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ORIGINAL ARTICLE

A Comparative Study of Self-Efficacy, Loneliness, and Well-Being in Adolescents Diagnosed With Autism Spectrum Disorder and Specific Learning Disorder

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Abstract

Purpose Adolescents diagnosed with Autism Spectrum Disorder (ASD) and Specific Learning Disorder (SLD) within the neurodevelopmental disorder spectrum face challenges across various developmental domains that persist throughout their lives. This study aimed to examine and compare levels of loneliness, subjective well-being, and self-efficacy among adolescents aged 14–17 with ASD, with SLD, and adolescents with typical development (TD), based on their self-reports, and to explore the relationships among these variables.

Method The instruments used in the assessment included the Children's Self-Efficacy Scale, the UCLA Loneliness Scale Short Form, and the Adolescent Subjective Well-Being Scale, which were administered to 180 adolescents (39 with ASD, 62 with SLD, and 79 with TD) attending inclusive high school settings.

Results Findings revealed that adolescents with SLD reported significantly higher family satisfaction and lower academic self-efficacy compared to their TD peers and peers with ASD. Adolescents with ASD reported higher levels of loneliness and lower social self-efficacy than those in the other two groups. Correlational analyses across all groups indicated significant relationships between subjective well-being and academic self-efficacy among adolescents with ASD, and between family satisfaction and general self-efficacy among those with SLD.

Conclusion These results can be interpreted as suggesting that adolescents with ASD in this study sample are sensitive to or affected by the challenges they face in social–emotional interaction and peer relationships. For adolescents with SLD, the findings underscore the importance of supportive family interactions for their well-being and may indirectly relate to their perceptions of academic challenges.

Keywords Specific learning disorder · Autism spectrum disorder · Subjective well-being · Loneliness · Self-efficacy

Introduction

Self-efficacy, loneliness, and subjective well-being are important psychological constructs reflecting individuals' perceptions of their abilities, social connectedness, and overall mental health (Kim et al., 2025; Li et al., 2023; Seifert, 2024). Bandura (2011) defined self-efficacy as a multifaceted construct, referring to an individual's belief in their capacity to take effective action in order to achieve short- or long-term goals when faced with a specific task or situation. Studies conducted with typical development (TD) individuals have shown that the sense of self-efficacy is highly influenced by one's perception of personal competence, interpretations of their environment, lived experiences, and feedback received from others (Marsh & Martin, 2011).

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Depending on personal experiences, self-efficacy may vary across different domains, such as academic, social, and emotional areas (Telef & Karaca, 2012). Academic, social, and emotional self-efficacy refer to individuals' perceptions of their ability to manage academic tasks, interpersonal relationships, and emotional regulation (Zimmerman, 2000). As ASD and SLD are associated with impairments in different functional domains, distinguishing among these self-efficacy domains is crucial for examining their domain-specific relationships with loneliness and subjective well-being across groups in the present study. Low self-efficacy has been associated with a range of negative outcomes such as poor academic achievement, anxiety, substance abuse, and depression (Calandri et al., 2020; Duy & Yıldız, 2019). Therefore, self-efficacy is considered a crucial protective factor for mental health, and the literature indicates a relationship between self-efficacy and well-being (Cattelino et al., 2023; Guo et al., 2025). Tu and Zhang (2015) found that self-efficacy mediates the relationship between loneliness and stress, as well as depression and in another study it was found that low emotional self-efficacy is related with higher subsequent loneliness and depressive symptoms (Calandri et al., 2020).

Loneliness is a complex phenomenon that can be experienced in various ways across different times, not only through physical isolation but also as an emotional state, with individual definitions and experiences playing a key role (Dahlberg, 2007). Recognizing these variations is essential for understanding both typically and atypically developing adolescents. Subjective well-being is also a multidimensional construct composed of a cognitive dimension—evaluations of one's life according to personal standards—and an emotional dimension, which encompasses the positive and negative emotions experienced in daily life (Maggino, 2016). Because subjective well-being reflects individuals' personal evaluations of their lives, it has been found to be associated with personal variables such as self-efficacy and loneliness (Jin et al., 2020). As individuals' perceived competence decreases and their levels of loneliness increase, their well-being is expected to be adversely affected (Scaria et al., 2020). Findings from studies conducted with TD participants contribute to a better understanding of the experiences of individuals with different developmental characteristics.

Autism Spectrum Disorder (ASD) and Specific Learning Disorder (SLD) are neurodevelopmental disorders characterized by heterogeneous individual profiles (Büttner & Hasselhorn, 2011; Torenvliet et al., 2023). ASD is defined with deficits in social communication and social interaction, accompanied by restricted, repetitive patterns of behavior and interests, with onset in early development and resulting in clinically significant functional impairment (American Psychiatric Association, 2013). Individuals with SLD typically demonstrate challenges in reading, reading comprehension, writing, and mathematics (Eklund et al., 2015). While these profiles reflect the core characteristics of each group, research indicates that adolescents with ASD may also experience academic difficulties, whereas adolescents with SLD can face challenges in social functioning (Brown et al., 2013; Livingston et al., 2018). Furthermore, both conditions are often accompanied by psychiatric comorbidities such as anxiety and depression (Araz-Altay & Görker, 2018; Bougeard et al., 2021). In relation to these issues, individuals within these groups may also experience impairments in self-efficacy, loneliness, and overall well-being (Camus et al., 2023; Torppa et al., 2024). In this context, close monitoring of individuals who differ from their peers in terms of neurodevelopmental characteristics is of particular importance.

Adolescents With Autism Spectrum Disorder

Adolescents with ASD are considered at risk in terms of self-efficacy, loneliness, self-esteem, and well-being due to the challenges they face in social communication and interaction (Mazurek, 2013). It has been emphasized that they require support through intervention programs to cope with these difficulties (Lee et al., 2024). Given their challenges in recognizing, expressing, and regulating emotions, adolescents with ASD should be closely monitored in terms of emotional self-efficacy, as these difficulties may negatively affect their confidence in handling emotionally challenging situations (Mazefsky et al., 2013). Emotional self-efficacy plays a key role in emotional regulation, and social competence, and its insufficiency has been linked to heightened symptoms of anxiety and depression, which are already prevalent in this group (Strang et al., 2012). Furthermore, the level of social self-efficacy in individuals with ASD has been shown to be associated with their overall well-being (Camus et al., 2023).

Adolescents with ASD who have weak social relationships and limited social support from their environment have been found to experience challenges related to well-being, and they are also aware of the loneliness they face (Bailey et al., 2020). Although adolescents with ASD are not necessarily rejected by their peers, they tend to have fewer friendships compared to their TD peers, and even when they do have at least one friend, the quality of those friendships is often limited (Bauminger & Kasari, 2000; Chang et al., 2019). Similarly, research indicates that they are less accepted by peers, more frequently socially isolated, and tend to experience increasing levels of loneliness as they grow older (Deckers et al., 2017; Locke et al., 2010; Rotheram-Fuller et al., 2010). In a study (Lasgaard et

al., 2010), 21% of adolescents with ASD reported feeling lonely most or all of the time. In adulthood, similar patterns persist, with approximately one-quarter or slightly fewer reporting having a "deep" friendship (Grace et al., 2022). Feelings of loneliness and social isolation are common and may lead to mental health problems (Schiltz et al., 2021). While individuals with ASD often view their families as a primary source of support—as consistently shown across studies—such positive evaluations do not extend to their peer relationships (see for a review: DePape & Lindsay, 2016). Therefore, individuals with ASD are at a higher risk of experiencing depression and anxiety disorders compared to TD individuals, which can in turn contribute to reduced self-esteem (Mazurek, 2013). Although their levels of life satisfaction may not reach clinically concerning levels, they tend to be lower compared to their TD peers.

Adolescents With Specific Learning Disorder

SLD are neurodevelopmental disorders typically diagnosed in early primary school and characterized by persistent academic difficulties. Individuals with SLD face higher risks than their TD peers for outcomes such as school dropout or failure to complete compulsory education (Cortiella, 2013). Many adolescents who fail to graduate on time show markedly low performance in reading and mathematics (Hakkarainen et al., 2016) and these difficulties can lower academic self-efficacy (Burden, 2008) and affect their well-being (Aro et al., 2024).

Academic challenges often emerge early in schooling. Limited reading skills reduce opportunities that foster self-efficacy (Peura et al., 2021), and repeated failures may lead both children and parents to have low expectations (Rimkute et al., 2014). Such problems extend beyond academics; for example, global self-concept in adolescence has been shown to mediate the link between academic skills and emotional well-being at age 20 (Torppa et al., 2024). Identifying risk and resilience factors is thus essential to support long-term outcomes.

Research on loneliness among adolescents with SLD is mixed. Some studies report friendship difficulties and higher loneliness (Heiman & Olenik-Shemesh, 2020; Zach et al., 2016), while others find no significant differences from TD peers (Li et al., 2024; Skues et al., 2016). Loneliness appears influenced more by social skills, hopefulness, and family relationships than by SLD itself (Al-Yagon, 2007; Feldman et al., 2016).

Findings on mental health are also inconsistent. Some studies show higher stress, depression, and behavioral problems (Aro et al., 2022), whereas others find no significant differences (Parhiala et al., 2015). Self-reports often reveal depression, low self-esteem, and loneliness (Codina et al., 2026; Skues et al., 2016; Yazdi-Ugav et al., 2022). Emotional difficulties linked to school experiences can drive behavioral problems (Benassi et al., 2022). Overall, support systems—both social and familial—play a key role in the self-efficacy, loneliness, and well-being of adolescents with SLD, highlighting the need to interpret findings within social and cultural contexts (Lambert et al., 2022). In this context, it is important to interpret the self-efficacy, loneliness, and well-being of adolescents with SLD in light of factors such as available support, family structure, and societal expectations.

Current Study

In Türkiye, the number of students with special needs in inclusive classrooms has been increasing, with ASD and SLD forming the two largest subgroups (Ministiry of National Education, 2024). Both groups attend mainstream schools and receive two hours of state-funded weekly individual support, with parents often prioritizing cognitive and academic development (Nuri & Erden, 2023). Despite these supports, challenges in social acceptance persist, and individuals with special needs are often found to experience low levels of social acceptance in inclusive education environments (Bakkaloğlu et al., 2020). Perceptions toward individuals with special needs appear to vary depending on the characteristic features of different diagnostic groups (Schell et al., 2024). It has been reported that individuals with ASD are often subject to more discriminatory attitudes (Çopuroğlu & Mengi, 2014), and in inclusive settings, students with ASD may be perceived by their teachers as "cold and uncommunicative," differing from their peers with other special educational needs (Krämer & Zimmermann, 2025). During this process, families of TD children may display negative attitudes, which can also influence TD peers (Simón et al., 2023). In contrast, individuals with SLD are often reported to experience higher levels of social acceptance and support compared to other diagnostic groups (Rakap & Kaczmarek, 2010) and are perceived by teachers as a group that is easier to engage with (Krämer & Zimmermann, 2025; Schell et al., 2024). These differing perceptions and attitudes toward diagnostic groups may influence adolescents' social and emotional experiences.

Adolescents with ASD and SLD often differ from their TD peers in self-efficacy (Camus et al., 2023; Peura et al., 2021), loneliness (Grace et al., 2022; Zach et al., 2016), and well-being (Aro et al., 2022; Bailey et al., 2020), reflecting challenges unique to each condition. However findings on these constructs vary by informant. Parent reports often indicate higher depressive symptoms, lower well-being (Ferenc et al., 2021; Franke et al., 2019), and lower interpersonal self-efficacy and self-esteem (van der Cruijsen &

Boyer, 2020) compared to adolescents' self-reports. Additionally, adolescents' definitions, interpretations, and awareness of these concepts also vary. Individuals with ASD may also interpret constructs differently; for example, TD adolescents describe loneliness in emotional terms, while those with ASD define it simply as being alone (Deckers et al., 2017). This suggests differences in conceptualization, underscoring the value of self-reports. Although previous studies have examined self-efficacy, loneliness, and well-being in individuals with ASD or SLD in comparison to their TD peers, the literature lacks a study that simultaneously includes TD, ASD, and SLD groups and investigates how the relationships among these variables differ across these populations, to the best of our knowledge. Accordingly, this study examines self-efficacy, loneliness, and well-being among adolescents with ASD, SLD, and TD peers based on their self-reports. Based on prior literature, our first hypothesis proposes that adolescents with ASD and SLD will report lower well-being and self-efficacy, and higher loneliness than TD peers, and our second hypothesis posits that adolescents with SLD will report higher social self-efficacy, lower loneliness, and higher well-being than those with ASD. For this purpose, the following research questions were addressed:

1. Do levels of self-efficacy, subjective well-being, and loneliness differ among adolescents with ASD, SLD, and TD?
2. Are self-efficacy, subjective well-being, and loneliness interrelated within each group?

Method

Participants

This study, designed using a relational survey model, employed purposive sampling. The study group consisted of a total of 180 adolescents enrolled in 9th through 12th grades (Table 1). An a priori power analysis was conducted using G*Power 3.1 to estimate the required sample size for the study. Based on a medium effect size (f = 0.25), an alpha level of 0.05, and a desired statistical power of 0.80, the analysis indicated that a minimum of 269 participants would be necessary to detect statistically significant effects. However, due to the challenges in recruiting adolescents with ASD and SLD, the final sample comprised 180 participants. This sample size yields a post hoc statistical power of approximately 58%, which is acknowledged and discussed as a limitation in the discussion section.

The adolescents with ASD and SLD who participated in this study were enrolled in general education settings alongside their TD peers as part of inclusive education practices and received two hours of free supplementary special education support per week at private rehabilitation centers. All participants were diagnosed by specialist child and adolescent psychiatrists according to DSM-5 criteria, and the absence of any additional disabilities was confirmed through information obtained from families, teacher reports, and school records. TD adolescents were selected from students without any diagnosed disabilities who were currently attending high school. All participants were native Turkish speakers. According to teacher reports, adolescents with ASD had individualized education plans that included curriculum content broadly aligned with their grade level and had adequate reading and writing skills to participate in whole-class instruction in inclusive settings without one-on-one support; their academic performance was reported to be close to grade level.

Data Collection Tools

Children's Self-Efficacy Scale

This scale was developed by Muris (2001) to assess the social, academic, and emotional self-efficacy of adolescents aged 14–17. The Turkish adaptation was conducted by Telef and Karaca (2012). It is a 5-point Likert-type scale consisting of 21 items across three subscales: Academic Self-Efficacy, Social Self-Efficacy, and Emotional Self-Efficacy. Example items reflect adolescents' perceived competence in various areas. For instance, the academic self-efficacy subscale involves items concerning understanding lessons and maintaining concentration during class activities. The items in the social self-efficacy subscale assess confidence in expressing one's opinions among peers or initiating conversations with unfamiliar people. The emotional self-efficacy subscale includes items related to managing emotions effectively and regulating distressing thoughts. The factor loading of the items is 56.70%. The Cronbach's alpha reliability

Table 1 Descriptive characteristics of the study group

Group	n	*M*	SD	Female (n)	Male (n)	Academic HS (n)	Vocational HS (n)
ASD	39	14.84	1.18	12	27	31	8
SLD	62	14.90	1.00	29	33	47	15
TD	79	15.05	0.92	65	14	40	39
Total	180	–	–	106	74	118	62

HS high school

coefficients are .84 for Social Self-Efficacy, .64 for Academic Self-Efficacy, .78 for Emotional Self-Efficacy, and .86 for the overall scale. Test–retest reliability coefficients are .89, .75, and .83 for the three subscales respectively, and .88 for the total scale. In this study, total scores for the Children's Self-Efficacy Scale were calculated by summing the items within each subscale. These total scores are not standardized, as they reflect the raw score based on participant responses. Higher scores on the scale indicate higher levels of self-efficacy.

UCLA Loneliness Scale—Short Form

This scale was developed by Hays and DiMatteo (1987) to measure loneliness levels in adolescents aged 14–19. It was adapted into Turkish by Yildiz and Duy (2014). The scale consists of a single dimension with 7 items and is structured as a 4-point Likert-type scale. The items address feelings of social isolation and emotional disconnection, such as having few opportunities to spend time with friends, not feeling understood by others, or lacking sufficient emotional support from family members. Item factor loadings range from .31 to .71, accounting for 40.99% of the total variance. The internal consistency reliability coefficient is .74, and the test–retest reliability is .84. Total scores were calculated directly, as the scale does not have subscales. These total scores are not standardized and represent the raw score based on participant responses. Higher total scores indicate greater levels of perceived loneliness.

Adolescent Subjective Well-Being Scale

This scale was developed by Eryılmaz (2009) to assess subjective well-being in adolescents aged 14–18. It is a 4-point Likert-type scale consisting of 15 items across four subscales: Satisfaction with Family Relationships, Satisfaction in Relationships with Significant Others (such as friends, relatives, teachers, and romantic partners), Life Satisfaction, and Positive Emotions. The scale items include statements related to perceived family support and affection, emotions and mood in daily life, and perceptions of individuals with whom the respondent shares the same environment. Item factor loadings range from .63 to .79, explaining 61.64% of the total variance. The internal consistency coefficient of the scale is .86, and the Spearman-Brown coefficient is .83. For the Adolescent Subjective Well-Being Scale, total scores were calculated by summing the items across the four subscales. Higher total scores indicate higher levels of subjective well-being. These total scores are not standardized, as they reflect the raw score based on participant responses.

Data Collection Procedure and Analysis

Ethics committee approval for this research was obtained with decision number 22, dated 01.03.2022, from the Ethics Committee of Dokuz Eylül University. Informed consent was obtained from all participants, and families were informed about the study and their permission was requested. The scales were administered individually in a quiet room. Prior to administration, participants were provided with necessary instructions regarding the procedure. For all participants, instructions were read aloud, and if participants had difficulty understanding any items, clarifications were provided using standardized explanations. Although no formal comprehension check was applied, participants were encouraged to ask questions if they encountered difficulties. All participants were given a preliminary explanation stating, "This is not a test. You are free to express whatever you think. You may ask me to explain any items you find difficult." This approach aimed to ensure that all participants, including those with ASD, were able to meaningfully engage with the self-report items.

Initially, descriptive statistics, including skewness and kurtosis coefficients, were examined for all variables in line with the research questions. The suitability of the data for multivariate analyses was assessed by checking key assumptions: multivariate normality was evaluated via skewness and kurtosis values, and homogeneity of variances was assessed using Levene's test. Due to insufficient nonsingular covariance matrices, Box's M test could not be computed. Mahalanobis distances were calculated to detect multivariate outliers. Pearson correlation coefficients were computed among the dependent variables to explore the relationship between them, and to assess potential multicollinearity issues. It was found that there were no multicollinearity issues, as all correlations were below 0.80. Multivariate Analysis of Variance (MANOVA) was applied to determine whether scores on the Children's Self-Efficacy Scale, UCLA Loneliness Scale, and Adolescent Subjective Well-Being Scale differed across groups. Due to the violation of the homogeneity of covariances assumption, a more robust statistic, Pillai's Trace, was used. The MANOVA results indicated significant differences between the groups on the linear combination of the dependent variables (Pillai's Trace = .564, $F = 8.398$, $p < .001$). Following a significant MANOVA result, separate univariate ANOVAs were conducted for each dependent variable to identify where the group differences occurred. For variables showing significant differences in MANOVA, post hoc analyses were conducted to identify which groups differed. According to Levene's Test results, the Scheffé test was used for group comparisons when the homogeneity of variance assumption was met, whereas Tamhane's T2 test was applied for

variables violating this assumption. Additionally, Bonferroni correction was applied to evaluate the robustness of the post hoc comparisons and reduce the risk of Type I error. In post hoc comparisons, the statistical significance of mean differences between groups was evaluated using 95% confidence intervals. Confidence intervals were interpreted based on whether they included zero, with intervals excluding zero indicating significant group differences. This approach enhances the accuracy and reliability of the estimated mean differences. Effect sizes were computed and interpreted following the criteria proposed by Green and Salkind (2016) (small effect = .01; medium effect = .06; large effect = .14). Pearson correlation coefficients were computed among the dependent variables across all participants. As Pearson correlation requires normality, the assumption of normality was checked using skewness and kurtosis values. The results indicated that the data met the normality assumption for all variables, and thus Pearson correlations were considered appropriate for the analysis. To determine whether the significant correlations differed statistically across the three groups, Fisher's r-to-z transformations were subsequently applied. In addition to p-values, 95% confidence intervals (CIs) were calculated for all correlation coefficients to provide an estimate of the precision and practical significance of the observed relationships. Confidence intervals that do not include zero indicate statistically significant associations. The width of the interval also reflects the degree of uncertainty around the point estimate, with narrower intervals suggesting more precise estimates. Data analyses were performed using the SPSS 26.00 software package.

Findings

Descriptive statistics for all variables were examined, revealing skewness and kurtosis coefficients within the acceptable range of ± 3. Box's M test could not be computed due to insufficient nonsingular covariance matrices across groups. Nevertheless, Levene's test for equality of error variances indicated that the homogeneity of variances assumption was met for most dependent variables ($p > .05$), supporting the use of MANOVA. Mahalanobis distances were calculated to detect multivariate outliers, with maximum values ranging from 2.45 to 2.85, below the critical chi-square value ($\chi^2(3) = 16.27$, $p < .001$), confirming the absence of significant outliers. Standardized residuals ranged between − 2.42 and + 3.25 across analyses, within the commonly accepted threshold of ± 3, indicating no influential residuals. Pearson correlation coefficients among the dependent variables ranged from − 0.46 to 0.82 ($p < .01$), demonstrating moderate negative and positive relationships. These findings justified the joint analysis of the dependent variables using MANOVA. Descriptive statistics for the dependent variables across groups are presented in Table 2.

A multivariate analysis revealed a significant effect of group, Wilks' Lambda = 0.512, $F(16, 340) = 8.462$, $p < .001$, partial $\eta^2 = .285$. This indicates a significant difference across groups on the combined dependent variables, with a large effect size. Following the significant multivariate effect, separate one-way ANOVAs were conducted for each dependent variable to determine the source of the group differences. Significant group differences were found in academic self-efficacy, $F(2, 177) = 12.17$, $p < .001$, $\eta^2 = .12$; social self-efficacy, $F(2, 177) = 5.13$, $p = .007$, $\eta^2 = .06$; UCLA Loneliness Scale, $F(2, 177) = 24.53$, $p < .001$, $\eta^2 = .22$; satisfaction in family relationships, $F(2, 177) = 6.37$, $p = .002$, $\eta^2 = .07$; and positive emotions, $F(2, 177) = 3.07$, $p = .049$, $\eta^2 = .03$.

Table 2 Descriptive statistics of the dependent variables for ASD, SLD, and TD groups

	ASD			SLD			TD		
Variables	*M* ± *SD*	Skewness	Kurtosis	*M* ± *SD*	Skewness	Kurtosis	*M* ± *SD*	Skewness	Kurtosis
Academic self-efficacy	22.41 (6.29)	.516	− .815	17.11 (4.22)	.016	− .315	20.47 (6.04)	.223	− .653
Social self-efficacy	19.67 (4.16)	.371	− .403	22.32 (5.83)	− .329	− .272	22.96 (5.43)	− .056	− .426
Emotional self-efficacy	19.33 (4.27)	.087	− .094	19.64 (6.79)	.026	− 1.022	18.82 (6.53)	.350	− .663
Self-efficacy total score	61.41 (10.26)	.550	− .275	59.08 (14.45)	− .014	− .434	62.25 (14.63)	.349	.152
UCLA loneliness scale	18.13 (3.21)	− .931	1.264	13.02 (4.84)	.787	.124	13.05 (3.65)	.495	.308
Satisfaction in family relationships	13.05 (2.41)	− .781	.533	14.03 (1.93)	− .554	− .955	12.55 (2.81)	− .940	1.111
Satisfaction in relationships with significant others	11.69 (2.20)	− .459	.942	12.05 (2.58)	− .710	1.151	12.13 (2.31)	− .586	1.396
Life satisfaction	8.54 (1.90)	− .979	2.266	8.29 (2.61)	− .203	− .787	8.13 (2.60)	− .291	− .557
Positive emotions	12.23 (2.38)	− .809	2.303	13.31 (2.61)	− .789	.414	12.28 (2.88)	− .807	.700
Subjective well-being scale total score	45.51 (6.50)	− .284	.058	47.68 (7.43)	− .407	.090	45.09 (8.71)	− .669	1.246

No significant group differences were observed for emotional self-efficacy, self-efficacy total score, satisfaction in relationships with significant others, life satisfaction, or subjective well-being total score ($p > .05$). Detailed pairwise comparisons, including 95% confidence intervals for the significant group differences, are presented in Table 3.

Pairwise post hoc comparisons revealed significant group differences on several variables. Adolescents in the ASD group reported significantly higher academic self-efficacy than those in the SLD group, while TD adolescents also scored higher than the SLD group. In terms of loneliness, the ASD group had significantly higher scores compared to both SLD and TD groups. Additionally, the SLD group reported greater satisfaction in family relationships than the TD group. For these comparisons, the 95% confidence intervals did not include zero, supporting the statistical significance of the mean differences. No significant differences were found among the groups for emotional self-efficacy, life satisfaction, satisfaction in relationships with significant others, or overall subjective well-being.

The relationships between adolescents' subjective self-efficacy, loneliness, and well-being were examined. For adolescents in the ASD group, the findings revealed that academic self-efficacy was positively associated with both positive emotions and overall subjective well-being. Additionally, emotional self-efficacy showed a significant positive relationship with satisfaction in relationships with significant others. The confidence intervals for these associations did not include zero and indicated moderate effect sizes, suggesting that these relationships are both statistically reliable and practically meaningful within this sample. The relationships among the other variables were found to be non-significant (Table 4).

The findings for adolescents with SLD are in Table 5. The results indicate a consistent pattern in which higher self-efficacy—across academic, social, and emotional domains—is associated with greater subjective well-being and lower loneliness among adolescent with SLD. Notably, emotional self-efficacy showed some of the strongest positive links with life satisfaction. Loneliness was moderately

Table 3 Post hoc comparisons of group differences on dependent variables

Dependent variable	Group 1	Group 2	Mean difference	SE	*p*	95% CI lower	95% CI upper
Academic self-efficacy	ASD	SLD	5.30	1.14	.000**	− 8.10	− 2.50
	ASD	TD	1.94	1.22	.305	− 1.02	4.91
	SLD	TD	− 3.36	.86	.000**	− 5.45	− 1.26
Social self-efficacy	ASD	SLD	− 2.65	1.09	.054	− 5.35	.04
	ASD	TD	− 3.30	1.04	.008*	− 5.87	− .72
	SLD	TD	− .64	.90	.779	− 2.87	1.60
Emotional self-efficacy	ASD	SLD	− .31	1.10	.989	− 2.99	2.36
	ASD	TD	.51	1.00	.942	− 1.92	2.95
	SLD	TD	.82	1.13	.850	− 1.92	3.56
Self-efficacy total score	ASD	SLD	2.32	2.81	.709	− 4.60	9.26
	ASD	TD	− .84	2.69	.952	− 7.48	5.80
	SLD	TD	− 3.17	2.33	.398	− 8.93	2.58
UCLA loneliness	ASD	SLD	5.11	.80	.000**	3.17	7.06
	ASD	TD	5.08	.66	.000**	3.48	6.69
	SLD	TD	− .03	.74	1.000	− 1.83	1.76
Satisfaction in family relationships	ASD	SLD	− .98	.50	.149	− 2.22	.26
	ASD	TD	.49	.48	.588	− .69	1.68
	SLD	TD	1.47	.42	.002	.45	2.50
Satisfaction in relationships with significant others	ASD	SLD	− .36	.49	.766	− 1.56	.85
	ASD	TD	− .43	.47	.650	− 1.59	.72
	SLD	TD	− .08	.40	.982	− 1.08	.92
Life satisfaction	ASD	SLD	.24	.45	.927	− .85	1.34
	ASD	TD	.41	.42	.702	− .61	1.44
	SLD	TD	.16	.44	.976	− .91	1.23
Positive emotions	ASD	SLD	− 1.08	.55	.150	− 2.43	.28
	ASD	TD	− .05	.53	.996	− 1.35	1.25
	SLD	TD	1.03	.46	.082	− .010	2.15
Subjective well-being scale total score	ASD	SLD	− 2.17	1.60	.404	− 6.12	1.79
	ASD	TD	.42	1.54	.963	− 3.37	4.21
	SLD	TD	2.59	1.33	.154	− .70	5.87

The bottom rows contain 95% confidence intervals

*p < .05, **p < .001

Table 4 Relationships between the scores of ASD adolescents on the scales

Variables	1	2	3	4	5	6	7	8	9	10	*M*	*SD*
1. Academic self-efficacy	1										22.41	6.29
2. Social self-efficacy	.085 [− .26, .40]	1									19.67	4.16
3. Emotional self-efficacy	.494** [.24, .69]	− .020 [− .26, .40]	1								19.33	4.27
4. Self-efficacy total score	.852** [.76, .92]	.449** [− .01, .12]	.710** [.54, .83]	1							61.41	10.26
5. UCLA loneliness scale	− .121 [− .40, .13]	− .135 [− .00, .14]	− .059 [− .35, .22]	− .154 [− .00, .13]	1						18.13	3.21
6. Satisfaction in family relationships	.247 [− .07, .49]	− .038 [− .00, .12]	− .040 [− .33, .22]	.120 [− .18, .37]	− .158 [− .38, .14]	1					13.05	20.41
7. Satisfaction in relationships with significant others	.182 [− .12, .45]	− .204 [− .41, .02]	.423** [.09, .64]	.205 [− .12, .48]	.256 [− .22, .61]	.038 [− .26, .38]	1				11.69	2.20
8. Life satisfaction	.150 [− .00, .13]	− .209 [− .53, .14]	.091 [− .22, .37]	.045 [− .27, .32]	.256 [− .18, .61]	.339* [.03, .70]	.342* [− .12, .69]	1			8.54	1.90
9. Positive emotions	.363* [.09, .60]	.005 [− .27, .28]	.184 [− .12, .43]	.301 [− .00, .57]	.062 [− .50, .50]	.361* [.03, .71]	.552** [.16, .80]	.664** [.39, .83]	1		12.23	2.39
10. Subjective well-being scale total score	.330* [− .01, .60]	− .142 [− .39, .12]	.222 [− .09, .47]	.237 [− .10, .54]	.126 [− .29, .47]	.615** [− .29, .87]	.655** [.39, .84]	.777** [.63, .87]	.881** [.78, .94]	1	45.51	6.50

The bottom rows contain 95% confidence intervals

*p < .05, **p < .001

and negatively correlated with all self-efficacy domains. Furthermore, satisfaction in family relationships and positive emotions were both moderately related to subjective well-being. The confidence intervals for these correlations did not include zero and reflected moderate to strong effect sizes, suggesting that these relationships are both statistically robust and practically relevant within this sample.

Findings related to TD adolescents are presented in Table 6. Overall, Table 6 shows that all variables are weakly to moderately correlated. Social self-efficacy scores were found to be moderately and positively correlated with scores of significant relationships, life satisfaction, positive emotions, and total well-being. Although UCLA Loneliness Scale scores were negatively correlated with all self-efficacy variables, these correlations were generally low, and only some were significant. The total subjective well-being score was found to be positively correlated with self-efficacy and negatively correlated with loneliness. The 95% confidence intervals provided in the table suggest that these associations are statistically reliable and not likely due to chance.

Correlations between academic self-efficacy and overall well-being scores, which were found to be significant in all three groups, were examined to determine whether they differed significantly from one another. The analysis revealed no significant differences among the three groups in the correlations between academic self-efficacy and overall well-being scores. However, for emotional competence and satisfaction with relationships with significant others—variables that also showed significant associations in all groups—the correlation coefficients between the SLD and TD groups differed significantly at the .05 level ($z = 2.543$, $p = .005$). When other variables showing similar associations in the SLD and TD groups were analyzed, no significant differences in correlations were observed.

Discussion and Conclusion

The current study set out to examine self-efficacy, loneliness, and subjective well-being among adolescents with ASD, SLD, and TD. Given prior evidence that academic difficulties in SLD can undermine academic self-efficacy, and that social communication challenges in ASD often impair social self-efficacy and heighten loneliness, we hypothesized that both ASD and SLD groups would demonstrate lower well-being and self-efficacy, alongside higher loneliness, compared to their TD peers. Furthermore, given that societal attitudes toward adolescents with SLD tend to be more accepting compared to those toward adolescents with ASD (Çopuroğlu & Mengi, 2014; Rakap & Kaczmarek, 2010) and that such attitudes often vary according to prevailing stereotypes (Krämer & Zimmermann, 2025; Schell et al., 2024), we anticipated that differences in social self-efficacy, loneliness, and well-being would favor the SLD group. Our results provided partial support for this assumption.

Comparisons of Adolescents Groups

The results indicated that adolescents with ASD had lower levels of social self-efficacy, experienced higher levels of loneliness compared to both SLD and TD peers, and reported fewer positive emotions than those with SLD. Consistent with these findings, previous research based on self-reports has also indicated that individuals with ASD tend to report greater loneliness and lower levels of positive affect compared to their TD peers (Brownlow et al., 2015; Chang et al., 2019; Whitehouse et al., 2009). In a study based on adolescents' self-reports (Whitehouse et al., 2009), researchers found that adolescents with ASD reported higher levels of loneliness, less willingness to form friendships, and more intense negative emotions compared to their TD peers, suggesting that these negative emotions may be linked to lower perceived quality of social relationships.

Unlike previous studies comparing adolescents with ASD (Mazurek, 2013; Schiltz et al., 2021) and SLD (Aro et al., 2022; Yazdi-Ugav et al., 2022) to their TD peers—where significant group differences were reported in variables such as well-being, anxiety, and depression—our findings showed no significant differences among ASD, SLD, and TD groups in overall subjective well-being. One possible explanation relates to the assessment method: in the present study, outcomes were obtained directly from participants' self-reports, whereas prior research has often relied on parent- or teacher-reports, and discrepancies between informant reports and self-assessments have been documented in ASD (Ferenc et al., 2021; Franke et al., 2019). A second potential explanation may be linked to the educational context of the participants. Adolescents with ASD in this sample were continuing their education in inclusive settings and reported higher academic self-efficacy than their SLD and TD peers, as well as comparable levels of life satisfaction to the TD group. In Türkiye, services for individuals with special needs largely prioritize cognitive and academic skill development, whereas psychological support services remain limited, and families often emphasize academic support (Nuri & Erden, 2023). It is therefore possible that adolescents' perceptions of competence, particularly in the academic domain, hold substantial importance within this sociocultural and educational context. In line with this interpretation, previous research has suggested that subjective well-being in individuals with ASD is associated with self-perceived cognitive ability (Deserno et al., 2017). Furthermore, the positive associations observed in our data between academic self-efficacy and both positive

Table 5 Relationships between the scores of SLD adolescent on the scales

Variables	1	2	3	4	5	6	7	8	9	10	*M*	*SD*
1. Academic self-efficacy	1										17.11	4.22
2. Social self-efficacy	.643** [.44, .77]	1									22.32	5.83
3. Emotional self-efficacy	.591** [.42, .73]	.572** [.39, .71]	1								19.65	6.79
4. Self-efficacy total score	.829** [.73, .90]	.860** [.77, .92]	.874** [.82, .91]	1							59.08	14.45
5. UCLA loneliness scale	− .493** [− .66, − .28]	− .558** [− .70, − .37]	− .583** [− .74, − .40]	− .643** [− .76, − .50]	1						13.02	4.84
6. Satisfaction in family relationships	.245 [− .02, .50]	.393** [.20, .60]	.269* [.05, .48]	.357** [.15, .57]	− .298* [− .53, − .09]	1					14.03	1.93
7. Satisfaction in relationships with significant others	.418** [.16, .68]	.459** [.21, .68]	.605** [.44 .74]	.592** [.38, .75]	− .407** [− .63, − .19]	.335** [.16, .52]	1				12.05	2.58
8. Life satisfaction	.287* [.00, .55]	.283* [.01, .52]	.356** [.11, .59]	.365** [.11, .60]	− .174 [− .45, .10]	.385** [.15, .58]	.512** [.27, .70]	1			8.29	2.61
9. Positive emotions	.387** [.13, .61]	.562** [.34, .74]	.269* [.01, .50]	.466** [.23, .66]	− .385** [− .67, − .09]	.538** [.39, .69]	.377** [.11, .61]	.486** [.23, .67]	1		13.31	2.61
10. Subjective well-being scale total score	.445** [.18, .66]	.558** [.33, .74]	.500** [.30, .68]	.590** [.39, .76]	− .415** [− .65, − .16]	.700** [.59, .80]	.746** [.61, .86]	.799** [.68, .87]	.792** [.65, .88]	1	47.68	4.84

The bottom rows contain 95% confidence intervals

*p < .05, **p < .001

affect and well-being indicate that academic competence perceptions may co-occur with more favorable emotional experiences. However, given the correlational nature of these findings, these relationships should be interpreted as associations rather than evidence for causal mechanisms. Academic self-efficacy may represent one of several factors linked to well-being among adolescents with ASD, and future longitudinal and intervention studies are needed to clarify directionality and potential mechanisms. Finally, to better contextualize group differences in self-efficacy, loneliness, and well-being, it is important to consider evidence indicating that individuals with ASD tend to demonstrate weaker emotional self-awareness than their TD peers, and that this discrepancy may increase with age, becoming more pronounced from adolescence onward (see Huggins et al., 2021, for a meta-analysis).

In line with the research questions, it was found that adolescents with SLD demonstrated lower academic self-efficacy than both their peers with ASD and TD peers. While lower academic self-efficacy compared to TD peers was expected, the difference observed between the SLD and ASD groups is particularly noteworthy. The fact that adolescents with ASD reported higher academic self-efficacy than those with SLD does not necessarily indicate superior academic performance, as perceived self-efficacy refers not to the number of skills one possesses, but to the belief in one's ability to use those skills effectively across various contexts (Chen et al., 2004). While some studies have reported that adolescents with ASD show limitations in metacognitive accuracy regarding their learning and competence, others have found no significant differences compared to their TD peers (see meta-analysis: Carpenter & Williams, 2022). Adolescents with ASD perceiving themselves as more academically competent than their peers with SLD may primarily reflect differences in self-perception rather than actual performance. Nevertheless, to better understand the academic self-efficacy of individuals with ASD, future studies should incorporate objective assessments of academic competence alongside self-reported evaluations.

Numerous studies in the literature report that adolescents with SLD, as well as their parents and teachers, frequently describe them as having low self-esteem and high levels of anxiety related to school and academic performance (Novita, 2016; Terras et al., 2009; Valås, 2001). On the other hand, adolescents with SLD did not differ from their TD peers in terms of social and emotional self-efficacy or loneliness. They reported higher levels of positive emotions compared to their peers with ASD and greater satisfaction in family relationships than their TD peers. The findings also indicated that as the self-efficacy levels of adolescents with SLD increased, their loneliness decreased and well-being improved. The literature similarly emphasizes the relationship among these constructs (Cattelino et al., 2023; Guo et al., 2025). Although low academic self-efficacy may pose a risk factor for social and emotional difficulties, it does not appear to negatively impact the overall well-being of adolescents with SLD. Factors such as satisfaction with family relationships, strong peer interactions, high social and emotional self-efficacy, and the absence of loneliness serve as important protective factors for their well-being (Kılıç-Tülü & Özbek, 2025; Stein et al., 2024).

In our study, adolescents with SLD reported higher satisfaction with family relationships than their TD peers and more positive emotions than those in the ASD group. This pattern may reflect the protective influence of family support for SLD adolescents (Terras et al., 2009) and may also explain why SLD adolescents did not differ from their TD peers in terms of overall well-being. The relatively favorable affective outcomes among SLD adolescents may also be shaped by more accepting societal attitudes toward SLD compared to ASD (Çopuroğlu & Mengi, 2014; Rakap & Kaczmarek, 2010) and greater opportunities for social participation in school contexts.

Intercorrelations Between Variables

The pattern of associations observed in the present study appeared to vary across diagnostic groups. Specifically, among adolescents with ASD, emotional self-efficacy was associated with perceived relationships with significant others, whereas academic self-efficacy was associated with positive affect and overall subjective well-being. In contrast, the associations observed among adolescents with SLD and TD appeared comparatively similar. Notably, several hypothesized associations were not statistically significant within the ASD group. While null findings should be interpreted with caution, this pattern may suggest that the constructs examined in this study (e.g., self-efficacy, loneliness, and well-being) could be understood and appraised differently by adolescents with ASD relative to their peers with SLD (Schiltz et al., 2021). Accordingly, further research is warranted to clarify how individuals with ASD conceptualize self-efficacy, loneliness, and subjective well-being.

Although loneliness in the SLD and TD groups appeared to be negatively associated with nearly all other variables, loneliness in the ASD group was not significantly related to any of the variables. Future studies should examine the meaning attributed to "loneliness" and investigate its potentially multidimensional nature across contexts (e.g., school versus daily life). Given that loneliness is inherently subjective (Dahlberg, 2007), these findings should also be interpreted in light of the measurement approach used to assess loneliness and the extent to which conventional measures capture ASD-specific experiences. Indeed, Schiltz et al.

Table 6 Relationships between the scores of TD adolescents on the scales

Variables	1	2	3	4	5	6	7	8	9	10	*M*	*SD*
1. Academic self-efficacy	1										20.47	6.04
2. Social self-efficacy	.488** [.29, .66]	1									22.96	5.43
3. Emotional self-efficacy	.536** [.33, .69]	.436** [.19, .65]	1								18.82	6.53
4. Self-efficacy total score	.834** [− .26, .40]	.768** [.64, .86]	.830** [.74, .90]	1							62.25	14.63
5. UCLA loneliness scale	− .130 [− .33, .08]	− .359** [− .52, − .17]	− .136 [− .34, .10]	− .248* [− .42, − .04]	1						13.05	3.65
6. Satisfaction in family relationships	.177 [− .04, .38]	.128 [− .16, .38]	− .098 [.33, .18]	.077 [− .16, .32]	− .213 [− .39, .01]	1					12.56	2.80
7. Satisfaction in relationships with significant others	.177 [− .08, .42]	.380** [.15, .59]	.254* [− .02, .51]	.328** [.05, .57]	− .268* [− .46, − .05]	.521** [.28, .70]	1				12.13	2.31
8. Life satisfaction	.200 [− .05, .41]	.343** [.12, .53]	.124 [− .13, .38]	.265* [.03, .49]	− .228* [− .42, − .04]	.550** [.36, .70]	.544** [.38, .68]	1			8.13	2.60
9. Positive emotions	.180 [− .03, .38]	.328** [.10 .52]	.075 [− .20, .37]	.230* [− .00, .46]	− .318** [− .49, .10]	.590** [.32, .79]	.584** [.41, .74]	.596** [.37, .77]	1		12.28	2.88
10. Subjective well-being scale total score	.224* [− .01, .45]	.353** [.10, .57]	.097 [− .18, .40]	.267* [− .00, .52]	− .313** [− .48, − .12]	.820** [.70, .90]	.789** [.67, .88]	.817** [.74, .88]	.854** [.75, .92]	1	45.09	8.71

The bottom rows contain 95% confidence intervals

*p < .05, **p < .001

(2021) argue that traditional loneliness frameworks may not fully reflect the lived experiences of individuals with ASD. Although the present study did not directly assess whether adolescents with ASD perceived loneliness as problematic or as related to their well-being, prior research suggests that the desire for social interaction and friendship may increase during adolescence in this group (Brownlow et al., 2015). This underscores the importance of examining social support needs across developmental periods using ASD-sensitive conceptual and measurement frameworks.

In addition to examining within-group correlations, we also explored whether the strength of associations between key variables differed significantly across the ASD, SLD, and TD groups. Specifically, we tested whether the correlations between academic self-efficacy and overall well-being—both of which showed significant associations within all three groups—differed significantly across groups. The results indicated that these correlations did not differ significantly between groups. Accordingly, the levels of association observed among these variables were found to be similar across the groups. However, for the variables of emotional competence and satisfaction in relationships with significant others, which were also significantly correlated within each group, a statistically significant difference was found between the SLD and TD groups ($z=2.543$, $p=.005$). This finding suggests that while similar patterns of association exist across groups in some domains, certain relationships—particularly those involving emotional and interpersonal dimensions—may vary in strength in adolescents with SLD compared to their typically developing peers. Future research should further examine potential contextual, developmental, and measurement-related factors that may contribute to these group-specific patterns.

Implications for Practice

In our study, the differences observed in social self-efficacy, loneliness, and positive emotions—particularly to the disadvantage of the ASD group—provide important insights for practical implications, as they highlight specific psychosocial areas where adolescents with ASD may require additional support. These findings suggest that interventions should not only address behavioral or academic aspects, but also prioritize the enhancement of emotional and interpersonal functioning. The findings of this study illustrate that having a learning disorder does not inherently lead to social or well-being difficulties; rather, outcomes are shaped by perceived social support (Heiman & Olenik-Shemesh, 2020), supportive education quality (Livingston et al., 2018) and coping skills of individuals' (Skues et al., 2016). In this study, adolescents with SLD reported higher satisfaction in family relationships compared to their TD peers, and no significant difference was found in life satisfaction. This may help explain why their academic difficulties are primarily confined to academic self-efficacy. For SLD adolescents, academic self-efficacy emerges as a critical leverage point, but interventions may also benefit from reinforcing perceived social support and family relationships. Additionally, future studies may investigate whether different subtypes of SLD, such as reading-, writing-, or mathematics-related difficulties, differentially influence adolescents' self-efficacy.

Early diagnosis and the implementation of comprehensive, preventive intervention plans for children with ASD or SLD before well-being is compromised can be considered vital in preventing potential problems later in life. It is equally important to provide guidance services for parents of children with special needs, helping them understand their children's needs and support them appropriately. Likewise, teachers must be able to accurately identify and respond to the needs of these students, working in collaboration with families and other professionals. From a policy perspective, the results underscore the need for inclusive education practices in Türkiye that go beyond physical integration to foster meaningful peer interactions. Current limitations in teacher training and school-level support for inclusion may be contributing to the psychosocial risks observed, particularly for ASD students. Tailored strategies that reflect group-specific needs—emotional skills training for ASD, academic competence support for SLD—are essential for optimizing outcomes during adolescence, a pivotal developmental stage for identity formation and social integration.

Limitations

In this study, we aimed to measure the variables directly through adolescents' self-reports. However, it is known that individuals with ASD may experience challenges in identifying and describing internal emotional experiences, as well as potential differences in self-awareness (Huggins et al., 2021). Furthermore, no formal cognitive or language screening was conducted as part of the selection process, which may limit the generalizability of the findings to the broader ASD population. Therefore, the findings reported here should be interpreted with these limitations in mind. Future research is recommended to incorporate data from multiple sources (e.g., teachers, parents) to strengthen the validity of findings related to these variables. It should also be noted that the participants with ASD in this study represent a subgroup with relatively higher cognitive and social functioning within the broader ASD population. Although the study involved adolescents with relatively high functioning, no formal assessment was conducted to evaluate whether participants fully understood the survey items. Similarly, the SLD group is known to be heterogeneous in

nature. One notable limitation of the current study is the relatively low statistical power (58%) due to a smaller-than-desired sample size. This may have reduced the likelihood of detecting significant effects, particularly those of small magnitude. Future studies with larger samples are needed to validate and extend these findings. Another limitation of the present study is that it was not pre-registered. In addition, the internal consistency of the Social Self-Efficacy subscale was relatively low (Cronbach's alpha = .64), which may indicate limited reliability of this specific measure. This should be taken into consideration when interpreting results involving this subscale, and future studies may consider using alternative or improved measures of social efficacy.

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Data Availability Data is available upon request.

Declarations

Conflict of interests The authors have no competing interests to declare that are relevant to the content of this article.

Ethical Approval Ethics committee approval was obtained for this research with decision number 22 of the ethics committee meeting of Dokuz Eylül University İzmir Türkiye, on 01.03.2022.

Informed Consent All participants were asked to consent to participate and families informed about the study and their permission was requested.

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