

The longitudinal trajectory of learned helplessness among adolescent students: The role of parental autonomy support and control

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Abstract

This study investigated the longitudinal trajectory of learned helplessness in academic settings during adolescence, examined the generalizability of this trajectory across students' demographic and academic backgrounds, and assessed the role of parental autonomy support and psychological control in predicting learned helplessness at each time point. We analyzed five waves of large-scale panel data following Korean adolescent students ($N=2590$) from Grade 7 to Grade 11. Our second-order latent basis growth modeling indicated that adolescent students tend to experience a significant, steady increase in helplessness from Grade 7 to Grade 11. In addition, both students' prior academic achievement and family income negatively predicted the intercept of learned helplessness. The contemporaneous effects of parental autonomy support and psychological control on learned helplessness were significant and in the expected directions at all time points: higher autonomy support was associated with lower learned helplessness, whereas higher psychological control was associated with higher helplessness. Notably, parental control exhibited a significant escalating effect, such that its detrimental effect on learned helplessness became stronger over time, whereas the protective effect of parental autonomy support remained stable. This study provides theoretical and practical implications, highlighting the roles of parental autonomy support and control in shaping adolescents' learned helplessness over time.

KEYWORDS

adolescence, learned helplessness, longitudinal study, parental autonomy support, parental control

INTRODUCTION

It is inevitable for students to encounter difficulties in academic contexts. Achieving academic success generally requires students to navigate and overcome these challenges. However, while some students exhibit persistence, expend greater efforts, and actively seek assistance when confronted with adverse situations, others are more inclined to relinquish their efforts, guided by the belief that they cannot alter the outcome of such circumstances. Learned helplessness has served as a theoretical framework explaining how individuals' beliefs about uncontrollability influence their motivation, cognition, emotion, and behavior (Maier & Seligman, 1976; Peterson et al., 1993; Seligman, 1972). Extant research on learned helplessness has provided compelling evidence of its detrimental effects. In particular, academic learned helplessness has been linked to

a range of maladaptive outcomes, including poor academic performance, greater school disengagement, and increased procrastination (e.g., Buzzai et al., 2021; Fincham et al., 1989; McKean, 1994; Peterson et al., 1993).

Adolescents are particularly susceptible to learned helplessness as they face increased academic challenges during the transition to secondary school and progression into higher grades (Anderman, 2013). These challenges can lead to self-doubt and feelings of helplessness. However, few have investigated how learned helplessness changes over time during adolescence. Understanding when it emerges and how it evolves is particularly crucial to provide timely support and interventions. Moreover, several important questions still remain unclear as to the developmental trajectory of learned helplessness. First, to our best knowledge, the generalizability of the trajectory across students' various demographic and academic characteristics has not

been thoroughly evaluated. Identifying any potential groups of students who are particularly vulnerable to learned helplessness could offer valuable insights into who should be targeted for support, enabling educators to allocate and use their limited resources and time more effectively. Second, social contexts could either buffer or bolster the manifestation and development of learned helplessness, making it imperative to understand this phenomenon within the social contexts where adolescents are situated. Nevertheless, the role of parents, arguably the most significant influence on various aspects of adolescents' development (Maccoby, 1992; Wentzel, 1998), remains less explored. As such, there is a clear need for longitudinal research to gain a more comprehensive understanding of learned helplessness among adolescents.

The present study aims to advance our understanding of learned helplessness in adolescent students by addressing these existing gaps in the literature. We first investigate the longitudinal trajectory of learned helplessness during adolescence by adopting second-order latent basis growth modeling, which offers a more precise and accurate estimate of developmental changes (Wickrama et al., 2022). Then, we evaluate how the trajectory generalizes across adolescent students' demographic and academic backgrounds. Specifically, we examine whether students' gender, prior achievement, and family income predict both the initial levels and the rate of change in learned helplessness. More importantly, guided by self-determination theory, we also investigate the role of parents. We assess to what extent parental autonomy support and control predict learned helplessness at each time point and if their predictive utility increases, decreases, or remains consistent over time.

Learned helplessness in academic contexts

Learned helplessness refers to a psychological state in which individuals, after repeated experiences of failure or uncontrollable events, believe they cannot control or influence outcomes (Seligman, 1972). This state involves a belief in the lack of control and manifests in cognitive, emotional, and motivational deficits. When facing difficulties, individuals with high levels of learned helplessness demonstrate a significant reduction in effort and exhibit passivity, viewing challenges as insurmountable. That is, learned helplessness fundamentally lies in uncontrollability or the lack of control—the belief that one's actions or abilities cannot influence outcomes (Maier & Seligman, 1976).

Learned helplessness is considered an essential outcome in its own right, not only serving as a clear indicator of an individual's maladaptive psychological state but also being linked to various other maladaptive consequences. Extensive research has demonstrated a close connection between learned helplessness and depression, emphasizing its pivotal role in both the development and severity of depression (e.g., Alloy & Abramson, 1982; Boysan, 2020; Khan et al., 2020; Miller & Seligman, 1976). Moreover, prior work

has provided compelling evidence indicating that learned helplessness is detrimental to motivational, cognitive, and behavioral functioning. Specifically, learned helplessness has been related to low levels of self-esteem and motivation, which is associated with decreased engagement in activities (Brewin & Furnham, 1986; Valas, 2001). It has also been associated with compromised cognitive functioning, particularly in problem-solving tasks, which limits individuals' capacity to address challenges or develop creative solutions (Klein & Seligman, 1976; Launius & Lindquist, 1988; Peterson et al., 1993). In addition, learned helplessness has been linked to early disengagement and procrastination (McKean, 1994; Niknam et al., 2023).

The present study focused on learned helplessness particularly within academic contexts. In academic settings, learned helplessness manifests when students perceive little control over their achievement outcomes in studying, exams, or classes, fostering a detrimental cycle of avoidance and declining academic performance (Buzzai et al., 2021). It has been well established that learned helplessness is associated with a range of negative academic consequences, including reduced engagement, decreased persistence, and lower achievement (e.g., Fincham et al., 1989; McKean, 1994). However, despite its well-established significance, the scope of research on learned helplessness in academic settings has not been sufficiently comprehensive. In particular, less attention has been devoted to understanding its development and the contextual factors that can either exacerbate or alleviate learned helplessness. Consequently, this study investigated the developmental trajectory of academic learned helplessness, particularly during adolescence, and evaluated the role of parental autonomy support and control as potential contextual factors that may mitigate or bolster learned helplessness, respectively.

Longitudinal changes in learned helplessness during adolescence

Adolescence is a critical stage characterized by significant academic and developmental challenges. School transitions often occur during this period, further complicating their academic journey. Adolescent students face increasing academic demands and inevitably more frequent failure experiences as they navigate more complex curricula and higher expectations. Additionally, adolescence is a period of self-identity development, where individuals grapple with understanding themselves and their capabilities. This intersection of heightened academic difficulties and the developmental task of self-identity formation makes adolescents particularly vulnerable to developing learned helplessness. When faced with repeated academic setbacks and self-discovery challenges, adolescents may develop learned helplessness, which can worsen over time. These factors make adolescence a critical area of focus for understanding learned helplessness and developing appropriate interventions.

A few existing studies have provided initial insights into the development of learned helplessness. Specifically, the two available longitudinal studies investigated its stability and change, suggesting that it is moderately stable but changes over time in childhood (Fincham et al., 1989; Nolen-Hoeksema et al., 1986). While informative, these studies have notable limitations that impede drawing any conclusions about how learned helplessness evolves in adolescence. First, both studies primarily focused on individuals' relative standing over time (i.e., rank-order stability) without examining mean-level changes, leaving it unclear whether and how the overall level of helplessness shifts over time. Second, they focused solely on childhood and only for relatively short periods, 1–2 years, limiting both the duration and developmental scope, and leaving adolescence, a critical period for the development of helplessness, unaddressed. Lastly, Nolen-Hoeksema et al. (1986) did not directly assess helplessness but instead operationalized it based on depressive symptoms and achievement problems, which may not adequately capture learned helplessness. These gaps leave our understanding of how learned helplessness evolves during adolescence incomplete. Without this understanding, identifying when to intervene and mitigate the adverse effects of learned helplessness is challenging. Therefore, more comprehensive longitudinal studies are needed to better understand the emergence and developmental course of learned helplessness during the critical adolescent years.

Another critical question that remains unanswered is whether the developmental trajectory of learned helplessness varies across different demographic characteristics. Cross-sectional research on learned helplessness and gender differences has yielded mixed findings. For instance, some studies have shown that girls are more likely to attribute failures to lack of ability, making them more prone to learned helplessness (McClure et al., 2011), whereas other studies found minimal gender differences (Parsons et al., 1982) or even greater helpless responses among boys at specific time points (Ziegert et al., 2001). Additionally, some studies have suggested different patterns of gender differences in learned helplessness (Valas, 2001) or differences in how boys and girls recover success expectancies, implying differences in learned helplessness (Dweck & Licht, 1980). These inconsistent findings may stem from the limitations of cross-sectional studies that reflect only a single point in time, highlighting the need for longitudinal research to provide clearer insights into the developmental trajectory of learned helplessness.

Furthermore, research has shown that socioeconomic status (SES) is associated with learned helplessness. Specifically, individuals from financially deprived backgrounds often perceive minimal control over their environments, a perception exacerbated by facing additional challenges compared to their middle-class peers (Evans et al., 2005). Social inequality generates significant stress that hinders mental adjustment and predisposes individuals to learned helplessness (Abramson et al., 1978; Brown et al., 2016). These findings indicate a connection between SES and learned

helplessness. However, it remains unclear how SES is related to the development or changes in learned helplessness during adolescence.

Lastly, prior academic achievement is also crucial, as students with lower achievement are more likely to experience academic failure, thereby increasing the likelihood of learned helplessness. Numerous studies support this relationship, indicating that students are more prone to feelings of helplessness following repeated academic failures and that early academic achievement plays a significant role in the development of learned helplessness (Buzzi et al., 2021; Peterson et al., 1993; Valas, 2001). Nevertheless, akin to SES, the relationship between prior academic achievement and not only the differences at specific points in time but also the developmental changes in learned helplessness remains insufficiently understood. Thus, the present study sought to gain a deeper understanding of learned helplessness and its development by examining adolescent students' gender, SES, and prior achievement as time-invariant covariates that predict the developmental trajectory of learned helplessness. In doing so, this study also aimed to identify whether any specific group of students is particularly vulnerable and, therefore, in need of targeted interventions and support.

Parental autonomy support and control

Parents are arguably one of the most influential figures for adolescents (Maccoby, 1992; Wentzel, 1998). They interact with their adolescent children in everyday life, and the beliefs, values, and behaviors they bring to the interactions substantially contribute to adolescents' development and learning. Extensive research has repeatedly and consistently provided empirical evidence establishing the influence of parents on adolescents (see Lazarides et al., 2015; Lengua et al., 2019; Pomerantz & Grolnick, 2017, for reviews). Given their well-established importance, the present study focused on parents and their role in shaping students' learned helplessness during adolescence. Indeed, the occurrence and development of learned helplessness are thought to require a consistent and repeated pattern of exposure to uncontrollable and aversive experiences, making it particularly critical to understand the role of parents, who are consistently involved in their children's lives on a daily basis and across diverse aspects of children's functioning. Accordingly, this study focused on how parents might contribute to the development of learned helplessness during adolescence.

Among various theoretical approaches, we sought to understand the role of parents in buffering or bolstering adolescent students' learned helplessness through the lens of self-determination theory (Ryan & Deci, 2000). Self-determination theory asserts that the social contexts in which students are situated play a pivotal role in their motivation and learning. Specifically, autonomy support and control have been identified as two distinct critical aspects of the social contexts parents could foster, leading to students' adaptive and maladaptive forms of motivation, respectively

(Grolnick & Ryan, 1989; Ryan & Deci, 2000). Parental autonomy support refers to the extent to which parents value and employ practices that encourage children's independent problem-solving and decision-making and acknowledge children's feelings (Bureau & Mageau, 2014; Grolnick & Ryan, 1989). A meta-analysis study reported that parents' autonomy support is related to students' higher levels of academic performance as well as adaptive psychological functioning across primary and secondary school to college levels (Vasquez et al., 2015). In contrast, parental control is conceptualized as the extent to which parents engage in restrictive, overcontrolling, and intrusive practices, characterized by demands for strict obedience, prioritization of the parental perspective over the child's own, and a lack of explanation (Grolnick & Pomerantz, 2009; Skinner et al., 2005). Parental control is distinct from the provision of structure, which involves communicating clear expectations, offering guidance, and supporting children in working toward desired outcomes (Skinner et al., 2005). Adolescents' perceptions of parental control, marked by intrusiveness and overcontrol, have been consistently linked to maladaptive psychological functioning and poor academic performance (see Soenens & Vansteenkiste, 2010, for a review).

We postulated that adolescents' perceptions of parental autonomy and control would buffer or bolster the manifestation and development of their learned helplessness, respectively. Adolescent students should be able to take action to respond to an adverse situation instead of passively surrendering even in the face of the seemingly impossible nature of the adverse situation. For this, they must understand that their actions can change the outcomes of the situation (Maier & Seligman, 1976; Seligman, 1972). Autonomy support, which enables students to take initiative and experience the controllability of their own actions and outcomes (Grolnick et al., 1997), is likely to promote this understanding and prevent them from experiencing learned helplessness. Indeed, extant research has documented that parental autonomy support is positively related to students' autonomous motivation, perceived control, and perceived competence (Vasquez et al., 2015; Won & Yu, 2018). In addition, a recent study has provided more direct evidence indicating that, albeit not from parents, teachers' autonomy support was negatively predictive of high school students' learned helplessness and academic performance (Filippello et al., 2020).

In contrast, parents' control, which can be depicted by parental practices pertaining to pressure, intrusiveness, and dominance (Grolnick & Pomerantz, 2009), is likely to debilitate adolescent students and aggravate learned helplessness. Parental control does not allow students to take an active, autonomous role; instead, they are externally controlled for their actions, losing initiative and opportunities to exercise their controllability. Accordingly, such parental practices could make students experience and learn that their actions are independent of consequences, leading to lower expectations for producing desired outcomes and greater feelings of inability and uncontrollability. Prior work has demonstrated that parental control is detrimental to students' autonomous

motivation as well as perceived control and competence (Soenens & Vansteenkiste, 2010; Won & Yu, 2018). Indeed, a few recent studies have reported that parental control positively predicted adolescent students' learned helplessness (Filippello et al., 2015, 2018).

Despite their potential importance, only a few studies have investigated the links between parental autonomy support and control and adolescent students' learned helplessness to this point (e.g., Filippello et al., 2015, 2018). In addition to the paucity of prior studies, firm conclusions concerning the role of parental autonomy support and control are hampered by at least two shortcomings. First, the few available studies have focused only on parental control (Filippello et al., 2015, 2018), resulting in the ignorance of parental autonomy support. Not controlling does not necessarily mean autonomy supportive. It remains unclear whether autonomy support and control could uniquely predict adolescents' learned helplessness in the presence of each other, pointing to a need for a more comprehensive investigation.

Second, to our best knowledge, there is no longitudinal research evaluating the role of parental autonomy support and control in learned helplessness, representing a notable gap in the literature. Adolescence is typically marked by an increasing need for separation and independence from parents (Hill & Tyson, 2009; Steinberg & Silverberg, 1986) and subsequent changes in social relationships and their importance (Smetana et al., 2004). As such, the importance of parental autonomy support and control in learned helplessness could change during this period. Specifically, it is likely that providing autonomy support and refraining from control could become increasingly vital in the process of individuation. Yet, there is a lack of research capturing such dynamics during adolescence, thus limiting a more nuanced understanding of learned helplessness. Therefore, the present study examined not only the extent to which parental autonomy support and control could predict adolescent students' learned helplessness at each time point (i.e., contemporaneous effects) but also if their predictive utility would change over time (i.e., escalating effects).

Beyond investigating the role of parents in learned helplessness, this study aimed to contribute to the broader literature on parental autonomy support and control by validating their importance within a Korean context, rather than the predominantly Western populations examined in prior research (e.g., Filippello et al., 2018; Won & Yu, 2018). Evaluating these parenting dynamics within a Korean context is particularly important given the unique sociocultural characteristics of Korea that may shape parenting practices and adolescents' responses to them. Korean parents are known for holding high academic expectations and displaying strong involvement in their children's education—often expressed through academic pressure and controlling parenting practices (Bong et al., 2008). Such practices occur within a highly competitive educational system marked by immense pressure from high-stakes university entrance exams (Bong et al., 2008). These conditions may render adolescents particularly vulnerable to academic setbacks and,

in turn, to the development of learned helplessness. By evaluating how the core tenets of self-determination theory—parental autonomy support and control—were manifested in a Korean context, this study sought to extend the literature and highlight their relevance across diverse cultural contexts.

Present study

The primary goal of the present study was to advance our understanding of learned helplessness among adolescent students by pursuing four related objectives. First, we investigated the longitudinal trajectory of learned helplessness over 5 years during adolescence. We expected that adolescents would demonstrate an increasing pattern of learned helplessness over time. Second, we evaluated students' gender, previous academic achievement, and family income as time-invariant covariates predicting the intercept and slope of the learned helplessness trajectory. Based on prior work (Buzzai et al., 2021; Peterson et al., 1993), it was hypothesized that students with low prior achievement and from low-income families would show high initial levels and steeper increasing slopes. Due to inconsistent findings, no specific hypothesis was formulated regarding gender differences. Third, we examined parental autonomy support and control as time-varying covariates predicting students' learned helplessness at each time point. We hypothesized that parental autonomy support would negatively predict learned helplessness, whereas parental control would positively predict it. Lastly, we tested if the predictive power of parental autonomy support and control changed over time. Given the increasing need for separation and independence from parents during adolescence (Hill & Tyson, 2009; Steinberg & Silverberg, 1986), we expected the predictive utility of both parental autonomy support and control to increase over time.

METHOD

Participants and procedures

The current study utilized data from the Korean Children and Youth Panel Survey 2018 (KCYPS 2018), a nationally representative panel dataset collected by the National Youth Policy Institute using stratified cluster sampling. The dataset consists of two cohorts: students in Grade 4 and Grade 7 sampled in 2018 (Ha et al., 2018). This study used the Grade 7 cohort data, tracking students from Grade 7 to Grade 11. The Korean education system comprises 6 years of elementary school, 3 years of middle school, and 3 years of high school. Therefore, Grade 7 marks the beginning of middle school, while Grade 10 marks the beginning of high school.

Data collection occurred at the beginning of each academic year's second semester, with both students and their parents participating in self-report surveys. Students were

recruited from schools, and parental involvement was sought following the students' recruitment. Research staff conducted individual data collection sessions using tablet PCs during in-home visits to the participants' households.

The data analyzed in this study comprised survey responses from 2590 students recruited from 162 middle schools. Among these participants, 54.2% were male and 45.8% were female. At the first wave of data collection (Grade 7), the average age of the participants was 12.98 years ($SD=0.66$). Socioeconomic status, measured by parent-reported monthly household income, was relatively balanced across the income spectrum, with 31.3% in the lower, 39.3% in the middle (a range aligning closely with the national average household income), and 29.5% in the higher income bracket.

Measures

Students completed surveys assessing learned helplessness, parental autonomy support and control, and academic backgrounds. Parents also completed surveys focusing on demographics and socioeconomic status. In addition to students' responses, we included parents' reports of household income as a proxy of socioeconomic status.

Learned helplessness in academic settings

To measure learned helplessness in academic settings, we adopted four items from the Academic Helplessness Scale (AHS) developed and validated in Korean adolescent samples by Bak et al. (2015). These items assessed the extent to which students perceived a lack of control over their academic outcomes (e.g., "I don't think I can be better than I am, no matter how much I study"). Students responded to the items using a 4-point Likert scale ranging from 1 (*not at all true*) to 4 (*very true*). Prior studies using this measure have demonstrated acceptable reliabilities and significant negative correlations with grit, as well as positive correlations with academic procrastination (e.g., Han, 2022; Lee & Kim, 2022). The Cronbach's alpha coefficients obtained from the current study ranged from .82 to .87.

Parental autonomy support

Parental autonomy support was assessed using the Korean version of the Parents as Social Context Questionnaire for Adolescents (PSCQ-A), originally developed by Skinner et al. (2005), and subsequently adapted and validated for use with Korean adolescents by Kim and Lee (2017). The questionnaire includes the autonomy support scale, which comprises four items assessing students' perceptions of parental autonomy support (i.e., "My parents allow me to pursue what I consider important"). Students responded to the items using a 4-point Likert scale ranging from 1 (*not at*

all true) to 4 (*very true*). Previous research utilizing this scale has consistently reported good reliabilities and demonstrated its positive correlation with grit and negative correlation with depression (e.g., Choi, 2023; Ju & Kim, 2022). The present study found Cronbach's alpha coefficients ranging from .86 to .87.

Parental control

Parental control was assessed using the coercion scale from the Korean version of the Parents as Social Context Questionnaire for Adolescents (PSCQ-A), originally developed by Skinner et al. (2005), and subsequently adapted and validated for use with Korean adolescents by Kim and Lee (2017). This scale includes four items assessing students' perceptions of parental control ("My parents are always telling me what to do"). Students responded to the items using a 4-point Likert scale ranging from 1 (*not at all true*) to 4 (*very true*). The scale has demonstrated acceptable internal consistency and theoretically consistent relationships with students' academic engagement and delinquency (e.g., Park, 2021; Yoo & Choi, 2021). In the present study, the Cronbach's alpha coefficients ranged from .73 to .80.

Demographic and academic background

Students' *prior academic performance* and their parents' *socioeconomic status* were measured. Specifically, students responded to a single item ("How would you describe your GPA in the last semester at school?") assessing their subjective evaluations of academic performance in the previous semester using a 5-point scale, ranging from 1 (*very poor*) to 5 (*very good*). Several studies have shown a high correlation between students' self-reported grades and their actual academic performance, which indicates the reasonable accuracy of self-reported grades (e.g., Chen et al., 2022; Felder-Puig et al., 2012). In addition, parents' reports of their monthly household income were utilized as a proxy for socioeconomic status. Parents indicated their monthly household income using a scale ranging from 1 (*no income*) to 12 (*10 million won or above*).

Statistical analysis

Our initial step involved computing descriptive statistics and correlations using the mean scores of the measures in SPSS 27 to gain a basic understanding of the longitudinal data. All subsequent analyses were conducted in Mplus 8.2. We conducted structural equation modeling using maximum likelihood estimation with robust standard errors. Prior to our main analyses, we evaluated the measurement invariance of learned helplessness from Grade 7 to Grade 11 by performing longitudinal confirmatory factor analyses. We specified a series of hierarchically nested models by adding equality constraints to parameters (i.e., configural invariance, metric invariance, scalar invariance). Subsequently, we compared

their model fit indices. When the equality constraints did not worsen the model fit, measurement invariance over time was ensured (Dimitrov, 2010; Nagengast & Trautwein, 2016).

After establishing sufficient measurement invariance, we performed latent growth modeling and identified the longitudinal trajectory of learned helplessness. Notably, when specifying all latent growth models, latent factors of learned helplessness were utilized as indicators of growth factors (i.e., intercept, slope) instead of using observed scores at each time point. This second-order modeling approach was intended to minimize bias by taking measurement errors into account. In conjunction with the second-order modeling approach, we utilized the effect coding method suggested by Little et al. (2006). This method enables a more stable estimation of the mean for latent factors. It has been particularly recommended for estimating and interpreting second-order growth mean parameters (Wickrama et al., 2022).

An unconditional latent growth model was first specified. We adopted a latent basis growth model, which allows for complex nonlinear growth patterns (Grimm et al., 2011). The latent basis growth model was identified by fixing the first and last factor loadings of the slope at 0 and 1, respectively, but freely estimating the other factor loadings (see Figure 1). This allows any nonlinear growth trajectories to be estimated rather than imposing a specific growth shape (e.g., linear or quadratic) onto the data.

Then, a conditional latent growth model was specified in which both time-invariant and time-varying covariates were incorporated (Wickrama et al., 2022). Specifically, students' gender, prior academic achievement, and family income were postulated and examined as time-invariant covariates, predicting the growth factors and explaining between-person differences. Parental autonomy support and control were evaluated as time-varying covariates, predicting learned helplessness and explaining within-person differences after controlling for the longitudinal trajectory (see Figure 1). Adolescent students' perceptions of parental autonomy support and control at each time point were regressed on corresponding learned helplessness (i.e., contemporaneous effects).

Lastly, we examined if the contemporaneous effects of parental autonomy support and control on adolescent students' learned helplessness would become more important over time (i.e., escalating effects). The Wald test was employed to assess these changes in the predictive power of parental autonomy support and control across time points. Equality constraints were added to the predictive path coefficients of parental autonomy support and control.

In evaluating the model fit, several model fit indices were considered, including chi-squared statistics (χ^2), the comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). Following the recommendations provided by Hu and Bentler (1999), CFI and TLI values greater than .95, RMSEA values less than .06, and SRMR values <.08 were considered indicative of a good

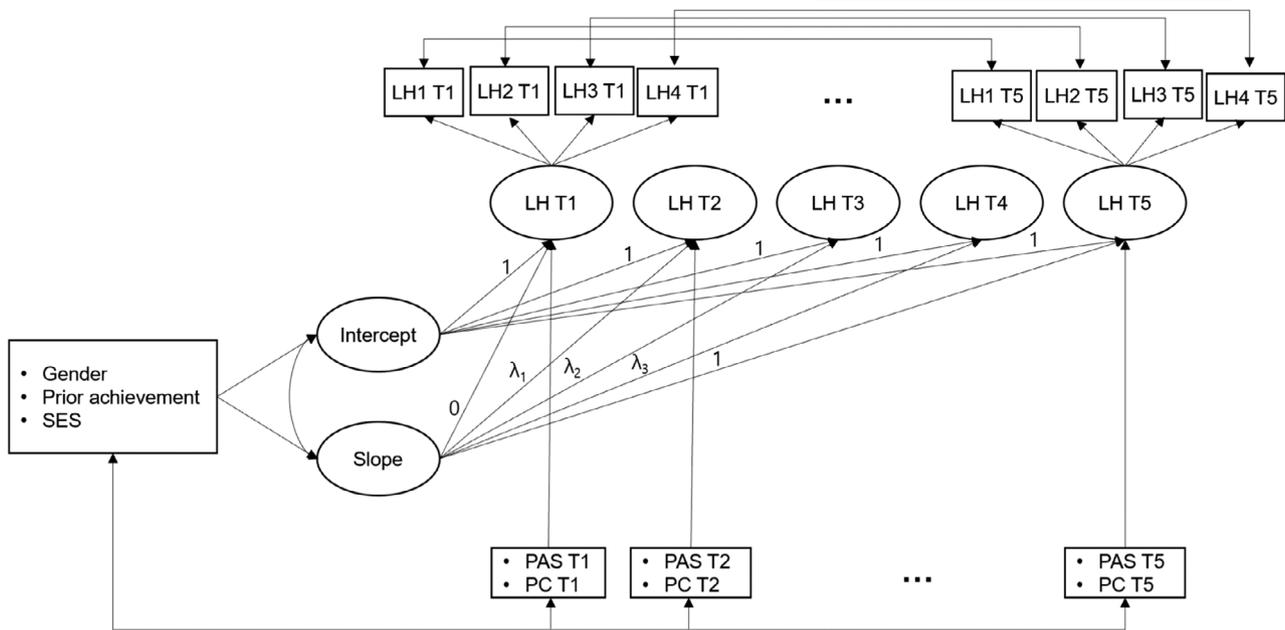


FIGURE 1 Second-order latent basis growth model with time-invariant and time-varying covariates. LH, learned helplessness; PAS, parental autonomy support; PC, parental control; SES, socioeconomic status.

fit. To determine measurement invariance, changes in CFI and RMSEA were monitored. Specifically, changes in CFI $<.010$ and RMSEA less than $.015$ were considered indicative of measurement invariance (Chen, 2007; Cheung & Rensvold, 2002).

Missing rates across all variables and time points ranged from 0% to 13.1%. Little's MCAR test was significant, $\chi^2(496) = 619.07, p < .001$, suggesting that data were not missing completely at random. To further examine the patterns of missingness, we compared students with and without missing responses. Specifically, students with missing responses were more likely to be male ($\chi^2[1] = 4.57, p < .05$) and to report higher learned helplessness (T1: $t[2588] = 2.74, p < .01$; T2: $t[745.65] = 3.98, p < .001$), lower parental autonomy support (T2: $t[2436] = -3.32, p < .001$; T5: $t[2250] = -2.92, p < .01$), and higher parental control (T1: $t[2588] = 2.06, p < .05$; T3: $t[2382] = 4.28, p < .001$; T4: $t[2263] = 2.65, p < .01$; T5: $t[434.84] = 3.13, p < .01$) than those without missing data. Thus, this pattern is consistent with a missing at random mechanism, whereby missingness depends on observed variables rather than unobserved values. We therefore used full information maximum likelihood (FIML) estimation to handle missing data, a method consistently recommended for longitudinal data analysis (e.g., Raykov, 2005).

RESULTS

Descriptive statistics and correlations

The descriptive statistics for all major variables are provided in Table A1. The mean scores of students' learned helplessness showed an increasing pattern from Grade 7 to Grade

11. The skewness and kurtosis statistics indicate that all variables follow a distribution that is approximately normal (Kline, 2016). Correlations among the study variables are presented in Table A2, with all correlations and their directions aligning with our expectations. Specifically, students' perceptions of parental autonomy support were negatively correlated with their learned helplessness at each time point ($-.25 \leq r \leq -.35$). In contrast, perceived parental control was positively correlated with learned helplessness at each time point ($.24 \leq r \leq .29$). Additionally, family income was negatively correlated with learned helplessness from Grade 7 to Grade 10 ($-.07 \leq r \leq -.14$). Prior achievement also demonstrated negative correlations with students' learned helplessness across all time points ($-.05 \leq r \leq -.26$).

Measurement invariance

We conducted longitudinal confirmatory factor analysis (CFA) to examine the measurement invariance of learned helplessness with individual items as indicators. As shown in Table 1, the configural invariance model demonstrated a good fit to the data. We then tested the metric invariance model and compared its fit indices to those of the configural invariance model. Changes in CFI and RMSEA were minimal ($\Delta\text{CFI} = -.001, \Delta\text{RMSEA} = .000$), indicating that metric invariance was achieved. Next, we tested the scalar invariance model, and its fit indices were compared to those of the metric invariance model. Changes in CFI and RMSEA were minimal again ($\Delta\text{CFI} = -.001, \Delta\text{RMSEA} = .001$), suggesting the scalar invariance was supported across the five time points.

TABLE 1 Measurement invariance of learned helplessness across time.

	χ^2 (df)	CFI	TLI	RMSEA	SRMR	Δ CFI	Δ RMSEA
Configural invariance	226.212 (120)***	.994	.990	.018	.015		
Metric invariance	246.673 (132)***	.993	.990	.018	.017	-.001	.000
Scalar invariance	277.908 (144)***	.992	.989	.019	.018	-.001	.001

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

Abbreviations: CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residue; TLI, Tucker–Lewis index.

TABLE 2 Unconditional latent basis growth model.

	Unstandardized estimate (SE)
Slope factor loadings	
Learned helplessness Grade 7	0.00 (.00)
Learned helplessness Grade 8	0.46 (.06)
Learned helplessness Grade 9	0.55 (.07)
Learned helplessness Grade 10	0.73 (.06)
Learned helplessness Grade 11	1.00 (.00)
Means	
Intercept	1.80 (.01)
Slope	0.21 (.02)
Variances	
Intercept	0.13 (.01)
Slope	0.15 (.02)
Covariance	
Intercept–slope	-0.08 (.02)

Unconditional latent growth model

Table 2 presents the results of the latent basis growth model without time-invariant and time-varying covariates. The model showed a good fit, $\chi^2(151) = 319.47$, $p < .001$, CFI = .990, TLI = .987, RMSEA = .021, SRMR = .029. A positive and significant latent mean of the slope factor indicates an increase in learned helplessness from Grade 7 to Grade 11. On average, the trajectory of learned helplessness started at 1.80 and increased by 0.21 units over 4 years. Additionally, the covariance between the intercept and slope factors was significant and negative, indicating that a higher initial level of learned helplessness was associated with a more gradual increase in learned helplessness over time.

Conditional latent growth model

The conditional latent growth model incorporated student gender, prior achievement, and family income as time-invariant covariates and perceived parental autonomy support and control at each time point as time-varying covariates. The conditional model demonstrated a good fit to the data, $\chi^2(425) = 768.06$, $p < .001$, CFI = .981, TLI = .980, RMSEA = .018, SRMR = .032.

TABLE 3 Effects of time-invariant covariates.

	Intercept			Slope		
	<i>b</i>	SE	β	<i>b</i>	SE	β
Gender	-.04	.02	-.05	-.02	.03	-.02
Prior achievement	-.12	.02	-.31***	.08	.02	.18***
Family income	-.02	.01	-.13***	.01	.01	.06

Note: Gender (0 = female, 1 = male). *** $p < .001$.

Time-invariant covariates

Time-invariant covariates were examined as predictors of the intercept and slope of learned helplessness (see Table 3). Student gender was not predictive of the growth factors. In contrast, prior achievement negatively predicted the intercept of learned helplessness ($\beta = -.31$, $p < .001$). Similarly, family income negatively predicted the intercept ($\beta = -.13$, $p < .001$). This indicates that students with higher levels of prior achievement and those from families with higher incomes tended to report lower initial levels of learned helplessness. Additionally, students' prior achievement emerged as a significant predictor of the slope of learned helplessness ($\beta = .18$, $p < .001$). However, our sensitivity analysis, in which the slope was regressed on the intercept, showed that prior achievement no longer significantly predicted the slope ($\beta = -.03$, SE = .04, $p = .376$), suggesting that the initial level of learned helplessness accounted for the observed association.

Time-varying covariates

Perceived parental autonomy support and control were examined as time-varying covariates (see Table 4). The contemporaneous effects of parental autonomy support on corresponding learned helplessness were consistently significant and negative across all time points ($-.18 \leq \beta \leq -.24$). Conversely, the contemporaneous effects of parental control on corresponding learned helplessness were consistently significant and positive across all time points ($.14 \leq \beta \leq .22$).

Next, the contemporaneous effects of the time-varying covariates were compared by the Wald tests to determine if these effects would change over time. The Wald test results indicated that the contemporaneous effects of parental autonomy support on learned helplessness remained consistent over time. In contrast, the Wald test results demonstrated

TABLE 4 Effects of time-varying covariates.

	<i>b</i>	SE	β
Grade 7			
Parental autonomy support	-.23	.02	-.24***
Parental control	.12	.02	.14***
Grade 8			
Parental autonomy support	-.21	.02	-.23***
Parental control	.17	.02	.20***
Grade 9			
Parental autonomy support	-.18	.02	-.19***
Parental control	.14	.02	.18***
Grade 10			
Parental autonomy support	-.18	.02	-.19***
Parental control	.18	.02	.20***
Grade 11			
Parental autonomy support	-.17	.02	-.18***
Parental control	.20	.02	.22***

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

that the contemporaneous effect of parental control at Grade 7 was significantly different from that of Grade 11 ($p < .01$), suggesting an escalating effect of parental control on learned helplessness over time.

DISCUSSION

In this study, we investigated the longitudinal changes in adolescents' learned helplessness over 5 years and examined whether and to what extent parental autonomy support and control predict adolescents' learned helplessness at each time point. Our findings lend support to three noteworthy conclusions. First, we confirm the longitudinal increase in learned helplessness during adolescence. Second, our findings indicate that this increasing pattern varies across adolescents' demographic characteristics. Third, parental autonomy support and control negatively and positively predicted learned helplessness, respectively, and furthermore, the predictive power of parental control was found to increase over time. In the remainder of this section, we review the findings that support these conclusions and discuss implications for research and practice.

Developmental trajectory of learned helplessness during adolescence

Our findings confirmed a longitudinal increase of learned helplessness from Grade 7 to Grade 11, consistent with our hypothesis. In other words, adolescent students tended to report lower expectations for achieving desired academic outcomes and greater feelings of inability and uncontrollability as they progressed through secondary school. It is not

surprising that learned helplessness heightened during this period, given the increasing academic challenges that students face in secondary school (Raufelder & Kulakow, 2021). In addition, as students advance through their grade levels during secondary school, they are exposed to a more controlled and competitive learning environment (Anderman & Maehr, 1994; Eccles & Midgley, 1989). Within this environment, students are more likely to experience repeated failures and uncontrollable situations, leading to learned helplessness.

This pattern of increased learned helplessness aligns with the findings of a systematic review by Vansoeterstede et al. (2023), which reported that school burnout tends to increase during adolescence. Additionally, our findings are consistent with well-established literature indicating that motivational constructs such as competence beliefs (Stipek & Daniels, 1988; Wigfield & Eccles, 1992), intrinsic motivation (Gottfried et al., 2001), and self-esteem (Robins & Trzesniewski, 2005) tend to decrease during adolescence. Notably, students' learned helplessness in academics has been consistently associated with maladaptive outcomes, including disengagement, low academic achievement, and early dropout rates (McKean, 1994; Niknam et al., 2023; Peterson et al., 1993; Valas, 2001). Accordingly, our findings underscore the importance of attending to learned helplessness during secondary school and providing appropriate support to mitigate and prevent its longitudinal increases.

The present study significantly advances our understanding of learned helplessness in several key ways. First, while prior research has well documented the negative consequences of learned helplessness (Alloy & Abramson, 1982; Boysan, 2020; Khan et al., 2020; Miller & Seligman, 1976), its longitudinal trajectory has yet to be systematically and extensively investigated. This study addresses this gap by examining the longitudinal change of learned helplessness over a 5-year period, commencing from the first year of secondary school. This period is particularly crucial as students are more likely to encounter academic failures and feelings of uncontrollability following the transition from elementary school (Anderman, 2013). These experiences provide valuable insight into the onset and development of learned helplessness during secondary school.

Second, our methodological rigor also contributes to a more precise understanding of how learned helplessness changes during adolescence. Notably, we adopted a second-order modeling approach with latent factors serving as indicators of growth models rather than composite scores. This approach allows for more accurate estimations and minimizes measurement error (Wickrama et al., 2022). Furthermore, latent basis growth models enabled the estimation of a nonlinear growth trajectory without imposing a specific form of development, such as linear or quadratic changes (Grimm et al., 2011). Thus, it was possible to depict the development trajectory more accurately. Additionally, it is worth noting that we utilized a large, nationally representative longitudinal panel dataset, enhancing the generalizability of our findings. Overall, these methodological

strengths allowed considerably more precise estimations and further reinforced our findings concerning the longitudinal trajectory of learned helplessness.

Gender, prior achievement, and family income and their relations to learned helplessness

One crucial question that remains unsolved in the literature is whether the longitudinal trajectory of learned helplessness can be generalized across various demographic characteristics. To address this question, we examined whether gender, prior achievement, and family income could predict the initial level and rate of change in learned helplessness from Grade 7 to Grade 11, particularly in the context of increased academic challenges and burdens during secondary school education. Understanding these predictors can provide valuable insights into how different groups of students experience and develop learned helplessness over time.

Students' gender was not found to predict the intercept and slope of the trajectory, indicating that male and female students exhibited comparable developmental patterns of learned helplessness. In other words, both male and female students tended to show a similar initial level and experience a developmental increase in learned helplessness. On one hand, our findings are consistent with some prior studies, such as Parsons et al. (1982) and Ziegert et al. (2001), which reported minimal gender differences in learned helplessness. On the other hand, our results contrast with other studies that have found significant gender differences (McClure et al., 2011; Waschbusch et al., 2003). This discrepancy might be due to differences in sample characteristics or educational contexts. Further research is needed to clarify these inconsistencies and better understand gender differences in learned helplessness across different developmental stages and academic contexts.

In contrast, students' prior achievement in Grade 6, the final year of their elementary school education, significantly predicted the intercept of learned helplessness trajectory. Specifically, prior achievement negatively predicted the initial level, indicating that higher grades achieved in elementary school corresponded to lower levels of reported learned helplessness in Grade 7, the first year of secondary school education. These findings are consistent with prior research indicating that early academic achievement plays a significant role in the development of learned helplessness and that students with lower achievement are more likely to experience academic failure, thereby increasing the likelihood of learned helplessness (Buzzai et al., 2021; Peterson et al., 1993; Valas, 2001). Although the rate of increase was significantly and positively predicted by prior achievement, our sensitivity analysis revealed that the predictive effect of prior achievement on the rate of increase in learned helplessness became nonsignificant once initial levels were accounted for, suggesting potential regression

to the mean or a floor effect. Therefore, this predictive effect should be interpreted with caution. Nevertheless, it has been well noted that prior achievement is one important determinant of learned helplessness, emphasizing the need for early interventions to support students at risk of academic failure.

Additionally, family income was predictive of the initial level of the trajectory. The higher the income of the family students came from, the more likely they were to report lower initial levels of learned helplessness. Importantly, family income did not predict the increasing rate, suggesting that the initial differences in learned helplessness remained consistent over time. This finding implies that students from low socioeconomic backgrounds may be more prone to learned helplessness, and this tendency may persist during adolescence without any interventions. It has been well established that students from low socioeconomic backgrounds are more likely to demonstrate underachievement, have difficulties in school adjustment, and drop out of school (Duncan & Brooks-Gunn, 2000; Sirin, 2005). The present study adds to this line of research and suggests that learned helplessness may serve as one factor contributing to such challenges. Educators may therefore want to pay particular attention to and prioritize their support for students from low socioeconomic backgrounds, recognizing their increased vulnerability to learned helplessness.

Taken as a whole, the present study is among the first to evaluate the generalizability of the longitudinal trajectory of learned helplessness across gender, prior achievement, and family income. Our findings indicate the importance of considering students' demographic characteristics to understand the developmental changes of learned helplessness during adolescence more accurately. Notably, the disparities stemming from differences in prior achievement appear to have somewhat diminished, whereas those arising from socioeconomic backgrounds do not appear to have been alleviated. These findings call for more targeted interventions and support systems tailored to address the specific needs of students from diverse demographic backgrounds, mitigating the risk of helplessness and promoting positive developments throughout adolescence.

Pivotal role of parents in adolescents' learned helplessness

Given the well-documented parental influences on diverse aspects of children's development and learning (Lazarides et al., 2015; Lengua et al., 2019; Pomerantz & Grolnick, 2017), we were particularly interested in evaluating parents' role in adolescents' learned helplessness. Specifically, our goal was to examine their role through the lens of self-determination theory, a prominent framework known for elucidating students' autonomy and competence—two mechanisms underlying learned helplessness. We postulated that parental autonomy support and control could serve as predictors of adolescents' learned helplessness.

Consistent with our expectations, the contemporaneous effects of both parental autonomy support and control on adolescents' learned helplessness were significant. That is, the more parental autonomy support and the lesser parental control adolescent students perceived at each time point, the less likely they were to report learned helplessness. The contemporaneous effects of parental autonomy support and control remained significant across time points. This study provides empirical evidence indicating the pivotal role parents could play in either buffering or bolstering their adolescent children's tendency to passively give up in the face of adverse situations rather than taking actions to overcome them.

Our findings align with prior research demonstrating the positive relation between parental control and learned helplessness (Filippello et al., 2015, 2018). We further extend the literature by revealing negative links between parental autonomy support and learned helplessness. Prior research has mostly focused on parental control as a determinant of adolescents' learned helplessness, leading to a limited understanding of parental autonomy support and its relation to learned helplessness. According to self-determination theory (Grolnick et al., 1997), parental autonomy support enables children to take initiative and play a more autonomous and active role in learning. Indeed, one study documented that teachers' autonomy support negatively predicted adolescent students' learned helplessness (Filippello et al., 2020). Building on these, we hypothesized and demonstrated that parental autonomy support is associated with adolescents' recognition that their actions can actually change the outcomes of even adverse situations, mitigating feelings of helplessness.

It is worth noting that parental autonomy support and control were evaluated within an integrative model. This identifies their unique predictions of learned helplessness. Furthermore, not controlling children does not necessarily indicate that the parents offer autonomy support. Our findings showed that parental control was significant even in the presence of parental autonomy support, corroborating the importance of refraining from parental practices focusing on pressure, intrusiveness, and dominance. Likewise, parental autonomy support was significant after taking into account parental control, which has been documented as a predictor of learned helplessness in prior work (Filippello et al., 2015, 2018). As such, our findings underscore the significance of parental practices that foster children's independent problem-solving, decision-making, and emotional validation. Providing autonomy support is as critical as not controlling adolescent students in preventing adolescents from experiencing learned helplessness.

Another notable contribution of the present study was that parental practices and learned helplessness were longitudinally investigated. Specifically, we examined if the contemporaneous effects of parental autonomy support and control changed over time. The contemporaneous effects of parental autonomy support were stable, which was different from our expectations. Initially, we hypothesized

that parental autonomy support would become increasingly important for students going through the process of individuation during adolescence. However, contrary to our initial hypothesis, it turned out that parental autonomy support was of equal importance for students' learned helplessness regardless of where they were in the process of individuation and adolescence.

In contrast, the contemporaneous effects of parental control significantly increased over time, supporting our hypothesis. Put differently, parental control demonstrated a progressively detrimental effect on learned helplessness over time during adolescence. This could plausibly be attributed to the process of individuation becoming more pronounced. During this period, it could be increasingly imperative for adolescents to practice their autonomy and experience their capability to make changes. However, parental control could deprive them of such opportunities, thus leading to learned helplessness. Additionally, it is possible that the effect of parental control is cumulative, thereby exacerbating learned helplessness over time. The findings from our longitudinal investigation lend support to the conclusion that considering adolescents' developmental stage is crucial for understanding the role of parental control in learned helplessness.

Lastly, it is worth noting that our findings were based on a sample of Korean adolescents. As noted earlier, the highly competitive academic environment and high-stakes testing in Korea may have contributed to the observed development of learned helplessness, which may limit the generalizability of the findings. Nevertheless, a prior systematic review that included both Eastern and Western samples documented overall increases in school burnout during secondary education (Vansoeterstede et al., 2023), and the declining patterns of competence beliefs during adolescence have been well established (e.g., Wigfield & Eccles, 1992), suggesting that these may reflect broader, cross-cultural trends. In addition, findings related to parenting may vary in Western samples due to sociocultural factors unique to Korea. Korean parents are known for high expectations and strong commitment to their children's education, which can sometimes be accompanied by academic pressure (Bong et al., 2008), potentially shaping how parental autonomy support and control are experienced. However, recent cross-cultural research has reported the universal importance of parental autonomy support across both Eastern and Western cultures (Jung et al., 2020), suggesting that the roles of parental autonomy support and control observed in the present study may also be applicable across cultural contexts. Still, future cross-cultural research is warranted to further examine and generalize these findings.

In sum, this study provides empirical evidence supporting the significance of both parental autonomy support and control in adolescents' learned helplessness and its development. Our findings suggest a consistent effect of parental autonomy support but an escalating effect of parental control on adolescents' learned helplessness. As a corollary, our results underscore the importance of considering adolescents' developmental stages when designing and providing

interventions to alleviate learned helplessness. Furthermore, our findings also highlight the necessity of longitudinal investigations to grasp the evolving role of parents in relation to adolescents' learned helplessness over time.

The findings of the present study have several important implications for educational policy. First, given the identified increase in adolescents' learned helplessness throughout secondary education, particularly among students with lower prior academic achievement or socioeconomic status, educational policymakers should prioritize early, targeted intervention programs aimed at reducing learned helplessness. Schools would benefit from systematically embedding psychological support and counseling services from the onset of secondary education to help mitigate feelings of helplessness and academic disengagement. Furthermore, educational policies should move beyond merely improving academic performance to explicitly fostering students' sense of autonomy and agency, directly addressing the factors underlying adolescents' vulnerability to learned helplessness. To this end, professional development programs for teachers could emphasize autonomy-supportive instructional practices, thereby creating learning environments that proactively nurture students' psychological resources.

The current findings also yield significant implications for parenting practices during adolescence. Specifically, the increasingly detrimental effect of parental control highlights that adolescents' feelings of helplessness may be exacerbated by overly controlling parenting, particularly as adolescents seek greater psychological independence and individuation. Thus, parents should recognize the potential harm of controlling practices and refrain from overly directive or coercive behaviors that limit adolescents' autonomy and initiative. More importantly, parents should actively engage in autonomy-supportive practices—such as encouraging independent decision-making, providing a rationale for their decisions, and acknowledging their children's feelings—to promote adolescents' sense of personal competence and agency (Grolnick & Lerner, 2023). Consequently, especially during this developmental period when learned helplessness tends to increase, such parenting approaches may help reduce adolescents' vulnerability to helplessness and support their psychological autonomy and academic motivation.

Limitations and future directions

The present study has several limitations that need to be addressed in future research. First, this study relied on self-report data, which may be subject to social desirability bias. Students may tend to present a more favorable image of themselves on survey items, potentially influencing their responses to the items assessing learned helplessness. While the present study provides valuable insights into the longitudinal changes of learned helplessness and the role of parents in these changes, it is challenging to draw any causal inferences about the relationships between parents' autonomy support and control and adolescents' learned

helplessness. Previous research has demonstrated that autonomy support can be experimentally manipulated (e.g., Reeve et al., 2004). Therefore, future research utilizing experimental design could provide a more robust evaluation and offer valuable insights into parental practices and their influence on adolescents' learned helplessness.

Second, we focused on the role of parents, with whom adolescents spend time and interact on a daily basis. However, other significant social figures during adolescence were not evaluated in the present study. Prior work has indicated that not only parents but also teachers can contribute to adolescents' learned helplessness (Filippello et al., 2020; Heyder & Brunner, 2018). Thus, future studies may consider examining the role of teachers alongside parents. Doing so may enable a more comprehensive understanding of the dynamic changes in social influences on the development of learned helplessness during adolescence and identify the most influential figure. This could further help design and implement interventions for alleviating adolescents' learned helplessness.

Third, the present study was conducted using a sample of Korean adolescents, which was large and nationally representative, increasing the generalizability of our findings. Prior cross-cultural research has also provided empirical evidence indicating the measurement invariance of learned helplessness across Eastern and Western cultures and its consistent relations to fear of failure and success orientation across cultures (De Castella et al., 2013). Nevertheless, certain findings may not generalize to other populations from different countries and cultures. Specifically, the findings concerning parents may vary in Western samples due to sociocultural factors unique to the Korean context (Bong et al., 2008). Thus, future cross-cultural research on parents' role in learned helplessness is clearly warranted.

CONCLUSION

Despite these limitations, the present study makes substantial contributions to the literature in several ways. First, this study identifies the developmental trajectory of adolescents' learned helplessness using longitudinal panel data following adolescent students from Grade 7 to Grade 11. Our findings not only confirm the longitudinal increase of learned helplessness during adolescence but also more accurately depict its change by adopting a second-order latent basis model. Second, the developmental trajectory varies across demographic characteristics. Specifically, findings suggest that the initial gaps stemming from low socioeconomic backgrounds consistently remain over time, calling for specific attention to this population. Third and perhaps most importantly, our findings confirm the pivotal roles of parental autonomy support and control in buffering or bolstering adolescents' learned helplessness, respectively, and further suggest the increasing importance of refraining from controlling practices over time. Overall, in addition to advancing theoretical understanding, the findings from the present study can inform the development of targeted

interventions and support aimed at mitigating learned helplessness.

AUTHOR CONTRIBUTIONS

Yujin Chang: Conceptualization; methodology; writing – original draft; writing – review and editing; formal analysis.

Sungjun Won: Conceptualization; methodology; writing – original draft; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study can be accessed from the National Youth Policy Institute at <https://www.nypi.re.kr/archive/mps>.

ETHICS STATEMENT

Ethics approval statement is not applicable.

PATIENT CONSENT STATEMENT

Patient consent statement is not applicable.

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APPENDIX

TABLE A1 Descriptive statistics for observed variables.

	M	SD	Skewness	Kurtosis	Range	Min. observed	Max. observed	α
Prior achievement	3.42	0.92	-0.19	-0.24	1-5	1.00	5.00	-
Family income	6.69	2.29	0.53	-0.01	1-12	1.00	12.00	-
Learned helplessness								
Grade 7	1.79	0.59	0.36	-0.04	1-4	1.00	4.00	.87
Grade 8	1.91	0.56	0.09	-0.09	1-4	1.00	4.00	.83
Grade 9	1.90	0.58	0.30	0.11	1-4	1.00	4.00	.85
Grade 10	1.93	0.56	0.16	-0.17	1-4	1.00	4.00	.84
Grade 11	2.01	0.56	0.15	0.09	1-4	1.00	4.00	.82
Parental autonomy support								
Grade 7	3.35	0.58	-0.54	-0.14	1-4	1.00	4.00	.88
Grade 8	3.21	0.57	-0.31	0.00	1-4	1.00	4.00	.86
Grade 9	3.24	0.54	-0.22	0.07	1-4	1.00	4.00	.87
Grade 10	3.19	0.54	-0.27	0.34	1-4	1.00	4.00	.87
Grade 11	3.12	0.54	-0.21	0.66	1-4	1.00	4.00	.87
Parental control								
Grade 7	2.18	0.65	0.20	-0.19	1-4	1.00	4.00	.77
Grade 8	2.15	0.61	0.09	-0.25	1-4	1.00	4.00	.76
Grade 9	2.19	0.66	0.21	-0.40	1-4	1.00	4.00	.80
Grade 10	2.08	0.57	0.23	0.06	1-4	1.00	4.00	.73
Grade 11	2.12	0.56	0.07	-0.04	1-4	1.00	4.00	.74

Note: $N = 2590$.

Abbreviations: Max., maximum; Min., minimum.

TABLE A.2 Correlations coefficients among observed variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Prior achievement	-																
2. Family income	.20***	-															
Learned helplessness																	
3. Grade 7	-.26***	-.13***	-														
4. Grade 8	-.13***	-.07***	.27***	-													
5. Grade 9	-.15***	-.14***	.24***	.33***	-												
6. Grade 10	-.14***	-.08***	.19***	.27***	.36***	-											
7. Grade 11	-.05*	-.02	.14***	.21***	.27***	.34***	-										
Parental autonomy support																	
8. Grade 7	.15***	.07***	-.30***	-.13***	-.13***	-.10***	-.10***	-									
9. Grade 8	.09***	.02	-.12***	-.35***	-.17***	-.16***	-.13***	.32***	-								
10. Grade 9	.07***	.04*	-.15***	-.15***	-.27***	-.15***	-.17***	.28***	.36***	-							
11. Grade 10	.05*	.05*	-.12***	-.15***	-.21***	-.28***	-.15***	.23***	.35***	.44***	-						
12. Grade 11	.02	.01	-.06**	-.15***	-.12***	-.16***	-.25***	.17***	.31***	.36***	.42***	-					
Parental control																	
13. Grade 7	-.09***	-.04*	.26***	.13***	.10***	.11***	.08***	-.40***	-.22***	-.17***	-.16***	-.11***	-				
14. Grade 8	-.06**	-.03	.13***	.29***	.13***	.09***	.11***	-.26***	-.44***	-.24***	-.21***	-.17***	.35***	-			
15. Grade 9	-.05*	-.07***	.13***	.14***	.26***	.12***	.12***	-.17***	-.26***	-.45***	-.29***	-.29***	.23***	.30***	-		
16. Grade 10	-.03	-.02	.11***	.11***	.13***	.24***	.11***	-.15***	-.24***	-.24***	-.34***	-.25***	.22***	.27***	.41***	-	
17. Grade 11	.03	.02	.13***	.14***	.09***	.13***	.28***	-.15***	-.21***	-.25***	-.27***	-.37***	.21***	.30***	.33***	.36***	-

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