

Collie, R.J. (2022). Perceived social-emotional competence: A multidimensional examination and links with social-emotional motivation and behaviors. *Learning and Instruction*.

<https://doi.org/10.1016/j.learninstruc.2022.101656>

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Running head: PERCEIVED SOCIAL-EMOTIONAL COMPETENCE

**Perceived Social-Emotional Competence: A Multidimensional Examination and Links
with Social-Emotional Motivation and Behaviors**

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**Perceived Social-Emotional Competence: A Multidimensional Examination and Links
with Social-Emotional Motivation and Behaviors**

Abstract

This study examined perceived social-emotional competence (perceived-SEC) and its links with students' social-emotional motivation (i.e., autonomous and controlled motivation) and behaviors (parent-reported prosocial behavior and conduct problems). Five types of perceived-SEC were examined: perceived competence for assertiveness, tolerance, social regulation, emotion regulation, and emotional awareness. With data from 414 Australian students, structural equation modeling demonstrated that an overarching (global) perceived-SEC factor was positively associated with autonomous motivation, introjected regulation, and prosocial behavior, and negatively associated with conduct problems. Two specific dimensions also had unique associations with the behaviors: Perceived competence for social regulation was negatively associated with external motivation and conduct problems, and perceived competence for tolerance was positively associated with autonomous motivation. In turn, autonomous motivation was positively associated with prosocial behavior, whereas external motivation was positively associated with conduct problems. Findings hold relevance for efforts aiming to understand the role of motivational drivers of students' social-emotional competence.

Keywords: social-emotional competence; perceived competence; autonomous motivation; controlled motivation; prosocial behavior

1. Introduction

Social-emotional competence (SEC) refers to individuals' effective management of their intra- and interpersonal interactions and is recognized as a core component of healthy adjustment in life (Collie, 2020). A decades-long body of work has examined SEC with the aim of understanding how to promote this competence among students. Typically, prior research has focused on SEC manifestations (i.e., the expressions of SEC) by assessing individuals' behaviors and skills (Stump et al., 2009). Recently, researchers have called for a focus on both mechanisms and manifestations of SEC and the process that connects them (Collie, 2020)—that is, rather than considering SEC as a single construct, it has been identified as a process involving mechanisms and manifestations. Two key mechanisms—individuals' social-emotional perceptions and motivation—are the intrapsychic drivers that underpin the SEC process (Rose-Krasnor & Denham, 2009), and are responsible for instigating the manifestations (e.g., behaviors). Mechanisms are, then, essential to consider because they are what makes the difference in whether students actually apply socially and emotionally competent behaviors in their life.

In the current study, the first mechanism (i.e., individuals' perceptions) was examined via perceived social-emotional competence (perceived-SEC), which refers to individuals' perceptions of being effective in their social-emotional interactions (Collie, 2020). Perceived-SEC has been posited as essential for promoting the second mechanism, social-emotional motivation (i.e., individuals' drive to act in socially and emotionally competent ways) and, in turn, adaptive manifestations (e.g., behaviors; Collie, 2020). Emerging research is now adding empirical evidence that supports conceptual work on the construct of perceived-SEC (Collie, 2021a). However, empirical studies are short in supply, have been narrow in operationalizing perceived-SEC, and have yet to examine whether perceived-SEC is associated with social-emotional motivation and behaviors. Given there are a diverse range of

social-emotional skills and behaviors, it is now important that knowledge about perceived-SEC is broadened to reflect the diversity of these. Moreover, because the structure of perceived-SEC has varied in prior research (separate vs. overarching factors; Collie, 2022a, 2022b), research is also needed to examine whether different dimensions of perceived-SEC are in fact separate constructs, whether they better reflect a global perceived-SEC construct, or both. Further still, research that identifies whether particular dimensions of perceived-SEC have more salient roles to play in relation to different social-emotional outcomes is also needed. Such research will hold relevance for efforts aiming to boost social-emotional behaviors among students—and, thus, is pertinent in light of the increased uptake of social-emotional learning in schools.

The present study examined five dimensions of perceived-SEC, the extent to which the dimensions represent distinct factors and/or fall under an overarching construct, and whether the dimension(s) of perceived-SEC are associated with students' social-emotional motivation and two behavioral outcomes as reported by parents. Figure 1 displays the hypothesized model. The current study was conducted among adolescents, a developmental period where increasingly complex social-emotional interactions arise (Eccles et al., 1993), but where declines in social-emotional behaviors and skills are observed (OECD, 2021). Accordingly, efforts to understand mechanisms implicated in adolescents' social-emotional behaviors are critical.

1.1. Conceptual Framework

The current study harnessed the Social and Emotional Competence (SEC) School Model (Collie, 2020) as the conceptual framework. Integrating theorizing and empirical support from SEC (Rose-Krasnor & Denham, 2009) and motivation literatures (self-determination theory, Ryan & Deci, 2017; social-cognitive theory, Bandura, 1997), the SEC School Model emphasizes the mechanisms and manifestations (including their associations)

that form the process of SEC and its development. According to Collie (2020), socially and emotionally competent behaviors (i.e., manifestations of SEC) can be fostered by boosting the mechanisms that drive these behaviors. Two overarching mechanisms are posited in the SEC School Model: social-emotional perceptions and motivation. Motivation theories have long established that individuals' perceptions impact motivation (Bandura, 1997; Ryan & Deci, 2017). The SEC School Model (Collie, 2020) applies this same understanding to the social and emotional domains. More precisely, the SEC School Model posits that social-emotional perceptions promote social-emotional motivation and that both factors boost adaptive behaviors. This central process was examined in the present study (see Figure 1) with a focus on a core perception, perceived-SEC, along with social-emotional motivation, and two behaviors.

1.2. Perceived Competence as a Central Mechanism of SEC

Perceived-SEC is considered a central mechanism of the SEC process because it acts as an intrapsychic driver of social-emotional motivation and, in turn, behaviors (Collie, 2020). As noted above, *perceived-SEC* is the perception of being capable in intrapersonal and interpersonal social-emotional interactions (Collie, 2020; cf. White, 1959). In the wider literature, perceived academic competence (indeed, more so than actual competence) is well-established to promote positive academic outcomes—including motivation and adaptive behaviors. This is because individual development and action-taking is mobilized by perceived competence (Bandura, 1997; Ryan & Deci, 2017)—when individuals feel competent, they are more likely to be driven to act in accordance with that. Alongside the broad literature examining perceived academic competence, emerging research is now considering perceived-SEC.

Research is demonstrating that there are dimensions of perceived-SEC that traverse different social and emotional capacities and that are linked with different outcomes. For

example, perceived competence for emotion regulation (i.e., feeling capable to adjust one's emotions) is linked with greater well-being among secondary school students, and perceived competence for conflict resolution (i.e., feeling capable to resolve disagreements constructively with others) is linked with greater prosocial behavior (Collie, 2021a). In other research, a more broadly defined construct of perceived social competence has been associated with greater autonomous prosocial motivation (i.e., motivation to engage in prosocial behaviors due to inherent satisfaction or valuing of such behaviors) and positive affect, as well as lower controlled prosocial motivation (i.e., motivation to engage in prosocial behaviors due to external pressures or demands), negative affect (Collie, 2022b), and psychological distress (Kristensen et al., 2021) among secondary students.

Together, research on perceived-SEC highlights this perception (including its various dimensions) is linked with social-emotional motivation and outcomes. However, prior work has tended to examine only one or two types of perceived-SEC or a broad factor that combines different types of perceived-SEC into one variable. Because social-emotional skills and behaviors are known to be multidimensional, work is needed to examine a wider range of perceived-SEC dimensions and to ascertain whether these dimensions are separate (specific) constructs, whether they reflect a global perceived-SEC construct, or both. The idea of there being both specific and global perceived-SEC dimensions aligns with Cattell's (1946) conceptual work on surface factors and source factors. Cattell argues that source factors are underlying constructs that drive surface factors, which are observable indicators. For perceived-SEC, there may be a source factor reflecting individuals' global sense of competence for social-emotional phenomena. Alongside this global factor, distinct components unique to each dimension may also be evident (surface factors). The current study, thus, sought to ascertain the structure of perceived-SEC.

Research is also needed to investigate whether particular dimensions are more salient in relation to different social-emotional motivation factors and behaviors. Such knowledge will help to inform practice about the most salient dimensions to consider for different outcomes. The purpose of the current study was to address these gaps by examining five dimensions of perceived-SEC as predictors of motivation and behavior. Before introducing the five dimensions, it is important to discuss the two frameworks that informed their selection.

The first framework was CASEL's (2020) model comprising five skills: self-awareness (awareness of one's emotions, thoughts, and values), self-management (or self-regulation; regulating one's emotions, thoughts, and actions), social awareness (i.e., understanding others' perspectives and social norms), relationship skills (i.e., engaging constructively and positively with others), and responsible decision-making (i.e., making constructive and respectful choices). Research has applied the CASEL framework to examine students' behaviors (Ross & Tolan, 2018).

The second framework is used by the OECD (Chernyshenko et al., 2019; OECD, 2021). In this model, social-emotional skills are organized under the Big 5 factors of personality: conscientiousness (dependable and disciplined), extraversion (sociable and enthusiastic), emotional stability (low emotional reactivity), openness (open to new experiences), and agreeableness (kind and warm; Norman, 1963). In the OECD's framework, conscientiousness (called "task performance") houses skills associated with behavioral self-regulation. Extraversion (called "engaging with others") includes skills related to sociability and assertiveness. Emotional stability (called "emotion regulation") reflects skills associated with emotion regulation. Openness (called "open-mindedness") includes skills involving an outward and tolerant approach towards the world. Agreeableness (called "collaboration") houses skills associated with a prosocial orientation to others. The OECD framework also

refers to additional skills (called “compound skills”) that cannot be assigned to only one of the personality factors (i.e., meta-cognition).

Together, the CASEL (2020) and OECD (2021) frameworks provide approaches for distilling key social-emotional skills. In the current study, the two frameworks, along with empirical research (Collie, 2021a), provided grounding for the five dimensions of perceived-SEC that were examined. It is important to note, however, that whereas the CASEL/OECD frameworks feature actual skills/behaviors, perceived-SEC reflects individuals’ sense of competence regarding those skills/behaviors.

The five perceived-SEC dimensions examined in the present study were perceived competence for assertiveness, tolerance, social regulation, emotion regulation, and emotional awareness. Table 1 provides definitions of the dimensions and shows how they map onto cognate skills in the CASEL (2020) and OECD (2021) frameworks. Notably, the five dimensions are not meant to be all-encompassing because there are different dimensions required in different cultures and contexts (Lee & Bong, 2017). Rather, the five dimensions were selected because they traverse the major components in both CASEL and OECD frameworks. The dimensions were anticipated to reflect unique constructs that also sit under an overarching, global perceived-SEC construct. The current study provided the opportunity to test this hypothesis, and to examine whether the global and/or specific factors have unique roles in play in predicting students’ social-emotional motivation and behavior.

1.3. Perceived Competence is Important for Motivation

Perceived competence lays a foundation for adaptive forms of motivation (Ryan & Deci, 2017). According to self-determination theory (Ryan & Deci, 2017), autonomous motivation reflects highly self-determined behavior regulation typified by volition and

choice—that is, intrinsic and identified motivation.¹ By comparison, controlled motivation reflects behavior regulation typified by pressures or demands that are considered externally controlled—that is, introjected and external motivation. Extrapolating from these definitions, the SEC School Model focuses on motivation in the social-emotional domains.

In the present study, *autonomous social-emotional motivation* was operationalized as incorporating: intrinsic motivation, which involves being motivated to undertake adaptive social-emotional behaviors due to inherent interest or enjoyment; and, identified motivation, which involves being motivated because the consequence is personally valued (Collie, 2022b; Ryan & Deci, 2017). Prior research shows that intrinsic and identified social-emotional motivation are highly correlated and best examined together as autonomous motivation (Aelterman et al., 2019; Longobardi et al., 2020).

In contrast, *controlled social-emotional motivation* was operationalized as incorporating: introjected motivation, which involves being motivated to undertake adaptive social-emotional behaviors to avoid guilt and shame; and, external motivation, which involves being motivated to avoid punishment. Prior research shows that these two factors are distinct and can be examined separately (Aelterman et al., 2019; Longobardi et al., 2020).

Despite research highlighting the link between perceived academic competence and autonomous academic motivation (Ryan & Deci, 2017), and theoretical support for the impact of perceived-SEC on social-emotional motivation (Collie, 2020; Ryan & Deci, 2017), few studies have considered whether these associations transfer to the social-emotional domains. In one example, Collie (2022b) found that perceived social competence was associated with greater autonomous prosocial motivation and lower external prosocial

¹ Although self-determination theory names the specific types of motivation as forms of behavior regulation, the term motivation is used in the current study to avoid confusion with the types of regulation examined under perceived-SEC.

motivation among secondary school students. The current study extends that work by considering both social and emotional measures of perceived competence and motivation.

In line with the SEC School Model, perceived-SEC was examined as a predictor of autonomous and controlled social-emotional motivation. It was hypothesized that perceived-SEC (as a global factor and/or as specific dimensions) would be associated with greater autonomous motivation and lower controlled motivation. This was based on the idea that perceived-SEC is considered essential for promoting internalization of key SEC-aligned values, norms, and beliefs (Collie, 2020; Ryan & Deci, 2017). In turn, internalization leads to greater autonomous motivation and lower controlled motivation (Ryan & Deci, 2017).

1.4. Foundations for Adaptive Behaviors

Students who report higher perceived-SEC and autonomous (rather than controlled) social-emotional motivation tend to engage in more adaptive behaviors and fewer maladaptive behaviors (Collie, 2020). In the present study, two behaviors were examined. *Prosocial behavior* involves interpersonal actions that are enacted to benefit others (e.g., helping someone; Schroeder & Graziano, 2015), whereas *conduct problems* involve antisocial behaviors such as acting aggressively, disobeying rules, and stealing (Bevilacqua et al., 2018).

Prior research demonstrates that perceived-SEC is directly associated with social-emotional behaviors. For example, perceived competence for conflict resolution is associated with greater prosocial behavior and lower conduct problems among students (Collie, 2021a). Researchers have also demonstrated that students who report greater autonomous prosocial motivation engage in fewer disruptive behaviors (Aelterman et al., 2019), more defending behaviors (Longobardi et al., 2020), and more prosocial behaviors at school (Wentzel et al., 2007). More recently, autonomous prosocial motivation has been associated with greater

prosocial behavior, and external prosocial regulation has been associated with lower prosocial behavior (Collie, 2022b).

Together, the emerging research indicates that perceived competence for conflict resolution and prosocial motivation are linked with the two behaviors. The current study extends that work by also considering emotional forms of perceived-SEC and motivation. It was hypothesized that both perceived-SEC and autonomous motivation would be associated with higher prosocial behavior and lower conduct problems, whereas the reverse would be true for controlled motivation. Based on the dual process hypothesis (e.g., Collie, 2022b), indirect associations between the perceived-SEC factors and the behaviors via motivation were also tested. The dual process hypothesis states that within-process associations (among adaptive factors) are stronger than cross-process associations (between adaptive and maladaptive factors; Collie, 2022b). As such, indirect associations from perceived-SEC to adaptive outcomes via autonomous motivation were expected to be significant and stronger than indirect associations via controlled motivation.

1.5. Study Overview

The purpose of this study was to examine five dimensions of perceived-SEC and how these are associated with important social-emotional outcomes. The first goal involved identifying whether the five dimensions can be considered specific factors and/or if they reflect a global perceived-SEC factor. The second goal involved ascertaining the extent to which perceived-SEC is uniquely associated with social-emotional motivation and, in turn, parent-reported behaviors (directly and indirectly). Figure 1 displays the hypothesized model.

Three research questions guided the study:

1. To what extent do the five dimensions of perceived-SEC reflect specific factors and/or a global perceived-SEC factor?

2. To what extent is perceived-SEC (using the specification determined from research question 1) positively associated with autonomous motivation and negatively associated with controlled motivation?
3. To what extent are perceived-SEC and the motivation factors associated with prosocial behavior and conduct problems (directly and indirectly)?

2. Method

2.1. Sample and Procedure

The sample comprised 414 secondary school students from across the following states/territories of Australia: Queensland (54%), Western Australia (25%), South Australia (16%), Tasmania (5%), and Northern Territory (1%). Of the sample, 44% were female, 56% were male, and 1% specified their gender as other or non-binary. Students' average age was 14 ($SD = 1$; range 13-16) years. Students were in grades 7 (12%), 8 (27%), 9 (28%), 10 (19%), 11 (13%), or 12 (1%) and most of the sample spoke English at home (94%). Ten percent of the sample had received a diagnosis of ADHD, which is slightly higher than national reports (i.e., 7.4%; Lawrence et al., 2015). Participants attended government (70%), Catholic (16%), or independent schools (13%) that were co-educational (95%), single-sex girls' (2%), or single-sex boys' schools (3%). Average socio-economic status (SES) was 995.17 ($SD = 62.19$), which is slightly below the national average (viz., $M = 1000$, $SD = 100$, see Measures for details; ABS, 2018). The questionnaire component directed to adults was completed by female (75%), male (25%), and non-binary (<1%) parent/carers. Notably, the sample can be considered broadly representative of the 13-16 year-old student population in Australia given the school sector breakdown and SES levels reflect population parameters (ABS, 2018, 2021), and given descriptive statistics for the behaviors align with normative data among Australian adolescents (Mellor, 2005).

Data were collected in October, 2021 with an online questionnaire. This timespan occurred during the COVID-19 pandemic. Notably however, participants were attending school in-person as usual given no COVID-19 restrictions in their jurisdictions at the time. Recruitment took place via Qualtrics (online survey management software) and its market research partners, who have contact details of a broad sample of the Australian populace. Parents (or carers) had previously signaled their interest in obtaining information about research projects run for parents and their children. This online approach to recruitment facilitated sampling Australia-wide, and data collection from parents and adolescents. Potential respondents received an email/app notification with the study invitation and the questionnaire URL. Parents provided consent and then answered screening questions to confirm they had a 13-16-year-old adolescent attending school in-person in Australia. Any parents who did not meet the screening requirements were withdrawn from the study. Parent respondents were then asked questions about their 13-16-year-old adolescent (if they had more than one adolescent, they were asked to choose one). Following this, parents were asked to hand their mobile device to the same adolescent, who then provided consent and completed the student section of the questionnaire. Respondents who finished the survey very quickly (less than 1/3 of the median time), who answered identically across many items in a row (80% of the survey), or who had duplicate IP addresses (matched with replicate demographic characteristics) were removed from the final sample. Of the respondents who passed the screening question, the response rate for the study was 81%. The study received ethics approval from the Institutional Review Board.

2.2. Measures

Unless otherwise stated, participants responded to all items on a scale from 1 (Strongly disagree) to 7 (Strongly agree). Parents reported on the behaviors and some background characteristics. All remaining variables were reported by students.

2.2.1. Perceived Social-Emotional Competence

The Perceived Social-Emotional Competence Scale (Collie, 2021b) was used to assess perceived-SEC. Scale development was based on prior research (Collie, 2021), and theoretical understanding of perceived competence (Ryan & Deci, 2017; White, 1959) and SEC (Collie, 2020). Five dimensions of perceived-SEC were assessed: *perceived competence for assertiveness* (4 items; e.g., “I feel capable to make sure my ideas are heard in group work at school”), *tolerance* (3 items; e.g., “I feel capable to be respectful of different cultures”), *social regulation* (4 items; e.g., “I can match my behavior to what is required by the teacher in the classroom”), *emotion regulation* (4 items; e.g., “I feel capable at changing how I’m thinking if I want to feel happier about something”), and *emotional awareness* (4 items; e.g., “I can use words to clearly explain how I’m feeling when I’m upset”). McDonald’s omega was used to estimate reliability (calculated from the final model specification; see details below) and was adequate (see Table 2 and Results sections for more details). Additional evidence of validity is presented below and in Supplementary Materials (measurement invariance tests and support from a separate study).

2.2.2. Motivation

Motivation was assessed with four stems that capture social and emotional motivation (e.g., “I put effort into being a caring person at school...” and “I put effort into apologizing to other students when I’ve done something unkind...”; Collie, 2021c; see also Collie, 2022a). The stems capture common social and emotional experiences that traverse the CASEL (2020) and OECD (2021) skills: relating with others, self-regulating actions, and self-regulating emotions. Each stem was accompanied by items reflecting the different types of behavior regulation: intrinsic, identified, introjected, and external (amotivation was too highly correlated [negatively] with autonomous motivation in preliminary analyses). As anticipated from prior research (e.g., Aelterman et al., 2019), intrinsic and identified motivation were

highly correlated ($r = .94$) and were modelled as one factor of autonomous motivation.

Reliability was adequate for autonomous motivation ($\omega = .88$), introjected motivation, and external motivation ($\omega = .78$). Additional evidence of validity evidence is provided below.

2.2.3. Behaviors

Parents (or carers) reported on students' prosocial behavior and conduct problems over the past six months with items from the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997). Five items assess prosocial behavior (e.g., "often volunteers to help others [parents, teachers, children]") and five items assess conduct problems (e.g., "often fights with other youth or bullies them"). Parents responded 0 (Not true), 1 (Somewhat true), or 2 (Certainly true). Reliability was adequate for prosocial behavior ($\omega = .73$) and conduct problems ($\omega = .68$). In analyses, an (error-adjusted) sum score was used for each behavior (Goodman, 1997).

2.2.4. Covariates

Five background characteristics served as controls in the present study. Gender was scored 0 (Male) and 1 (Female). Age was scored in years. Language background was scored 0 (English) or 1 (non-English speaking background). ADHD (reported by parents) was scored 0 (no diagnosis) or 1 (ADHD diagnosis). Socio-economic status (SES) was scored using home postcode (reported by parents) and the ABS (2018) index of relative socio-economic advantage and disadvantage, where a higher score represents a higher SES. These characteristics have been associated with the social-emotional factors under examination. For example, female students typically exhibit more prosocial behaviors and younger students report higher autonomous prosocial motivation (Collie, 2022b). Students with ADHD (the most prevalent neurodevelopmental disorder among Australian adolescents; Lawrence et al., 2015) report lower perceived-SEC (Collie, 2021a).

2.3.Data Analysis

Mplus 8.6 (Muthén & Muthén, 2021) was used for all analyses. Analyses involved confirmatory factor analysis (CFA), exploratory structural equation modelling (ESEM), bifactor modelling, and structural equation modelling (SEM). In all models, robust maximum likelihood (MLR) was used, along with full information maximum likelihood to handle missing data (<1%). Model fit was assessed with root-mean-square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker Lewis index (TLI). RMSEA values $\leq .08$ and CFI/TLI, values $\geq .90$ indicate adequate fit (Hu & Bentler, 1999).

2.3.1. Preliminary Analyses

Means and standard deviations were calculated for each variable. Then, the appropriate model specification for the perceived-SEC dimensions was tested. Although the factor structure was hypothesized to be bifactor (with one global-factor and five specific-factors), several models were run to test this was the optimal specification. First, a CFA was run with the five dimensions of perceived-SEC entered as separate latent factors. Then, an ESEM was run. Both CFA and ESEM are measurement models; however, in CFA items load onto a single factor (no cross-loadings), whereas ESEM allows items to load on multiple factors (with cross-loadings; for a review, see Morin et al., 2020). ESEM was tested because prior research has shown relatively strong correlations among different perceived-SEC factors (e.g., Collie, 2022a), the perceived-SEC factors are conceptually related constructs (Morin et al., 2020), and they fall under the same overarching construct in the SEC model (Collie, 2020). The ESEM was run with oblique rotation and with items loaded onto all latent factors—where main loadings were freely estimated and cross-loadings were specified to be close to zero (Morin et al., 2020). The ESEM was compared with the CFA to ascertain the extent to which it yielded better model fit, lower factor correlations, small to moderate cross-loadings, and well-defined factors (Morin et al., 2020).

Given the hypothesis of a global perceived-SEC construct, the retained CFA or ESEM was then examined using a bifactor specification (Morin et al., 2020). Bifactor models estimate a global-factor that captures shared variance across all factors, along with several specific-factors that capture variance unique to the different dimensions. In bifactor CFA, all items are loaded onto the global-factor, target items are loaded onto the specific-factors (no cross-loadings), and factor correlations are constrained to zero (Morin et al., 2020). In bifactor ESEM, orthogonal rotation is used, all items are loaded onto the global-factor, and all items are simultaneously loaded onto the specific-factors (with cross-loadings for non-target items specified to be close to zero; Morin et al., 2020). The bifactor model (either CFA or ESEM) was then tested to ascertain whether it yielded better model fit, a well-defined global-factor, relatively well-defined specific-factors, and (for the ESEM only) smaller cross-loadings compared to the original model.

After running the CFA, ESEM, and the bifactor counterpart, the most appropriate model was selected as the final solution. Then, the final model was used to calculate McDonald's omega for reliability of the different factors. Importantly, with ESEM and bifactor models, lower reliability coefficients are anticipated given that items contribute to the definition of more than one factor (Morin et al., 2020). As per Morin et al. (2020, 2021), cross-loadings were ignored in calculating omega coefficients with (bifactor) ESEM, and omega estimates of $\geq .50$ were considered adequate for specific-factors. For completeness, measurement invariance tests were run to ascertain the extent to which the items functioned similarly across two key subgroups in the sample (i.e., by gender and SES; see Supplementary Materials for details).

For the motivation factors, a CFA was run to ascertain factor structure and calculate omega coefficients.² Residuals of motivation items with identical stems were correlated. Omega coefficients were calculated from this CFA and factor scores for the motivation factors were saved for use in the SEM. More precisely, because of the complexity of the bifactor ESEM, it was not possible to integrate latent motivation factors into the SEM. Measurement invariance tests were run for the motivation factors (by gender, SES; see Supplementary Materials for details). Finally, although main analyses involved specifying the two behaviors as error-adjusted sum scores (see below), a preliminary CFA was run involving the behaviors to enable calculation of omega coefficients.

2.3.2. Main Analyses

A full measurement model was run with the final specification of perceived-SEC, along with the motivation factor scores, error-adjusted sum scores for behaviors, and covariates. The behaviors were modelled with the loading constrained to 1 and the residual constrained with the following equation: $\sigma^2 * (1 - \omega)$, where σ^2 is the variance and ω is the reliability of the factor (Brown, 2006). All covariates were estimated with loading set to 1 and residual set to 0. The measurement model provided correlations among substantive factors.

Next, SEM was run with the final specifications as per the measurement model, and with the paths shown in Figure 1. More precisely, the perceived-SEC factors were examined as predictors of motivation and, in turn, both perceived-SEC and the motivation factors were examined as predictors of the behaviors. Covariates served as controls for all factors, and factors at the same point in the model were correlated to control for shared variance (except in the case of a bifactor solution for the perceived-SEC factors, which is orthogonal). Finally,

² For completeness, the same process as that used for the perceived-SEC items was also run for the motivation factors (i.e., comparing CFA with ESEM and then testing bifactor models). The CFA was the superior model over the ESEM and bifactor models, and so this was retained.

indirect associations from the perceived-SEC factors to the behaviors (via motivation) were examined in the SEM using a non-parametric bootstrapping approach (1,000 draws; Shrout & Bolger, 2002).

3. Results

3.1. Preliminary Analyses

Means and standard deviations are shown in Table 2. Starting with perceived-SEC, the CFA yielded good fit: $\chi^2(142) = 213.38, p < .001, RMSEA = .035, CFI = .97, TLI = .96$. The ESEM also yielded good fit: $\chi^2(86) = 127.37, p = .002, RMSEA = .034, CFI = .98, TLI = .96$. In comparing these two models, it was evident that the ESEM yielded slightly better fit, and comprised lower factor correlations ($r_s = .34$ -.65, mean $r = .54$ in the ESEM compared with $r_s = .55$ -.84, mean $r = .73$ in the CFA), small to moderate cross-loadings, and well-defined factors. As such, ESEM was selected as the retained solution. Next, a bifactor ESEM was run: $\chi^2(72) = 89.04, p = .08, RMSEA = .024, CFI = .99, TLI = .98$. The bifactor ESEM yielded better fit than the ESEM, it had a well-defined global-factor ($|\lambda| = .44$ -.78; $M = .63$), and relatively well-defined specific-factors ($|\lambda| = .23$ -.66; $M = .38$). In addition, the bifactor ESEM had relatively smaller cross-loadings (ESEM cross-loadings $|\lambda| = .01$ -.38, $M = .09$; bifactor-ESEM cross-loadings $|\lambda| = .01$ -.23; $M = .07$), and the number of cross-loadings above .10 was less in the bifactor ESEM (19) when compared with the ESEM (25).

Based on these different statistics, the bifactor ESEM was selected as the final model, with a global-factor (global perceived-SEC) and five specific-factors comprising perceived competence for assertiveness, tolerance, social regulation, emotion regulation, and emotional awareness. Supplementary Materials show the loadings for the different factors in the bifactor ESEM solution and the results of measurement invariance tests across gender and SES subgroups, which demonstrated equivalence. Omega coefficients for perceived-SEC were calculated from the bifactor ESEM (see Table 2). For the global-factor, global perceived-

SEC, the omega was adequate at .95. For the specific-factors, omegas were adequate for assertiveness ($\omega = .53$), tolerance ($\omega = .62$), social regulation ($\omega = .55$), emotion regulation ($\omega = .65$), and emotional awareness ($\omega = .53$).

The CFA involving the motivation factors demonstrated adequate fit: $\chi^2 (127) = 290.20, p < .001, RMSEA = .056, CFI = .94, TLI = .90$. Omega coefficients for motivation were calculated from this model and were also adequate (see Table 2). Supplementary Materials provide details of measurement invariance tests by gender and SES for the motivation factors (again, these demonstrated equivalence). The CFA involving the behaviors also demonstrated adequate fit: $\chi^2 (34) = 64.49, p < .001, RMSEA = .047, CFI = .95, TLI = .94$. Omega coefficients were calculated from this model and were generally adequate (see Table 2); though, the coefficient for conduct problems was slightly below cut-offs (see Limitations).

3.2. Main Analyses

The measurement model involving the latent perceived-SEC global- and specific-factors, the motivation factor scores, the error-adjusted sum scores for the behaviors, and covariates yielded good fit: $\chi^2 (202) = 231.33, p = .08, RMSEA = .019, CFI = .99, TLI = .98$. Correlations are displayed in Table 3 and were generally as expected (for a description of these, see Supplementary Materials).

Turning to the SEM, the fit was good: $\chi^2 (202) = 213.22, p = .08, RMSEA = .019, CFI = .99, TLI = .98$. Figure 2 displays the results and Table 4 shows the standardized beta estimates. Global perceived-SEC was positively associated with autonomous motivation, introjected motivation, and prosocial behavior, and it was negatively associated with conduct problems. Turning to the specific-factors, perceived competence for tolerance was positively associated with autonomous motivation, and perceived competence for social regulation was negatively associated with external motivation and conduct problems. Next, autonomous

motivation was positively associated with prosocial behavior, and external motivation was positively associated with conduct problems. Introjected motivation was not associated with either of the behaviors. In terms of indirect associations, only one path was significant: global perceived-SEC \rightarrow autonomous motivation \rightarrow prosocial behavior ($\beta = .23$, $SE = .05$, $p < .001$, 95% CI[.14, .33]).³

4. Discussion

This study examined five dimensions of perceived-SEC and their unique associations with social-emotional motivation and behaviors. Preliminary analyses demonstrated that perceived-SEC is appropriate to consider by way of a global-factor that explains overarching perceived-SEC, as well as via five specific-factors reflecting unique types of perceived-SEC. Main analyses demonstrated that global perceived-SEC and the specific-factors were associated with motivation and the behaviors in varying ways (beyond the role of covariates and shared variance). Global perceived-SEC played the most consistent role: it was positively associated with autonomous motivation, introjected motivation, and prosocial behavior, and negatively associated with conduct problems. Of the specific-factors, perceived competence for social regulation negatively predicted external motivation and conduct problems, and perceived competence for tolerance positively predicted autonomous motivation. Turning to the motivation factors, autonomous motivation was positively associated with prosocial behavior, whereas external motivation was positively associated with conduct problems. Taken together, the findings yield knowledge about five dimensions of perceived-SEC that are pertinent to social-emotional outcomes. In terms of generalizability, the findings are relevant to 13-16 year-olds in Australia (both male and female, across a range of SES backgrounds) and likely hold relevance to similar populations in other countries given

³ Because bootstrapping is not available in *Mplus* with ESEM, indirect associations were examined without bootstrapping in the main SEM, and with bootstrapping in a path analysis using factor scores saved from the ESEM model. Results revealed an indirect association that was significant in both models.

research has shown these types of factors are applicable across different cultures (OECD, 2021). Notable findings are discussed below.

4.1. Global- and Specific-Factors of Perceived-SEC

The findings demonstrate that both global- and specific-factors appear to offer unique information about students' perceived-SEC, which builds on prior work that has not considered both specifications (Collie, 2021a, 2022b; Kristensen et al., 2021). The global perceived-SEC factor appears to reflect a broader sense of competence related to social-emotional phenomena (i.e., source factor; Cattell, 1946). As such, intervention efforts that broadly target perceived-SEC may be appropriate. At the same time, the results demonstrated that the five dimensions also reflect specific or unique aspects of perceived-SEC—and two of these were associated with outcomes beyond the role of global perceived-SEC. Thus, efforts to boost specific dimensions of perceived-SEC may also be important. Future research is now needed to examine these dimensions among other samples of students, and to ascertain whether the remaining specific-factors have stronger associations with other outcomes (discussed below). For theory, the findings suggest that consideration of both global- and specific-factors is important in future work on SEC.

4.2. Links Between Perceived-SEC and Motivation

The global perceived-SEC factor was positively associated with both autonomous motivation and introjected motivation. The association with autonomous motivation was hypothesized and likely occurred because individuals who feel more competent in their social-emotional experiences come to internally endorse the values and beliefs associated with adaptive social-emotional interactions—and this internalization encourages autonomous motivation (Collie, 2020; Ryan & Deci, 2017). This finding is important given well-recognized declines in perceived competence and motivation in adolescence (Eccles et al.,

1993). Efforts to boost global perceived-SEC may be one way to reduce these developmental declines.

The positive association between global perceived-SEC and introjected motivation was unexpected. However, it is possible global perceived-SEC means students are more attuned to the opinions of others—a developmental characteristic of adolescence; Tomova et al., 2021)—which might raise feelings of wanting to be perceived as a good person (i.e., introjected motivation; Ryan & Deci, 2017). Ideally, students are supported so they move towards autonomous motivation. Of note, autonomous and introjected motivation were positively associated in bivariate correlations. This correlation aligns with other research examining social-emotional motivation (Aelterman et al., 2019; Longobardi et al., 2020) and academic motivation (Litalien et al., 2017), and may partly explain these findings—autonomous and introjected motivation are not inversely associated and so similar connections with perceived-SEC may occur. For theory, the finding suggests it is important to consider social-emotional forms of introjected and external motivation separately, rather than under controlled motivation, given their different roles in this study.

Students with higher levels of perceived competence for tolerance reported greater autonomous motivation. Perhaps this finding occurred because perceived competence for tolerance is inherently imbued with social awareness and open-mindedness (OECD, 2021), which are important for internalizing the interpersonal values and norms of SEC that are core to autonomous social-emotional motivation (Collie, 2020; Ryan & Deci, 2017).

The only factor linked with external motivation (negatively) was perceived competence for social regulation. Perhaps low perceived competence for social regulation means students are less likely to internally endorse the values associated with social regulation—and so they feel externally pressured to undertake social and emotional behaviors instead (Ryan & Deci, 2017). It was interesting that global perceived-SEC was not associated

with external motivation—thus, it was the specific-factor of social regulation that was crucial. Future research is needed to see if this finding is replicated with other samples.

4.3. Associations Involving the Behaviors

Perceived-SEC and motivation were significantly associated with the behaviors in different ways. Global perceived-SEC was associated with greater prosocial behavior and lower conduct problems. In combination with the findings above, these results suggest that efforts to boost global perceived-SEC may be one avenue to help stave off the recognized social-emotional behavior declines in adolescence (OECD, 2021). Alongside this, perceived competence for social regulation had a unique, negative association with conduct problems. This finding is not surprising given social regulation skills are known to be linked with adaptive behaviors (Carlo et al., 2012). However, it does suggest that perceived competence for social regulation is particularly salient for avoiding conduct problems in adolescence.

Autonomous motivation was associated with greater prosocial behavior, whereas external motivation was associated with greater conduct problems. The high levels of self-determination involved in autonomous motivation mean students are more likely to engage in prosocial behaviors because they internally endorse these behaviors (Longobardi et al., 2020; Ryan & Deci, 2017). With external motivation, feeling externally pressured to be caring or reliable means the individual has not internalized the value of such behaviors (Ryan & Deci, 2017)—accordingly, these students appear to engage in behaviors that go against the values and norms of SEC (Aelterman et al., 2019). Although introjected motivation was unassociated with prosocial behavior in the SEM, it was positively correlated in the CFA—which aligns with prior research (Aelterman et al., 2019) and suggests that desires to be viewed as a good person are linked with prosocial behavior, but not beyond the role of autonomous motivation.

Finally, global perceived-SEC was indirectly associated with greater prosocial behavior via autonomous motivation. This finding aligns with the dual process hypothesis (Collie, 2022b), which posits that perceived-SEC is associated with adaptive outcomes by way of the boost it provides in self-determined social-emotional motivation. The fact that no indirect associations via introjected and external motivation were evident also aligns with the dual process theory, given that cross-process associations are expected to be weaker.

Three of the specific-factors (assertiveness, emotion awareness, emotional awareness) were not associated with the motivation and behavioral factors (but were so via their contribution to global perceived-SEC). Although other research shows these dimensions when assessed as skills (not perceptions) are positively associated with different outcomes (e.g., achievement, well-being; Guo et al., 2022), it may be that their most salient role as perceptions is via global perceived-SEC. Future research that tests this assertion is important and will be relevant for further developing theory in the area.

4.4. Practical Implications

A central implication of the current study is that perceived-SEC—and, in particular, global perceived-SEC—may be a lever to consider in practice. This is especially important in adolescence given declines in social-emotional behavior/skills that occur once students make the transition to high school (OECD, 2021). Ensuring that students enter adolescence from a high base of perceived-SEC is critical to helping reduce these declines.

In terms of developing global perceived-SEC (and social-emotional motivation and behaviors), social-emotional learning programs are a key avenue and involve providing students with skills and knowledge related to SEC, such as how to regulate their emotions or consider others' points-of-view (Johnson et al., 1996; Metz et al., 2013). Teachers may also want to directly target the specific perceived-SEC factors through their teaching practices.

Once again, although three specific-factors were not uniquely associated with the motivation

and behavioral factors, there were so via their contribution to global perceived-SEC and thus are relevant to address in practice.

For assertiveness, social regulation, and emotion regulation, teachers can encourage students to: reflect on a situation in which they could have engaged more confidently, or regulated their actions or emotions differently; brainstorm how they could respond to or interpret the situation differently; put those ideas in practice; and, evaluate the impact of and refine the different strategies (e.g., Boekaerts & Pekrun, 2016). For tolerance and emotional awareness, building students' perspective-taking abilities and social-emotional vocabulary through literature can be helpful, such as by role-playing book characters' responses in different situations, and reflecting on characters' perspectives, motives, and emotions (Brewer et al., 2022). For all perceived-SEC factors, developing a growth mindset may also be important. Growth mindsets are linked with greater perceived competence, and growth mindset interventions can boost prosocial behavior (Derr & Morrow, 2020). Accordingly, helping students feel that they can develop their social-emotional behaviors (i.e., a social-emotional growth mindset) may also be important for perceived-SEC (see CESE, 2021 for practical strategies).

4.5.Limitations

The findings of the present investigation should be interpreted with respect to several limitations. First, most variables were assessed using student self-reports. Although this approach is appropriate for measuring intrapsychic constructs, research with multiple waves of data is needed to address concerns about common-source bias. Despite this, the behaviors were parent/carer-reported, which reflects a strength of the study. However, parents/carers may not know or be able to report on students' behaviors at school. Future research that collects data from teachers is important. Second, the data were cross-sectional, which means that causal ordering could not be assessed. The construct ordering in the hypothesized model

was determined from theory. Nevertheless, studies with longitudinal and experimental designs are needed. Third, the reliability estimate for conduct problems was slightly below accepted cut-offs. Because this is a well-used scale, it was retained in analyses. Nonetheless, some caution is warranted in interpreting the findings involving conduct problems. Finally, five dimensions of perceived-SEC were examined. Future work is needed to see if these dimensions are relevant in different cultures and to ascertain whether other dimensions should be considered.

5. Conclusion

The current study examined perceived-SEC and demonstrated its structure as comprising an overarching global perceived-SEC factor and specific-factors. The study also showed that perceived-SEC was positively associated with adaptive forms of motivation and behaviors. Findings indicate that perceived-SEC is something schools and intervention developers may want to consider in efforts to boost social and emotional development among adolescents.

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Figure 1

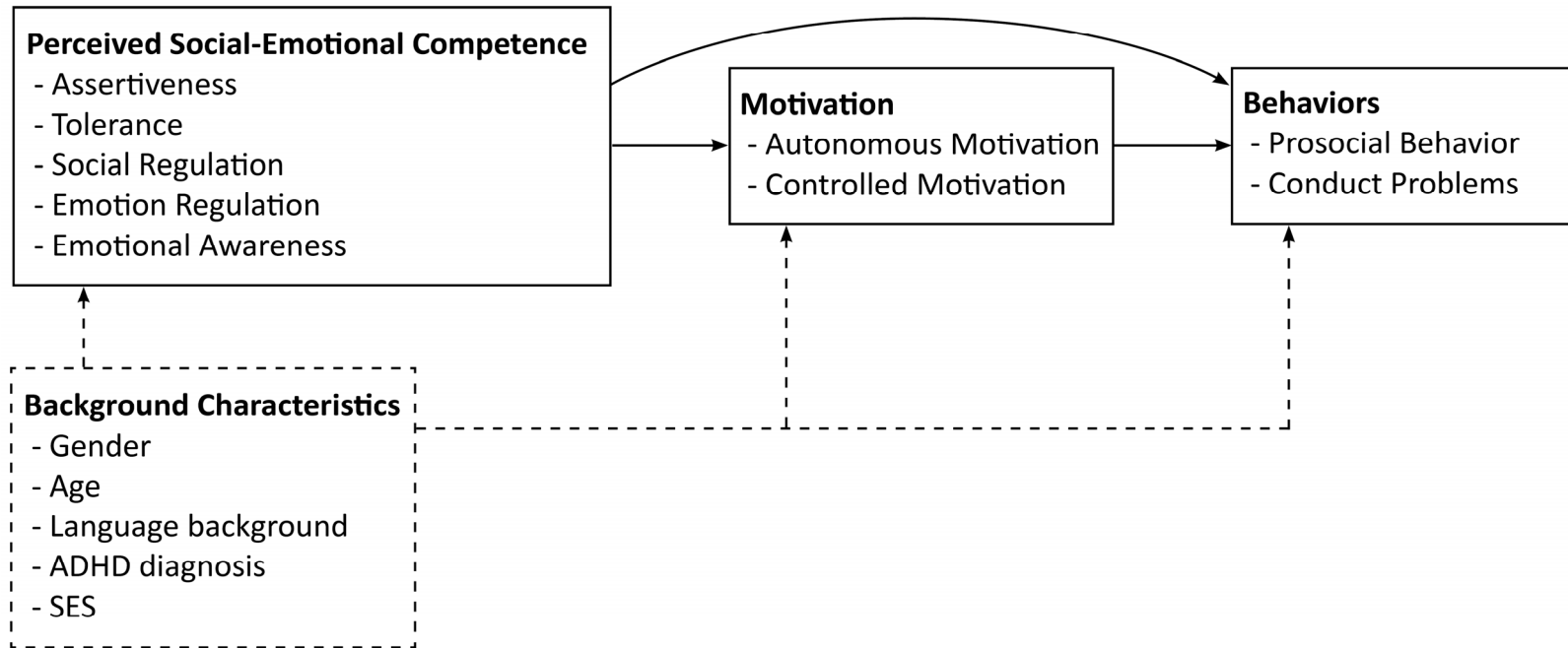
Hypothesized Model

Table 1

The Perceived-SEC Factors, Definitions, and Cognate Skills

Perceived-SEC Factors	Definitions	Cognate Skill(s) in CASEL's Model	Cognate Skill(s) in OECD's model (and the Big 5)
Perceived competence for assertiveness	...feeling capable to advocate for oneself, take a stand, and act as a leader (Chernyshenko et al., 2019).	Self-awareness	Engaging with others (Extraversion)
Perceived competence for tolerance	...feeling capable to be open to diverse points-of-view, and to treat others respectfully even if they are from different backgrounds (Chernyshenko et al., 2019).	Social awareness Relationship skills	Open-mindedness (Openness) Collaboration (Agreeableness)
Perceived competence for social regulation	...feeling capable to adjust or manage one's behaviors as needed in different situations to meet social norms (Collie, 2021a).	Self-management Responsible decision-making	Task performance (Conscientiousness)
Perceived competence for emotion regulation	... feeling capable to adjust one's thoughts to experience fewer negative emotions or more positive emotions (Collie, 2021a).	Self-management Responsible decision-making	Emotion regulation (Emotional stability)
Perceived competence for emotional awareness	... feeling capable to identify and name emotions that one experiences (Smith et al., 2019).	Self-awareness	Meta-cognition (compound skill)

Table 2

Reliability Estimates and Descriptive Statistics

	Omega (ω)	<i>M</i>	<i>SD</i>
<i>Perceived-SEC</i>			
Global perceived-SEC (g)	.95	—	—
Assertiveness (s)	.53	4.83	1.11
Tolerance (s)	.62	5.62	0.92
Social regulation (s)	.55	5.11	1.06
Emotion regulation (s)	.65	4.76	1.10
Emotional awareness (s)	.53	4.88	1.16
<i>Motivation</i>			
Autonomous	.88	5.51	0.82
Introjected	.80	4.82	0.93
External	.78	3.90	1.30
<i>Behaviors</i>			
Prosocial	.73	7.46	2.00
Conduct problems	.68	1.59	1.67

Note. (g) = global-factor. (s) = specific-factor.

Table 3

Correlations Among Substantive Factors

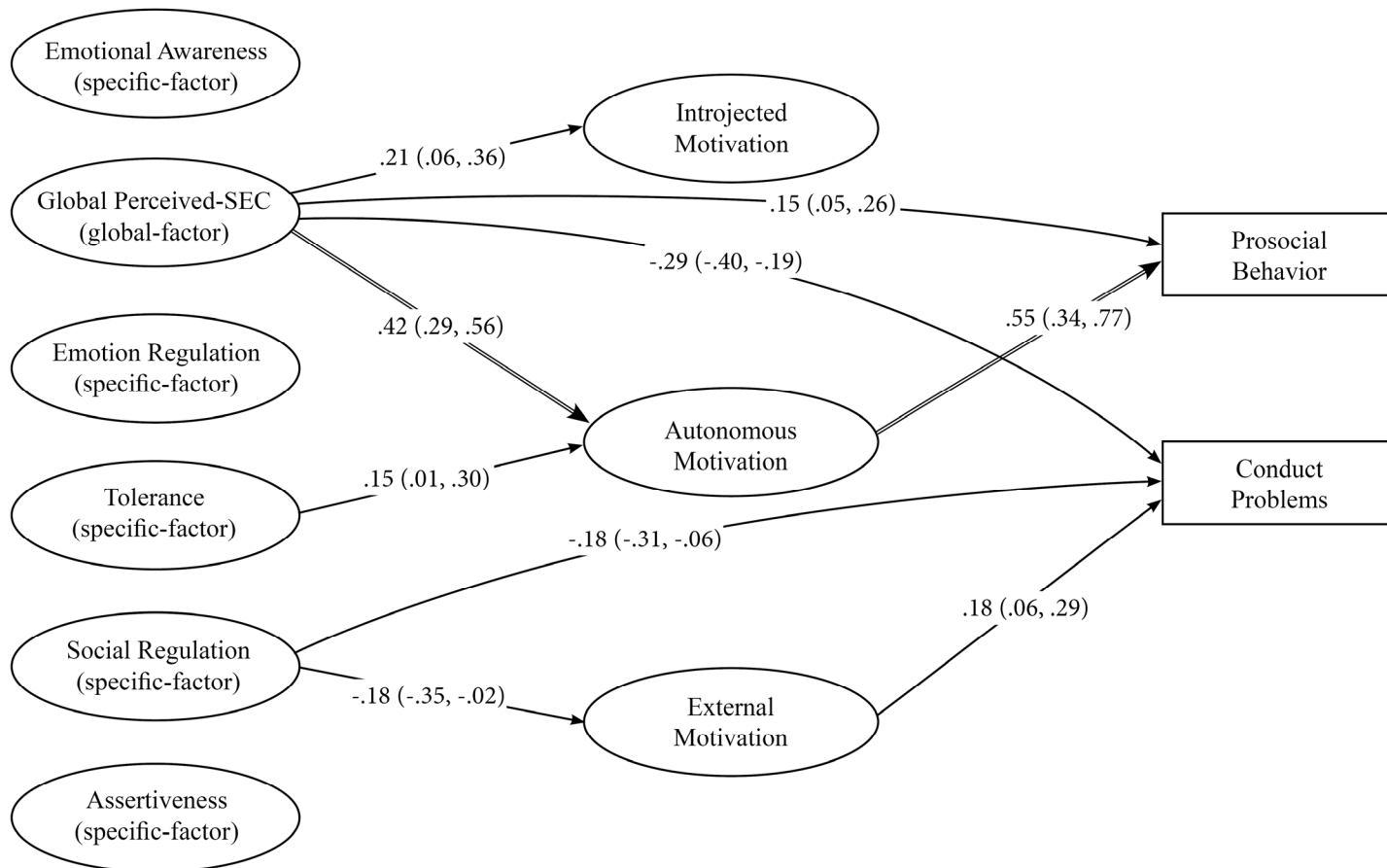
	Motivation			Behaviors	
	Autonomous	Introjected	External	Prosocial	Conduct problems
<i>Perceived-SEC</i>					
1. Global perceived-SEC (g)	.43***	.20**	-.04	.40***	-.43***
2. Assertiveness (s)	.01	.07	-.01	.09	.07
3. Tolerance (s)	.13	-.01	-.04	.11	.01
4. Social regulation (s)	.21*	.09	-.22*	.12	-.30***
5. Emotion regulation (s)	.17	.16	-.07	.11	-.08
6. Emotional awareness (s)	.02	.01	-.04	.06	-.06
<i>Motivation</i>					
7. Autonomous					
8. Introjected	.71***				
9. External	-.43***	.05			
<i>Behaviors</i>					
10. Prosocial	.62***	.35***	-.35***		
11. Conduct problems	-.50***	-.27***	.34***	-.51***	

Note. (g) = global-factor. (s) = specific-factor.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Figure 2

Standardized Beta Estimates from Structural Equation Model



Note. Standardized betas (with 95% confidence intervals in parentheses). Only significant paths shown. Solid lines represent significant direct associations. Double lines represent significant direct and indirect associations. For all paths (including non-significant paths and those involving covariates), see Table 4.

Table 4

Standardized Beta Estimates from Structural Equation Model

	Perceived-SEC						Motivation			Behaviors	
	Global perceived-SEC	Assert.	Tolerance	Social regulation	Emo. regulation	Emo. awareness	Autonomous	Introjected	External	Prosocial	Conduct problems
<i>Covariates</i>											
Gender	.16*	-.04	.07	.06	-.19	-.04	.01	.03	.05	.02	.05
Age	-.06	.01	-.09	.02	.03	.06	.09*	.09*	-.10*	-.01	.05
Language background	.11**	-.03	.04	-.09	.05	-.10*	-.01	-.04	-.04	-.04	.02
ADHD	-.24**	.14	.11	-.15	-.03	.01	-.05	.01	.14**	-.10*	.19***
SES	-.05	-.01	-.04	.14*	-.08	.02	.10*	.05	-.12*	.03	-.08
<i>Perceived-SEC</i>											
Global perceived-SEC (g)							.42***	.21**	-.02	.15**	-.29***
Assertiveness (s)							.01	.07	-.03	.11	.05
Tolerance (s)							.15*	.01	-.08	.05	.01
Social regulation (s)							.19	.08	-.18*	-.04	-.18**
Emotion regulation (s)							.18	.17	-.06	.03	-.03
Emotional awareness (s)							.01	.01	-.03	.04	-.05
<i>Motivation</i>											
Autonomous										.55***	-.16
Introjected										-.08	-.08
External										-.09	.18**
<i>Indirect association</i>											
Perceived-SEC → Autonomous motivation → Prosocial behavior										.23***	

Note. SES = socio-economic status. (g) = global-factor. (s) = specific-factor. Assert. = assertiveness. Reg. = regulation. Emo. = emotion/emotional.

* $p < .05$, ** $p < .01$, *** $p < .001$.