

Understanding and supporting the motivation of students from low-income families

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ABSTRACT

Motivational development in low-income adolescents has been insufficiently studied, due to the difficulties involved in accessing the target population. Nevertheless, previous research suggests that some specific developmental patterns might be particular to this group. On the basis of Self-Determination Theory (SDT) and using latent growth modeling (LGM), we investigated the trajectories of intrinsic and extrinsic motivations in low-income students during adolescence, and we identified the role of parents, teachers, and classmates in determining these trajectories. The participants were 228 adolescents ($M_{\text{age}} = 12.8$; $SD_{\text{age}} = 1.74$; 43.4% girls; 17.1% immigrants) officially certified by the Italian government as being below the poverty threshold. Data was collected by means of a four-wave research design over a period of two years.

Our findings revealed a significant drop in levels of identified regulation over time, while all other forms of motivation, including intrinsic motivation, remained stable during the period considered. Low-income students therefore appear to experience a specific form of motivational decline during adolescence, so that they perceive studying as being less and less meaningful in relation to their goals, values and identities. This decline is even more pronounced for second-generation and male low-income adolescents.

However, parents and teachers were significant predictors of identified regulation at each point in time, suggesting that their support for autonomy fosters identified regulation throughout adolescence. As regards the role of classmates, peer acceptance appears to support identified regulation, while having many friendships seems to have a negative impact on this kind of motivation.

1. Introduction

Over 20% of children and adolescents in the United States and in Europe live in households with incomes below the poverty line (Garcia, 2015; Yoshikawa et al., 2012), a situation that has been worsened by the adverse economic effects of the COVID-19 pandemic (UNICEF, 2020). Apart from its many other deleterious aspects, poverty has a well-documented negative impact on students' levels of educational achievement (e.g. Organization for Economic Co-Operation and Development [OECD], 2004; Sirin, 2005; White, 1982), which appears to increase throughout the period of compulsory education (Cameron et al., 2015; Helbling et al., 2019; Kieffer, 2012). It is therefore important to carefully analyze the malleable factors that may influence the academic performance of very low-income students. In this regard

motivation is one of the most significant dimensions to take into consideration, because it is closely related to academic outcomes such as performance and persistence (e.g. Ryan & Deci, 2017; Howard et al., 2021).

Research on the psychological consequences of poverty suggests that growing up in a family which lacks the means for providing material comforts might influence the motivational development of children and adolescents (Alivernini et al., 2021; Bianchi et al., 2022; Manganelli et al., 2021). Many studies have shown that those who live in poverty are more likely to perceive a valuable future goal as less desirable than a more immediate outcome with an inferior value: a psychological phenomenon known as temporal discounting or delay discounting (for a review, see de Bruijn & Antonides, 2022; Haushofer & Fehr, 2014). This tendency of families living in poverty to focus on the present rather than

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the future appears to be particularly relevant to students' motivation in compulsory schooling. Studying during this period is clearly a future-oriented activity, as it has a practical value in relation to a future goal, such as getting a better-paid job or gaining access to higher education (de Bilde et al., 2011; Eccles & Wigfield, 2002), and motivational theories point out that socioeconomic conditions can influence students' future-oriented motivations. For example, achievement goal theory assumes that the distal reasons prompting students to adopt achievement goals are formed through the internalization of socioeconomic values (Liem & McInerney, 2018) and, according to Self-Determination Theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2017), socioeconomic and cultural factors such as rewards, norms, values and obligations affect students' regulatory styles of studying, orienting them either toward the present or the future (Reeve et al., 2018; de Bilde et al., 2011).

Although there are strong empirical and theoretical reasons for assuming that living in poverty shapes the academic motivation of children and adolescents, no studies specifically focusing on this issue have as yet been published. Empirical evidence is also lacking on how motivation can be encouraged and supported in this particular population of students. This research is intended to at least partially remedy this situation. On the basis of SDT (Deci & Ryan, 1985; Ryan & Deci, 2017), we investigated patterns of motivational change during two years of compulsory schooling for adolescents who were officially certified by the Italian government as living below the poverty threshold. The determinants of these changes in motivation were also analyzed, identifying the specific roles of parents, classmates, and teachers.

1.1. Academic motivations according to SDT

On the basis of the classic distinction between intrinsic and extrinsic motivation, Self-Determination Theory posits a continuum of relative motivational autonomy along which various distinct regulatory approaches to studying can be placed (Ryan & Deci, 2017). The continuum begins with external regulation which involves studying in order to obtain rewards or avoid punishment and which is controlled by a completely external source. The next type of motivation to study, introjected regulation, is more self-directed but it is associated with internal pressures to avoid negative emotions such as guilt or shame. The autonomous end of the motivational continuum begins with identified regulation, when students consciously recognize studying as being personally significant and important, even though they might not particularly enjoy it. Finally, intrinsic motivation has the highest level of autonomy: students are motivated to study due to their own personal interest and they enjoy this activity for its own sake. Each form of motivation has been shown to be closely correlated with certain academic, behavioral and emotional outcomes (Alivernini et al., 2021; Assor et al., 2009; Burton et al., 2006; Cavicchiolo et al., 2022; Koestner & Losier, 2002; Ratelle et al., 2004; Ryan & Deci, 2017). For example, numerous studies indicate that externally motivated students tend to be less persistent and to obtain lower grades (Guay & Bureau, 2018; Ryan & Deci, 2017). Similarly, introjected regulation is rarely associated with high levels of achievement, which typically comes at the cost of negative emotions and stress (Assor et al., 2009). Identified and intrinsic regulation are both forms of autonomous motivation, which have proved to lead to positive consequences in the educational context (Vansteenkiste, Simons, et al., 2005). Nevertheless, these consequences appear to differ, with intrinsic motivation predicting psychological well-being and with identified regulation being more closely related to students' academic results (Burton et al., 2006).

As regards low-income students, it is important to consider that these two autonomous forms of motivation appear to be associated with different temporal perspectives (de Bilde et al., 2011). Intrinsic motivation is firmly rooted in the present, in the sense that intrinsically motivated adolescents tend to immerse themselves in their studies, as a source of pleasure and enjoyment, and they do not focus on future outcomes. Instead, identified regulation, due to its functional or

utilitarian aspects, is future-oriented and students with this kind of motivation are committed to studying because they see it as important for the goals they personally endorse. As we have pointed out, this future time perspective is often absent in low-income families, which tend to be more present-oriented, preferring current satisfactions over those in a hypothetical future (de Bruijn & Antonides, 2022; Haushofer & Fehr, 2014). It is therefore reasonable to suppose that growing up in such an environment would specifically undermine students' identified motivation to study and the detrimental effects should become evident during adolescence, since in childhood learning is to a large extent based on intrinsic motivation (Ryan & Deci, 2017).

1.2. Motivational changes during adolescence

Although as yet no longitudinal research has investigated motivational changes during adolescence in a population of low-income students, some studies have examined this phenomenon in the general population. In a study on intrinsic motivation in students from the ages of 9 to 17, Gottfried et al. (2001) detected a linear decrease of this kind of regulation as students' ages increased. Subsequent studies investigating also other forms of motivation have indicated that motivational decline during adolescence is not limited to intrinsic motivation but also applies to the various forms of extrinsic motivation. Otis et al. (2005) found that all forms of students' motivation decrease from the ages of 13 to 15, while Leroy and Bressoux (2016) detected a similar decline in students between 10 and 12 years of age. Finally, Gnams and Hanfstingl (2016) identified a marked decline in all kinds of motivation from age 11 to 16, especially in the area of intrinsic motivation. According to these results, it would therefore seem that there is a reduction in all types of motivation to study during adolescence.

However, there is growing evidence that motivational changes during adolescence can vary widely between different subpopulations of students. Ratelle et al. (2004) found that introjected and external regulation was very stable during late adolescence, whereas changes in levels of intrinsic and identified regulation differed across groups of students, increasing in some and decreasing in others. More recently, Guay et al. (2021) identified five distinct profiles for changes in motivation during secondary school. Three of these profiles involved increases in autonomous motivation, while the other two were characterized by unchanging (low or moderate) levels of autonomous motivation. In contrast with the previous studies, no decline in levels of autonomous motivation was observed from the ages of 13 to 15. Xie et al. (2021) investigated changes in high-school students' academic motivation during 2 school years and identified six distinct motivational profiles: amotivated, externally regulated, balanced demotivated, moderately motivated, balanced motivated, and autonomously motivated.

These studies clearly show that there can be very wide variations in motivational development during adolescence. Nevertheless, they are limited by the fact that they identify distinct groups of students with different motivational characteristics on the basis of person-centered data-driven approaches, rather than applying and testing a specific theory or hypothesis. While these approaches have a solid exploratory relevance, the results of the various studies can be inconsistent, and they often do not provide a satisfactory theoretical explanation for the dissimilarities in motivational development in different subpopulations of students. In addition person-centered data-driven approaches require multiple sets of parameters rather the single set used in a variable-centered analysis, which means that they are not parsimonious (Howard & Hoffman, 2018). In the present study we therefore used a variable-centered approach focused on understanding the development of motivation in the subpopulation of low-income students, for which, as we have pointed out, there are good theoretical as well as empirical reasons to hypothesize a particular kind of motivational development.

1.3. Determinants of academic motivation according to SDT

According to Self-Determination Theory, all human beings have the three basic psychological needs of autonomy, competence, and relatedness, the satisfaction of which leads to motivation and wellbeing in the individual (Ryan & Deci, 2017). Autonomy is satisfied when students see them as agentic and integrated with their own volition, competence when they have the perception of being effective in their environment, and relatedness when they see themselves as socially connected with others. In an educational context, the main agents for satisfying these basic psychological needs and thus for promoting academic motivation (Ryan & Deci, 2017) are students' parents, teachers and especially as regards relatedness - their peers (Chia et al., 2016; Guay et al., 2017).

1.3.1. Parents and teachers

Parents and teachers are the primary providers of education for children and adolescents and when they are supportive of autonomy they also have a positive influence on academic motivation (Chia et al., 2016; Fan & Chen, 2001; Hill & Taylor, 2004; Pomerantz et al., 2005; Reeve, 2002; 2006). At home as well as at school being autonomy-supportive means giving students the opportunity to make decisions for themselves whenever appropriate, considering their points of view, and providing coherent and meaningful explanations as to why they might have to engage in uninteresting activities (Grolnick, 2016; Reeve, 2002; 2006). When teachers and parents are autonomy-supportive of students they try to see things from their point of view and are consequently also more responsive to their relational and competence concerns (Ryan & Deci, 2020). According to SDT, autonomy-support therefore leads to the satisfaction of not only autonomy, but also of competence and relatedness, and thus of all the basic psychological needs of students (Cheon et al., 2018; Ryan & Deci, 2017, 2020). When the autonomy of adolescents is supported, they feel understood, respected, and encouraged in their initiatives (Reeve, 2009).

Although several studies have found that support for autonomy can foster the motivation of students, (Chia et al., 2016; Reeve, 2002; 2006), there is little empirical evidence regarding the impact of similar strategies on the different motivational trajectories of adolescents. Ratelle et al. (2004) showed that students with problematic changes in their motivation during the transition to college perceived their own parents as less supportive of their autonomy than those of other students. More recently Guay et al. (2021) found that the behavior of teachers and fathers was an important positive predictor of autonomous motivation during secondary school, but this study focused on students' perception of relatedness, rather than support for autonomy.

1.3.2. Peers

Although peers do not provide education in such a structured way as teachers and parents do, according to SDT they can support academic motivation mostly through the satisfaction of the need for relatedness (Guay et al., 2017; 2021), since adolescence is a developmental period during which social interactions are highly significant (Smetana et al., 2006). Nevertheless, research investigating the relationship between relatedness and academic motivation has had mixed results. A number of studies (Cox & Ullrich-French, 2010; Furrer & Skinner, 2003; Gairns et al., 2015) suggest that positive social interactions with peers are associated with optimal levels of motivation, while several other studies have found either no association (Guay et al., 2017; Ryan et al., 1994) or even a negative association between peer relatedness and autonomous motivation (Guay et al., 2021; Guiffreda et al., 2013). In interpreting these results it should be noted that in some studies (Guay et al., 2017; Guay et al., 2021) relatedness is assessed by taking into consideration the entire peer network, whereas the most important peer group as regards academic motivation is probably that of classmates, as most educational experiences and peer social interactions related to academic activities take place within this group (Hofmann & Müller, 2018; Ladd, 1990; 1999). Furthermore, these studies do not distinguish between two

different aspects of peer relatedness in the group of classmates: peer acceptance and friendships (Alivernini et al., 2019; Cavicchiolo et al., 2022, 2023; Ladd et al., 1997). Whereas peer acceptance indicates inclusion in the group and is generally measured by the number of classmates who have social interactions with a student, friendship refers to a connection with one or more specific individuals, which involves frequent contacts and the sharing of activities outside the context of school (Kindermann, 1993; Hall, 2019; Parks, 2007). This distinction is in line with the definition of relatedness in SDT as the experience of being connected and of being important either to a group or to another individual (Ryan & Deci, 2017). Regarding the possible different effects of these two aspects of relatedness on academic motivation, a recent study shows that peer acceptance in the group of classmates might be more important than friendships for experiencing positive emotions in the context of academic activities at school (Alivernini et al., 2019). This suggests that being accepted by the class might be more important for academic motivation than having friends (which might even have a negative impact). When adolescents define what constitutes a friendship, spending time together is usually one of the first factors they mention (Parks, 2007). Since making and keeping friends requires a significant commitment of time and energy (Hall, 2019), although it is certainly important for psychological well-being and happiness (Demir et al., 2015), it can take energy away from a student's academic activities and interests. The mixed results reported in the literature on the relationship between relatedness and academic motivation might therefore be due, at least in part, to the contrasting effects of peer acceptance and friendships.

1.4. Low-income students and determinants of academic motivation

No published studies hitherto have investigated the effects of peer relatedness and support for autonomy by parents and teachers on the patterns of motivational change in low-income students.

There are theoretical grounds for supposing that in this population there are few or no benefits deriving from peer relatedness and support for autonomy, since they target the satisfaction of psychological rather than material needs in order to promote students' motivation.

In this regard, Maslow's (1954, 1970) theory of the hierarchy of human needs appears to be relevant to the present study as it leads to predictions that are at odds with SDT. According to Maslow's paradigm, physical needs and needs for security, such as living within safe environments and communities in which there is a sense of protection and order, must first be satisfied before more complex psychological needs such as that posited by SDT are acknowledged and can start to motivate behavior. Low-income adolescents often live in social contexts where violence and crime are quite common, and their material requirements, as well as their needs for security and care provided by their families, are often neglected and unsatisfied (Conger et al., 2010). Therefore, according to Maslow's theory, the needs of autonomy, relatedness and competence of these adolescents do not motivate their behavior, since their unfulfilled fundamental material and safety needs necessarily take priority. On the other hand, SDT claims that this hierarchy does not exist and that psychological needs can have a strong motivating force even in very deprived socio-economic conditions (Reeve et al., 2018; Ryan & Deci, 2017). Until now research on adolescents has mainly provided evidence on the generalizability of SDT across different cultures (eg. Nalipay, et al., 2020; Sheldon, et al., 2009; van Egmond, et al., 2017; 2020) and the question of whether peer relatedness and autonomy support truly benefits the development of academic motivation in low-income students is still open.

Even if the effects of parents, teachers and peers prove to be positive also for low-income students, the specific impact of each of these factors still needs to be determined. In this regard, recent studies have documented that low-income students experience less social inclusion among their classmates (Cavicchiolo et al., 2023) leading them to experience less positive emotion at school (Alivernini et al., 2019). It is therefore

possible that their academic motivation would particularly benefit from acceptance by their classmates. In addition, it is widely recognized that families living in poverty have high levels of family conflict (Dashiff et al., 2009; Wadsworth & Berger, 2006) which, together with the tendency of adolescents to assert their individuality and become independent, might have the effect of accelerating the emotional detachment of low-income adolescents from their parents, in order to affirm their identity and individuality (De Goede et al., 2009). During adolescence this could lead to a decreased importance of autonomy support from parents in favor of peers and teachers (Kim et al., 2018).

1.5. Aims and hypotheses

The present longitudinal study had two main aims. Firstly, to identify the trajectories of intrinsic and extrinsic motivations of low-income students during adolescence, focusing on systematic changes in motivation. Secondly, to establish the role of parents, teachers, and classmates in determining these trajectories. Four hypotheses emerged from theoretical considerations and from our review of the literature.

Hypothesis 1 (H1): Low-income students' identified regulation will decrease during adolescence. This hypothesis is based on studies showing that for families living in poverty the future time perspective – a definitional characteristic of identified regulation according to SDT (de Bilde et al., 2011) – is much less important, as they are focused on the present (de Bruijn & Antonides, 2022; Haushofer & Fehr, 2014).

Hypothesis 2 (H2): Low-income students' academic motivation development will benefit from autonomy support provided by parents and teachers and from peer relatedness. This prediction was in line with SDT claim, according to which basic psychological needs are universally valid (Reeve et al., 2018), and if they are satisfied by means of autonomy support and relatedness, this tends to lead to positive motivational outcomes, even when material and economical needs are frustrated.

Hypothesis 3 (H3): The motivational benefits of parental support for autonomy might decline over time while the benefits of teacher support and peer relatedness increase. The increasing independence of adolescents, together with the high level of parent-adolescent conflict that is typical of low-income families (Dashiff et al., 2009), might cause an emotional disengagement of low-income adolescents from their parents in favor of their peers and their teachers (Kim et al., 2018).

Hypothesis 4 (H4): Experiencing peer acceptance in the classmates' group might be more important for the development of academic motivation than having friends. This is based on evidence showing that peer acceptance predicts more positive emotions in the school context (Alivernini et al., 2019) and that friendships can reduce the commitment to academic activities and interests (Guiffreda et al., 2013).

2. Method

2.1. Participants and procedure

The participants were enrolled in social centers that offered free recreational activities for young people below the poverty threshold. Nine centers were involved in the study, with locations in disadvantaged urban and suburban areas of nine different cities in northern, central, and southern Italy. These centers provide free support services to young people from low-income families, in the form of recreational afternoon programs (e.g. sports and physical activities) and they are frequented by students of various ages from many different schools.

The participants were given a letter explaining the aims of the study, which they showed to their parents in order to obtain their informed written consent. The students who provided this permission were then invited to fill in the questionnaire during a typical recreational afternoon in the social center. The eligibility criteria for inclusion in the study were: (a) being from 10 to 16 years of age (inclusive); (b) living in families in conditions of poverty, according to the official Italian indicator of household income and assets (Equivalent Economic Status

Index, ISEE; Council of Ministers, 2013); (c) attending the after-school social centers for disadvantaged minors; (d) being able to speak and read Italian. The exclusion criteria were: (a) having a learning disability or cognitive impairment that would make the participant incapable of completing the study; (b) failing to provide parental written permission.

The data was collected via an online survey administered in the social centers under the supervision of trained researchers who ensured the participants' privacy and the standardization of all the study procedures. This study was conducted in accordance with the Italian ethical guidelines for research in psychology (National Board of Italian Psychologists, 1989) and the study protocol was approved by the institutional review board at the first author's institution.

The data for the present study was gathered at four different points in time over a period of two consecutive school years with a six-month interval between each measurement. At the beginning of the school year, 232 young people who were attending schools from the 5th to the 10th grade and participating in activities of the social centers were invited to fill in a questionnaire investigating the measures adopted in the present study. Four parents did not give their written permission for participation in the research so at time 1 (T1) 228 students filled in the questionnaire. At time 2 (T2), 17 of the original participants could not be contacted as they were no longer attending the after-school educational centers, so 211 adolescents responded to the second data collection (92.5% retention). At time 3 (T3) a further 18 participants were not available so 193 adolescents were involved in this data collection (91.5% retention). Finally, at time 4 (T4), 187 participants completed the online survey (since 6 adolescents could not be contacted, 96.9% retention). These high response rates are in line with recent studies on Italian adolescents (Bianchi et al., 2021) and are probably due to the popularity of these centers among students and their parents, since they offer a range of services and recreational activities free of charge.

Demographic information was collected at T1. Of the 228 adolescents who participated in the first administration ($M_{age} = 12.8$; $SD_{age} = 1.74$, age range: 10–16), 56.6% were males. The 8.3% were first-generation immigrants, while 8.8% were second-generation immigrants. This percentage is in line with the figures for low-income immigrant students attending Italian schools collected by the most recent national reports (Foundation for Initiatives and Studies on Multi-Ethnicity, 2020; Ministry of Education, Universities and Research, 2020). All the first-generation immigrants who participated in the present study had spent a minimum period of 8 months in the Italian school system.

2.2. Measures

Since coefficient alpha assumes that all items are equally correlated with the underlying construct and this was unrealistic in our case, we assessed reliability via coefficient omega at each time point, with values of 0.65 as the minimally accepted level (Dunn et al., 2014).

2.2.1. Academic motivations

Due to the logistical constraints in the social centers for disadvantaged students, a short version of the Academic Self-Regulation Questionnaire (SRQ-A, Ryan & Connell, 1989) was adopted to measure different motives for doing school activities. The questionnaire consists of four scales, each of which includes three items expressing reasons for trying to do well at school and for doing homework, pertaining to four different regulation styles: external regulation (example item: "Because that's what I'm supposed to do"), introjected regulation (example item: "Because I want the teacher to think I'm a good student"), identified regulation (example item: "Because it's important to me to try to do well in school") and intrinsic motivation (example item: "Because I enjoy doing my homework"). The responses were given on a 4-point Likert-type scale ranging from 1 (*not at all true*) to 4 (*very true*). The omega coefficient for intrinsic motivation was 0.84 at T1, 0.81 at T2, 0.83 at T3 and 0.85 at T4; for identified regulation it was 0.75 at T1, 0.76 at T2,

0.77 at T3 and 0.77 at T4; for introjected regulation it was 0.70 at T1, 0.72 at T2, 0.76 at T3 and 0.74 at T4; for external regulation it was 0.66 at T1, 0.68 at T2, 0.71 at T3 and 0.72 at T4. This time-efficient measure has proved in previous studies on national representative samples to have good psychometric properties and to be invariant across biological sex and immigrant background (Alivernini et al., 2018).

2.2.2. Parental support for autonomy

Parental support for autonomy was measured by using the Italian version of the Perceptions of Parents Scale (POPS; Alivernini & Lucidi, 2011; Grolnick et al., 1991). This scale includes three items that assess adolescents' perceptions of how supportive their parents are of their autonomy at home (example item: "At home my parents give me explanations about why I have to behave in a certain way") and the responses were given on a 5-point scale ranging from 1 (*never*) to 5 (*very often*). The omega coefficient for this scale was 0.72 at T1, 0.72 at T2, 0.74 at T3 and 0.76 at T4. The reliability and validity of the POPS are well-documented (e.g., Alivernini & Lucidi, 2011; Costa et al., 2015; Vansteenkiste et al., 2005). In the present study, the POPS demonstrated strong measurement invariance over time ($\Delta\text{CFI}_{\text{weak-strong}}$ parents autonomy support = 0.001).

2.2.3. Support for autonomy by teachers

Teachers support for autonomy was measured by using the Italian version of the Learning Climate Questionnaire (LCQ; Alivernini et al., 2019; Williams & Deci, 1996). This includes four items that regard the way teachers behave in class (example item: "My teachers encourage me to ask questions during the lesson") and the responses were given on a 5-point scale ranging from 1 (*never*) to 5 (*very often*). The omega coefficient for this scale was 0.68 at T1, 0.72 at T2, 0.75 at T3 and 0.76 at T4. The LCQ has demonstrated strong psychometric properties in several previous studies (e.g. Alivernini et al., 2019; Cheon et al., 2012; Jang et al., 2016; Jang et al., 2009; Nishimura & Joshi, 2021). In the present study, the LCQ demonstrated strong measurement invariance over time ($\Delta\text{CFI}_{\text{weak-strong}}$ teachers autonomy support = 0.006).

2.2.4. Peer relatedness

Peer relatedness was measured with The Classmates Social Isolation Questionnaire for adolescents (CSIQ-A; Cavicchiolo et al., 2022), a measure of social relationships that specifically refers to the context of the classmates. It includes eight items covering the two domains of peer acceptance and peer friendship: four items for the former (example item: "How many of your classmates speak with you?") and four items for the latter (example item: "How many of your classmates do you meet outside school?"). For each item, the participants were asked to indicate the number of their classmates with whom they had social relationships on a 5-point scale ranging from 1 (*none*) to 5 (*all*). The omega coefficient for peer acceptance was 0.80 at T1, 0.83 at T2, 0.83 at T3 and 0.84 at T4; while the omega coefficient for peer friendship was 0.82 at T1, 0.86 at T2, 0.85 at T3 and 0.84 at T4. The CSIQ-A has proved to be a psychometrically sound measure for children and adolescents, and it has demonstrated measurement invariance across biological sex, socioeconomic status and across groups with different immigrant backgrounds (Alivernini & Manganelli, 2016; Bianchi et al., 2021, 2022; Cavicchiolo et al., 2022). In addition, in the present study, peer acceptance and peer friendship demonstrated strong measurement invariance over time ($\Delta\text{CFI}_{\text{weak-strong}}$ peer acceptance = 0.004; $\Delta\text{CFI}_{\text{weak-strong}}$ peer friendship = 0.010).

2.2.5. Prior achievement

This variable corresponded to the students' official school grades in Italian and mathematics awarded at the end of the previous school year. School grades, expressed as a whole number from 4 to 10, were provided to the social centers directly by the student's schools. For Italian, this grade includes several aspects of language proficiency (i.e. listening, oral production and interaction, reading and comprehension, writing, vocabulary, and grammar). For mathematics it measures several aspects

of arithmetic, geometry, measurement, data analysis and forecasting. The national language and mathematics are generally considered the most important subjects in Italian school, and they have proved to be very closely correlated with results in national standardized tests (Cavicchiolo et al., 2020; Paletta et al., 2017).

2.2.6. Demographic and sociocultural covariates

The present study considered the following demographic and sociocultural covariates: biological sex (0 = female, 1 = male), age at T1 and immigrant background (first- and second-generation). In accordance with the definition of the Organization for Economic Co-operation and Development (OECD, 2014), foreign-born participants with foreign-born parents were defined as first-generation immigrants, while adolescents born in Italy of parents born in another country were considered second-generation immigrants. Immigrant background was coded by means of two dummy variables (0/1), for first- and second-generation immigrants, with native participants acting as the reference category.

2.3. Data analysis

In the present study unconditional and conditional latent growth models (LGM) were adopted in order to address our research aims and hypotheses. These models are an application of a structural equation model (SEM) to the analysis of change (Preacher, 2018). They have several advantages over other techniques. Firstly they model aspects of change as random effects, making it possible to estimate the means, variances and covariances of individual differences in intercepts and slopes. In addition they allow to assess the fit of the model to the data, to analyze changes in the latent variables and to examine the antecedents and consequences of change (Preacher, 2018). The models were tested using the Robust Maximum Likelihood estimator (MLR). Measurement invariance was conducted as a preliminary test to assess the feasibility of the subsequent latent growth models. Data were analyzed using IBM Spss Statistics version 27 for preliminary analysis and Mplus 8 version 1.6.1 (Muthén & Muthén, 1998–2017) for all the other analyses using full information maximum likelihood (FIML) to handle missing data.

2.3.1. Measurement invariance

In order to ensure that each type of motivation was measured in the same way over time, longitudinal confirmatory factor analyses (CFAs) were conducted. A series of increasingly restrictive models were assessed: in the first model all the parameters were allowed to be freely estimated in all four separate time points (configural invariance); in the second model factor loadings were constrained to be equal over time (weak invariance); finally we constrained the item intercepts to be equal over time (strong invariance). We considered CFI values in order to monitor changes over time: differences between models that were less than or equal to 0.010 confirmed time invariance across the four time points (Chen, 2007; Cheung & Rensvold, 2002).

2.3.2. Unconditional latent growth model

To assess changes in the different types of motivations of low-income students during the period of the study, unconditional growth models were performed adopting a multiple indicator approach and latent variables. We preferred to use latent variables in order to take into account measurement error. Significant changes over time were assessed by using the following fit indices: the χ^2 test statistic, the Comparative Fit Index (CFI) which should be higher than 0.95 for a good model fit, as well as the Root Mean Square Error of Approximation (RMSEA), in which values of ≤ 0.05 can be considered as a good fit and finally the Standardized Root Mean Square Residual (SRMR), which should be lower than 0.10 for an acceptable fit (Hu & Bentler, 1999; Schermelleh-Engel et al., 2003). Latent models showing good fit statistics indicated that the hypothesized shape of the data was appropriate for the pattern of change (Hertzog et al., 2008). The Satorra-Bentler Chi-square difference test was performed to compare the models. Given that we have four

time points, it was possible to test linear as well as quadratic patterns of change and intercept and slopes estimates and variances were estimated as well as the covariance between the intercept and the slope for the linear latent growth model.

2.3.3. Conditional latent growth model

Based on the results of the previous analyses, we assessed covariates that we thought would explain the changes over time by means of a conditional latent growth model. We evaluated time-invariant (that do not change over time) and time-varying covariates (that potentially change over time). The following covariates were hypothesized to explain between-person differences and included as time invariant factors: biological sex, immigrant background, prior achievement and age at T1. The two latter variables were centered at their grand-mean (see Wang & Maxwell, 2015). Support for autonomy from parents and teachers, and peer relatedness (i.e. peer acceptance and peer friendship) were included as time-varying factors to explain any further within-person variance that was unexplained by the underlying trajectory (Bollen & Curran, 2006; Curran et al., 2010; Preacher et al., 2008). These time-varying factors were centered at their grand-mean. We included these supports as time varying covariates to consider the joint contribution of the latent curve process and of the time-specific measures (Bollen & Curran, 2006). Two different models were examined. In the first model in order to test for the decline of parental support for autonomy and the increase of teacher support and peer relationships, these effects were assumed to be the same at each of the four points in time, while in the second model these effects were assumed to vary over time. The Satorra-Bentler Chi-square difference test was performed to compare the two models. Due to the complexity of our model and the sample size, we opted to use factor scores in the conditional linear growth models. To use factor scores we implemented a multistage approach (McNeish & Wolf, 2020). First, we calculated factor scores from longitudinally invariant measurement models (Millsap, 2011) by using the regression method implemented in Mplus. Subsequently, we used them in the conditional latent growth models. Factor scores, in contrast to scale scores, preserve some of the characteristics of the underlying measurement structure (Guay et al., 2021; Skrondal & Laake, 2001).

Materials and the analysis code for this study are available by emailing the corresponding author.

3. Results

Descriptive statistics are displayed in Appendix A while correlations among all variables can be consulted in Appendix B.

3.1. Measurement invariance

All of the models demonstrated strong measurement invariance over time ($\Delta CFI_{\text{weak-strong}}$ external regulation = 0.002; $\Delta CFI_{\text{weak-strong}}$ introjected regulation = 0.003; $\Delta CFI_{\text{weak-strong}}$ identified regulation = 0.002; $\Delta CFI_{\text{weak-strong}}$ intrinsic motivation = 0.007), thereby confirming that each construct was being measured in the same way over time (Widaman et al., 2010).

3.2. The unconditional growth models: Trajectories of the four types of motivation

Table 1 shows the fit statistics for the various unconditional growth models based on latent variables we tested. The results revealed that a linear growth model was an appropriate model of change for identified regulation (χ^2 (58) = 63.84, p = .28; RMSEA = 0.021; CFI = 0.992; SRMR = 0.055), while intercept-only and quadratic models seemed to be less appropriate to our data. In contrast intercept-only models (which assume no change across time) better represent our data for external (χ^2 (63) = 68.43, p = .30; RMSEA = 0.019; CFI = 0.988; SRMR = 0.061) and introjected regulation (χ^2 (63) = 73.21, p = .18; RMSEA = 0.027; CFI =

Table 1

Fit statistics for the unconditional growth models based on latent variables and results of the Satorra-Bentler Chi-square difference test.

Model	χ^2	df	p-value	χ^2 diff-test ^a	df	p-value
<i>External regulation</i>						
Intercept only	68.428	63	0.298			
Linear	65.060	58	0.244	3.198	5	0.670
Quadratic	645.479	58	0.000			
<i>Introjected regulation</i>						
Intercept only	73.211	63	0.178			
Linear	68.709	58	0.159	4.639	5	0.462
Quadratic	525.594	53	0.000			
<i>Identified regulation</i>						
Intercept only	83.236	63	0.045			
Linear	63.840	58	0.279	18.793	5	0.002
Quadratic	696.677	58	0.000	0	0	-
<i>Intrinsic motivation</i>						
Intercept only	84.768	63	0.035			
Linear	84.013	62	0.030	0.848	1	0.357
Quadratic	134.100	57	0.000			

Note: The selected models are presented in bold. ^aSatorra-Bentler Chi-square difference test between intercept only and linear models and between linear and quadratic models.

0.980; SRMR = 0.059) as well as for intrinsic motivation (χ^2 (63) = 84.77, p = .04; RMSEA = 0.039; CFI = 0.976; SRMR = 0.072).

Table 2 shows the parameters for the selected models. The results indicate that all the intercept means and variances were significant. Identified regulation significantly declined over time (linear slope mean = -0.04, p < .05) and there was a significant variation between low-income adolescents in their rates of change (linear slope variance = -0.02, p < .05). Finally, the results showed a significant negative association between the intercept and the linear slope (intercept-linear covariance = -0.05, p < .01), suggesting a developmental pattern of a steeper decrease of identified regulation over time in low-income adolescents who reported high initial levels of this kind of motivation to study.

3.3. The conditional latent growth model: Factors associated with the trajectory of identified regulation

Firstly, we tested a conditional linear growth model with time-invariant covariates and time-varying covariates that we assumed would have equal effects over time¹. The model demonstrated a good

¹ We have also tested if the time-varying predictors have a trend themselves. We started with intercept-only models (i.e. no growth in the supports for autonomy and peer relatedness) and we extended the LCMs to include a slope factor (linear growth); we next built models which include a quadratic factor (quadratic growth). Finally, we compared the fit of those models by using the Satorra-Bentler chi square difference test. The results indicated that for supports for autonomy and peer relatedness, the intercept-only model better represents the data (Parents autonomy support – comparison between the intercept-only and the linear growth model S-B χ^2 (3) = 4.52, p = .211, for the quadratic LCM, multiple estimation problems were encountered, thus suggesting that the quadratic model was a poor representation of the observed data; Teachers autonomy support – comparison between the intercept-only and the linear growth model S-B χ^2 (6) = 7.15, p = .307, for the quadratic LCM, multiple estimation problems were encountered; Peer acceptance – comparison between the intercept-only and the linear growth model S-B χ^2 (6) = 6.29, p = .392, comparison between the linear and the quadratic growth model S-B χ^2 (6) = 7.22, p = .301; Peer friendship – comparison between the intercept-only and the linear growth model S-B χ^2 (4) = 4.38, p = .357, comparison between the linear and the quadratic growth model S-B χ^2 (5) = 5.14, p = .399). In conclusion, support for autonomy from parents and teachers and peer relatedness (i.e. peer acceptance and peer friendship) did not appear to have a trend during the period considered. We would like to thank an anonymous Reviewer for prompting us to empirically verify this point.

Table 2
Parameters for selected latent variable models.

	External regulation		Introjected regulation		Identified regulation		Intrinsic motivation	
	Unstandardized	Std.	Unstandardized	Std.	Unstandardized	Std.	Unstandardized	Std.
Intercept mean	2.84*** (0.04)	5.59	2.42 (0.04)***	5.53	3.20*** (0.05)	5.02	2.68*** (0.04)	5.69
Intercept variance	0.26*** (0.05)		0.19 (0.04)***		0.41*** (0.05)		0.22*** (0.04)	
Linear slope mean			-0.04* (0.02)	-0.28				
Linear slope variance			0.02* (0.01)					
Intercept-linear covariance			-0.05** (0.02)	-0.57				

Note: Unstandardized and standardized (Std.) estimates. Standard errors are displayed in parentheses. *** $p < .001$; ** $p < .01$; * $p < .05$.

data fit: $\chi^2(75) = 101.68, p = .022$; RMSEA = 0.039; CFI = 0.954; SRMR = 0.066. In order to investigate the hypothesis that the effect of the different factors changed over time we tested a second model with the only difference being that time-varying covariates were free to vary over time: $\chi^2(63) = 93.13, p = .008$; RMSEA = 0.046; CFI = 0.948; SRMR = 0.062. The results of the Satorra-Bentler Chi-square difference test ($S-B\chi^2(12) = 9.23, p = .683$) suggested that the two models were equivalent and the most parsimonious model (i.e. time-varying covariates fixed over time) was therefore retained. This result indicated that the influence of peer relatedness and support for autonomy from parents and teachers did not change over time. Fig. 1 presents the full LGM while Table 3 shows the parameters for the identified regulation model.

3.3.1. Time-invariant covariates: Demographic and sociocultural factors

Table 4 shows all standardized (significant and non-significant) paths for time-invariant factors. Biological sex, age and second-generation immigrant background were found to be significantly associated with the initial levels of identified regulation. Females, younger adolescents and second-generation immigrants had higher initial levels of identified regulation, while neither first-generation immigrant background nor prior achievement proved to be significantly related to initial levels of identified regulation. Age also proved to be significantly associated with the initial levels of identified regulation with younger adolescents who showed higher levels compared to the older ones. Subsequent multiple-group analyses revealed that the functional form of change (e.g. no-growth, linear, quadratic) did not differ between younger and older students (younger students: $\min_{age} 10, \max_{age} 12$; older students: $\min_{age} 13, \max_{age} 16$) and that the linear growth model was the best fitting model for both groups (younger students $S-B\chi^2(5) = 13.891, p < .05$ and older students $S-B\chi^2(5) = 11.588, p < .05$). Second-generation immigrant background negatively predicted the slope of identified regulation ($\beta = -0.22, p < .10$). Because the slope of identified regulation was negative, this indicated that having a second-generation immigrant background tended to enhance the decrease of identified regulation over time. Furthermore, we found that the slope effect for prior achievement approached the level of significance ($\beta = 0.17, p = .09$) thus showing that higher levels of prior achievement might mitigate the decreasing of identified regulation. Finally, the intercept and the slope of identified regulation were found to be negatively correlated ($r = -0.70, p < .001$): this result suggests that low-income adolescents who reported higher initial levels in their identified regulation to study tend to have identified regulation slopes that were less negative/decrease less over time.

3.3.2. Time-varying covariates: Autonomy supports and peer relatedness

Peer relatedness (including peer acceptance and peer friendship) and support for autonomy from parents and teachers showed significant effects (see Fig. 1). These findings indicate that increased levels of peer acceptance and support for autonomy from parents and teachers were related to higher levels of identified regulation while having more friends seems to be negatively associated with students' identified regulation.

4. Discussion

The general purpose of the present study was to identify the trajectories of intrinsic and extrinsic motivations of low-income students during adolescence, as well as to establish the role of parents, teachers, and classmates in determining these trajectories.

4.1. Motivational trajectories during adolescence in low-income students

Several studies on people living in poverty indicate that they tend to perceive a significant goal in the future as less desirable than a less valuable result in the present (de Bruijn & Antonides, 2022; Haushofer & Fehr, 2014). Previous research has established the emphasis of identified regulation on future personal goals, due to its functional aspects (de Bilde et al., 2011). On this basis we hypothesized a progressive decline in the identified regulation of low-income students during adolescence (H1) when intrinsic motivation is less central to learning than it is in childhood (Ryan & Deci, 2017). Our results were fully in line with this hypothesis: we found a significant drop in levels of identified regulation over the two years of the longitudinal study and the initial levels of this form of motivation differed as a function of age, with older students having lower levels of identified regulation. All other forms of motivation (external regulation, introjected regulation and intrinsic motivation) remained stable over the period considered. These findings are consistent with recent research showing that motivational changes during adolescence can differ widely across subpopulations of students (Guay et al., 2021; Xie et al., 2021). Compared to the results based on groups from the general population (Gnamb & Hanfstingl, 2016; Leroy & Bressoux, 2016; Otis et al., 2005), low-income students therefore appear to experience a specific form of motivational decline during adolescence, pertaining to the goal-directed regulation.

It is worth noting that in our sample the levels of intrinsic motivation, the most autonomous form of motivation, remained unchanged during the two-year period considered. The age range (10–16) of our sample at T1 does not allow us to exclude the possibility that there could have been a drop in intrinsic motivation before our study started, during late childhood. Nevertheless, the stability of intrinsic motivation that we observed is consistent with a recent research from Guay and colleagues (2021) showing that self-determined forms of motivation do not necessarily decay during adolescence. As regards the present study, this stability can be interpreted in the light of the present-oriented outlook of people with a low income (de Bruijn & Antonides, 2022; Haushofer & Fehr, 2014), since intrinsic regulation involves studying for the inherent pleasure of doing so, perhaps because the student is fascinated by a particular topic at school and wants to read about it in more depth. When intrinsically motivated low-income students are absorbed in a particular activity, they therefore focus completely on the present and future-oriented outcomes are less important (de Bilde et al., 2011). Instead, many learning activities, such as memorizing facts before an exam or doing monotonous exercises in order to master a mathematical procedure or grammar rule, have a low intrinsic appeal. However, there is evidence that seeing such activities as necessary for reaching personal goals in the future is more important, for ensuring school achievement, than being interested in the subject for its own sake (Burton et al., 2006;

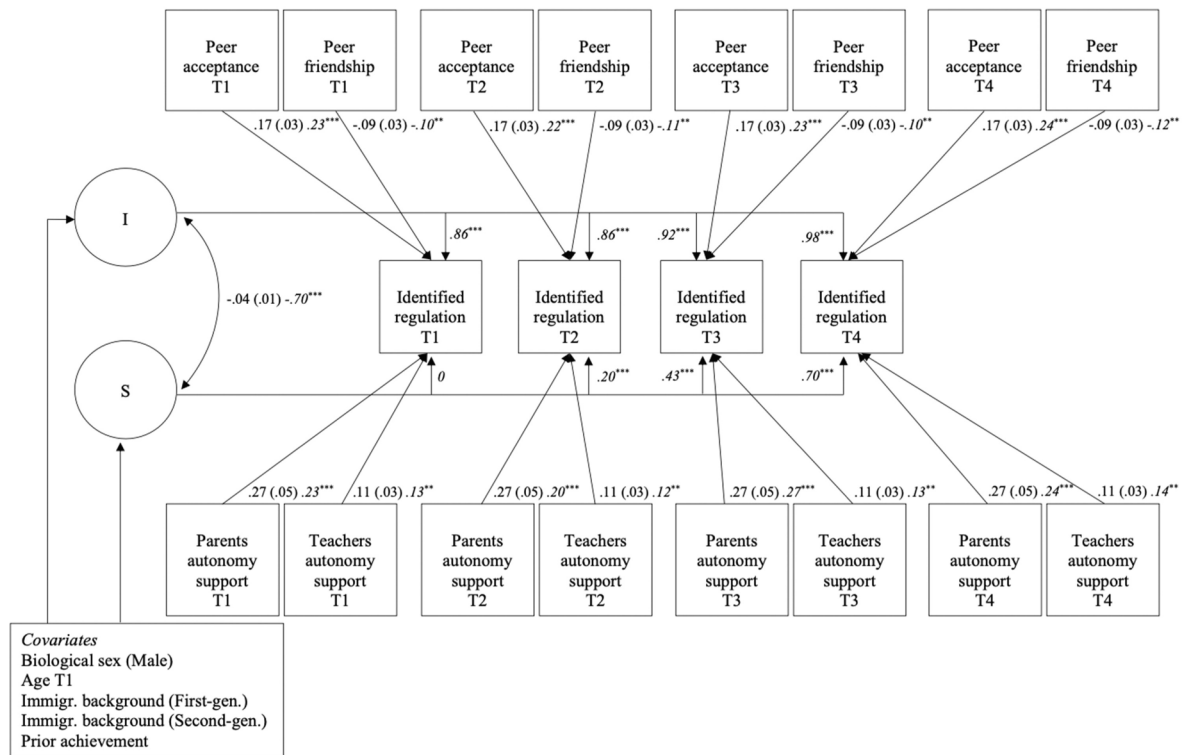


Fig. 1. Conditional latent growth model for identified regulation. Note: I = intercept; S = slope. Standardized estimates. *** $p < .001$; ** $p < .01$; * $p < .05$.

Table 3
Parameters for identified regulation model.

	Identified regulation	
	Unstandardized	Std.
Intercept mean	3.30*** (0.05)	6.20***
Linear slope mean	-0.05*** (0.02)	-0.38**
Intercept-linear covariance	-0.04*** (0.01)	-0.70***

Note: Unstandardized and standardized (Std.) estimates. Standard errors are displayed in parentheses. *** $p < .001$; ** $p < .01$; * $p < .05$.

Table 4
Latent growth modeling: intercepts and slopes of time-invariant factors.

Time-invariant covariates	I	S
Biological sex (Male)	-0.21**	0.08
Age T1	-0.15*	0.13
Immigrant background (first-generation)	0.08	-0.04
Immigrant background (second-generation)	0.14*	-0.22**
Prior achievement	0.00	.17 ^a

Note: I = intercept; S = slope. Standardized estimates. *** $p < .001$; ** $p < .01$; * $p < .05$; ^a approached the level of significance.

Koestner & Losier, 2002).

The differences we observed in initial levels of identified regulation and its rate of change provide additional data, which can be useful with regard to research and practice. Male low-income students proved to have lower initial levels of identified regulation, a result which is consistent with studies in the general population showing that boys usually have less autonomous motivation to study than girls (Alivernini et al., 2018; Grouzet et al., 2006; Vallerand et al., 1992; Vallerand et al., 1989; Vallerand et al., 1997; Vallerand & Bissonnette, 1992). However, biological sex did not predict motivational changes, suggesting that this gap in autonomous motivation to study could be formed before adolescence.

In our sample of low-income students, there was a more rapid decline

in motivation in second-generation immigrants (who were born in Italy of immigrant parents) than in natives and first-generation immigrants. This result is in line with findings in the literature on immigrants in the US and Europe (Alivernini et al., 2018; Marks et al., 2014; Pong & Zeiser, 2012; Portes & Rumbaut, 2001; Suárez-Orozco & Suárez-Orozco, 1995), indicating that second-generation immigrants are less motivated than those of the first-generation, even though they have had more time to cope with difficulties related to living and studying in a new country (Diemer et al., 2014; Fuligni & Yoshikawa, 2004; Marks et al., 2014; Pong & Zeiser, 2012; Portes & Rumbaut, 2001; Suárez-Orozco & Suárez-Orozco, 1995). In the literature, an open issue is to determine the specific motivational factors producing this paradoxical situation by examining within-subject changes in motivational processes over time (Marks et al., 2014). Our study reveals that the academic maladjustment of the children of immigrant parents in a western country might be due to a particularly marked decline in identified regulation during adolescence. Immigrant parents often move to another country in order to improve their children's opportunities and life (Buriel, 2012), and our results suggest that the belief that schooling and studying can lead to this goal might diminish from one immigrant generation to the next.

Finally, it is also important to bear in mind that initial levels and rate of changes of identified regulation were negatively correlated, indicating that low-income students who had higher levels of motivation at the beginning of the study experienced a steeper decline in this motivation over time. This finding suggests that students who show initial higher levels of motivation, and therefore from the point of view of teachers and school may seem less problematic, are actually more at risk of experiencing a strong decline over time.

4.2. Factors supporting academic motivation in low-income students

On the basis of SDT, we hypothesized that (H2) the academic motivation of low-income students would benefit from peer relatedness and support for their autonomy provided by parents and teachers, even if they live in material and economic conditions which one might suppose to limit the relevance of psychological needs and supports (Maslow,

1954). Our results were in line with this hypothesis, by indicating that these psychosocial factors predicted higher rates of identified regulation throughout the entire period of the study, and that they therefore appear to play a role in promoting academic motivation throughout adolescence. We have thus extended previous studies (eg. Nalipay, et al., 2020; Sheldon, et al., 2009; van Egmond, et al., 2017; 2020) by pointing out the effectiveness of these factors, also for students living in deprived material and economic conditions in western countries. As regards parents, it is worth noting that although low-income households are more likely to engage in authoritarian education (e.g. Dodge et al. 1994; Gurland & Grolnick 2005; Hanson & Chen 2007), when they adopt autonomy-supportive behaviors they appear to foster their children motivation. Therefore, in contrast to what was hypothesized in previous studies (Kim et al., 2018), low-income adolescents do not seem to be desensitized to the advantages related to autonomy support from their parents because they experience it less often than their more affluent peers.

In contrast with our third hypothesis (H3), we found no evidence for any diminution over time in the benefits of parental support for autonomy in favor of their teachers and their peers. Thus the growing independence of adolescents, together with the high level of parent-adolescence conflict characteristic of low-income families (Dashiff et al., 2009) do not appear to be associated with a progressive emotional disengagement of the adolescents from their parents. On the contrary, the process of progressive independence and separation of these adolescents in the transition from childhood to adulthood does not seem to involve any disconnection from their parents as important sources of motivational support (Smollar & Youniss, 1989).

We also hypothesized (H4) that different aspects of peer relatedness (peer acceptance and peer friendship) may affect academic motivation differently, and our results supported this hypothesis. Whereas being accepted within the group of classmates appears to encourage and sustain academic motivation, having many friendships appears to have a negative impact. Previous research has shown that low-income adolescents are more at risk of being socially excluded at school and that they experience more positive emotions during academic activities when they are socially included by their classmates, even in the form of intermittent interactions such as an occasional chat (Alivernini et al., 2019; Cavicchiolo et al., 2023). The results of the present study extend these findings by showing that peer acceptance in the classroom also favors the identified regulation of low-income students. On the other hand, making and maintaining friendships requires time (e.g. in shared activities out of school) which is a limited resource (Hall, 2019), and although important for psychological well-being and happiness (Demir et al., 2015), it can take energy away from academic activities and interests. Our results indicate that in the context of educational research it is important to distinguish between different kinds of peer relatedness within the group of classmates, as they can lead to contrasting outcomes.

4.3. Implications for practice

Teachers should be aware of the peculiar motivational development of low-income students during adolescence, which seems to lead them to lose sight of their future aims as a motivation for studying. These students gradually become less convinced of the importance of doing their best at school in order to achieve their personal goals in life. Those who have higher initial levels of motivation, and who may therefore seem less problematic from the point of view of teachers and school staff, are actually more at risk of experiencing a strong decline in this motivation over time. Males and second-generation immigrant students from low-income families are particularly at risk, so special attention should be dedicated to them.

Our results suggest that various strategies are available to teachers and schools to prevent or reduce this specific motivational decline. Promoting the peer acceptance of low-income students among their classmates (Cavicchiolo et al., 2023) appears to be effective for increasing

their identified regulation to study. This is good news for teachers and school staff, since stimulating social interactions and contacts (e.g. by organizing group activities in which low-income students can participate) is in fact much easier than supporting the closer relationships that are the foundation of friendships (Alivernini et al., 2019).

Support for autonomy appears to be an effective preventive measure throughout adolescence. Previous research has identified the behaviors of teachers and school staff that can foster perceptions of autonomy support (Chia et al., 2016; Grolnick, 2016; Reeve, 2002; 2006; 2009; Reeve & Cheon, 2014) and that appear to be effective also for disadvantaged students (Alivernini et al., 2019; Vansteenkiste et al., 2020). These include trying to recognize the students' points of view (e.g. by asking them to make proposals and express their ideas), offering options with regard to activities to be carried out in class, acknowledging negative feelings when students express a lack of interest in a lesson, and the avoidance of coercive language (e.g. using terms such as "must" or "have to").

The same kinds of support have been shown to be effective not only in the school context, but also at home (Chia et al., 2016; Grolnick et al., 2002; Grolnick, 2016). Our results therefore indicate that the parents of low-income students should be more aware that support for their children's autonomy might help them to develop higher levels of motivation. Some strategies appear to be particularly effective in promoting the involvement of parents with a low income. These include scheduling school meetings and events at times that are convenient for them, using methods of communication such as social media or texting, and taking into account the decisive role of school counselors and social workers (Murray et al., 2014). It is equally important to consider that is crucial to make sure that low-income parents get involved because they see their participation as important for furthering goals that they share with their children, and to bear in mind that getting parents involved by inducing feelings of guilt can be counterproductive (Grolnick, 2016).

4.4. Strengths and limitations

The present study has several strengths. It focuses on the population of low-income students which has been insufficiently investigated in longitudinal research. The eligibility criteria for being included in the study (living below the poverty threshold) were based on objective measures of economic status (Equivalent Economic Status Index, ISEE) rather than on self-reports. We adopted a set of sophisticated and parsimonious variable-centered analyses using a theory-driven rather than data-driven approach in order to answer our research questions and test the hypotheses on which they were based. We evaluated trajectories for each specific type of academic motivation (i.e. intrinsic, identified, introjected and external) and we took into consideration the major determinants of academic motivation according to SDT and several demographic and sociocultural factors.

However, this study does have some limitations. Firstly, although we used well-established standardized measures of academic motivation, autonomy support and peer relatedness, our variables (with the exception of prior academic achievement) were based on self-reports. The instruments we adopted proved to be valid from several different points of view, but we cannot exclude that self-report bias may have played a role in some of the results we observed.

The development and use in future studies of implicit measurement methods for academic motivations might corroborate the insights based on self-reports. Implicit measures mean that the participants are unaware of what is being investigated (e.g. motivations toward studying), and infer psychological attributes from the results of performance-based tasks (Gawronski & Hahn, 2019). Implicit measures are assumed to be less susceptible to intentional deceptions; nevertheless they appear to capture related but distinct constructs from self-report measures (e.g., Nosek & Smyth, 2007). Therefore, in order to get a fuller picture of the development of motivation in low-income students, the evidence provided by explicit and implicit assessments could be used in a complementary way. Future research could also consider including

observational and informant-reported measures (i.e. provided by teachers and peers). The integration of these additional assessments would decrease the risk of mono-method approaches that might lead to overestimating associations between the variables being studied (Podsakoff et al., 2003; Olino & Klein, 2015). However, it should be borne in mind that, for practical and ethical reasons, it could be particularly hard to study the motivational development of low-income students using observational and informant-reported measures.

Secondly, in the present study we investigated the role of peers with respect only to relatedness. This is consistent with previous studies that consider this experience particularly significant for academic motivation (Guay et al., 2017; Guay et al., 2021), due to the extreme importance that adolescents give to social interactions with their peers (e.g. Smetana et al., 2006). Peers do not formally provide education in the way that teachers and parents do, and thus they generally do not have a structured and consistent autonomy-supportive or controlling style regarding academic activities. Nevertheless, we believe that future research might benefit from empirically testing this hypothesis, by investigating students' behavior that could support autonomy and competence at school more directly, in addition to relatedness.

Thirdly, the usual limitations of observational studies apply to our findings, and caution should be made in interpreting the parameters of the model causally, even though we adopted a longitudinal design with multiple waves and the posited relationships were based on theory. In addition, future studies may adopt other analytical approaches, such as a cross-lagged longitudinal design, to investigate possible reciprocal relationships between the predictors considered (parental autonomy support, autonomy support by teachers, peer acceptance and peer friendship) and academic motivation. In fact, although this was not the theoretical focus of the present study, it would be valuable to have evidence about the temporal precedence of these variables. Finally, due to logistical limitations, we were only able to collect longitudinal data across two academic years albeit at four different time points. Future studies may profitably look into collecting data over a longer time period in order to ascertain possible changes in the motivational trajectories we identified.

Appendix A

Descriptive statistics of all the variables considered in the study

Variable	Mean or %	SD	Skewness	Kurtosis
<i>Motivation</i>				
External T1	2.74	0.71	-0.12	-0.22
External T2	2.72	0.68	-0.04	-0.02
External T3	2.77	0.69	-0.13	-0.22
External T4	2.72	0.69	-0.18	-0.26
Introjected T1	2.57	0.72	0.05	-0.23
Introjected T2	2.51	0.75	0.01	-0.36
Introjected T3	2.52	0.65	0.17	-0.05
Introjected T4	2.59	0.67	-0.09	-0.10
Identified T1	3.17	0.73	-0.49	-0.63
Identified T2	3.07	0.74	-0.53	-0.34
Identified T3	3.08	0.69	-0.24	-0.85
Identified T4	3.01	0.68	-0.35	-0.20
Intrinsic T1	2.59	0.75	-0.19	-0.21
Intrinsic T2	2.40	0.73	0.16	-0.31
Intrinsic T3	2.50	0.73	-0.26	-0.26
Intrinsic T4	2.53	0.73	-0.13	-0.50
<i>Time-invariant covariates</i>				
Gender (1 = male)	56.6%	-	-	-
Age T1	12.79	1.74	0.11	-1.01
Immigrant background (1 = I generation)	8.3%	-	-	-
Immigrant background (1 = II generation)	8.8%	-	-	-
Achievement T1	6.91	1.34	0.08	-0.23
<i>Time-varying covariates</i>				
Peer acceptance T1	3.73	0.87	-0.79	0.60
Peer acceptance T2	3.73	0.85	-0.60	-0.01
Peer acceptance T3	3.70	0.87	-0.65	0.39

(continued on next page)

5. Conclusions

By using latent-growth modeling we have provided several important insights into the development of academic motivation in low-income students during adolescence. Our results suggest that the levels of identified regulation in these students significantly decline and therefore that over time they perceive studying as being less and less meaningful in relation to their personal goals, values and identities. All other forms of motivation, including intrinsic motivation, remained stable, indicating that low-income students appear to experience a specific form of motivational development during adolescence.

It is important to note that the results also indicate that support for autonomy by teachers and parents can foster identified regulation throughout adolescence. Finally, we have shown that promoting peer relatedness in the classroom can be an effective way to support identified regulation. Nevertheless, it is important to distinguish between peer acceptance and peer friendship since, while social acceptance in the group of classmates appears to support academic motivation, having many friendships seems to have a negative impact.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

(continued)

Variable	Mean or %	SD	Skewness	Kurtosis
Peer acceptance T4	3.76	0.83	-0.76	0.73
Friendship T1	2.62	0.88	-0.04	-0.58
Friendship T2	2.72	0.89	-0.30	-0.32
Friendship T3	2.68	0.86	-0.24	-0.47
Friendship T4	2.77	0.92	-0.05	-0.28
Parents autonomy support T1	3.77	0.84	-0.68	0.44
Parents autonomy support T2	3.83	0.80	-0.33	-0.35
Parents autonomy support T3	3.69	0.88	-0.55	0.27
Parents autonomy support T4	3.78	0.80	-0.58	0.82
Teachers autonomy support T1	3.30	0.85	-0.47	0.40
Teachers autonomy support T2	3.27	0.80	-0.57	0.73
Teachers autonomy support T3	3.28	0.77	-0.38	0.33
Teachers autonomy support T4	3.33	0.83	-0.49	0.17

Appendix B

Correlations among all variables used in the present study.

Study variables	External regulation				Introjected regulation				Identified regulation				Intrinsic motivation			
	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4	T1	T2	T3	T4
Autonomy support - parents T1	0.17*	0.07	0.14	0.04	0.25***	0.15*	0.18*	0.04	0.31***	0.26***	0.27***	0.17*	0.14*	0.08	0.14*	0.03
Autonomy support - parents T2	0.10	0.16*	0.21**	0.05	0.17*	0.18**	0.19*	0.13	0.23**	0.34***	0.27***	0.13	0.07	0.06	0.12	-0.04
Autonomy support - parents T3	0.09	0.06	0.20**	0.15*	0.19**	0.07	0.16*	0.10	0.21**	0.31***	0.31***	0.15*	0.02	0.01	0.04	0.01
Autonomy support - parents T4	0.11	0.06	0.07	0.16*	0.10	-0.06	0.04	0.20**	0.09	0.15*	0.23**	0.32***	0.04	-0.02	0.06	0.21**
Autonomy support - teachers T1	0.33***	0.01	0.23**	0.17*	0.27***	0.17*	0.15*	0.19*	0.25***	0.10	0.14	0.14	0.29***	0.18*	0.14*	0.20**
Autonomy support - teachers T2	0.10	0.17*	0.14	0.26***	0.06	0.30***	0.12	0.29***	0.03	0.27***	0.06	0.13	0.05	0.23**	0.12	0.19*
Autonomy support - teachers T3	0.15*	-0.03	0.15*	0.21**	0.22**	0.12	0.29***	0.24**	0.17*	0.19*	0.19**	0.19*	0.26***	0.28***	0.37***	0.21**
Autonomy support - teachers T4	0.01	0.05	0.16*	0.37***	0.13	0.07	0.15	0.43***	0.09	0.12	0.14	0.43***	0.12	0.16*	0.26**	0.44***
Peer acceptance T1	0.27***	0.19**	0.24**	0.17*	0.20**	0.03	0.16*	0.07	0.26***	0.18*	0.20**	0.12	0.11	-0.01	0.10	0.03
Peer acceptance T2	0.11	0.24***	0.10	0.15*	0.21**	0.14*	0.10	0.07	0.20**	0.27***	0.18*	0.14	-0.02	0.00	0.00	0.02
Peer acceptance T3	0.10	0.15*	0.22**	0.23**	0.15*	0.06	0.16*	0.05	0.24**	0.21**	0.33***	0.15*	0.12	-0.01	0.21**	0.10
Peer acceptance T4	0.03	0.12	0.21**	0.27***	0.12	0.03	0.10	0.19*	0.11	0.13	0.23**	0.33***	0.01	0.01	0.17*	0.20**
Peer friendship T1	0.09	0.08	0.05	0.15*	0.12	0.02	0.12	0.13	-0.15*	-0.17*	-0.14*	-0.07	0.01	0.02	0.11	0.17*
Peer friendship T2	-0.03	0.09	-0.07	0.15*	0.15*	0.14	0.02	0.14	-0.12	-0.06	-0.19**	-0.07	-0.11	0.04	-0.08	0.16*
Peer friendship T3	0.08	0.09	0.03	0.26**	0.18*	0.07	0.06	0.22**	-0.11	-0.08	-0.10	0.07	0.05	0.13	0.23**	0.27***
Peer friendship T4	0.02	0.12	0.11	0.25**	0.08	0.14	0.12	0.30***	-0.11	-0.06	-0.07	0.02	0.08	0.18*	0.15	0.32***
Prior achievement	-0.17**	-0.13	0.01	0.06	0.08	0.07	0.08	0.19*	-0.01	-0.02	0.02	0.21**	0.17*	0.12	0.13	0.20**
Biological sex (Male)	0.05	0.00	0.03	0.04	0.00	0.01	0.12	-0.04	-0.19**	-0.18*	-0.09	-0.17*	-0.10	-0.07	-0.02	-0.08
Age T1	-0.13*	-0.13	-0.15*	-0.16*	-0.13*	-0.12	-0.12	-0.17*	-0.15*	0.06	-0.02	-0.15*	-0.23***	-0.06	-0.03	-0.06
First-generation immigrant	-0.02	-0.06	0.02	-0.09	-0.09	-0.05	-0.05	-0.15*	-0.02	0.05	-0.01	0.00	-0.09	-0.07	-0.03	-0.18*
Second-generation immigrant	0.03	-0.01	0.03	-0.04	0.02	0.04	-0.02	-0.04	0.13*	0.07	0.02	0.01	0.03	0.02	0.00	-0.04

Note: T1 = time 1; T2 = time 2; T3 = time 3; T4 = time 4. *** p <.001; ** p <.01; * p <.05.

References

Alivernini, F., & Lucidi, F. (2011). Relationship between social context, self-efficacy, motivation, academic achievement, and intention to drop out of high school: A longitudinal study. *The Journal of Educational Research, 104*(4), 241–252. <https://doi.org/10.1080/00220671003728062>

Alivernini, F., & Manganelli, S. (2016). The Classmates Social Isolation Questionnaire (CSIQ): An initial validation. *European Journal of Developmental Psychology, 13*, 264–274. <https://doi.org/10.1080/17405629.2016.1152174>

Alivernini, F., Manganelli, S., Cavicchiolo, E., Girelli, L., Biasi, V., & Lucidi, F. (2018). Immigrant background and gender differences in primary students' motivations toward studying. *The Journal of Educational Research, 111*(5), 603–611. <https://doi.org/10.1080/00220671.2017.1349073>

Alivernini, F., Cavicchiolo, E., Girelli, L., Lucidi, F., Biasi, V., Leone, L., ... Manganelli, S. (2019). Relationships between sociocultural factors (gender, immigrant and socioeconomic background), peer relatedness and positive affect in adolescents. *Journal of Adolescence, 76*, 99–108. <https://doi.org/10.1016/j.adolescence.2019.08.01>

Alivernini, F., Bianchi, D., Cavicchiolo, E., Manganelli, S., Cozzolino, M., Lucidi, F., & Park, N. (2021). Positive Youth Development Among Youth Living in Poverty: The Role of Psychological Needs Satisfaction. *Youth & Society, 0*(0). <https://doi.org/10.1177/0044118X211035956>

Alivernini, F., Manganelli, S., Girelli, L., Cozzolino, M., Lucidi, F., & Cavicchiolo, E. (2021). Physical Distancing Behavior: The Role of Emotions, Personality, Motivations, and Moral Decision-Making. *Journal of pediatric psychology, 46*(1), 15–26doi. <https://doi.org/10.1093/jpepsy/jsaa122>

Alivernini, F., Cavicchiolo, E., Manganelli, S., Chirico, A., & Lucidi, F. (2019). Support for autonomy at school predicts immigrant adolescents' psychological well-being. *Journal of Immigrant and Minority Health, 21*(4), 761–766. <https://doi.org/10.1007/s10903-018-0839-x>

Assor, A., Vansteenkiste, M., & Kaplan, A. (2009). Identified versus introjected approach and introjected avoidance motivations in school and in sports: The limited benefits of self-worth strivings. *Journal of Educational Psychology, 101*(2), 482–497. <https://doi.org/10.1037/a0014236>

Bianchi, D., Cavicchiolo, E., Lucidi, F., Manganelli, S., Girelli, L., Chirico, A., & Alivernini, F. (2021). School Dropout Intention and Self-esteem in Immigrant and Native Students Living in Poverty: The Protective Role of Peer Acceptance at School. *School Mental Health, 13*(2), 266–278. <https://doi.org/10.1007/s12310-021-09410-4>

Bianchi, D., Cavicchiolo, E., Manganelli, S., Lucidi, F., Girelli, L., Cozzolino, M., Galli, F., & Alivernini, F. (2021). Bullying and victimization in native and immigrant very-low-income adolescents in Italy: Disentangling the roles of peer acceptance and friendship. *Child & Youth Care Forum*. Advance online publication. <https://doi.org/10.1007/s10566-021-09612-6>

Bianchi, D., Cavicchiolo, E., Manganelli, S., Lucidi, F., Chirico, A., Girelli, L., ... Alivernini, F. (2022). School absenteeism and self-efficacy in very-low-income students in Italy: Cross-lagged relationships and differential effects of immigrant background. *Children and Youth Services Review, 136*, 106446. <https://doi.org/10.1016/j.childyouth.2022.106446>

Bollen, K. A., & Curran, P. J. (2006). *Latent curve models: A structural equation perspective*. Wiley.

Buriel, R. (2012). Historical origins of the immigrant paradox for Mexican American students: The cultural integration hypothesis. In C. Garcia Coll, & A. K. Marks (Eds.), *The immigrant paradox in children and adolescents: Is becoming American a*

- developmental risk? (pp. 37–60). American Psychological Association. <https://doi.org/10.1037/13094-002>.
- Burton, K. D., Lydon, J. E., D'Alessandro, D. U., & Koestner, R. (2006). The differential effects of intrinsic and identified motivation on well-being and performance: Prospective, experimental, and implicit approaches to self-determination theory. *Journal of Personality and Social Psychology*, 91(4), 750–762. <https://doi.org/10.1037/0022-3514.91.4.750>
- Cameron, C. E., Grimm, K. J., Steele, J. S., Castro-Schilo, L., & Grissmer, D. W. (2015). Nonlinear Gompertz curve models of achievement gaps in mathematics and reading. *Journal of Educational Psychology*, 107, 789–804. <https://doi.org/10.1037/edu0000009>
- Cavicchiolo, E., Manganeli, S., Girelli, L., Chirico, A., Lucidi, F., & Alivernini, F. (2020). Immigrant children's proficiency in the host country language is more important than individual, family and peer characteristics in predicting their psychological well-being. *Journal of Immigrant and Minority Health*, 21, 195–199. <https://doi.org/10.1007/s10903-020-00998-4>
- Cavicchiolo, E., Lucidi, F., Diotaiuti, P., Chirico, A., Galli, F., Manganeli, S., ... Alivernini, F. (2022). Adolescents' Characteristics and Peer Relationships in Class: A Population Study. *International journal of environmental research and public health*, 19(15), 8907. <https://doi.org/10.3390/ijerph19158907>
- Cavicchiolo, E., Sibilio, M., Lucidi, F., Cozzolino, M., Chirico, A., Girelli, L., ... Alivernini, F. (2022). The Psychometric Properties of the Behavioural Regulation in Exercise Questionnaire (BREQ-3): Factorial Structure, Invariance and Validity in the Italian Context. *International journal of environmental research and public health*, 19(4), 1937. <https://doi.org/10.3390/ijerph19041937>
- Cavicchiolo, E., Manganeli, S., Bianchi, D., Biasi, V., Lucidi, F., Girelli, L., ... Alivernini, F. (2023). Social inclusion of immigrant children at school: the impact of group, family and individual characteristics, and the role of proficiency in the national language. *International Journal of Inclusive Education*, 27(2), 146–166. <https://doi.org/10.1080/13603116.2020.1831628>
- Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling*, 14, 464–504. <https://doi.org/10.1080/10705510701301834>
- Cheon, S. H., Reeve, J., & Moon, I. S. (2012). Experimentally based, longitudinally designed, teacher-focused intervention to help physical education teachers be more autonomy supportive toward their students. *Journal of Sport and Exercise Psychology*, 34, 365–396.
- Cheon, S. H., Reeve, J., Lee, Y., & Lee, J.-w. (2018). Why autonomy-supportive interventions work: Explaining the professional development of teachers' motivating style. *Teaching and Teacher Education*, 69, 43–51. <https://doi.org/10.1016/j.tate.2017.09.022>
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9, 233–255. https://doi.org/10.1207/S15328007SEM0902_5
- Chia, L. W., Keng, J. W. C., & Ryan, R. M. (2016). *Building autonomous learners. Perspectives from Research and Practice using Self-Determination Theory*. Springer.
- Conger, R. D., Conger, K. J., & Martin, M. J. (2010). Socioeconomic Status, Family Processes, and Individual Development. *Journal of Marriage and the Family*, 72(3), 685–704. <https://doi.org/10.1111/j.1741-3737.2010.00725.x>
- Costa, S., Soenens, B., Gugliandolo, M. C., Cuzzocrea, F., & Larcán, R. (2015). The mediating role of experiences of need satisfaction in associations between parental psychological control and internalizing problems: A study among Italian college students. *Journal of Child and Family Studies*, 24(4), 1106–1116. <https://doi.org/10.1007/s10826-014-9919-2>
- Council of Ministers (2013). Decree of the President of the Council of Ministers 159 (Italy). Retrieved from <https://www.gazzettaufficiale.it/eli/id/2014/1/24/14G00009/sg>.
- Cox, A. E., & Ullrich-French, S. (2010). The motivational relevance of peer and teacher relationship profiles in physical education. *Psychology of Sport and Exercise*, 11(5), 337–344. <https://www.sciencedirect.com/science/article/pii/S1469029210000312>
- Curran, P. J., Obeidat, K., & Losardo, D. (2010). Twelve Frequently Asked Questions About Growth Curve Modeling. *Journal of cognition and development: Official journal of the Cognitive Development Society*, 11(2), 121–136. <https://doi.org/10.1080/15248371003699969>
- Dashiff, C., DiMicco, W., Myers, B., & Sheppard, K. (2009). Poverty and adolescent mental health. *Journal of Child and Adolescent Psychiatric Nursing*, 22(1), 23–32. <https://doi.org/10.1111/j.1744-6171.2008.00166.x>
- de Bilde, J., Vansteenkiste, M., & Lens, W. (2011). Understanding the association between future time perspective and self-regulated learning through the lens of self-determination theory. *Learning and Instruction*, 21(3), 332–344. <https://doi.org/10.1016/j.learninstruc.2010.03.002>
- de Bruijn, E.-J., & Antonides, G. (2022). Poverty and economic decision making: A review of scarcity theory. *Theory and Decision*, 92(5–37). <https://doi.org/10.1007/s11238-021-09802-7>
- De Goede, I. H. A., Branje, S. J. T., & Meeus, W. H. J. (2009). Developmental changes in adolescents' perceptions of relationships with their parents. *Journal of Youth and Adolescence*, 38, 75–88. <https://doi.org/10.1007/s10964-008-9286-7>
- Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. *Plenum*. <https://doi.org/10.1007/978-1-4899-2271-7>
- Demir, M., Ortel-Clark, H., Özdemir, M., & Özdemir, S. B. (2015). Friendship and happiness among young adults. In M. Demir (Ed.), *Friendship and happiness: Across the life-span and cultures* (pp. 117–135). Springer Science + Business Media.
- Diemer, M. A., Li, C.-H., Gupta, T., Uygun, N., Sirin, S., & Rogers-Sirin, L. (2014). Pieces of the immigrant paradox puzzle: Measurement, level, and predictive differences in precursors to academic achievement. *Learning and Individual Differences*, 33, 47–54. <https://doi.org/10.1016/j.lindif.2014.04.005>
- Dodge, K. A., Pettit, G. S., & Bates, J. E. (1994). Socialization mediators of the relation between socioeconomic status and child conduct problems. *Child Development*, 65, 649–665. <https://doi.org/10.1111/j.1467-8624.1994.tb00774.x>
- Dunn, T. J., Baguley, T., & Brunsden, V. (2014). From alpha to omega: a practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology (London, England: 1953)*, 105(3), 399–412. <https://doi.org/10.1111/bjop.12046>
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual review of psychology*, 53(1), 109–132. <https://www.annualreviews.org/doi/full/10.1146/aanurev.psych.53.100901.135153>
- Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review*, 13, 1–22. <https://doi.org/10.1023/A:1009048817385>
- Foundation for Initiatives and Studies on Multi-Ethnicity, ISMU (2020). *The Twenty-fifth Italian Report on Migrations 2019* (National Report). Retrieved online on August 2020 from <https://www.ismu.org/the-twenty-fifth-italian-report-on-migrations-2019/>.
- Fulgini, A., & Yoshikawa, H. (2004). Parental investments in children in immigrant families. In A. Kalil, & T. DeLeire (Eds.), *Family investments in children* (pp. 139–161). Erlbaum.
- Furrer, C., & Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology*, 95(1), 148–162. <https://doi.org/10.1037/0022-0663.95.1.148>
- Gairns, F., Whipp, P. R., & Jackson, B. (2015). Relational perceptions in high school physical education: Teacher- and peer-related predictors of female students' motivation, behavioral engagement, and social anxiety. *Frontiers in Psychology*, 6, 850. <https://doi.org/10.3389/fpsyg.2015.00850>
- Garcia, A. F. (2015). *7 facts about child poverty you should know*. Retrieved from <https://blogs.unicef.org/blog/7-facts-about-child-poverty-you-should-know/>.
- Gawronski, B., & Hahn, A. (2019). Implicit measures: Procedures, use, and interpretation. In H. Blanton, J. M. LaCroix, & G. D. Webster (Eds.), *Measurement in social psychology* (pp. 29–55). Routledge/Taylor & Francis Group. <https://doi.org/10.4324/9780429452925-2>
- Gnamb, T., & Hanfstingl, B. (2016). The decline of academic motivation during adolescence: An accelerated longitudinal cohort analysis on the effect of psychological need satisfaction. *Educational Psychology*, 36(9), 1691–1705. <https://doi.org/10.1080/01443410.2015.1113236>
- Gottfried, A. E., Fleming, J. S., & Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology*, 93(1), 3–13. <https://doi.org/10.1037/0022-0663.93.1.3>
- Grolnick, W. S., Ryan, R. M., & Deci, E. L. (1991). Inner resources for school achievement: motivational mediators of children's perceptions of their parents. *Journal of Educational Psychology*, 83, 508e517. <https://doi.org/10.1037/0022-0663.83.4.508>
- Grolnick, W. S. (2016). Parental Involvement and Children's Academic Motivation and Achievement. In W. Liu, J. Wang, & R. Ryan (Eds.), *Building Autonomous Learners* (pp. 169–183). Springer. https://doi.org/10.1007/978-981-287-630-0_9
- Grolnick, W. S., Gurland, S. T., Jacob, K. F., & Decourcy, W. (2002). The development of self-determination in middle childhood and adolescence. In A. Wigfield, & J. S. Eccles (Eds.), *Development of achievement motivation* (pp. 147–171). Academic Press. <https://doi.org/10.1016/B978-012750053-9/50008-5>
- Grouzet, F. M., Otis, N., & Pelletier, L. G. (2006). Longitudinal cross-gender factorial invariance of the Academic Motivation Scale. *Structural Equation Modeling*, 13, 73–98. https://doi.org/10.1207/s15328007sem1301_4
- Guay, F., & Bureau, J. S. (2018). Motivation at school: Differentiation between and within school subjects matters in the prediction of academic achievement. *Contemporary Educational Psychology*, 54, 42–54. <https://doi.org/10.1016/j.cedpsych.2018.05.004>
- Guay, F., Denault, A.-S., & Renaud, S. (2017). School attachment and relatedness with parents, friends and teachers as predictors of students' intrinsic and identified regulation. *Contemporary Educational Psychology*, 51, 416–428. <https://doi.org/10.1016/j.cedpsych.2017.10.001>
- Guay, F., Morin, A. J. S., Litalien, D., Howard, J. L., & Gilbert, W. (2021). Trajectories of self-determined motivation during the secondary school: A growth mixture analysis. *Journal of Educational Psychology*, 113(2), 390–410. <https://doi.org/10.1037/edu0000482>
- Guiffreda, D. A., Lynch, M. F., Wall, A. F., & Abel, D. S. (2013). Do Reasons for Attending College Affect Academic Outcomes?: A Test of a Motivational Model From a Self-Determination Theory Perspective. *Journal of College Student Development*, 54(2), 121–139. <https://doi.org/10.1353/csd.2013.0019>
- Gurland, S. T., & Grolnick, W. S. (2005). Perceived threat, controlling parenting, and children's achievement orientations. *Motivation and Emotion*, 29, 103–121. <https://doi.org/10.1007/s11031-005-7956-2>
- Hall, J. A. (2019). How many hours does it take to make a friend? *Journal of Social and Personal Relationships*, 36(4), 1278–1296. <https://doi.org/10.1177/0265407518761225>
- Hanson, M. D., & Chen, E. (2007). Socioeconomic status and health behaviors in adolescence: A review of the literature. *Journal of Behavioral Medicine*, 30, 263–285. <https://doi.org/10.1007/s10865-007-9098-3>
- Haushofer, J., & Fehr, E. (2014). On the psychology of poverty. *Science*, 344(6186), 862–867. <https://doi.org/10.1126/science.1232491>
- Helbling, L. A., Tomasik, M. J., & Moser, U. (2019). Long-term trajectories of academic performance in the context of social disparities: Longitudinal findings from

- Switzerland. *Journal of Educational Psychology*, 111(7), 1284–1299. <https://doi.org/10.1037/edu0000341>
- Hertzog, C., von Oertzen, T., Ghisletta, P., & Lindenberger, U. (2008). Evaluating the power of latent growth curve models to detect individual differences in change. *Structural Equation Modeling*, 15(4), 541–563. <https://doi.org/10.1080/10705510802338983>
- Hill, N. E., & Taylor, L. C. P. (2004). Parental school involvement and children's academic achievement: Pragmatics and issues. *Current Directions in Psychological Science*, 13, 161–164. <https://doi.org/10.1111/j.0963-7214.2004.00298.x>
- Hofmann, V., & Müller, C. M. (2018). Avoiding antisocial behavior among adolescents: The positive influence of classmates' prosocial behavior. *Journal of Adolescence*, 68, 136–145. <https://doi.org/10.1016/j.adolescence.2018.07.013>
- Howard, M. C., & Hoffman, M. E. (2018). Variable-centered, person-centered, and person-specific approaches: Where theory meets the method. *Organizational Research Methods*, 21(4), 846–876. <https://doi.org/10.1177/1094428117744021>
- Howard, J. L., Bureau, J., Guay, F., Chong, J., & Ryan, R. M. (2021). Student Motivation and Associated Outcomes: A Meta-Analysis From Self-Determination Theory. *Perspectives on psychological science: A journal of the Association for Psychological Science*, 1745691620966789. Advance online publication. doi:10.1177/1745691620966789.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modelling*, 6, 1–55. <https://doi.org/10.1080/10705519909540118>
- Jang, H., Reeve, J., Ryan, R. M., & Kim, A. (2009). Can self-determination theory explain what underlies the productive, satisfying learning experiences of collectivistically oriented Korean students? *Journal of Educational Psychology*, 101(3), 644–661. <https://doi.org/10.1037/a0014241>
- Jang, H., Kim, E. J., & Reeve, J. (2016). Why students become more engaged or more disengaged during the semester: A self-determination theory dual-process model. *Learning and Instruction*, 43, 27–38. <https://doi.org/10.1016/j.learninstruc.2016.01.002>
- Kieffer, M. J. (2012). Before and after third grade: Longitudinal evidence for the shifting role of socioeconomic status in reading growth. *Reading and Writing: An Interdisciplinary Journal*, 25, 1725–1746. <https://doi.org/10.1007/s1145-011-9339-2>
- Kim, S., Holloway, S. D., Bempechat, J., & Li, J. (2018). Explaining Adolescents' Affect: A Time-Use Study of Opportunities for Support and Autonomy across Interpersonal Contexts. *Journal of Child and Family Studies*, 27(8), 2384–2393. <https://doi.org/10.1007/s10826-018-1092-6>
- Kindermann, T. A. (1993). Natural peer groups as contexts for individual development: The case of children's motivation in school. *Developmental Psychology*, 29(6), 970–977. <https://doi.org/10.1037/0012-1649.29.6.970>
- Koestner, R., & Losier, G. (2002). Distinguishing three ways of being internally motivated: A closer look at introjection, identification, and intrinsic motivation. In E. Deci, & R. Ryan (Eds.), *Handbook of self-determination research* (pp. 101–121). University of Rochester Press.
- Ladd, G. W., Kochenderfer, B. J., & Coleman, C. C. (1997). Classroom peer acceptance, friendship, and victimization: Distinct relational systems that contribute uniquely to children's school adjustment. *Child development*, 1181–1197. <https://www.jstor.org/stable/1132300>.
- Ladd, G. W. (1990). Having friends, keeping friends, making friends, and being liked by peers in the classroom: Predictors of children's early school adjustment? *Child Development*, 61(4), 1081–1100. <https://doi.org/10.1111/j.1467-8624.1990.tb02843.x>
- Ladd, G. W. (1999). Peer relationships and social competence during early and middle childhood. *Annual Review of Psychology*, 50(1), 333–359. <https://doi.org/10.1146/annurev.psych.50.1.333>
- Leroy, N., & Bressoux, P. (2016). Does amotivation matter more than motivation in predicting mathematics learning gains? A longitudinal study of sixth-grade students in France. *Contemporary Educational Psychology*, 44–45, 41–53. <https://doi.org/10.1016/j.cedpsych.2016.02.001>
- Liem, G. A. D., & McInerney, D. M. (2018). *Big Theories Revisited 2*. IAP. https://play.google.com/store/books/details?id=7g9bDwAAQBAJ&source=gbs_api
- Manganelli, S., Cavicchiolo, E., Lucidi, F., Galli, F., Cozzolino, M., Chirico, A., & Alivernini, F. (2021). Differences and similarities in adolescents' academic motivation across socioeconomic and immigrant backgrounds. *Personality and Individual Differences*, 182, 111077. <https://doi.org/10.1016/j.paid.2021.111077>
- Marks, A. K., Ejesi, K., & García Coll, C. (2014). Understanding the U.S. Immigrant Paradox in Childhood and Adolescence. *Child Development Perspectives*, 8(2), 59–64. <https://doi.org/10.1111/cdep.12071>
- Maslow, A. H. (1954). *Motivation and Personality*. Harper.
- Maslow, A. H. (1970). *Motivation and personality* (2nd ed.). Harper & Row Publishers.
- McNeish, D., & Wolf, M. G. (2020). Thinking twice about sum scores. *Behavior research methods*, 52(6), 2287–2305. <https://doi.org/10.3758/s13428-020-01398-0>
- Millsap, R. E. (2011). *Statistical approaches to measurement invariance*. New York, NY: Taylor & Francis.
- Ministry of Education, Universities and Research [MIUR] (2020). *Gli alunni con cittadinanza non italiana A.S. 2018/2019* [Students with non-Italian citizenship 2018–2019] Retrieved online on August 2020 from: https://www.miur.gov.it/do-cuments/20182/0/Rapporto++Gli+alunni+con+cittadinanza+non+italiana_as_2018-2019.pdf/f1af9f21-cccb-434e-315e-5b5a7c55c5db?t=1616517692793
- Murray, K. W., Finigan-Carr, N., Jones, V., Copeland-Linder, N., Haynie, D. L., & Cheng, T. L. (2014). Barriers and Facilitators to School-Based Parent Involvement for Parents of Urban Public Middle School Students. *SAGE Open*, 4(4). <https://doi.org/10.1177/2158244014558030>
- Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus User's Guide* (Eighth ed.). Los Angeles, CA: Muthén & Muthén.
- Nalipay, M. J. N., King, R. B., & Cai, Y. (2020). Autonomy is equally important across East and West: Testing the cross-cultural universality of self-determination theory. *Journal of Adolescence*, 78, 67–72. <https://doi.org/10.1016/j.adolescence.2019.12.009>
- National Board of Italian Psychologists (1989, February 18). *Code of Ethics for the Psychologist*. <https://www.psy.it/national-board-of-italian-psychologists-code-of-ethics-for-the-psychologist>.
- Nishimura, M., & Joshi, A. (2021). Self-Determination Theory and the Happiness and Academic Achievement of Students at a Women's University. *Psychological Studies*. <https://doi.org/10.1007/s12646-021-00617-8>
- Nosek, B. A., & Smyth, F. L. (2007). A multitrait-multimethod validation of the Implicit Association Test: Implicit and explicit attitudes are related but distinct constructs. *Experimental Psychology*, 54, 14–29.
- Olino, T. M., & Klein, D. N. (2015). Psychometric Comparison of Self- and Informant-Reports of Personality. *Assessment*, 22(6), 655–664. <https://doi.org/10.1177/1073191114567942>
- Organization for Economic Co-Operation and Development. (2004). *Messages from PISA 2000: Organisation for economic co-operation and development*. Author.
- Organization for Economic Co-Operation and Development. (2014). *PISA 2012 technical report. Programme for International Student Assessment*, Organisation for Economic Co-Operation and Development Publishing. Retrieved February, 2020, from <https://www.oecd.org/pisa/pisaproducts/PISA-2012-technical-report-final.pdf>.
- Otis, N., Grouzet, F. M. E., & Pelletier, L. G. (2005). Latent Motivational Change in an Academic Setting: A 3-Year Longitudinal Study. *Journal of Educational Psychology*, 97(2), 170–183. <https://doi.org/10.1037/0022-0663.97.2.170>
- Paletta, A., Alivernini, F., & Manganelli, S. (2017). Leadership for learning: The relationships between school context, principal leadership and mediating variables. *International Journal of Educational Management*, 31(2), 98–117. <https://doi.org/10.1108/IJEM-11-2015-0152>
- Parks, M. R. (2007). *LEA's series on personal relationships. Personal relationships and personal networks*. Lawrence Erlbaum Associates Publishers.
- Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *The Journal of applied psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Pomerantz, E. M., Grolnick, W. S., & Price, C. E. (2005). The role of parents in how children approach achievement: A dynamic process perspective. In A. J. Elliot, & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 229–278). Guilford Publications.
- Pong, S., & Zeiser, K. L. (2012). Student engagement, school climate, and academic achievement of immigrants' children. In C. Garcia Coll, & A. K. Marks (Eds.), *The immigrant paradox in children and adolescents: Is becoming American a developmental risk?* (pp. 209–232). American Psychological Association.
- Portes, A., & Rumbaut, R. G. (2001). *Legacies: The story of the immigrant second-generation*. University of California Press.
- Preacher, K. J., Wichman, A. L., MacCallum, R., & Briggs, N. E. (2008). Latent growth curve modeling. *Sage Publications*.
- Preacher, K. J. (2018). Latent Growth Curve Models. In G. R. Hancock, L. M. Stapleton, & R. O. Mueller (Eds.), *The reviewer's guide to quantitative methods in the social sciences* (2nd ed., pp. 185–198). Routledge.
- Ratelle, C. F., Guay, F., Larose, S., & Sénéchal, C. (2004). Family correlates of trajectories of academic motivation during a school transition: A semiparametric group-based approach. *Journal of Educational Psychology*, 96(4), 743–754. <https://doi.org/10.1037/0022-0663.96.4.743>
- Reeve, J., & Cheon, H. S. (2014). An intervention-based program for research on teachers' motivating styles. In S. Karabenick, & T. C. Urdan (Eds.), *Advances in motivation and achievement* (pp. 297–343). Emerald Group Publishing.
- Reeve, J., Ryan, R. M., & Deci, E. L. (2018). Sociocultural influences on student motivation as viewed through the lens of self-determination theory. In G. A. D. Liem, & D. M. McInerney (Eds.), *Big theories revisited 2* (pp. 31–60). IAP.
- Reeve, J. (2002). Self-determination theory applied to educational settings. In E. L. Deci, & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 183–203). University of Rochester Press.
- Reeve, J. (2006). Teachers as facilitators: What autonomy-supportive teachers do and why their students benefit. *Elementary School Journal*, 106, 225–236. <https://doi.org/10.1086/501484>
- Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist*, 44(3), 159–175. <https://doi.org/10.1080/00461520903028990>
- Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology*, 57, 749–761.
- Ryan, R. M., & Deci, E. L. (2017). Self-determination theory: Basic psychological needs in motivation, development, and wellness. *The Guilford Press*. <https://doi.org/10.1521/978.14625/28806>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61, Article 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Ryan, R. M., Stiller, J. D., & Lynch, J. H. (1994). Representations of relationships to teachers, parents, and friends as predictors of academic motivation and self-esteem. *The Journal of Early Adolescence*, 14(2), 226–249. doi:10.1177/027243169401400207.

- Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the Fit of Structural Equation Models: Tests of Significance and Descriptive Goodness-of-Fit Measures. *Methods of Psychological Research*, 8(2), 23–74.
- Sheldon, K. M., Abad, N., & Omoile, J. (2009). Testing self-determination theory via Nigerian and Indian adolescents. *International Journal of Behavioral Development*, 33(5), 451–459. <https://doi.org/10.1177/0165025409340095>
- Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, 75, 417–453. <https://doi.org/10.3102/00346543075003417>
- Skrondal, A., & Laake, P. (2001). Regression among factor scores. *Psychometrika*, 66, 563–575. <https://doi.org/10.1007/BF02296196>
- Smetana, J. G., Campione-Barr, N., & Metzger, A. (2006). Adolescent development in interpersonal and societal contexts. *Annual Review of Psychology*, 57, 255–284. <https://doi.org/10.1146/annurev.psych.57.102904.190124>
- Smollar, J., & Younis, J. (1989). Transformations in adolescents' perceptions of parents. *International Journal of Behavioral Development*, 12(1), 71–84. <https://doi.org/10.1177/016502548901200104>
- Suárez-Orozco, C., & Suárez-Orozco, M. (1995). *Children of immigration*. Stanford University Press.
- UNICEF, save the children say. Retrieved on May 2020 from <https://www.unicef.org/eca/press-releases/150-million-additional-children-plunged-poverty-due-covid-19-unicef-save-children>.
- Vallerand, R. J., & Bissonnette, R. (1992). Intrinsic, extrinsic, and amotivational styles as predictors of behavior: A prospective study. *Journal of Personality*, 60, 599–620. <https://doi.org/10.1111/j.1467-6494.1992.tb00922.x>
- Vallerand, R. J., Blais, M. R., Briere, N. M., & Pelletier, L. G. (1989). Construction et validation de l'Échelle de Motivation en Éducation (EME) [Construction and validation of the Academic Motivation Scale]. *Canadian Journal of Behavioural Science*, 21, 323–349.
- Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallières, E. F. (1992). The Academic Motivation Scale: A measure of intrinsic, extrinsic, and amotivation in education. *Educational and Psychological Measurement*, 52, 1003–1017. <https://doi.org/10.1177/0013164492052004025>
- Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology*, 72, 1161–1176.
- van Egmond, M. C., Navarrete Berges, A., Omarshah, T., & Benton, J. (2017). The role of intrinsic motivation and the satisfaction of basic psychological needs under conditions of severe resource scarcity. *Psychological Science*, 28(6), 822–828. <https://doi.org/10.1177/0956797617698138>
- van Egmond, M. C., Hanke, K., Omarshah, T. T., Navarrete Berges, A., Zango, V., & Sieu, C. (2020). Self-esteem, motivation and school attendance among sub-Saharan African girls: A self-determination theory perspective. *International Journal of Psychology*. <https://doi.org/10.1002/ijop.12651>
- Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., & Matos, L. (2005). Examining the motivational impact of intrinsic versus extrinsic goal framing and autonomy-supportive versus internally controlling communication style on early adolescents' academic achievement. *Child Development*, 76(2), 483–501. <https://doi.org/10.1111/j.1467-8624.2005.00858.x>
- Vansteenkiste, M., Zhou, M., Lens, W., & Soenens, B. (2005). Experiences of Autonomy and Control Among Chinese Learners: Vitalizing or Immobilizing? *Journal of Educational Psychology*, 97(3), 468–483. <https://doi.org/10.1037/0022-0663.97.3.468>
- Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic psychological need theory: Advancements, critical themes, and future directions. *Motivation and Emotion*, 44, 1–31. <https://doi.org/10.1007/s11031-019-09818-1>
- Wadsworth, M. E., & Berger, L. E. (2006). Adolescents Coping with Poverty-Related Family Stress: Prospective Predictors of Coping and Psychological Symptoms. *Journal of Youth and Adolescence*, 35(1), 54–67. <https://doi.org/10.1007/s10964-005-9022-5>
- Wang, L. P., & Maxwell, S. E. (2015). On disaggregating between-person and within-person effects with longitudinal data using multilevel models. *Psychological methods*, 20(1), 63–83. <https://doi.org/10.1037/met0000030>
- White, K. R. (1982). The relation between socioeconomic status and academic achievement. *Psychological Bulletin*, 91, 461–481. <https://doi.org/10.1037/0033-2909.91.3.461>
- Widaman, K. F., Ferrer, E., & Conger, R. D. (2010). Factorial Invariance within Longitudinal Structural Equation Models: Measuring the Same Construct across Time. *Child Development Perspectives*, 4(1), 10–18. <https://doi.org/10.1111/j.1750-8606.2009.00110.x>
- Williams, G. C., & Deci, E. L. (1996). Internalization of biopsychosocial values by medical students: A test of self-determination theory. *Journal of Personality and Social Psychology*, 70(4), 767–779. <https://doi.org/10.1037/0022-3514.70.4.767>
- Xie, K., Vongkulluksn, V. W., Cheng, S.-L., & Jiang, Z. (2021). Examining high-school students' motivation change through a person-centered approach. *Journal of Educational Psychology*. <https://doi.org/10.1037/edu0000507>
- Yoshikawa, H., Aber, J. L., & Beardslee, W. R. (2012). The effects of poverty on the mental, emotional, and behavioral health of children and youth: Implications for prevention. *The American psychologist*, 67(4), 272–284. <https://doi.org/10.1037/a0028015>