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Supportive Parenting and Adolescents Digital Citizenship Behaviors: The Mediating Role of Self-Regulation

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Abstract

A plethora of studies have shown that parenting practices can lead to problematic Internet use. However, few studies have explored how parents foster positive online behavior in adolescents. This study addresses this gap by using self-determination theory to examine how supportive parenting practices, such as autonomy support and structure provision, can influence digital citizenship behaviors in adolescents. The study considered the mediating role of adolescents' self-regulation, and examined how sex and adolescence stage moderate these relationships. The study included 570 Mexican adolescents (48% girls and 52% boys), and structural equation modeling and multigroup invariance statistics were conducted for analysis. The results showed that autonomy support was positively associated with all dimensions of digital citizenship, while structure provision was only positively associated with online civic engagement. Self-regulation was found to mediate the relationship between autonomy support, structure provision, and digital citizenship behaviors. The multigroup analysis confirmed that sex and adolescence stage did not affect the relationship between parenting practices and digital citizenship behaviors. Overall, the results suggest that supportive parenting practices can encourage positive digital citizenship behaviors among adolescents.

Keywords: digital citizenship; parental mediation; self-regulation; adolescents; structural equation model

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Introduction

Adolescents comprise the most Internet-connected population (International Telecommunication Union, 2022; United Nations Children's Fund & International Communication Union, 2020). In Mexico, 92% of adolescents are Internet users (National Institute of Statistic and Geography, 2023a). Adolescents' use of social media and technology can have both positive and negative effects. While it can help in identity development, acquire knowledge, and engage in societal issues (J. Hu & Yu, 2021; James et al., 2021; C. Wang & Gu, 2019; Weinstein & James, 2022), it also poses risks, such as Internet addiction (Agbaria, 2021; Kuss et al., 2021; Nwufu et al., 2023) and exposure to being victims of catfishing, cyberbullying, cyberstalking, and sexual harassment (Brandau & Ray, 2021; K. Choi et al., 2017; Hicks et al., 2021; Madrid-López et al., 2020; Worsley et al., 2017). A study using a national sample of Mexican adolescents aged 12 to 19 years found that 30% of females and 23% of males experienced online aggression in the past year. The most common forms of online aggression reported were offensive messages (33%), sexual content (26%), sexual insinuations or proposals (24%), and identity theft (19%; National Institute of Statistic and Geography, 2023b).

Online aggression can have long-lasting detrimental effects on mental health, including depression, hostility, and suicidal ideation (Extremera et al., 2018; Lozano-Blasco & Cortés-Pascual, 2020; Wright, 2018). In light of the dual impact of social media and technology on adolescents, it is imperative to understand the factors that contribute to adolescents' safety and well-being in their online interactions, and how to help them maximize the benefits of social media and technology. According to some scholars (L. L. Chen et al., 2021; M. Choi et al., 2017; Ribble, 2015; Weinstein & James, 2022), digital citizenship increases opportunities while minimizing potential risks among adolescents. Substantial evidence (Jones & Mitchell, 2016; Kim & Han, 2020; Phillips & Anderson, 2020; Vlaanderen et al., 2020) indicates that digital citizenship is crucial for protecting individuals from online risks. As a result, digital citizenship has increasingly attracted the attention of politicians and educators (Cortesi et al., 2020; Council of Europe, 2022; James et al., 2021).

Although there are multiple definitions of digital citizenship, we have examined some of the most influential ones in the literature (see M. Choi et al., 2017; Kim & Han, 2020; Mossberger et al., 2007; Ribble, 2015). Ribble (2015) offers a normative competence-focused conceptualization of digital citizenship that includes nine dimensions: digital access, digital commerce, digital communication and collaboration, digital etiquette, digital literacy, digital health and welfare, digital law, digital rights and responsibility, and digital security and privacy. On the other hand, Mossberger et al. (2007) elaborated a participation-focused conceptualization of digital citizenship, which emphasized the importance of individuals through digital media in social, economic, and political issues.

Based on previous studies, M. Choi et al. (2017) offered an integrative definition of digital citizenship comprising four central categories: digital ethics, media information literacy, participation, and critical resistance. Kim and Han (2020) proposed that 'accepting diversity' should be considered an essential dimension of digital citizenship. The authors assert that contextual factors influence the evolution of phenomena, and in the current era, globalization, migration, and the availability of media resources that facilitate interactions with individuals from diverse cultural and economic backgrounds must be taken into consideration.

To guide our study, we adopted the definition offered by James et al. (2021), who refers digital citizenship as the "responsible use of technology to learn, create, and participate" (p. 12). Therefore, our study used digital citizenship dimensions related to adolescents' ethical and responsible behaviors toward others and the community. Considering the above, our study considers three fundamental dimensions of digital citizenship: (1) online respect, which includes behaviors that demonstrate consideration of others' opinions and rights; (2) online civic engagement, which includes activities that promote community development and enhance the well-being of its members; and (3) online diversity acceptance, which refers to the acknowledgment and maintenance of positive interpersonal relationships with individuals exhibiting physical, cognitive, behavioral, socioeconomic, cultural, and sexual differences (M. Choi et al., 2017; Jones & Mitchell, 2016; Kim & Han, 2020; Valdés-Cuervo et al., 2024).

It is imperative for scholars to pay more attention to multiple variables that trigger digital citizenship. However, current research remains limited to analyzing individual-related variables (see Erreygers et al., 2016; Zeng et al., 2020; Zheng et al., 2022) and has yet to consider other potential factors, such as family influence. To address this gap, we examined parental influence on adolescents' digital citizenship.

Parents and Adolescents' Online Behaviors

Research on parenting emphasizes its significant role in shaping children's behavior through the socialization processes. According to Maccoby (2015), socialization is the process through which individuals are taught the skills, behavioral patterns, values, and motivations necessary to function in the culture in which they are growing. While multiple factors such as school and society may influence the socialization process, parents are the primary and most influential agents during the socialization cycle (Carrizales et al., 2023; Harro, 2010; Miller-Slough & Dunsmore, 2020).

Parents play a vital role in teaching their children societal norms and expectations (Grusec & Davidov, 2007). As primary socialization agents and caregivers, they play a pivotal role in guiding children's interactions in online environments. Parents are also responsible for supervising their children's media use and promoting it (García-Vázquez et al., 2024; A. Meeus et al., 2019). This process, known as parental mediation, involves strategies to minimize the detrimental effects of technology and social media and to maximize their benefits (Hwang et al., 2017; Milosevic et al., 2022).

Numerous studies have examined various parental mediation strategies. The literature identifies two types of mediation, active and restrictive. Active mediation involves parents communicating with their children about the

potential risks and benefits associated with Internet usage as well as sharing opinions on media content and activities. On the other hand, restrictive mediation involves setting rules, limits, and conditions for media use, such as the amount of time spent on the Internet and the type of content children can access (Chng et al., 2015; Milosevic et al., 2022; Valkenburg et al., 2013). Findings regarding the impact of these parental mediation strategies on problematic media use in children (Collier et al., 2016; Vossen et al., 2024) remain inconclusive, presenting a challenge for parents in developing effective online socialization strategies for their children.

The mixed effects of active and restrictive parental mediation on adolescents' online behaviors may be better understood by considering the specific style of parental mediation strategies (Fikkers et al., 2017; Padilla-Walker et al., 2020). Theoretical models of effective parenting, such as the self-determination theory (SDT; Deci & Ryan, 1985), may contribute to explaining how parenting style mediates adolescents' digital citizenship. For instance, when parents employ restrictive mediation strategies, such as limiting their children's online activities, psychological control is involved. This form of control may result in feelings of shame or apprehension regarding the potential loss of parental affection if children fail to comply. On the other hand, active mediation involves engaging in discussions with children regarding their online activities and providing explanations for the imposed restrictions and allowing children to make decisions within certain boundaries. Overall, evidence suggests that the two types of parental mediation strategies impact children differently (Griffith & Grolnick, 2014; Shek et al., 2018).

Another significant gap in previous research that limits the understanding of how parents promote prosocial online behavior is the tendency to focus predominantly on how parents either encourage or discourage risky online activities (Benrazavi et al., 2015; Collier et al., 2016; Legate et al., 2019; Martins et al., 2019; Nikdel & Parvinian Nasab, 2022). SDT (Deci & Ryan, 1985) has the potential to elucidate the mechanisms by which parents foster prosocial behaviors in online environments among adolescents.

SDT is a well-established theoretical model for positive parenting research. According to SDT, all individuals have an inherent tendency to develop a cohesive sense of self (Ryan & Deci, 2017). The theory posits that individuals must satisfy their autonomy, competence, and relatedness needs to achieve optimal development. While SDT emphasizes that social-contextual factors may support or hinder children's basic psychological needs (Ryan & Vansteenkiste, 2023), parental socialization should focus on creating conditions that satisfy basic psychological needs.

Parents who support children's autonomy and provide structure facilitate the satisfaction of the basic needs of children, which subsequently contributes to positive individual development (Grolnick & Lerner, 2023). Parents support autonomy when facilitating their children's sense of volition, consider their perspectives, and show empathy for them. Facilitating open discussions, offering choices, and fostering children's initiatives are autonomy support strategies (Fousiani et al., 2014; Mabbe et al., 2018; Ryan & Deci, 2017). The provision of structure within the home environment reflects parental efforts to establish a predictable environment that facilitates children's effective behavioral management and comprehension of success across diverse domains. Providing clear and consistent guidelines and expectations, elucidating the rationale for roles and expectations, offering constructive feedback, and consistently enforcing consequences for behaviors constitute integral components of structural provision (Griffith & Grolnick, 2014; Grolnick & Lerner, 2023; Ryan & Deci, 2017; Skinner et al., 2005; Vosylis & Erentaité, 2022).

Autonomy support and parental structure appear to be promising factors influencing prosocial behavior in adolescents. Multiple studies have found that parents who support autonomy encourage offline prosocial behaviors in adolescents (Costa et al., 2018; Hardy et al., 2010; Padilla-Walker & Son, 2018; Rueth et al., 2017), and evidence suggests that providing autonomy support in online contexts will likely result in adolescents exhibiting offline prosocial behaviors (A. Meeus et al., 2019; Valkenburg et al., 2013). Furthermore, multiple studies examining the effect of parental structure provision on adolescents have found that it is associated with more effective psychological functioning and social competencies in children in offline contexts (Flamm & Grolnick, 2013; Griffith & Grolnick, 2014; Grolnick et al., 2014; Marbell & Grolnick, 2013; Okorn et al., 2022).

To our knowledge, only the study conducted by H. Wang et al. (2022) uses the SDT theoretical framework to analyze the link between parental autonomy support and digital citizenship in adolescents. Moreover, contrary to the suggestions of some scholars (Carlo et al., 2022; Kim & Han, 2020; Xiao et al., 2024), H. Wang et al. did not measure the dimension of diversity acceptance in digital citizenship to examine adolescents' prosocial actions toward others with different social identities and characteristics. Unlike previous research, this study attempts to address these gaps and employs an alternative methodology by examining the additive effects of autonomy support and structure on digital citizenship behavior.

The Mediational Role of Self-Regulation

Self-regulation involves active cognitive, emotional, and behavioral efforts to voluntarily inhibit, activate, or change attention or behavior to attain specific goals (Casey & Caudle, 2013; Zimmerman & Schunk, 2011). This is essential for the socialization of children at home (Farley & Kim-Spoon, 2014; Grolnick et al., 1999). According to Organismic Integration Theory (Ryan & Deci, 2017), a mini-theory of SDT—a family context that supports children's need for autonomy, competence, and relatedness—is associated with better self-regulation skills. Autonomy-supportive parenting allows children to make choices, express themselves, and solve problems collaboratively or with support; in doing so, it also fosters the development of problem-solving skills in children. Several studies have shown a positive link between autonomy-supportive parenting (Kocayörüc et al., 2015; Marbell-Pierre et al., 2019; Nie et al., 2016; H. Wang et al., 2022) and parents' structure provision (Griffith & Grolnick, 2014) with self-regulation in children.

Positive Youth Development (PYD; Lerner et al., 2015) suggests that self-regulation is an adaptive development asset for children. Self-regulation enables children to interact more effectively with their environments. Adolescents with high self-regulation skills are better able to handle intense negative emotions and avoid engaging in harmful behaviors. Research has demonstrated that self-regulation skills can help prevent online misbehavior (Han et al., 2017; Mei et al., 2016; Vazsonyi et al., 2017) and promote prosocial online behavior among adolescents (Hardy et al., 2015; Memmot-Elison et al., 2020; Nie et al., 2016; Valdés-Cuervo et al., 2021). Additionally, the PYD perspective suggests that adolescents who engage in prosocial behaviors often use self-regulation skills, which are further strengthened by the positive outcomes of prosocial behaviors, leading to greater subjective well-being (Li et al., 2022), self-esteem, and hope (H. Hu et al., 2023).

Moderating Influence of Sex and Age

Research based on the gender schemas framework (Bem, 1981) suggests that parents engage in the differential socialization of male and female children, employing gender-specific strategies that reinforce sex differences (Halim et al., 2023; Halpern & Perry-Jenkins, 2016). A plethora of studies report that parents exhibit different behaviors when raising male and female children (Endendijk et al., 2017; Szkody et al., 2021; Zhang & Ng, 2022). A recent meta-analysis conducted by Endendijk et al. (2016) reported that parents tend to employ more supportive autonomy practices with female children than with male children and more controlling practices with male children than with female children. Rodríguez-Menéndez et al. (2023) also report differences based on gender. The authors found that female children tend to perceive that parents provide more structure than male children. In a similar vein, Flamm and Grolnick (2013) found an association between parental structure and more adaptive functioning in female than in male. Sartor and Youniss (2002) found that female reported higher levels of parental support, social monitoring, and school monitoring compared to their male counterparts.

The separation-individuation framework (Blos, 1979) posits that parenting practices evolve as children mature (Bi et al., 2022; V. H. H. Chen & Chng, 2016; Soenens et al., 2007; Steinfeld, 2021). Research indicates that parenting practices promoting autonomy demonstrate a more pronounced positive effect on middle adolescence compared to early adolescence (Soenens et al., 2007). Furthermore, evidence suggests that parental support diminishes with age (W. Meeus et al., 2005), whereas early adolescents experience increased conflict and less authoritative relationships with their parents (Hadiwijaya et al., 2017). These findings indicate the necessity to investigate whether the associations among supportive parenting practices, adolescents' self-regulation, and digital citizenship behaviors exhibit similarities or differences across early and middle adolescent populations.

The Present Study

This study focused on early and middle adolescents in Mexico to address the aforementioned gaps in the literature. Mexico has a diverse population in terms of ethnicity, culture, and socioeconomic status. This diversity leads to different patterns of individualism and collectivism. Although a vertical collectivist orientation persists in society, recent studies have demonstrated a shift towards horizontal individualistic values, particularly within the urban middle-class population (Cienfuegos-Martínez et al., 2016; Díaz-Loving et al., 2018; Soler-Anguiano et al., 2023). This transformation in family values manifests in increased parental support for children's autonomy and the establishment of less authoritarian relationships with them. There is a lack of empirical studies on how the shift towards a more individualistic horizontal structure in Mexican families affects adolescents' digital citizenship

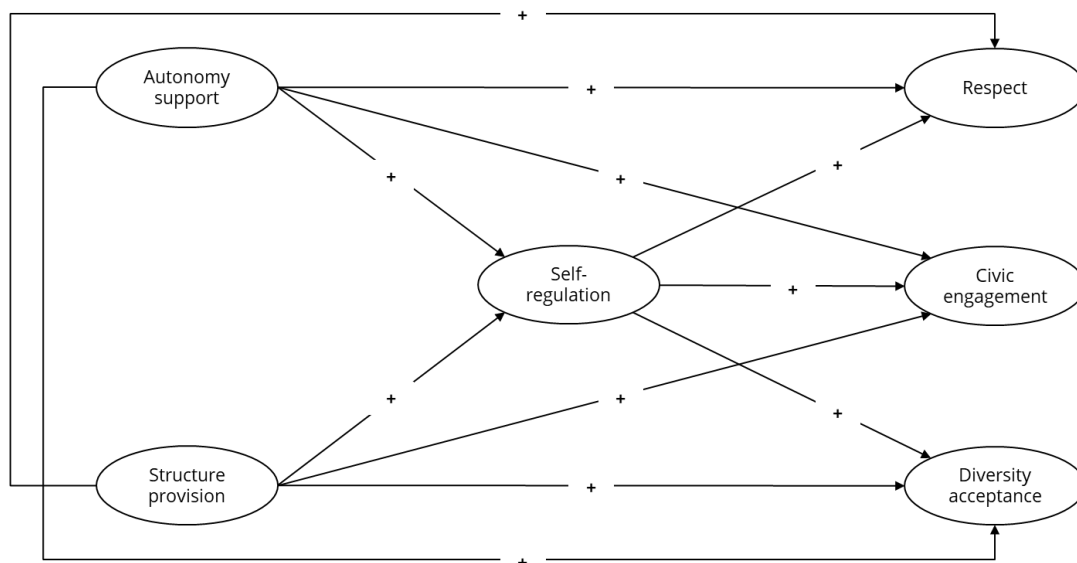
behaviors. However, based on previous research, it is possible to posit that these changes may lead parents to educate their children to prioritize their well-being over that of others and the community, potentially hindering the development of digital citizenship (Booyesen et al., 2021; Georgiou et al., 2018; Smith et al., 2019).

In this context, it is important to highlight that according to universalism without a uniform perspective (Grolnick & Lerner, 2023) and the parenting model that contrasts form with function (Bornstein, 2012), cross-cultural studies conducted using SDT have found that the ways parents provide autonomy support and structure to their children may vary across cultures. However, their impact on adolescent development remains similar. Empirical studies indicate that, in both individualist and collectivist cultures, parental provision of autonomy and structure results in positive outcomes for children (Griffith & Grolnick, 2014; Marbell & Grolnick, 2013; Marbell-Pierre et al., 2019).

Within this context, the present study sought to test a structural model by investigating the relationships between supportive parenting practices (autonomy support and structure provision) and digital citizenship (online respect, online civic engagement, and online diversity acceptance) among Mexican adolescents, as well as the mediating role of self-regulation in these relationships. Furthermore, this study sought to assess the moderating influence of sex and stage of adolescence (early versus middle) on these associations.

This study aimed to examine the following hypotheses: Direct relationships (**H1a**) parental autonomy support and structure provision were expected to have a positive relationship with self-regulation and digital citizenship behaviors, and (**H1b**) a positive relationship between adolescents' self-regulation and digital citizenship is expected. Indirect relationships: (**H2a**) autonomy support and structure provision have an indirect positive link to digital citizenship, while improves self-regulation. Due to the lack of similar conclusive studies, we did not anticipate hypotheses about how students' sex (male vs. female) and the stages of adolescence (early vs. middle) moderate the structural relationships in the proposed model.

Figure 1. Theoretical Model of the Links Between Supportive Parenting Practices, Self-Regulation, and Digital Citizenship Behaviors in Adolescents.



Methods

Participants

Data were collected from 16 urban public secondary schools and 16 high schools in four cities in Sonora, Mexico. The schools were chosen using convenience sampling, including schools from different zones in cities. Questionnaires were administered to a randomly selected group of fifteen students in each classroom. After excluding 30 participants who completed less than 30% of the items, a sample of 570 adolescents (48% female and 52% male) was obtained. Among them, 285 were early adolescents aged 10 to 13 ($M_{age} = 12.3$ years, $SD = 0.4$), and 285 were middle adolescents aged 14 to 16 ($M_{age} = 14.8$ years, $SD = 0.4$). Consistent with the demographic composition of most urban public schools in Mexico, these institutions comprise students from the low and middle socioeconomic strata (National Institute of Statistic and Geography, 2018).

Regarding family structure, 68.8% of adolescents resided in two-parent households, 24.6% in single-parent households, and 6.6% in alternative family configurations. The educational attainment of parents varied significantly. Among parents with less than an upper-secondary education, 43% of fathers and 39.5% of mothers were categorized as such. Conversely, for those with upper-secondary education, 25.2% of fathers and 29.2% of mothers completed this level. Regarding tertiary education, the distribution was relatively equitable, with 31.6% of fathers and 31.2% of mothers having attained this level of educational attainment.

Measures

Digital Citizenship Behaviors

The Digital Citizenship Behaviors Scale was used (Valdés-Cuervo et al., 2024). The scale includes 21 items rated on a five-point Likert-type format (0 = *Never*, 1 = *Seldom*, 2 = *Sometimes*, 3 = *Almost always*, 4 = *Every time*). The scale assesses *online respect* (7 items, e.g., *In online settings, I avoid getting involved in disputes and offensive interactions; When experiencing any disagreement online, I am careful with my language so as not to come across as mean*, McDonald Omega $\omega = .87$); *online civic engagement* (7 items, e.g., *I have used the Internet to raise awareness about social issues in my community; I have used the Internet to advocate for charity activities that support disadvantaged people in my community*, $\omega = .85$) and *online diversity acceptance* (7 items, e.g., *I have online friends with diverse sexual identities and orientations; I have online friends from a different religion*, $\omega = .90$). The authors found evidence of discriminant validity for each subscale, as well as internal validity, in a sample of Mexican adolescents using confirmatory factorial analysis, $SBX^2 = 60.23$, $df = 43$, $p = .042$; SRMR = .04; CFI = .97; TLI = .97; RMSEA = .039, 90% CI [.027, .059].

Supportive Parenting

Drawing on previous studies (Flamm & Grolnick, 2013; Rocchi et al., 2017; Skinner et al., 2005; Soenens et al., 2007; Valkenburg et al., 2013), we developed a scale to assess how Mexican adolescents perceive parental practices concerning their online behaviors. The scale comprises 10 items on a Likert-type response format (0 = *Not true at all*, 1 = *Usually not true*, 2 = *Sometimes true*, 3 = *Usually true*, 4 = *Very true*) to measure: (a) *autonomy support* (5 items, e.g., *My parents are usually willing to consider my point of view regarding Internet usage; My parents allow me to choose my activities and how I spend my time on the Internet within certain limits*, $\omega = .86$, average extracted variance AVE = .51); and (b) *structure provision* (5 items, e.g., *My parents set a clear and rational rule about Internet use; My parents talk to me about the importance of following the rules they set about the Internet*, $\omega = .82$, AVE = .50). The CFA confirmed that the model fit the data, $SBX^2 = 54.78$, $df = 33$, $p = .009$; SRMR = .02; CFI = .98; TLI = .97; RMSEA = .051, 90% CI [.03, .06].

Self-Regulation

We used six items from Novak and Clayton's (2001) self-regulation questionnaire ($\omega = .72$, AVE = .53; e.g., *I develop a plan for all online activities and I do consider the short- and long-term consequences of my acts*). Responses were recorded on a five-point Likert-type scale (0 = *Never*, 1 = *Almost never*, 2 = *Sometimes*, 3 = *Almost always*, 4 = *Always*). The CFA supported that the measurement model fit the data, $SBX^2 = 15.80$, $df = 9$, $p = .071$; SRMR = .02; CFI = .99; TLI = .96; RMSEA = .02, 90% CI [.01, .04].

Procedure

This study was approved by the Research Bioethical Committee of the Technological Institute of Sonora. Following approval from the school principals, a consent letter was distributed to the students' parents to explain the research goals and to request permission for their children's participation. Ten percent of parents did not return the signed consent form. Consequently, the children were excluded from the study. Prior to data collection, the researchers explained the study goals to the participants and addressed their questions and concerns regarding the investigation. All students provided written consent to participate. The researchers administered questionnaires to the students' classrooms during school hours. We collected data from November 2022 to January 2023.

This study employed several strategies to mitigate common method variance (CMV) bias resulting from using self-report measures from a single source. First, the questionnaires did not include names or other sensitive personal data; they only requested information on sex, age, and grade. Second, data were collected on input variables, including parental autonomy support and provision of structure, as well as output variables, such as adolescent self-regulation and digital citizenship behaviors, with a three-week interval between the two datasets. There were no dropouts between the two survey administrations. Three distinct versions of the survey were developed, each with questions arranged in different sequences that were randomly assigned to the participants. Research participants were informed that their involvement was voluntary and that their data would be maintained confidentially and utilized exclusively for research purposes. Additionally, the students were informed that the questionnaires had no correct or incorrect answers.

Data Analyses

Less than 3% of the data were missing for all variables, which were addressed using multiple imputation methods available in the SPSS 27. Means, standard deviations, Spearman's correlations, and mean differences by sex and state of adolescence (early vs. middle) were calculated using the SPSS 27. To ensure that CMV did not introduce bias into the analysis, we used the unmeasured latent construct method. This methodology compares a model that incorporates an unobservable construct associated with all items to a model comprising only study variables (Podsakoff et al., 2003; Williams et al., 2016). The differences between the two models ($\Delta X^2 = 3.12$, $df = 1$, $p = .077$) suggest that CMV does not significantly bias the study.

CFA and structural models were calculated using *JASP* software. A diagonally weighted least squares (DWLS) estimation procedure was employed because it demonstrates adequate performance with ordinal and non-normally distributed data (Bandalos & Finney, 2019). The goodness-of-fit of the models was evaluated by examining several fit indices (Finney & Di Stefano, 2013; Hair et al., 2014) as well as the Satorra-Bentler chi-square statistic and associated probability (SBX^2 with $p > .001$), CFI $\geq .95$, TLI $\geq .95$, AGFI $\geq .95$, SRMR $\leq .08$, RMSEA $\leq .08$).

A multigroup analysis was performed to examine the sex and stage of structural invariance in adolescence over the relationships proposed in the model. This approach assesses whether a model specified in a sample is equivalent to that of other independent samples from the same population. We tested the nested models by following the guidelines proposed in the literature (see Byrne, 2011; Vandenberg & Lance, 2000). First, we assessed the configural model invariance (constraints were not imposed in the model). Second, we tested model measurement invariance (fixed measurement weights equal across samples). Finally, we examined the structural invariance (constrained structural weight equal across the samples). Model invariance was confirmed when the difference in SBX^2 (ΔSBX^2) was not statistically significant ($p < .001$), the difference in CFI (ΔCFI) was less than $\leq .01$, and the difference in RMSEA ($\Delta RMSEA$) was less than $\leq .015$. When these criteria are unmet, we rely on ΔCFI and $\Delta RMSEA$ because SBX^2 is sensitive to the sample size (Byrne, 2011; Sass & Schmitt, 2013).

Results

Preliminary Analysis

Table 1 indicates that adolescents sometimes exhibit digital citizenship behaviors but rarely self-regulated their behaviors. Additionally, they sometimes perceived parental practice as supportive. Autonomy support and structure provision were positively correlated with self-regulation, online respect, and online civic engagement behaviors. Only autonomy support showed a statistical relationship with acceptance of online diversity. Finally, self-regulation was positively correlated with all online citizenship behaviors. These effect sizes ranged from low ($r < .20$) to large ($r < .30$), indicating the practical and theoretical consequences of the correlations between the study variables (Funder & Ozer, 2019).

Independent *t*-tests revealed that male children experienced lower levels of autonomy support and structure provision, and demonstrated reduced online respect and online diversity acceptance behaviors compared to female children. Furthermore, the analyses indicated that early adolescents received higher levels of autonomy support and structure provision than middle adolescents, whereas middle adolescents exhibited enhanced self-regulation and digital citizenship behaviors relative to early adolescents.

Table 1. Means, Standard Deviations, Correlations, and Mean Comparisons by Sex and Stage of Adolescence (Early vs. Middle).

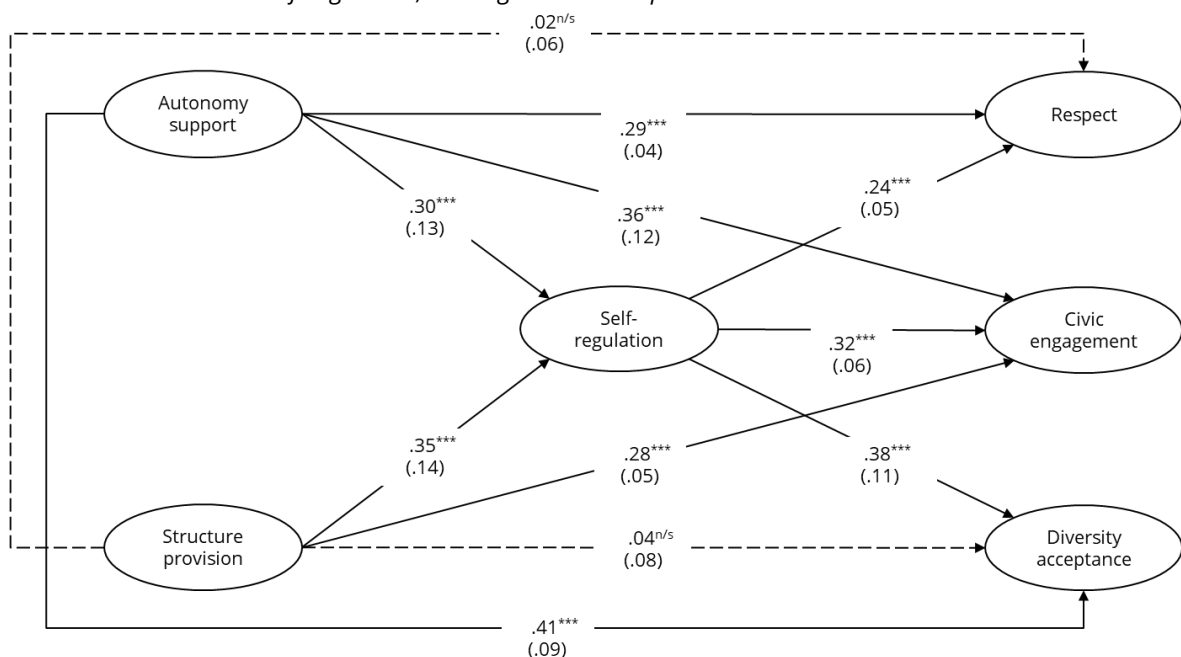
Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Autonomy support	2.51	1.10	-					
2. Structure provision	2.22	1.19	.64***	-				
3. Self-regulation	1.55	1.04	.32***	.33***	-			
4. Online respect	2.72	0.91	.20***	.13**	.21***	-		
5. Online civic engagement	2.03	0.99	.17***	.05	.25***	.38***	-	
6. Online diversity acceptance	2.22	0.87	.22***	.07	.27***	.36***	.41***	-
<i>M/SD</i> Male			2.23/1.11	1.99/1.19	1.56/1.05	2.60/0.93	1.97/1.00	2.17/1.11
Female			2.81/1.00	2.47/1.15	1.54/1.04	2.86/0.87	2.08/0.98	2.27/0.67
Student's <i>t</i>			6.20	4.75	-0.20	3.26	1.24	1.33
<i>p</i>			< .001	< .001	.841	.001	.215	.184
Cohen's <i>d</i>			0.55	0.41	0.01	0.29	0.11	0.11
<i>M/SD</i> Early adolescent			2.60/1.06	2.57/1.13	1.26/0.97	2.64/1.02	1.84/1.01	2.12/0.65
Middle adolescent			2.41/1.13	1.85/1.14	1.87/1.02	2.82/0.77	2.23/0.94	2.32/1.23
Student's <i>t</i>			2.01	7.20	-7.04	-2.30	-4.50	2.43
<i>p</i>			.044	< .001	< .001	.021	< .001	.015
Cohen's <i>d</i>			0.17	0.63	0.61	0.20	0.40	0.20

Note. **p* < .05. ***p* < .01. ****p* < .001.

Structural Equation Modeling

The results of the structural equation modeling are presented in Figure 2. The goodness-of-fit indices indicated that the model demonstrated a satisfactory fit to the data, $SBX^2 = 249.62$, $df = 217$, $p < .006$; $SRMR = .04$; $CFI = .97$; $TLI = .96$; $RMSEA = .03$, 90% CI [.02, .04]. The model explained 20% of the variance in online respect, 26% in online civic engagement, and 22% in acceptance of online diversity.

Figure 2. Results of the Structural Model of the Relationship Between Supportive Parenting Practices, Self-Regulation, and Digital Citizenship Behaviors in Adolescents.



Note. Standardized coefficients and standard errors are reported. Non significant relationships are represented with dashed lines. *** *p* < .001; n/s = non significant.

Figure 2 shows the standardized coefficients and standard errors of the structural model. The results showed that parental autonomy support was positively related to self-regulation, online respect, online civic engagement, and online diversity acceptance behaviors ($\beta = .30, p < .001$; $\beta = .29, p < .001$; $\beta = .36, p < .001$; $\beta = .41, p < .001$, respectively). In contrast, structure provision was positively related to self-regulation and online civic engagement ($\beta = .35, p < .001$; $\beta = .28, p < .001$), although it did not affect online respect or diversity acceptance behaviors ($\beta = .02, p = .836$; and $\beta = .04, p = .624$, respectively). Finally, self-regulation was positively related to online respect, online civic engagement, and online diversity acceptance behaviors ($\beta = .24, p < .001$; $\beta = .32, p < .001$; $\beta = .38, p < .001$).

This study confirmed that self-regulation serves as a mediating factor in the relationship between parenting practices and digital citizenship behavior. Specifically, the study revealed that self-regulation partially mediated the associations between parental autonomy support and online respect, $\beta = .07, p = .005$, 95% CI [.02, .17], online civic engagement, $\beta = .10, p = .003$, 95% CI [.02, .20], and online diversity acceptance behaviors, $\beta = .13, p < .001$, 95% CI [.05, .21]. Furthermore, self-regulation was identified as a partial mediator in the association between structure provision and online civic engagement, $\beta = .11, p < .001$, 95% CI [.07, .18], and a complete mediator in the relationships between structure provision and online respect, $\beta = .08, p = .009$, 95% CI [.05, .13], as well as online diversity acceptance behaviors, $\beta = .13, p < .001$, 95% CI [.08, .21].

Structural Invariance Analysis

Finally, a multigroup analysis was conducted to examine the moderating effects of students' sex and stage of adolescence on the relationships proposed in the model. Structural model configural invariance was confirmed in both sexes, $SBX^2 = 524.69, df = 434, p = .002$; SRMR = .05; CFI = .95; TLI = .95; RMSEA = .03, 95% CI [.02, .03], and adolescent stages, $SBX^2 = 508.22, df = 434, p = .008$; SRMR = .07; CFI = .95; TLI = .95; RMSEA = .05, 95% CI [.02, .07]. In addition, the differences between the values of the Satorra-Bentler chi-square tests ($\Delta SBX^2, p < .001$), comparative goodness of fit indices ($\Delta CFI, p < .01$), and root mean square error of approximation ($\Delta RMSEA, p < .015$) suggest that the measurement and structural models were invariant because the relationships proposed in the model exhibited invariance, as the relationships proposed in the model were similar for early and middle adolescence (see Table 2).

Table 2. Results of the Structural Invariance Analysis by Sex and Stage of Adolescence (Early vs. Middle).

Model	SBX ²	df	ΔSBX^2	Δdf	p	ΔCFI	$\Delta RMSEA$
Sex							
Configural	524.69	434					
Metric	545.71	452	21.02	18	.278	.001	.001
Structural weights	556.50	460	10.79	8	.214	.001	.001
Structural residuals	563.82	467	7.12	7	.417	.001	.001
Stage of adolescence							
Configural	508.22	434					
Metric	523.98	452	15.76	18	.610	.001	.001
Structural weights	544.57	460	20.59	8	.008	.003	.001
Structural residuals	563.49	463	18.92	3	.008	.004	.001

Discussion

Current research has consistently reported that supportive parenting encourages offline prosocial behaviors in adolescents. However, while the impact of supportive parenting has been well studied, there is a lack of research on its effects on prosocial online behavior. Unlike most studies, we used the SDT (Deci & Ryan, 1985) framework to analyze how parenting practices influence prosocial online adolescent behavior. By applying the SDT conceptualization of positive parenting, we explored the direct and indirect relationships between parental autonomy support, provision of structure, self-regulation, and adolescents' digital citizenship behaviors. We also examined how adolescent sex and developmental stage moderated these relationships. Our findings partially support our hypothesis. As expected, parental autonomy was positively and directly related to all the dimensions

of digital citizenship. Moreover, parental provision of structure showed a positive association only with online civic engagement, and an indirect association with self-regulation. Furthermore, self-regulation was positively correlated with all digital citizenship behaviors.

The Direct Relations of Supportive Parenting With Digital Citizenship Behaviors

The study found that parental support of autonomy is positively related to children's ability to self-regulate and engage in digital citizenship behaviors, such as online respect, online civic engagement, and online diversity acceptance. This result aligns with previous research under the SDT framework, which suggests that adolescents are more likely to exhibit prosocial behaviors when parents provide multiple options and their perspectives and feelings are considered by their parents (Flamm & Grolnick, 2013; Padilla-Walker & Son, 2018; Rueth et al., 2017). While further research is needed, this positive association may explain the link between autonomy, prosocial behaviors, and positive psychological outcomes, such as well-being and happiness (Kelley et al., 2023; Rinner et al., 2022).

Our study confirmed that parental structure provision is significantly linked to online civic engagement behaviors, consistent with previous research in offline contexts (Grolnick et al., 2014; Okorn et al., 2022; Patall et al., 2024). This finding highlights the significance of this practice in influencing both offline and online prosocial behaviors. Contrary to our initial hypotheses, no direct correlation was observed between online respect, online diversity acceptance behavior, and parental structure. While further research is necessary to elucidate these findings, we postulated that the association between parental provision of structure might be a limitation due to the multifaceted nature of the online environment, including diverse online contexts, peer influence, social pressure, anonymity, the absence of immediate consequences, and challenges in supervision.

Our study confirms that parental autonomy support and structure provision influence adolescents' behavioral regulation. This finding is consistent with previous studies that found that parental socialization practices significantly influence self-regulation development (Liu & Chang, 2016; Moilanen et al., 2015; Steinfeld, 2021; von Suchodoletz et al., 2011). This finding indicates that when parents establish clear and consistent guidelines, elucidate rules and expectations, implement predictable and consistent consequences, and provide constructive feedback, they foster a supportive environment conducive to the development of adolescents' psychological resources.

The Role of Self-Regulation

The results of this study have several implications for understanding the role of self-regulation in the relationship between parental practice and digital citizenship. Consistent with previous research (Nie et al., 2016; H. Wang et al., 2022), this study found that self-regulation partially mediates the associations between autonomy-supportive parenting practices and all types of digital citizenship behaviors as well as the relationships between parental structure provision and online civic engagement behaviors.

Furthermore, the findings demonstrate that self-regulation fully mediates the relationship between structure provision and online respect, and civic engagement emphasizes the crucial role of self-regulation in prosocial online behavior. This complete mediation suggests that the influence of parental structure provision on digital citizenship is entirely transmitted through adolescents' self-regulation, indicating that cultivating self-regulation is fundamental to promoting respectful and civically engaged online behavior.

These findings collectively suggest that self-regulation serves as a mediating factor in the relationship between parenting practices and adolescents' online behavior. Self-regulation provides a mechanism through which parenting practices can enhance adolescents' digital citizenship behavior. Moreover, the results demonstrated how various parenting practices can influence digital citizenship behaviors through the mediating effect of self-regulation.

The Role of Sex and Age

The study's findings align with the gender schemas framework (Bem, 1981), demonstrating differences in parenting practices between sexes. These results may be associated with the traditional gender attitudes reported among Mexican parents (Lira-Ochoa et al., 2023; Solís-Cámara et al., 2013). Consistent with previous research, the

study findings indicate that parents more frequently employ autonomy-supportive practices and provide structure to females than to males (Endendijk et al., 2016; Rodríguez-Menéndez et al., 2023).

In accordance with the separation-individuation framework proposed by Blos (1979), our findings suggest that parents tend to provide greater autonomy support and structure to their children during early adolescence than during middle adolescence. As suggested by J. Wang et al. (2024), it seems that the changes in adolescents' autonomy are associated with changes in the provision of autonomy and structure. This suggests that parents balance the provision of guidance and structure, while progressively allowing their children to increase their involvement in decision-making processes and competencies. Consequently, as adolescents develop increased autonomy and social competence during the transition from early to middle adolescence, supportive parental practices may evolve to accommodate their changing developmental needs. Further empirical research is needed to substantiate these findings.

Age and stage of adolescence did not moderate the relationship between study variables. In other words, supportive parenting is equally effective for both male and female adolescents, as well as for early and middle adolescents. In line with the SDT principle of universalism without uniformity (Soenens et al., 2015), the findings showed that when parents support autonomy and provide structure, they create similar favorable conditions for girls and boys throughout different adolescent stages, despite the differences in the expressions of these parenting practices.

Limitations

Although relevant to parents, educators, and researchers, our findings must be approached cautiously because of their limitations. First, in contrast to experimental or longitudinal designs, the use of a cross-sectional design precludes the establishment of causal relationships between variables and determination of variable evolution over time. Second, our findings, which rely solely on students' self-reports for measuring variables, pose risks of bias, such as social desirability and self-confirmation bias. Consequently, subsequent research should enhance data collection methodologies by incorporating multiple information sources (e.g., peers, siblings, parents, and teachers) and employing a multi-method approach (e.g., observations, interviews, and experimental tasks) to comprehensively assess adolescents' positive online behaviors. Third, our sample was not nationally representative of Mexican students; therefore, future studies should include students from diverse regions of the country, including rural and Indigenous Mexican populations. Furthermore, although this study explored the association between supportive parenting practices and digital citizenship behaviors, additional research is required to elucidate the bidirectional effects of these variables.

Conclusions

This study presents empirical evidence that corroborates the Self-Determination Theory (SDT) perspective on supportive parenting. The findings indicated that both early and middle adolescents, irrespective of gender, exhibited a higher likelihood of demonstrating online respect, civic engagement, and diversity acceptance behaviors when their parents provided autonomy support within a structured environment. These findings suggest that subsequent research should examine the impact of parenting practices on the development of digital citizenship behavior. Moreover, scholars should examine how these behaviors evolve as adolescents transition to adulthood, and how this progression contributes to their capacity for active societal participation.

Empirical evidence demonstrates the association between adolescent self-regulation and risky digital behaviors. However, more studies are needed to examine how self-regulation relates to adolescents' digital citizenship and parenting practices within the framework of SDT. This study also confirms that parenting practices influence the development of self-regulation in both sexes and stages of development. Nevertheless, further research is necessary to identify the cognitive and emotional factors that affect the relationship between positive parenting practices and digital citizenship behavior. Nonetheless, we foresee that this study is essential to the literature, as it provides evidence of a correlation between these variables.

Adolescents can benefit from developing digital citizenship, which helps them create most online opportunities while avoiding risks. Researchers and practitioners can develop more effective intervention protocols for parents by considering the relationship between parental autonomy support, structure provision, and adolescents' digital citizenship behaviors. Additionally, by considering variables, such as adolescents' self-regulation, stage of

development, and sex, researchers can better understand how these personal factors affect the effectiveness of parenting practices. Therefore, educational institutions, schools, and practitioners should assist parents in developing competencies to support their children's autonomy while establishing a framework for their online activities. These interventions could encompass parental education programs, such as workshops and seminars, parental coaching and counseling (including individual coaching and family therapy), digital parenting tools, such as parenting applications and support groups, and peer learning opportunities, such as parent support groups and peer learning networks.

Implications for Future Research

This study posits that the examined model contributes significantly to the understanding of adolescents' digital citizenship behaviors and their correlation with positive parenting practices as conceptualized within the framework of Self-Determination Theory (SDT). Consequently, it is recommended that subsequent investigations build upon these findings and examine various variables that may mediate the relationship between parenting practices and digital citizenship behaviors, such as self-disclosure. Finally, we suggest that future research should consider examining additional specific parenting practices not addressed in the current investigation, such as inductive discipline, reasoning, and parental warmth, as potential variables for further analysis.

Conflict of Interest

The authors have no conflicts of interest to declare.

Use of AI Services

The authors declare they have used AI services, specifically Grammarly, for grammar correction and minor style refinements. They carefully reviewed all suggestions from these services to ensure the original meaning and factual accuracy were preserved.

Authors' Contributions

Agustín Morales-Álvarez: conceptualization, data curation, formal analysis, investigation, writing—original draft. **Angel Alberto Valdés-Cuervo:** conceptualization, formal analysis, investigation, funding acquisition, writing—original draft, writing—review & editing. **Lizeth Guadalupe Parra-Pérez:** conceptualization, investigation, project administration, writing—review & editing.

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