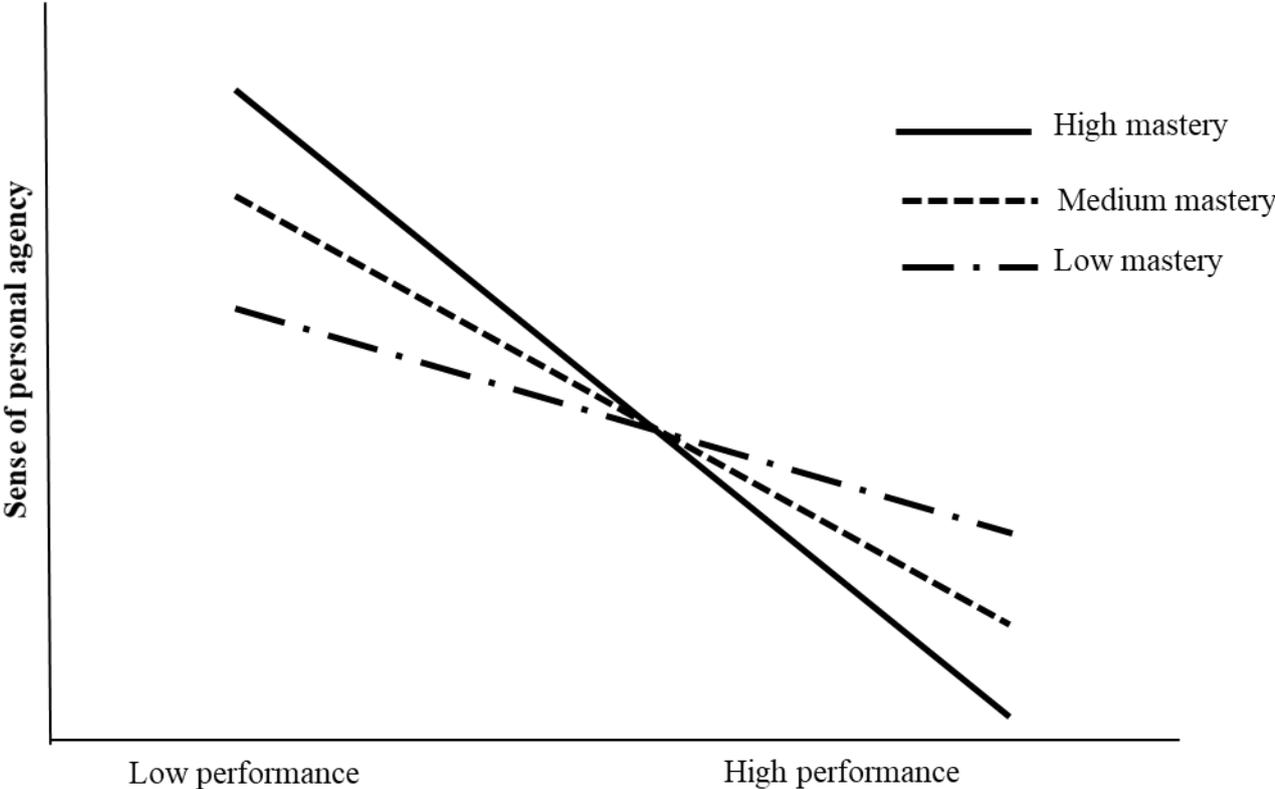


Figure 2*Standardized Coefficients of Final Model.*

Note. Standardized coefficients are presented for boys (in bold) before the slash and for girls after the slash. Non-significant paths are denoted by n.s.. SG –Setting goals; OPT – Optimism; DM– Decision-making; SE – Self-efficacy. * $p < .05$; ** $p < .01$; *** $p < .001$.

Figure 3

Role of the Interaction of Performance's and Mastery's Goals on Adolescents' Sense of Personal Agency, Regardless of Adolescents' Sex.



Supplementary Material**Table S1:** *Incidence of Risk Factors.*

Composite Risk Index	Incidence
No risk experience	13.0%
One risk experience	16.1%
Two risk experience	26.7%
Three risk experience	21.5%
Four risk experience	19.4%
Five risk experience	3.3%

Table S2.*Correlation among study variables by sex.*

	1	2	3	4	5	6	7	8	9	10
1. Age	-									
2. Sense of personal agency	-.06	-								
3. Multiple family disadvantage	-.09**	-.12**	-							
4. Performance goal structure	.16**	-.10**	.15**	-						
5. Mastery goal structure	.09**	.03	-.02	.34**	-					
6. Interaction between performance and mastery	-.08**	-.05	.03	-.21**	-.31**	-				
7. Student-teacher ratio	-.09**	.02	.10**	.24**	-.02	.17**	-			
8. Alienation to peers	-.04	-.31**	.06*	.02	-.03	.05	.01	-		
9. Trust to peers	.01	.29**	-.02	-.07*	.01	-.02	-.04	-.68**	-	
10. Sex <i>1- Female / 2- Male</i>	.10**	.10**	-.09**	.05	.03	-.02	-.03	.07*	-.14**	-
M	15.92	3.44	2.28	3.54	3.91	.08	.11	2.27	5.10	1.44
SD	.93	.55	1.38	.56	.40	.27	.05	.82	.70	.50

Note. **M** – Mean; **SD** – Standard-deviation. * $p < .05$, two-tailed. ** $p < .01$, two-tailed.

Table S3.*Goodness-of-Fit Indices of different models with different constraints among sex.*

Model	Constrained paths	χ^2 (df)	CFI	TLI	RMSEA	SRMR	Model comparison with M ₀	
							$\Delta\chi^2$ (df)	<i>p</i>
M ₀ : Unconstrained ⁱ	All constrained	169.06 (80)	.971	.951	.047	.034		
M ₁ : Constrained ⁱⁱ	All free	191.40 (88)	.967	.951	.048	.040	26.78 (8)	.001
M ₂ : Final ⁱⁱⁱ	Trust; Performance; Ratio (free)	171.56 (85)	.972	.956	.045	.034	1.27 (5)	.938

ⁱ All paths from the independent to dependent variables were allowed to be different for boys and girls;

ⁱⁱ All paths were constrained to be equal in the two groups;

ⁱⁱⁱ The links between trust in peers, student-teacher ratio, and school performance goal structure with sense of agency were released and allowed to take different values for boys and girls.