



Is the Self-Categorization of Social Network Consumption Related to Subjective Well-Being? A Longitudinal Study of Spanish Adolescents

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Abstract

The impact of social network consumption on adolescents' subjective well-being (SWB) has remained a subject of debate in cross-sectional studies, and the understanding of how changing social network consumption patterns affect SWB over time is even more limited. This study adopts an innovative approach, utilizing various measurement scales to assess adolescents' SWB alongside the evolution of their SSNC patterns. A four-wave longitudinal study was conducted involving 341 participants aged 9 to 14 from Spain. The findings indicate that as adolescents age, their perception of SSNC increases, while SWB declines over time. Adolescents categorizing themselves as low consumers of social networks consistently exhibited higher SWB scores than those with medium and high consumption levels. Notably, the relationship between SSNC and SWB showed variations depending on the measurement scale used. An analysis of the evolution of social network consumption profiles (SNCPs) revealed four distinct profiles, although these were not linked to changes in SWB over time. Finally, participants with an extreme consumption profile consistently exhibited significantly lower SWB scores. These findings underscore the importance of continuously monitoring social media use and its effects on SWB, especially within subgroups displaying more extreme consumption patterns, an insight that has implications for preventive interventions.

Keywords Longitudinal study · Social network consumption · Profiles of social network consumption · Adolescents · Subjective well-being

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1 Introduction

1.1 Adolescents and Social Network Consumption

In recent years, online activities have significantly increased among the general population, and especially among children and adolescents, as both the scientific literature and data from national and international statistics show (Andrade et al., 2021; Eurostat, 2022; Garmendia et al., 2016; Instituto Nacional de Estadística, 2019; Ofcom, 2016; Ólafsson et al., 2013; Observatorio Nacional de Tecnología y Sociedad, 2022). Some authors suggest that this growth is related to a change in the pattern of consumption, which points to an earlier and greater online presence and knowledge of digital tools in children aged eight and even under (Holloway et al., 2013; Livingstone et al., 2011).

A recent report compiled by researchers from the EU Kids Online Network provides evidence of widespread social network consumption among children and adolescents aged 9 to 16 across 19 European countries (Smahel et al., 2020). Most of the adolescents have increased their use of smartphones and the Internet, while the time spent using these devices doubled from 6% in 2013 to 13% in 2017 in all the countries studied. Over 80% of those surveyed reported browsing online on their smartphones at least once a day. Regarding sociodemographic characteristics related to access to social media, gender culture is on the verge of disappearing, as differences between boys and girls appear to be irrelevant in this regard. The same is not true of age, however. Generally speaking, the older they are, the more they use their smartphones to go online. In the case of Spain, no gender differences were found in relation to going online, while in relation to age, data showed that 90% of 15–16 year-olds, 70% of 12–14 year-olds and 28% of 9–11 year-olds use a smartphone several times a day or have permanent access to the Internet (Smahel et al., 2020).

In the same vein, the report “Net Children Go Mobile”, which analysed adolescents’ social media use between 2010 and 2015, confirmed that the average starting age for Internet access was decreasing, being around 7 years old at the time the report was published (Garmendia et al., 2016). The report found that on average 9 or 10 year-olds started using the Internet when they were 7, while 15 or 16-year-old adolescents started at 10. Furthermore, 85% of adolescents aged 15–16 reported having a social network profile and, although the data showed a general decrease in social network use in all ages and both genders between 2010 and 2015, the authors explained that this was due to a change in their preferred instant message application.

The aim of the present paper is to explore adolescents’ perceptions of Social Network Consumption (SSNC), asking them to classify themselves as consumers, rather than about the time they spend online on weekdays and at the weekend, as is habitually the case. As previous studies have indicated, there are two main limitations when asking about the level of consumption of different audio-visual media (TV, mobile phone, computer, Internet) in terms of hours of self-reported use: a) it is difficult for adolescents to remember exactly how many hours they spend using audio-visual media; and b) the number of hours of consumption spent on the weekend could be very different from those spent during the week. Therefore, asking about consumption in this way has led to inconsistencies in the answers and weakness in their inter-

pretation. In this regard, Casas et al. (2007b) demonstrated that responses regarding perceptions related to consumption (self-categorizations as a consumer) are highly correlated to usage time. These data highlighted that measuring perception of consumption according to the subjects' self-categorization could provide relevant information regarding how adolescents consider their own consumption and whether it is excessive or not, leaving aside the hours spent per day. This paper therefore explores adolescents' consumption of social networks based on their own self-categorization.

1.2 Subjective Well-Being (SWB) and Adolescents' Social Network Consumption (SNC)

Research on the effects that social media consumption can have on the subjective well-being (SWB) of adolescents is underdeveloped. In this paper, we refer to SWB as the way in which people evaluate their lives, related to both general and specific life domains (Diener, 1994). SWB is composed of three elements that reflect the combination of a cognitive process (satisfaction or dissatisfaction)—including a general measure and a more specific measure in terms of life domains—and two affective dimensions (positive and negative affect) (Cummins & Cahill, 2000). It is important to add here the findings of various studies that adolescent SWB decreases significantly from the age of 12 onwards (see González-Carrasco et al., 2017a; Tomin & Cummins, 2011). Although no gender differences are observed in terms of overall SWB scores, they are found when analysing satisfaction with different life domains (Casas et al., 2007a, b; Casas & González, 2020; Casas & González-Carrasco, 2020).

A significant number of studies conducted over the past twenty years have pointed out that there is no clear direction in the relationship between social network consumption and adolescents' SWB. Whereas some authors consider that social network consumption has a negative impact on their SWB (Kraut et al., 1998; Kross et al., 2013; Nie, 2001), others consider it to be positive (Doğan, 2016; Kraut et al., 2002; Lian et al., 2020; Valkenburg & Peter, 2007, 2009). Non-significant relationships have also been found (Gross et al., 2002) or both positive and negative relationships with SWB in the same sample (Verduyn et al., 2017). Other studies, such as the one by Wang et al. (2014), have suggested that the relationship between social network consumption and SWB depends on the purpose of usage, it being positive when adolescents make social use of networks and unrelated when usage is for entertainment purposes only.

Specific consequences of an excessive use of social networks among youngsters have also been highlighted. Whereas some authors have detected negative emotions such as loneliness or even depression (Kim et al., 2009; Przybylski et al., 2013; Turkle, 2012), other studies have identified positive associations between the intensity of Facebook use and social trust, life satisfaction and civic engagement (Valenzuela et al., 2009). Authors such as Keum (2011) have suggested a lack of connection between social network consumption and subjective happiness, loneliness or life satisfaction. The afore mentioned results are supported by a meta-analysis carried out by Webster et al. (2020), in which the authors reviewed all available studies focusing on SWB and the use of both online and offline social networks among 11 to 18-year-old adolescents. These authors pointed out that different aspects comprising SWB

(including mood, life satisfaction, loneliness and self-esteem) displayed contradictory results with online social network use.

Further light has been shed on this issue recently. For example, based on the Health Behaviour in School-aged Children (HBSC) survey of 29 countries, Boer et al. (2020) found no relationship between an intensive use of social media (by those adolescents who present a high frequency of online contact with friends and with other people) and life satisfaction. However, when analysing the country-level variable, they determined that intensive users reported more life satisfaction and friendship support in countries where there is a higher prevalence of intensive social media use, while intensive users informed of lower life satisfaction in countries with a low prevalence. This study also explored the relationship between problematic users of social media (adolescents who responded positively to some items on the Social Media Disorder Scale) and different psychological variables related to SWB. In this case, in all countries, the results showed that problematic users presented low levels of life satisfaction, school satisfaction and family and friend support. Similarly, Donoso et al. (2021) concluded that only when Internet use is identified as problematic does it have a negative effect on adolescents' SWB. In contrast, the effects are positive when the Internet use is not problematic. Summarizing, then, previous studies have shown that the more excessive or problematic the use of social media, the lower adolescents' well-being. This pattern is also found in studies exploring the relationship between SWB and an addictive use of social networks. Specifically, Telef (2016) confirmed negative associations of SWB in relation to Internet addiction when using cognitive measures (e.g. the BMSLSS) and a positive relationship with affective measures (e.g. negative affect).

1.3 Social Network Consumption, SWB and Longitudinal Studies

Most of the studies identified here are cross-sectional, limiting our understanding of the relationship between adolescents' social network consumption and different SWB cognitive indicators, something the present study aims to address.

A recent follow-up study conducted by Kerestes and Stulhofer (2020) analysed the relationship between time spent using online social networks (OSN)—measured through a self-reported item of OSN—and SWB—measured through the Personal Well-being Index-School version (PWI-SC)—over a period of 23 months. A panel of secondary school students from 10 to 15-year-olds (middle and late adolescence) participated in three waves. A first interesting result showed that for girls, the higher the OSN use, the lower their SWB, while for boys this relationship was positive. Although an increase in OSN use was observed among the two genders throughout the waves—a little more pronounced among those adolescents reporting lower consumption in the first wave (base line)—this increase was not found to be related to SWB. The authors of the study noted the importance of carrying out more longitudinal studies with a longer-term duration to gain more in-depth knowledge regarding the direction of the relationship of social network consumption and SWB.

Similarly, two long-term studies were carried out with adolescent samples in the UK based on the UK Household Longitudinal Study (2009–2016), with the same range of ages (10 to 15 years old) and over five years. Both studies explored the

association between social media use (using a single question asking for the number of hours spent chatting or interacting with friends through social media) and SWB. The first, conducted by Booker et al. (2018), assessed SWB with an overall happiness score for positive aspects and the Strengths and Difficulties Questionnaire (SDQ) for the negative ones. The main results showed, on the one hand, that use and interaction with social media generally increased with age, for both boys and girls. And, on the other hand, a decrease in the levels of happiness was observed for both genders. A relevant conclusion of this study was that gender differences were observed in the association of social media use with SWB, but only at the age of 10: the greater social media interaction at this age, the lower the SWB scores at later ages among girls. Moreover, an interesting change in patterns of consumption was also observed over time: those adolescents that displayed higher levels of social media interaction at age 10 showed a slower rate of change with age than those who interacted less with social media at this same age.

In the second study, Orben et al. (2019) focused their research on discerning the between-person associations (transversal) from within-person effects (longitudinal) using random-intercept cross-lagged panel models. To assess SWB, they used a list of six life satisfaction domains (friends, family, appearance, schoolwork, school, life and a global mean). The first analysis of between-person associations showed a very low and negative correlation between SN use and satisfaction levels. The second, examining the within-person effects, showed a minimal longitudinal predictive effect for both SN use on life satisfaction and life satisfaction on SN use. However, a gender pattern was also observed, with the between-person associations and within-person effects being more negative in females, leading the authors to conduct individualized model analyses to confirm this. In the case of males, only within-person longitudinal effects were observed, with social media use predicting slight decreases in life satisfaction and mean satisfaction scores. In contrast, for females, a slight decrease was observed in all explored domains of life satisfaction, except for appearance satisfaction. Furthermore, longitudinal effects were observed, as an increase in life satisfaction predicted lower Social Network (SN) usage, and an increase in SN usage also predicted lower life satisfaction one year later. This study underscores the importance of continuing to analyse longitudinal data using various analytical strategies to explore the relationship between social media use and its impact on well-being, as well as its reciprocal effects.

By way of conclusion, the lack of consensus on the impact that the use of social media can have on adolescents' SWB in cross-sectional studies, and the scarce evidence regarding whether changes in the consumption of social networks at these ages over time have an impact on SWB, make it difficult to draw solid conclusions regarding this relationship. In this respect, the aim of the present study is, on the one hand, to provide more in-depth scientific evidence of the relationship between SWB and the SSNC over the years. To this end, in contrast with previous studies, we combine unidimensional (context-free) and multidimensional (domain-based) scales to explore adolescents' SWB and, moreover, use a single scale to explore the SSNC not based on the number of hours of time spent using SN but rather on adolescents' self-categorization as social network consumers. And, on the other hand, we aim to provide novel results related to the following aspects not explored in previous studies: a) dif-

ferent types of social network consumption profiles (SNCP) presented by adolescents over time, and how these changes in consumption patterns affect their SWB; and b) what type of relationship exists between extreme and non-extreme SSNC patterns and SWB, considering that these extreme patterns do not refer to problematic use of the social network (see for example Rial et al., 2015) but rather to a very high or very low perception of self-consumption over time (evaluated in this study through a Self-Categorization Social Network Consumption Scale).

2 Objectives

The main objective of this study is to analyse the relationship between adolescents' self-categorization of their social network consumption (SSNC) and their SWB over a four-year longitudinal study. Specifically, we explore:

1. The changes observed in the adolescents' SSNC and in their SWB, separately, over time.
2. The relationship between adolescents' Social Network Consumption Profiles (SNCPs) and their SWB across time.
3. Changes in the consumption patterns with regard to SNCPs and how this relates to the evolution of their SWB.
4. Extreme and non-extreme consumption profiles and their relationship with SWB.

3 Materials and Method

3.1 Participants

The data used in this paper were taken from a longitudinal study carried out with the same participants over four school years. Data were collected in 15 schools in the province of Girona (Catalonia, north-east Spain). The final sample comprised only those schools that made the commitment to collaborate for the entire four years of the study. In the Spanish education system, the primary education stage is compulsory and lasts six years, while the secondary stage includes compulsory and non-compulsory stages, the duration of compulsory secondary education being four years. In this study, the final two years of primary and four years of compulsory secondary education were selected. Some of the selected schools provided both primary and secondary education, and it was possible to follow pupils in the same school throughout the study. However, in the case of schools that did not offer both primary and secondary education, primary and secondary schools located in the same or a nearby town were selected to avoid losing pupils who changed schools when they moved from primary to secondary education.

The selected primary and secondary schools were diverse in terms of type (51.6% were state-run and 48.4% were subsidized), geographical location (three different

municipalities within the province of Girona) and municipality size (over 10,000 inhabitants or between 2,000 and 10,000 inhabitants).

Of the total number of potential participants, 341 children and adolescents met the requirements of the study: a) having participated in the four waves of the study, and b) having responded to all the scales included in the analysis.

In the first wave, the participants were aged between 9 and 14, with a mean of 11.49 ($SD=1.3$), with 44% of the participants being boys and 56% girls. These participants comprised students from Year 5 of primary education (mainly 10 years old) until Year 10 of secondary education (mainly 15 years old).

3.2 Instruments

The study used data from one scale measuring perception of social network consumption and two scales measuring cognitive SWB: the single-item scale on Overall Life Satisfaction (OLS) and the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS). The main reason for this was that scientific evidence exploring SWB in adolescents supports the use of both single-item and multi-item scales, given the different results observed in various cultural contexts (see Casas, 2017; Casas et al., 2012; Casas & González, 2020; González-Carrasco et al., 2017a, b; Ortúzar et al., 2019).

Self-Categorization Social Network Consumption Scale (SSNCS) This is a single-item scale asking what type of social network consumer (Facebook, Twitter, WhatsApp, Instagram, Snapchat) participants consider themselves to be, with five response options (1=I never or hardly ever use them; 2=I'm a low consumer; 3=I'm an average consumer; 4=I'm a fairly high consumer; 5=I'm a very high consumer) (Casas et al., 2007b). To increase the number of participants in each group for comparison purposes, participants were classified using three categories according to the response options: low consumer (never consume or low consumption), medium consumer (average consumption) and high consumer (high or very high consumption). This scale has been used in other studies as an indicator of excessive use of technologies and social networks (Malo et al., 2018; Martín-Perpiñá et al., 2019).

Single Item on Overall Life Satisfaction (OLS) With this scale, the participants expressed their satisfaction considering their life as a whole, as indicated by Campbell et al. (1976), using an eleven-point scale where 0 means Not at all satisfied and 10 Totally satisfied. The OLS has proven to be a reliable and valid measure in previous research (Abdel-Khalek, 2006; Casas & González-Carrasco, 2021).

Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS) This scale was developed to be used with students between the ages of 8 and 18. It includes five items referring to satisfaction with different life domains, plus one item on general satisfaction. Previous studies confirmed the adequacy of its psychometric properties (Huebner et al., 2006; Seligson et al., 2003). Although the original version proposes a seven-point scale from "Terrible" to "Delighted", we used an eleven-point scale (from 0 to 10) in this study, as this is more adequate for capturing the variability of

the responses, as well as being more sensitive and comprehensible for children and adolescents (Casas et al., 2012). In addition, it also facilitated the task for participants as the same response scale was used for all of the items assessing SWB.

3.3 Procedure

This study was carried out with the authorization of the Catalan Department of Education. After obtaining this permission, schools willing to participate in the study were asked about the most convenient dates for administering the questionnaire. Consent was previously requested from the parents or legal tutors of the students involved in the study. Once consent was obtained, paper questionnaires were administered in the classroom setting over four consecutive years. Researchers were present during the administration to answer any questions and give instructions on how to complete the questionnaire. The regular teacher was also present to help the researchers organize the classroom.

3.4 Data Analysis

First, the psychometric properties of the scales were analysed to gather evidence supporting its use in the specific context of the study. Cronbach's Alpha was used for analysing BMSLSS internal consistency, considering adequate values those equal or above .7 and below .95, as that is the range habitually reported for acceptable values (Tavakol & Dennick, 2011). Nunnally and Bernstein's proposal (1994) was followed to compute the reliability of the OLS. The latter was calculated by taking the reliability of the BMSLSS as the multiple-item measure of reference and assuming a value of 1.00 for \hat{r}_{xy} . The psychometric properties of the SSNCS were not explored as their appropriateness for the intended purpose was previously assessed (Casas et al., 2007b).

To analyse the connection between the SSNCS and the two SWB scales used in the study, we first focused on understanding the relationship between these two measures across waves. To this end, descriptive analyses were calculated to describe percentages of the SSNCS (low, medium, high) in each wave. ANOVA analysis was conducted to identify differences in SWB indicators between types of social network consumers.

After investigating the waves separately, we connected data from the different waves by creating *Social Network Consumption Profiles (SNCP)*. This was done by classifying participants according to the changes in their consumption of social networks over time. To this end, we combined information from the consumption scale by using different codes, which reflected how the consumption increased, decreased or remained stable throughout the four waves. Codes were then created to describe what happened from each wave to the next. The next step consisted in combining these codes to create consumption profiles, which were used to classify participants according to how they perceived their consumption. Specifically, five profiles were created that reflected the tendencies throughout the waves. Thus, all the participants

were represented by a combination of digits reflecting the specific changes they had undergone.

Profile 1 (P1): Stable. No change at any time, therefore the participant has the same score throughout the four waves.

Profile 2 (P2): Increase. There is an increase over the four waves, which leads to high consumption scores by the end of the survey.

Profile 3 (P3): Decrease. There is a decrease over the four waves, which leads to lower consumption scores by the end of the survey.

Profile 4 (P4): Up-down-maintained. There are changes over the waves, but the participant ends up with their initial score.

Profile 5 (P5): Up-down-not maintained. There are changes over the waves and the participant ends up with a different score from the initial one.

The profiles were used to analyse the progress of participants' consumption as well as its connection with SWB. A Factorial Repeated Measures ANOVA (Mixed Between-Within Subjects) was conducted to understand how the mean changed in the groups observed, how one group differs from another and to test the potential interaction between the two variables (SWB and SNCP) over time (Hertzog & Rovine, 1985). To better understand potential differences between participants, we also compared SWB by dividing the participants into different categories. On the one hand, SWB was compared in two groups of participants: extreme—those defining themselves as high consumers (response 5 on the SSNCS) in at least one of the waves (51% of the participants); and non-extreme—those who did not use this option in any of the waves. In addition, we also compared SWB between stable profiles P1 and the rest of the groups. In both cases, the t-test for independent samples was used.

All data analyses were carried out using the SPSS v.28 statistical program, and the minimum level of signification was $p < .05$.

4 Results

4.1 SWB Scale Psychometric Properties and Means

Reliability was assessed for the BMSLSS scale considering the five items evaluating satisfaction with specific life domains. Table 1 shows Cronbach's alpha values for data from all the waves.

As Table 1 shows, reliability was good for waves 2 and 4, but not for waves 1 and 3. That being said, in waves 1 and 3 all the items had adequate properties, obtaining discrimination index values (item-test correlation) from .285 to .524 in wave 1 and .284 to .438 in wave 3. Item 2 (in wave 1), which asked about satisfaction with friends, and item 3 (in wave 3), asking about satisfaction with life as a student, were those items with the lowest values. However, the alpha values did not increase in any

Table 1 Cronbach's alpha values for BMSLSS

	Wave 1	Wave 2	Wave 3	Wave 4
BMSLSS	.651	.712	.626	.713

Table 2 Reliability of single-item scale OLS

	Wave 1	Wave 2	Wave 3	Wave 4
OLS	.307	.463	.628	.585

Table 3 Comparison of means of SWB indicators along waves

	Means values per waves				Pairwise comparisons					
	W1	W2	W3	W4	W1-W2	W1-W3	W1-W4	W2-W3	W2-W4	W3-W4
BMSLSS	8.82	8.52	7.94	7.77	T=5.37; P<.001	T=13.94; P<.001	T=16.41; P<.001	T=9.58; P<.001	T=12.38; P<.001	T=3.20; P<.035
OLS	8.95	8.56	8.12	7.91	T=4.41; P<.001	T=8.59; P<.001	T=12.06; P<.001	T=4.74; P<.001	T=7.35; P<.001	T=2.71; P<.035

F=136; $p<.001$
F=54.7; $p<.001$

Table 4 Percentages of SSNC

	Low	Medium	High
Wave 1	31.5	22.5	45.9
Wave 2	24	21	55
Wave 3	10.7	32.9	56.4
Wave 4	8.7	26.2	65.1

of the cases studied when removing these items, indicating that all the items contributed to the reliability of the scale. Both items obtained values of above 0.3 in the rest of the waves. Table 2 indicates the reliability results for the single-item scale OLS.

As Table 2 shows, the values gathered were generally low, although they were higher in the last two waves. The reliability of the OLS was limited, however. This could be due to the BMSLSS being used as the reference measure, when single-item and multi-item scales do not measure the construct in the same way, as indicated in previous studies on SWB (Casas & González-Carrasco, 2021). That being said, both are good indicators in this regard.

Means for all the SWB indicators were computed throughout the waves. As Table 3 shows, there was a decrease in all SWB means from wave 1 to wave 4. Differences between waves were tested within each indicator of SWB, all being found to be significant, with p values lower than .01, except the difference between the third and fourth waves, which was also significant, and had p values lower than .05.

4.2 Self-Categorization Social Network Consumption Scale (SSNCS)

Table 4 shows the percentages for each wave with regard to the SSNC (low, medium, and high).

As Table 4 shows, the percentage of low consumers decreased from wave 1 to wave 4. This contrasts with the percentage of high consumers, which increased from the first to the final wave, it being the most frequent categorization in all waves. Generally speaking, the results indicate that respondents rated their social network consumption higher over time, although the percentage of medium consumers remained stable throughout the waves. Figure 1 illustrates the tendency of SSNC over waves.

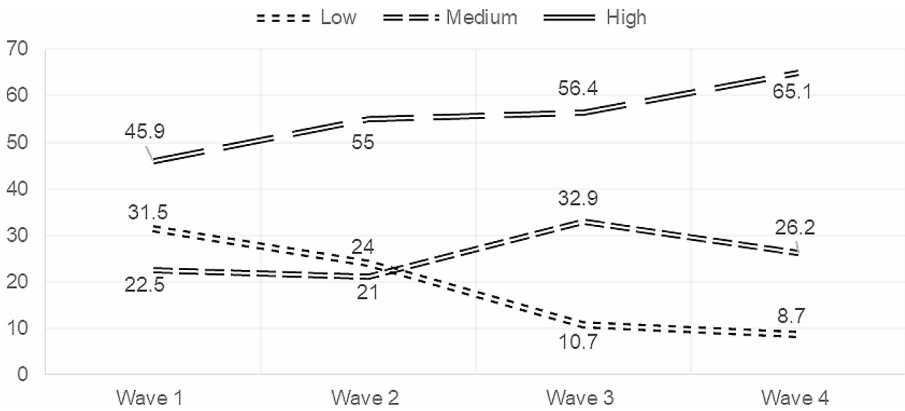


Fig. 1 Percentage of participants in each SSNC (Low, Medium, High) in each wave

Table 5 ANOVA results comparing SWB indicators by SSNC along waves

		F value	Low consumers mean/ vs. Medium consumers mean (t value)	Low consumers mean/ High consumers mean (t value)	Medium consumers mean / High consumers mean (t value)
BMSLSS	Wave 1	11.93**	9.13/8.9 (127.95**)	9.13/8.57 (149.81**)	8.9/8.57 (132.91**)
	Wave 2	3			
	Wave 3	2.21			
	Wave 4	2.25			
OLS	Wave 1	7.4**	9.27/9.05 (97.3**)	9.27/8.68 (113.88**)	9.05/8.68 (101.02**)
	Wave 2	2.4			
	Wave 3	3.05*	8.44/8.27 (62.19**)	8.44/7.95 (64.24**)	8.27/7.95 (97.89**)
	Wave 4	3.05*	8.04/8.19 (56.27**)	8.04/7.78 (59.44**)	8.19/7.78 (93.42**)

*p < .05; **p < .01

4.3 Differences in SWB Indicators According to SSNC per Wave

Differences in SWB indicators between SSNC profiles were computed for each wave. The results pointed to significant differences in wave 1 for both SWB scales, and in waves 3 and 4 only for the OLS. In addition to the differences for each scale in each wave, pairwise comparisons also displayed significant differences. Table 5 shows the values for the ANOVA general test and for pairwise comparisons when differences in the ANOVA were significant.

4.4 Social Network Consumption Profile (SNCP)

As explained in the data analysis section, four consumption profiles were defined to describe the most frequent tendencies of participants. Table 6 shows how participants were distributed according to this classification.

A total of 40.8% of participants were placed in the same self-categorized group of consumers (P1 and P4) in the first and last waves, 22% of those being in the same group of consumers over all four waves (P1). Furthermore, 29.3% of participants' perception of their consumption increased from the start to the end of the study (P2), whereas for 10.3% of participants it decreased (P3). Also, 19.6% of participants changed their evaluation and ended up in a different group from the one they were at the beginning of the study.

4.5 Factorial Repeated Measures ANOVA (Mixed Between-Within Subjects) for SNCPs

First, the two assumptions for conducting mixed repeated measures ANOVA were tested in order to confirm the adequacy of the analysis. The equality of error variances was evaluated by computing the Levene's test, whereas the Box's test statistic was considered for assessing the equality of covariance matrices. Homogeneity of covariances was tested instead of sphericity because violating the former could introduce bias in the F test, and because tests used for the latter (as the Mauchly's test) have demonstrated lack of power (Abdi, 2010). Equality of covariance was not supported for the OLS, and the results were therefore not interpreted. However, both assumptions were confirmed for the BMSLSS, as the Levene's test was non-significant for all the conditions ($p > .01$) and the Box's test of equality of covariance matrices was non-significant ($p > .01$).

As both assumptions were confirmed for the BMSLSS, the Wilks' Lambda statistic was considered for the multivariate test. According to the results, there was a main effect of the BMSLSS ($p < .01$), but no interaction effect between the BMSLSS and the SNCP ($p = .704$). Therefore, the only variable affecting SWB was time. Partial Eta Squared was used to estimate the effect size, which was considered to be large (.46), since it was above .14 (Cohen, 1969). The within-subject effect was non-significant ($p = .09$), which indicates that there was no main effect of the SNCP. Figure 2 shows the main effect of time on SWB.

Summarizing, the results indicate that the participants' perception of their consumption did not influence their SWB. Thus, SWB decreased in a similar way in the different profiles of consumers over all waves.

Table 6 Percentages of SNCPs

	Percentage
P1. <i>Stable consumption</i>	22
P2. <i>Increased consumption</i>	29.3
P3. <i>Decreased consumption</i>	10.3
P4. <i>Up-Down-Maintained consumption</i>	18.8
P5. <i>Up-Down-Not Maintained consumption</i>	19.6

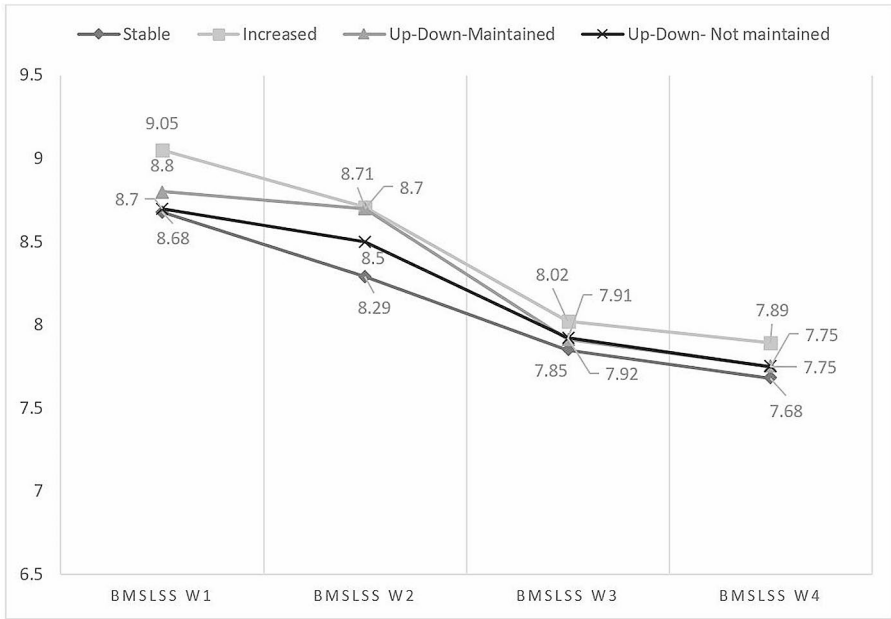


Fig. 2 Mixed repeated measures ANOVA results

Table 7 Mean differences between extreme and non-extreme participants

		T value
BMSLSS	Wave 1	-2.71**
	Wave 2	-1.37
	Wave 3	-2.46**
	Wave 4	-2.79**
OLS	Wave 1	-1.75
	Wave 2	-2.09*
	Wave 3	-3.28**
	Wave 4	-2.50*

* $p < .05$; ** $p < .01$

4.6 Exploration of Extreme Profiles

Significant differences appeared when comparing extreme and non-extreme respondents, the latter group obtaining higher means for the two SWB scales (see Table 7).

Significant differences were found for both scales in waves 3 and 4, whereas differences only appeared for the BMSLSS in wave 1, and only for the OLS in wave 2 (Figs. 3 and 4).

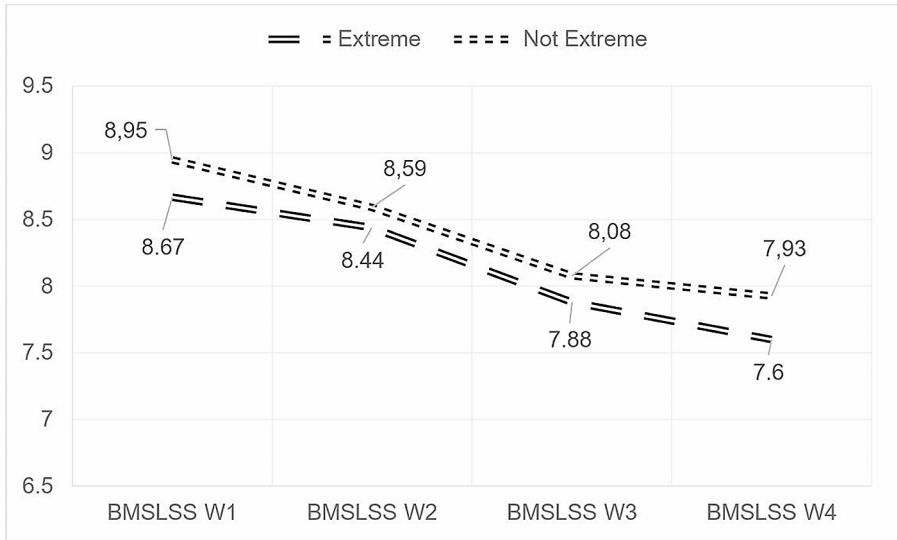
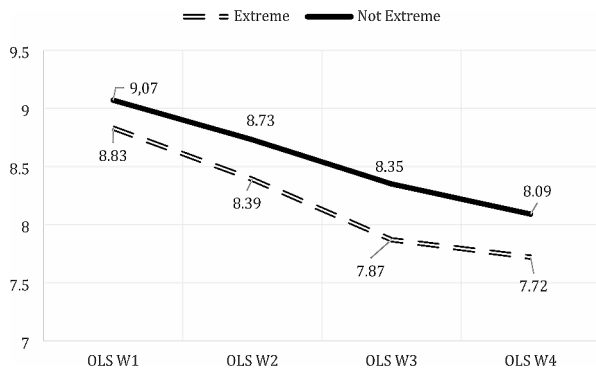


Fig. 3 Differences in BMSLSS according to Extreme vs. Not Extreme profiles per wave

Fig. 4 Differences in OLS to Extreme vs. Not Extreme profiles per wave



5 Discussion

The main objective of this study was to investigate the relationship between adolescents' perception of their SSNC and SWB. To this end, a longitudinal study of four waves was conducted with a panel of children and adolescents aged 9 to 14. The longitudinal aspect of the study was designed to overcome limitations identified in previous cross-sectional studies in the following ways: firstly, by evaluating SWB using two types of scales, one single-item and one multi-item, and by measuring SSNC using a single item based on self-categorization as consumers; secondly, by creating SSNC profiles and exploring their relationship with SWB over a long-term study lasting four years; and finally, by exploring the relationships between extreme and non-extreme patterns of SSNC.

In line with the findings of many previous studies and research reports (Andrade et al., 2021; Eurostat, 2022; INE, 2019; Ofcom, 2016; Ólafsson et al., 2013; Observatorio Nacional de Tecnología y Sociedad, 2022), our results support the notion that a substantial proportion of adolescents perceive themselves as high consumers of social media. According to the findings with regard to the first specific objective, the surveyed adolescents' perception of their social network consumption increased over time (with age) in two ways: a) those participants categorizing themselves as low consumers decreased from the first to the fourth wave; b) those categorizing themselves as high consumers had increased substantially after four years. These results confirm the general trend observed in adolescents from different cultural contexts, according to which social network consumption starts before the age of 10 (Holloway et al., 2013; Livingstone et al., 2011) and increases with age (Smahel et al., 2020). On the other hand, in relation to SWB, the scores for the two measures used to explore SWB (the OLS and BMSLSS) were observed to decrease over time (between waves 1 and 4) in line with previous research (Booker et al., 2018; González-Carrasco et al., 2017a, b; Kerestes & Stulhofer, 2020; Orben et al., 2019; Tomy & Cummins, 2011).

When analysing the relationship between children and adolescents' SSNC and SWB (second specific objective), differences appeared in SWB scores for participants aged between 9 and 14 (wave 1) and 10 and 15 (wave 2) according to SSNC categories (low, medium, and high). Thus, those participants categorizing themselves as low consumers of SN presented higher SWB scores than the medium and high consumers; likewise, those classified as medium consumers expressed higher SWB scores than high consumers. In contrast, the only differences in OLS scores for those aged between 11 and 17 (wave 3) and 12 and 18 (wave 4) were observed according to the SSNC categories. The observed trend was the same as that described above, with the highest OLS scores being identified among participants who perceived themselves as low or medium consumers of SN. These results confirm those of previous longitudinal studies (Booker et al., 2018; Orben et al., 2019), in which it was also observed that, overall, those adolescents who used SN more frequently had lower SWB scores, with gender being a distinctive element in the association between SSNC and SWB in these studies. Additionally, the results are in line with those from previous cross-sectional research in indicating that the more intensive or problematic (Boer et al., 2020; Donoso et al., 2021) or even addictive (Telef, 2016) social media consumption is, the lower the levels of SWB.

We can therefore conclude that the negative relationship between SSNC and SWB depends on the scale used to measure these concepts. Thus, assessing SWB by means of a scale measuring different domains of satisfaction, such as the BMSLSS, or by another only measuring overall life satisfaction (OLS) yields different results. The observation that overall life satisfaction (OLS) is linked to changes in the type of SSNC in older adolescents (waves 3 and 4) over time provides new and different results to those found by Kerestes et al. (2020), in which an effect was found for different life domains but not for overall satisfaction. That being said, however, our findings are congruent with those of the study by Orben et al. (2019), in that social network consumption did predict overall satisfaction, albeit slightly, and following a gender pattern.

We also explored the evolution of SNCs, identifying four different profiles that corresponded to the third specific objective: Stable Consumption (P1); Increased Consumption (P2); Up-Down-Maintained Consumption (P3); and Up-Down-Not Maintained Consumption (P4). Although adolescents who categorize themselves as high consumers of social networks were identified as those with lower SWB scores, from the multi-mixed GLM analysis we also found that oscillations in the consumption profile over time are not related to SWB evolution. Although adolescents' SWB decreases over time, as reported by other studies (Booker et al., 2018), this decrease does not appear to be related to changes in consumption patterns over time (Keum, 2011; Webster et al., 2020). This is a novel finding of the present study: what has the greatest impact on adolescents' SWB over time is not so much related to oscillations in their social network consumption patterns, but rather to the impact of their own perception of being a higher or lower consumer of SN in their more immediate social context. In other words, lower SWB could be explained in terms of social comparison, in the sense that adolescents perceiving themselves as low SN consumers in a context where their peers are perceived as high consumers (*upwards comparisons*, Appel et al., 2016) would appear to have a negative effect on their self-image and well-being, and vice versa, a phenomenon confirmed by other recent research (Park et al., 2021; Wang et al., 2017).

Given that previous research has found no interaction effect between the change in the pattern of social network consumption over time and SWB (as measured by the BMSLSS), we have created two new consumption profiles (fourth specific objective): the Extreme consumption profile (representing 51% of the participants in our study), and the Non-extreme consumption profile. The results indicated that those adolescents who were classified in the Extreme consumption profile—those who had categorized themselves as very high SN consumers at least once over the four waves—have significantly lower SWB scores over time. Thus, SN use would appear to be related to a decrease in SWB in those participants who perceive their use as high or extreme, but not in those in the less extreme use group. As previous literature has pointed out, adolescents not engaging in excessive use of SN in a manner that interferes with their daily activities (Malo et al., 2018; Martín et al., 2019) and, additionally, engaging for more social purposes (Wang et al., 2014), have a positive impact on adolescents' overall perception of their well-being. Furthermore, when use is perceived to disrupt their daily life and become more problematic or addictive, it may be associated with lower levels of SWB (Boer et al., 2020; Donoso et al., 2021; Telef, 2016).

6 Limitations and Future Research

One strength of this study is its longitudinal nature, since it has allowed us to provide further insight into the relationship between perceived SSNC and SWB. The study is not without its limitations, however. One is that SSNC was explored using a single item based on adolescents' self-perceptions. Although this type of measure appears in many of the studies explored in the literature review, and is probably more effective than asking about the number of hours of consumption, future studies should

combine the self-reported scale with more objective measures, such as monitoring levels of consumption by means of an app (e.g. measuring digital wellbeing, including screen time and type and frequency of different SN use), for example. On the other hand, other related measures of SWB should be included beyond those assessing the cognitive dimension. Including scales that measure affect or psychological well-being would add new findings to this study. Moreover, as other longitudinal studies similarly conclude, it is possible that this relationship is being mediated by other relevant variables not considered here as it would have exceeded the objective of this article, such as gender, loneliness or social capital (Marttila et al., 2021; Yoo & Jeong, 2017). This possibility should also be explored in the future.

7 Conclusions and Practical Implications

In the present study, low or moderate perceived adolescent SN use was found to have a positive impact on their SWB, in contrast to high perceived use. Furthermore, in line with other national and international research on this subject, adolescent SWB was found to decrease with age.

Regarding the measures used to explore SWB between the ages of 9 and 18, we can conclude that our study supports the importance of combining measures that assess the construct using a single item with those that do so from different domains of life satisfaction. In this regard, differences were found in adolescents' perception of their consumption according to the measure of SWB used, in line with the findings of previous studies. In the same vein, it could also be noted that, within the cognitive dimension of SWB, it would be interesting to explore what happens with a context-free scale such as the SLSS (Satisfaction with Life Scale).

No differences were observed in adolescent SWB according to SNCP over time. Thus, higher or lower SWB was not detected among either those who perceived their consumption as stable, those whose perception of consumption increased, or those whose oscillated.

Oscillations in patterns of social network consumption would not appear to be related to a higher or lower level of SWB among adolescents, but rather to their perceiving themselves as stable (positively related to SWB) or high (negatively related to SWB) SN consumers.

The authors deem it important to continue exploring the relationship between SWB and SSNC over time among those subgroups of adolescents who exhibit more extreme consumption patterns and may therefore be at a higher risk of problematic or addictive social network use.

Finally, the present study has contributed to knowledge about the relationship between adolescents' perception of their social network consumption (SSNC) and subjective well-being (SWB) over four years. In this sense, adolescents' SWB is more influenced by adolescents' perception of SSNC in their immediate social context than by changes in consumption patterns over time. Extreme SSNC was associated with significantly lower SWB scores over time, highlighting the impact of excessive social media use on well-being. In short, the study highlights the complex relationship between social media consumption in adolescence and subjective well-

being, influenced by individual perceptions, social comparisons, and the extent of consumption.

On a practical level, and considering the results of this study, we propose that SN use continue to be monitored from early adolescence—around 10 years of age—considering a wide range of psychological and social variables. As this study has shown, in terms of SWB, it is not so relevant how adolescents' consumption patterns change over time, as this is expected to increase, but it is important to explore how their self-perception of consumption (high or low) may affect their relational context. How is the well-being of those adolescents who perceive themselves as low SN users impacted by their peers being high users?

In this line, and since the use of social media is part of the life of children and adolescents as digital natives, it is necessary to promote from an early age a healthy and rich use of Information and Communication Technology (ICT) opportunities. Media literacy is, in this sense, an educational resource that will enable respectful, ethical, and collaborative use among peers. In addition, the family and the school should be committed to prevention using media regulation strategies that are empowering and active for adolescents. That means that adults must accompany them and actively educate them through interest and open dialogue about the risks and opportunities offered by technologies. Given the importance of the peer group in adolescence, as it allows for the exploration of one's own individual and social identity, it is necessary to create group interventions that allow for the development of socioemotional competences as relevant to mental health as prosociality and empathy to promote the responsible use of ICTs. Moreover, social policies should not only focus their actions on limiting or regulating the use of technologies in certain contexts but should also orient their actions towards developing the digital well-being of the general population and, specifically, that of children and adolescents (see for instance Arroyo et al., 2023). We suggest further exploration of some psychosocial aspects, such as social comparison, ideological value or the sense of identity associated with the use of social networks at this age.

Authors Contribution All the authors equally contributed to the conception and design of the research. SMC and MGC collected the data and IBB performed the quantitative analysis. IBB and SMC interpreted the data and wrote the results. Three authors co-wrote the introduction discussions and conclusions. All of them reviewed the final version of article.

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Data Availability The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Declarations

Competing Interest The authors declare that they have no conflicts of interest.

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