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Online antecedents for young consumers' impulse buying behavior

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ABSTRACT

Acting on a sudden urge to purchase something without a prior intention or plan to do so and without considering its long-term effects is regarded as impulse buying behavior. The convenience and automatization of online and mobile shopping have made impulsive purchases increasingly easier. In addition, targeted online advertisements, and presence of brands on social media networks may tempt consumers to make hasty purchase decisions. Thus, there is a call for more research on how consumer-related factors and digital environment facilitate impulsive purchases. Based on a survey of 2318 respondents from 18- to 29-year-olds in Finland, we examined young adults' impulse buying behavior from the perspective of self-control and persuasion in online environments. The findings suggest that low self-control not only directly enables impulsive purchasing, but also does so by fostering positive attitude toward targeted advertisements and the impulsiveness within social networks. Furthermore, a positive disposition towards targeted advertisements renders consumers more susceptible to the impulsiveness of social networks, encompassing the impact of recommendations and product displays on social media. Finally, we offer guidance on how the teaching of self-control and online media literacy can strengthen the resistance to persuasion in online environments and decrease the tendency to engage in impulse buying behavior.

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1. Introduction

New technologies offer easy access and a continuous stream of immediate consumption opportunities resulting in not only benefits but also certain challenges related to digital consumption. One societal challenge in online environments is the allure and ease of impulse buying behavior (Dodoo & Wu, 2019). Baumeister (2002) defines impulse buying behavior (hereafter simply "impulse buying") as acting on a sudden urge to purchase something without a prior intention or plan to do so and without considering one's long-range goals, ideals, or resolutions. Impulse buying is often linked to excessive shopping behavior, which may strain one's well-being and finances, especially in the online context (Rose & Dhandayudham, 2014).

In digital environments, a central aspect of marketing is targeted advertising, wherein companies provide consumers with better-

matching advertisements using information collected from the consumers' web browsing and search behaviors and other available information online (Boerman et al., 2017; Chen & Stallaert, 2014; Varnali, 2021). Further, digital platforms increasingly track consumers' online activities and infer their preferences to enhance their engagement and deliver relevant and personalized messages to them (Liu & Wei, 2021). Hence, social media offers a distinctive platform for personalized advertising, and consequently, impulse buying (Dodoo & Wu, 2019). Therefore, it holds significance to assess consumers' attitudes towards targeted advertising, as their responsiveness to advertising, specifically a positive attitude, is linked to behavioral intentions and actual purchasing behavior.

(Bosnjak et al., 2020; Kim & Han, 2014).

Social media exerts a significant impact on individuals' behavior due to the extensive range of experiences shared through social media networks (Aragoncillo & Orús, 2018). In the context of purchasing, these experiences encompass the presentation, evaluation, and endorsement of products and services. These actions can cultivate positive brand perceptions and stimulate spontaneous and impulsive buying decisions (Aragoncillo & Orús, 2018; Kim & Johnson, 2016; Xiang et al., 2016).

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These communal social encounters contribute to the development of subjective norms, which wield considerable influence over users' purchasing choices, particularly when originating from meaningful connections (Savolainen et al., 2021). Aragoncillo and Orús (2018) define this influence of social networks on impulsive purchases as "impulsiveness of social networks."

Notably, young people are the vanguards of digital consumerism because they are active online shoppers and social media users (see e.g., Statista, 2023). Thus, young people are highly exposed to online marketing (Dhanesh & Duthler, 2019) and are susceptible to peer influence and social norms within the realm of social media (Savolainen et al., 2021). Prior research shows that younger consumers may be more likely to buy impulsively while older ones may be better able to engage in self-control (Iyer et al., 2020). Also, consumption is among the most central building blocks of young people's identities (Deutsch & Theodorou, 2010; Wilska, 2017) and young adults are prone to developing harmful habits such as excessive consumption, which may lead to a long-lasting burden on one's finances and well-being (Oksanen et al., 2018). For these reasons, in the present study, we focused on young people aged 18–29.

The present study sought to determine whether the online stimuli provided by social media networks and targeted advertising have links to young consumers' impulse buying behavior. The study is founded upon the theory of planned behavior (Ajzen, 1991), which investigates the connections between beliefs and behavior. This theory encompasses three fundamental components that can function as inhibitors or catalysts for specific behaviors: perceived (lack of) behavioral control, subjective norm, and attitude. These characteristics make the theory of planned behavior a suitable framework for investigating impulse buying behavior (Bosnjak et al., 2020; Cheung & To, 2017). Nevertheless, to our knowledge, the theory of planned behavior has not been employed to explore the impact of social networks on impulsive buying. Our approach to studying impulse buying is from the perspective of behavioral control, manifested as a low self-control or the inability to manage the limited set of cognitive, emotional, and behavioral resources that one uses to control one's behavior (Baumeister, 2002; Hedgcock et al., 2012). Therefore, impulse buying can be regarded as a shopping behavior in which one is unable to control their behavior despite the harm it may cause, such as overspending and indebtedness.

For the reasons stated above, it is important to gain a deeper comprehension of the factors that influence digital consumption and impulse buying (Duong & Liaw, 2021; Iyer et al., 2020). There is also demand for more research on how consumers' intrinsic factors are associated with their impulse buying behavior in the online context (Badgaiyan & Verma, 2014). Also, despite strong evidence of how social media-provided stimuli and targeted advertisements affect consumer decision-making and behavior in online environments (e.g., Doyen et al., 2012; Thourunroje, 2018; Xiang et al., 2016), there is a need for more information about the psychological mechanisms of the influence of online behavioral targeting (Liu & Wei, 2021). Further, Zahrai et al. (2022) call for more empirical research to conceptualize the multi-dimensional phenomenon of self-control in online environments.

To the best of our knowledge, the current study is among the first to explore how low self-control is also indirectly linked to impulse buying behavior through positive attitude towards targeted advertising and proclivity to follow product recommendations disseminated through social media networks that contribute to the formation of subjective norms. In earlier studies employing the theory of planned behavior, subjective norm, perceived behavioral control, and attitude have traditionally been treated as independent determinants of intention, or previous research has analyzed how perceived behavioral control moderates the impacts of attitude and subjective norm on intention (La Barbera & Ajzen, 2020).

Drawing on literature on self-control (e.g., Baumeister, 2002; Hedgcock et al., 2012) and impulsive online behaviors (e.g., Anindito & Handarkho, 2022; Aragoncillo & Orús, 2018), we extend the existing

theory by formulating and validating a conceptual model that elucidates indirect connections between low self-control and impulsive buying behavior. To help fill the afore identified research gaps, we explore how low self-control is associated with impulse buying through receptivity to influences of the online environment. First, we investigate whether low self-control has also an indirect link to impulse buying through a positive attitude toward targeted advertising. Second, we examine if there is also an indirect association between low self-control and impulse buying through subjective norm that has shaped by product display and recommendations on social media platforms, commonly referred as impulsiveness of social networks. Third, we investigate whether a positive attitude toward targeted advertising also makes consumers more prone to impulsiveness of social networks. Fourth, our research contributes to the theory of planned behavior by applying the framework to examine a behavior that is predominantly spontaneous and unplanned (see Zahrain et al., 2022).

2. Theoretical background and hypotheses

2.1. Low self-control and impulsive online behaviors

Self-control is understood as the ability to modify one's thoughts, change one's emotions, and adjust one's impulses (Ramadan et al., 2021; Sharma et al., 2010). According to theory of planned behavior it can either facilitate or impede performance of the behavior (Bosnjak et al., 2020). Existing research on the relationship between self-control and online behavior focuses mainly on explicit processes to resist persuasion. Studies claim that resisting persuasion requires the ability and motivation to process information and show self-control (Harris et al., 2009; Moses & Baldwin, 2005). People's personal propensities affect how they process information and, consequently, whether they choose to exert self-control or indulge when facing an option (Laran, 2020). People who have low self-control also have difficulty regulating their behavior (Laran & Janiszewski, 2011) and are thus more prone to distorting memories of their past self-control to license their indulgence (May & Irmak, 2014). Additionally, research has linked problems with self-control to impulse buying (Baumeister, 2002).

Impulse buying is hedonically charged and driven by a desire for strong emotional experiences (Iyer et al., 2020; Rook, 1987; Sharma et al., 2010). Impulsive behavior can be characterized by spontaneity and novelty-, variety-, and pleasure-seeking behavior (Baumgartner, 2002; Dickman, 2000). However, although impulse buying is usually driven by the desire for immediate, positive emotional outcomes of the purchase (Amos et al., 2014), it is considered a negative behavior as it often results in negative post-behavior outcomes, such as negative feelings, guilt, and dissatisfaction (e.g., Trocchia & Janda, 2002). Therefore, impulsive behavior is associated with self-control: low self-control leads to a higher propensity for impulsive behavior. Thus, we hypothesized the following.

H1. Low self-control is positively linked to impulse buying.

Social media content has become more commercialized, including powerful targeted advertisements by social media influencers. Social media marketing utilizes the social networks, cultures, and practices of the youth and of their role models and heroes (Schwemmer & Ziewiecki, 2018; Thourunroje, 2018). On social media and online platforms, consumers are exposed to affective and experiential content shared by others (e.g., service and product experiences, feelings, and personal lives). These kinds of content have been found to strongly affect users' beliefs, emotions, attitudes, and behavioral intentions and stimulate impulse buying (Aragoncillo & Orús, 2018; Munnukka et al., 2019; Xiang et al., 2016). Prior studies have shown that social media users frequently fail to control their behaviors; that is, they may ignore their long-term goals for short-term gratification (see Du et al., 2018). Therefore, social media content is considered highly influential and drives spontaneous behavior, such as liking, sharing, commenting, and

buying. Low self-control may make an individual even more susceptible to influential online stimuli such as peer influence (Meldrum et al., 2013) and is expected to be positively associated with consumers' impulsiveness on social media (Ramadan et al., 2021). Thus, we hypothesized the following.

H2. Low self-control is positively associated with impulsiveness of social networks.

2.2. Low self-control and positive attitude toward targeted advertising

In behavioral targeting, machine learning algorithms are used to monitor consumers and make inferences about their characteristics, preferences, search histories, media consumption data, purchases, and web-browsing behaviors (Liu & Wei, 2021; Varnali, 2021). Then, based on their monitoring and the data collected from them, consumers can see personalized and targeted advertisements online (Boerman et al., 2017; Chen & Stallaert, 2014; Varnali, 2021). This process of displaying personalized advertisements to consumers based on their online activities is called behavioral targeting, online behavioral advertising, or online targeted advertising (Boerman et al., 2017; Chen & Stallaert, 2014; Liu & Wei, 2021; Varnali, 2021). Digital platforms, such as Facebook, Google, and Netflix, use behavioral targeting to increase consumer engagement (Liu & Wei, 2021). Furthermore, extant studies have revealed that targeted advertisements can increase click-through rates and spontaneous, unplanned purchases (Boerman et al., 2017; Dodoo & Wu, 2019; Mohan, 2020) or impulse buying.

Prior research has stressed the role of cognitive control in resisting persuasion by advertising. Cognitive control includes functions such as response inhibition, which is necessary to override automatic reactions (Büttner et al., 2014; Garon et al., 2008). Besides acknowledging the presence of persuasion, resistance to persuasion requires skills to activate knowledge of it and to act on it (Büttner et al., 2014; Moses & Baldwin, 2005). Self-control is a continuous process that requires the use of emotional and behavioral resources to alter and control one's behavior (Baumeister, 2002; Hedgcock et al., 2012). In a study by Janssen et al. (2010), depletion of self-control resources appeared to inhibit the generation of counterarguments to adverts because it hindered the processing of message-relevant information, as evidenced by reduced sensitivity to argument quality (Chaiken & Trope, 1999). Moreover, previous studies have shown that persuasion by a counter-attitudinal message increased after an act of self-control, and greater resistance to a persuasive message diminished the self-control resources available for use on a subsequent unrelated self-control task (Burkley, 2008; Janssen et al., 2010). Especially in online environments, self-control is needed to resist advertising messages because continuous exposure to online stimuli decreases self-regulation (Rose & Dhandayudham, 2014). Such stimuli include behaviorally targeted advertisements (Boerman et al., 2017; Chen & Stallaert, 2014; Varnali, 2021) that repeatedly appear to a consumer who is browsing webpages. Therefore, we hypothesized the following.

H3. Low self-control is positively linked with a positive attitude toward targeted advertising.

2.3. Targeted advertising and impulsive online behaviors

Targeted advertising and other algorithm-based recommendations are essentially based on the user's prior online activity and preferences (Chen & Stallaert, 2014; Liu & Wei, 2021), but also on the preferences of the user's online peers (Bakshy et al., 2012). Thus, it is important to recognize how algorithms intertwine with the user's social media activity and networks. In social media, individuals are motivated to find content that fits their identities, and algorithms further increase the visibility of such content (Keipi et al., 2016). Moreover, social media strongly affects consumer behavior and can stimulate impulse buying as social media users share experiences of their purchases and offer

recommendations (Xiang et al., 2016).

According to the theory of planned behavior (Ajzen, 1991), an individual's attitude towards a particular behavior is influenced by their perception of it as positive or negative. For instance, when viewing in-app commercials, consumer's emotional and cognitive attitudes towards these advertisements impact their feelings and interest in seeking further information (Cheung & To, 2017). Previous research has also shown that both consumers' positive attitudes toward advertisements and online advertisements that provide information and entertainment increase the click-through rate (Ozcelik & Varnali, 2019). Additionally, consumers' persuasion knowledge, which includes recognizing and understanding the marketer's motives, strategies, and tactics, influences their attitudes toward and responses to targeted advertisements (Dodoo & Wu, 2019; Mohan, 2020). Therefore, those who perceive personalized advertisements as relevant and worth acting on may generally be more susceptible to related information and make purchases based on recommendations found on social media and in one's social networks. In other words, one who perceives targeted advertisements as relevant and meaningful is likely to also find the recommendations of one's social media networks relevant. Thus, we developed the following hypothesis.

H4. A positive attitude toward targeted advertising is positively associated with impulsiveness of social networks.

In digital environments, the aim of behavioral targeting is to enhance consumer engagement and present better-matching advertisements based on the tracking of consumers' online activities (Boerman et al., 2017; Chen & Stallaert, 2014; Liu & Wei, 2021; Varnali, 2021). Advertisements on social media are personalized based on consumers' online profiles and activities and the matching of advertising content with consumers' needs, interests, and browsing history (Dodoo & Wu, 2019). Social media content has become more commercial than before as peers and social media influencers share personalized content, enhancing unplanned purchases (Aragoncillo & Orús, 2018; Kim & Johnson, 2016; Xiang et al., 2016). Therefore, because personalized advertisements match some aspects of consumers' personalities, consumers may perceive such advertisements as more relevant to them (Dodoo & Wu, 2019; Kreuter & Wray, 2003; Petty et al., 2002), which can be seen as a form of self-referencing. Earlier studies have shown that perceived relevance is the factor that explains the effectiveness of personalization (e.g., Dodoo & Wu, 2019; Kalyanaraman & Sundar, 2006). Prior studies have also acknowledged that a lack of relevance is a central factor in users' avoidance of advertisements on social media (Dodoo & Wu, 2019; Kelly et al., 2010). According to Dodoo and Wu (2019), perceived relevance also influences impulse buying tendency. This is because self-referencing may affect consumers' purchase decisions when they do not exert much cognitive effort to process information (i.e., peripheral processing) (Tam & Ho, 2006). This means that the act of impulse buying is usually not the result of careful thinking, but rather happens in situations in which consumers make decisions based on peripheral cues, which may increase consumers' impulse buying tendency on social media (Dodoo & Wu, 2019). Previous research has confirmed that perceptions of relevance due to personalization give rise to behavioral changes (Dodoo & Wu, 2019; Rimer & Kreuter, 2006). Based on this conceptualization, we hypothesized the following.

H5. A positive attitude toward targeted advertising has a positive link to impulse buying.

2.4. Impulsiveness of social networks and impulse buying

Within the online environment, the significance of social norms in guiding user behavior is emphasized by the abundance of information and the fast pace of social media. These factors encourage users to make swift decisions based on readily available information (Flanagin et al., 2014; Savolainen et al., 2021). In this context, individuals tend to prefer and rely on information coming from meaningful social networks (Flanagin et al., 2014), which shape normative beliefs that subsequently

lead to perceived social pressure or subjective norms (Bosnjak et al., 2020; Cheung & To, 2017). Notably, these influences can drive individuals to engage in risky behaviors, such as impulsive buying (Anindito & Handarkho, 2022).

Due to the characteristics of the online environment, consumers are expected to respond more spontaneously to commercial stimuli, which often lead to impulsive purchases. These characteristics include greater product assortment and variety (Chen-Yu & Seock, 2002), personalized information (Koufaris, 2002), content with multisensory stimulation (Kacen, 2003), use of less tangible virtual payment methods, anonymity, and lack of human contact (Rook & Fisher, 1995), buying in private (Aragoncillo & Orús, 2018), and ease of buying (Dawson & Kim, 2009). Furthermore, on social media platforms, consumers are influenced by their peers who share stimulating and personalized content that further enhances their propensity to make unplanned purchases (Aragoncillo & Orús, 2018; Kim & Johnson, 2016; Xiang et al., 2016). Young consumers, in particular, are highly influenced by peer influence and subjective norms in an online environment (Anindito & Handarkho, 2022; Savolainen et al., 2021). There is also prior evidence that consumers who use social media intensively are more prone to making impulsive purchases (Thoumrungroje, 2018). According to Thoumrungroje (2018), consumers who are intensively immersed in social media applications may forget their other concerns and escape their daily problems while using social media. They also adopt the materialistic values often displayed on social media, which may lead to impulsive and compulsive purchases (Thoumrungroje, 2018).

For the aforementioned reasons, consumers who are sensitive to others' influence and who have a higher tendency to act spontaneously on social media are more likely to follow the recommendations and examples and make impulsive purchases compared to those with lower spontaneity. Thus, we formulated the following hypothesis.

H6. Impulsiveness of social networks is positively associated with impulse buying.

2.5. Summary of theoretical framework

Based on our theoretical framework, we formulated a research model that utilizes the elements from the theory of planned behavior (Ajzen, 1991) (Fig. 1). We focused on behavioral control, attitude, subjective norms, and behavior components of the theory of planned behavior. Intention was omitted from the model as the focus of the study was impulse buying that is characterized by acting without a prior intention or plan. Impulsive and addictive behaviors are predominantly driven by implicit motives and immediate acting rather than deliberate intention.

In such behaviors, there is often a contradiction between intention and real-life behavior due to self-control failures in resisting the impulsive urges (Zahrai et al., 2022). Such extensions of the theory of planned behavior as “non-planned behavior” have been utilized in prior research on addictive and impulsive behaviors where deliberate intention is often in contradiction with real-life behavior due to self-control failure in resisting sudden impulses (Zahrain et al., 2022).

We hypothesized that low self-control is directly linked to impulse buying (H1), because weakened self-control can facilitate to act out the normal behavior (Bosnjak et al., 2020). We augment the original theory hypothesizing that low self-control is also indirectly linked to impulse buying through a positive attitude toward targeted advertisements and impulsiveness of social networks. Therefore, low self-control is associated with both impulsiveness of social networks (H2) and a positive attitude toward targeted advertisements (H3). We also hypothesized that a positive attitude toward targeted advertisements is linked to impulsiveness of social networks (H4). Subsequently, a positive attitude toward targeted advertisements (H5) and a tendency toward impulsiveness of social networks (H6) are both linked to impulse buying. Altogether, our research model implied that the negative effects of low self-control would directly affect impulse buying but would also affect it through the tendency to be influenced by the online stimuli and perceived subjective norms provided by social media networks and targeted advertisements.

3. Materials and methods

3.1. Design and data collection

The data were collected from 18- to 29-year-old online panel survey respondents in continental Finland. Finland is a post-industrial, affluent society (Wilska, 2002) with substantial communication technology infrastructure. Finnish consumers widely use both the Internet and e-commerce: 92% of the Finnish population aged 16–89 years use the Internet, and 54% have purchased products or services online within 3 months before the time of data collection (Official Statistics of Finland, 2021a). Young adults were chosen as the research subjects because the rapid digitalization of consumption environments has affected young people the most (e.g., Nyrhinen et al., 2023). Young people also shop more online and spend more time on social media than people in older age groups (Dhanesh & Duthler, 2019; Official Statistics of Finland, 2021a).

The respondents of the online panel were randomly contacted during the period from December 2, 2020, to February 22, 2021. The

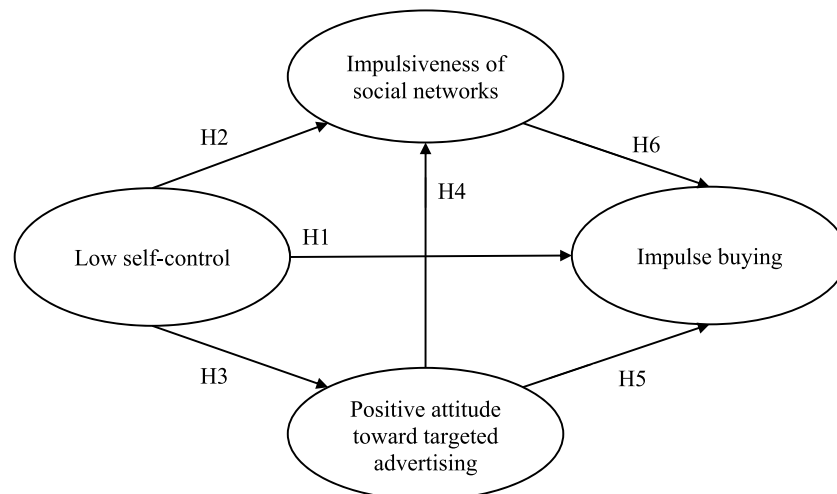


Fig. 1. Framework and hypotheses.

respondents were selected from a consumer panel of 350,000 individuals through stratified sampling based on quotas in terms of age, gender, and living area. Thus, the study data matched the general population well (see Table 1). A total of 2318 qualified responses were gathered. The respondents were given rewards and compensation for their time and effort in participating in the survey according to the policy of the panel owner.

The data in our study were gathered amidst the COVID-19 pandemic, a circumstance deemed opportune for investigating impulsive online buying behaviors. This was due to the substantial emphasis on online shopping during the pandemic, as individuals opted to remain at home and abstain from visiting physical stores due to the safety measures and restrictions in place (Zamboni et al., 2021). Consequently, a majority of consumers spend more time online, extended their usage of social networking services, and thus became more susceptible to the influence of their peers and problematic online and buying behaviors (Nyrhinen et al., 2023; Sirola et al., 2022).

3.2. Measures

The scales that were used to measure each construct were drawn from the literature and applied to better fit the context of the present study. The measurement scales consisted of 11 items regarding 4 constructs. The measures for low self-control were derived from the Brief Self-control Scale developed by Tangney et al. (2004). Self-control has been the subject of substantial research and multidimensional scales have been developed based on a single self-control construct by Tangney et al. (2004) (Manapat et al., 2021). We relied on two-dimensional conceptualization by Maloney et al. (2012) with focus on the “impulsivity” dimension. This variation of the self-control scale provided suitable metrics for our study, because the impulsivity factor captures “a tendency to act on spontaneous thoughts or feelings rather than one’s ability to override impulses” (Maloney et al., 2012, p. 114). The scale for a positive attitude toward targeted advertisements was drawn from a multidimensional scale by Kim and Han (2014) measuring factors affecting consumer attitudes toward smartphone advertising. To capture consumers’ attitudes toward the relevance of targeted advertisements, we used the items measuring the perceived personalization of advertisements (Xu et al., 2008; Ünal et al., 2011 in Kim & Han, 2014) and modified the items from the mobile context to measure targeted advertisements in general. The scale for impulsiveness of social networks (i.e., influence of social media networks on impulsive purchase decisions) was derived from Aragoncillo and Orús (2018). The scale for impulse buying was adopted from Rook and Fisher (1995). Some of the scales consisted of fewer items compared to the original scales as items were excluded from the model during the measurement scale validation

Table 1
Sample characteristics.

		Sample	Population (2019)
Sex	Male	34 %	51 %
	Female	66 %	49 %
Age	18–22	40 %	39 %
	23–25	26 %	25 %
	26–29	33 %	36 %
Neighborhood	City	83 %	83 %
	Countryside/rural area	17 %	17 %
Highest education level attained	Comprehensive or incomplete education	16 %	15 %
	Upper secondary education	60 %	64 %
	Polytechnic or bachelor’s degree	18 %	16 %
	Master’s or postgraduate degree	6 %	5 %
Disposable income	Median	€ 1200	€ 1173
	Mean	€ 1408	€ 1247

due to the weak factor loadings and/or due to a poor fit to the present research context.

3.3. Data analysis

The descriptive analyses were conducted with the IBM SPSS 26.0 statistical program. For validation of the measurement model, testing the conceptual model and hypotheses, structural equation modeling with the maximum likelihood estimation method based on confirmatory factor analysis was employed using the AMOS 26.0 software. Additionally, PROCESS v3.5 by Andrew F. Hayes (Hayes, 2012) was applied for mediation effect analysis.

4. Results

4.1. Assessment of the measurement model

The measurement model was designed to measure the following four constructs: impulsiveness of social networks, impulse buying, positive attitude toward targeted advertisements, and low self-control. The validity of the measurement model and the unidimensionality of the constructed scales were tested via confirmatory factor analysis. The reliability and validity results of the measurement scales showed that all the component loadings were equal to or greater than 0.635 (Table 2). The items were also found to converge on their assigned factors as the average variance extracted (AVE) values exceeded the cut-off value of 0.50. Furthermore, the composite reliabilities for all the factors ranged from 0.687 to 0.812, thus demonstrating good internal reliability (Bagozzi & Yi, 2012). The measurement model was also tested for discriminant validity using Fornell and Lacker’s AVE method (Fornell & Lacker, 1981) and Bagozzi’s method (Bagozzi, 1991). The correlations

Table 2
Constructs and measures.

Construct	Items	Mean	SD	Loading
Low self-control	Sometimes I can’t stop myself from doing something even if I know it’s wrong.	3.000	1.264	0.658
	I often act without thinking about all the alternatives.	2.890	1.206	0.797
Impulsiveness of social networks	Social media networks are often good sources of inspiration for my purchase decisions.	3.110	1.181	0.650
	When I see an interesting product on social media, I often end up purchasing the same product.	3.030	1.037	0.854
	Sometimes, when I see someone in my social network displaying an interesting product, I feel the need to purchase the same product.	2.830	1.209	0.791
Positive attitude toward targeted advertisements	I feel that the advertisements that target me are relevant.	3.030	1.037	0.635
	The advertisements that have targeted me have led to a purchase.	2.830	1.209	0.824
Impulse buying	I have found new products that suit my needs through targeted advertisements.	2.970	1.189	0.764
	I sometimes purchase goods for the sake of pleasure rather than necessity.	3.310	1.090	0.721
	I find making spontaneous purchases enjoyable.	3.050	1.294	0.723

Note: SD = standard deviation; Scales 1 = disagree entirely, 5 = completely agree.

between the constructs were below 0.60; thus, the square roots of the AVEs showed acceptable discriminant validity, because the square roots of the AVE of each construct were higher than any construct correlation (Table 3). Although some items of the original measurement scale were excluded during the validation process, the conceptual meaning of each scale were assessed to remain sufficiently unchanged. For example, from the low self-control scale by Maloney et al. (2012) 2 out of 4 items were removed, but it was still able to capture one's inability to resist their impulses. Similarly, despite impulse buying was measured with fewer items than in previous studies, consumers' tendency to enjoy spontaneous purchases and buying for sake of pleasure rather than necessity was still captured with our final scale. Therefore, the metrics is still sufficiently consistent with scales by Aragoncillo and Orús (2018) and Rook and Fisher (1995).

4.2. Nonresponse bias and common method bias

The nonresponse bias was assessed by comparing the sample to the structure of the population aged 18–29 years in Finland (see, e.g., Official Statistics of Finland, 2021b). The data were representative of the adult population with respect to age, gender, living area, and educational background. The common method bias (CMB) was minimized through the following procedures. We mixed the questionnaire items, strove to minimize item ambiguity, and kept the respondents' identities confidential. To disclose the possibility that the results could be interfered with by CMB, Harman's single factor test (Harman, 1976) was conducted. The results of the test show that CMB is unlikely to be an issue because the variance for the single factor was 31.6%, which was below the cutoff value of 50%.

4.3. Structural model

The results of testing the conceptual model and the hypotheses are shown in Table 4. The model fit was assessed through several indices, which indicated a good fit despite the high chi-square value (Scher-melleh-Engel et al., 2003). The values of IFI, TLI, RFI, and CFI were clearly above 0.9 and ranged from 0.978 to 0.90, and the values of RMSEA and SRMR were 0.034 and 0.021, respectively, all indicating a good fit for the model. The CMIN/DF value was below the threshold value of 5. The conceptual model accounted for 44% of the variance in impulse buying, 40% of the variance in impulsiveness of social networks, and 9% of the variance in positive attitude toward targeted advertisements. The results also support all the hypotheses. With respect to H1, low self-control was found to have a positive association with impulse buying ($\beta = 0.403, p < 0.001$). Similarly, low self-control was found to have a positive links to impulsiveness of social networks ($\beta = 0.240, p < 0.001$) and to a positive attitude toward targeted advertisements ($\beta = 0.247, p < 0.001$), supporting H2 and H3, respectively. With respect to H4, a positive attitude toward targeted advertisements was found to have a positive association with impulsiveness of social networks ($\beta = 0.579, p < 0.001$). Positive attitude toward targeted advertisements was found to have a positive association with impulse buying ($\beta = 0.190, p < 0.001$), which supports H5. With respect to H6, impulsiveness of social networks was found to have a positive link to impulse buying ($\beta = 0.253, p < 0.001$).

Table 3
Validity, reliability, and intercorrelation.

	Mean	SD	CR	AVE	1	2	3	4
SelfContrl (1)	2.945	1.235	0.687	0.527	0.726			
BehImpuls (2)	3.18	1.680	0.688	0.525	0.568	0.725		
Attitude (3)	2.943	1.145	0.787	0.555	0.304	0.431	0.745	
SolImpuls (4)	2.990	1.142	0.812	0.594	0.405	0.511	0.575	0.771

Note: SD = standard deviation; CR = composite reliability; AVE = average variance extracted; construct correlations, square root of AVEs (on the diagonal); SelfContrl = low self-control; BehImpuls = impulse buying; Attitude = positive attitude toward targeted advertisements; SolImpuls = impulsiveness of social networks.

Table 4
Results of hypothesis testing.

Relationship	β	SE	CR	R ²	Hypothesis
SelfContrl → BehImpuls	0.403***	0.032	12.418	0.44	H1: Supported
SelfContrl → SolImpuls	0.240***	0.025	9.504	0.40	H2: Supported
SelfContrl → Attitude	0.247***	0.024	10.322	0.09	H3: Supported
Attitude → SolImpuls	0.579***	0.035	16.604		H4: Supported
Attitude → BehImpuls	0.190***	0.039	4.901		H5: Supported
SolImpuls → BehImpuls	0.253***	0.036	7.113		H6: Supported

Note: ***p < 0.001; **p < 0.01; *p < 0.05; ns = not significant; model fit: χ^2 (Chi Square) (29) = 106.767; CMIN/DF (Discrepancy Divided by Degree of Freedom) = 3.682; IFI (Incremental Fit Index) = 0.990; TLI (The Tucker-Lewis Index) = 0.984; RFI (Relative Fit Index) = 0.978; CFI (Comparative Fit Index) = 0.990; RMSEA (The Root Mean Square Error of Approximation) = 0.034; SRMR (The Standardized Root Mean Square Residual) = 0.021; Attitude = positive attitude toward targeted advertisements; SelfContrl = low self-control; SolImpuls = impulsiveness of social networks; BehImpuls = impulse buying.

Besides the direct links, the mediating effects were also tested. A significant positive indirect association between low self-control and impulse buying was detected ($\beta = 0.190$; CI lower 0.170, CI upper .212). Furthermore, the specific indirect effects of low self-control on impulse buying through attitude toward targeted advertisement ($\beta = 0.065$; CI lower 0.050, CI upper 0.080) and impulsiveness of social networks ($\beta = 0.126$; CI lower 0.106, CI upper 0.147) were both significant and positive. Therefore, we can conclude that the associations between low self-control and impulse buying are partially mediated through positive attitudes towards targeted advertisement and impulsiveness of social networks.

5. Discussion

The current study aimed to investigate the connections between low self-control, a positive attitude towards targeted advertisements, and the impulsiveness of social networks, along with their joint effect on impulse buying. The obtained results supported all the hypotheses, showing that the association between low self-control and impulse buying is partially mediated by a positive attitude toward targeted advertisements and impulsiveness of social networks. Our research offers new insights into understanding the mechanisms by which low self-control leads to impulse buying in the online buying context. More precisely, the findings reveal that consumers' decreased control over their impulses makes them less resistant to persuasion by targeted marketing stimuli in online environment. Further, we showed that consumers with higher acceptance of targeted online advertising are also more prone to being influenced by social media.

5.1. Theoretical implications

Unlike prior studies on advertising based on online behavioral targeting, we did not approach online behavioral targeting simply as an algorithm that follows consumers' online behaviors. Rather, we addressed Liu and Wei's (2021) call by examining the mechanisms by which consumers become more prone to behavioral targeting. We employed the theory of planned behavior to investigate impulsive online behaviors and enhance the existing understanding of impulse buying.

Our study demonstrates how consumers' low self-control influences their inclination for impulse buying, with this influence being mediated through attitudes towards targeted advertising and the impulsiveness of social networks. Our findings align with the body of literature that underscores the connection between low self-control and impulse buying (e.g., [Baumeister, 2002](#)), as an individual's limited capacity to adjust their thoughts and emotions makes the control of impulses challenging. However, our research also reveals indirect relationships between low self-control and impulse buying, expanding the comprehension of this overarching connection in three distinct ways. The findings of our research also contribute to the theory of planned behavior by extending it to the context of impulsive behaviors.

First, consistent with the research conducted by [Janssen et al. \(2010\)](#) and [Chaiken and Trope \(1999\)](#), our findings confirm that low self-control is linked to a positive attitude towards targeted advertising. Drawing from previous studies, it is likely that individuals with limited self-control resources are more susceptible to the multitude of stimuli presented by digital advertisements and their targeted persuasion techniques (cf. [Rose & Dhandayudham, 2014](#)). However, our findings also show that low self-control, as a consumer's intrinsic factor, is not only directly associated with impulsive purchases but is also associated with it through a positive attitude toward targeted advertising. In other words, low self-control is found to make consumers more receptive towards advertising, which further leads to a higher inclination to impulsive purchases.

Second, consistent with earlier research by [Aragoncillo and Orús \(2018\)](#), [Kim and Johnson \(2016\)](#), and [Xiang et al. \(2016\)](#), we demonstrated that low self-control diminishes consumers' resistance to persuasion within social media platforms. Furthermore, our study stands as one of the first to explore the indirect association, revealing that low self-control also increases consumers' responsiveness to the impulsiveness of social networks. This heightened responsiveness subsequently contributes to an increased inclination for impulse buying. Thus, alongside its direct relation to impulse buying, low self-control exhibits an indirect association with impulsive purchasing behavior through impulsiveness of social networks, namely, product displays and reviews on social media. As such, our findings provide further support for existing research indicating that the influence of social networks can shape subjective norms, and in turn, significantly impact the purchasing decisions of young consumers ([Anindito & Handarkho, 2022](#); [Savolainen et al., 2021](#)). Notably, susceptibility to the influence of perceived norms is particularly emphasized among individuals with low self-control ([Meldrum et al., 2013](#)).

Third, our findings not only align with previous research conducted by [Bakshy et al. \(2012\)](#) and [Keipi et al. \(2016\)](#), but also build upon their insights by demonstrating that individuals with positive attitude toward targeted advertising are additionally predisposed to being influenced by recommendations and product displays within social media. Likewise, the perceived relevance of self-referencing in targeted advertising further impacts tendencies towards impulse buying. This is due to the tendency of consumers to initially evaluate advertisements based on their attractiveness rather than the specific content they contain (cf. [Dodoo & Wu, 2019](#); [Tam & Ho, 2006](#)).

Fourth, we address the call by [Zahrai et al. \(2022\)](#) to test and develop frameworks for self-control for problematic social media use. The theory of planned behavior by [Ajzen \(1991\)](#) was initially developed to examine behavior that results from a reasoned process of considering the options, evaluating the consequences, and making decisions on how to act ([Barber, 2011](#)). Later, the framework has been also extended to include impulsivity as a predictor for behavior (e.g., [Churchill et al., 2008](#)). Following these prior studies we utilized the theory of planned behavior, but rather than examining impulsiveness as an extension of this framework, we contribute to the prior applications of the theory by approaching it as a lack of behavioral control. Further, we illustrate how the dimensions of planned behavior can be used to predict impulsive behaviors that lack a premeditated intention.

5.2. Implications for practitioners

The results of the present study show how peer influence on social media and targeted online advertisements are linked with the impulsive purchases of young consumers. Consumers need new skills in the digital environment to avoid the risks related to impulsive behaviors. They should be aware that all their actions online are tracked by advertisers and service providers and that the collected information is used for targeted advertisements and other algorithm-based recommendations that may lead to impulsive purchases. Impulse buying has also been shown to be associated with indebtedness and compulsive buying behaviors that may lead to the development of shopping addiction ([Wang & Xiao, 2009](#)). Given that indebtedness may have long-lasting negative consequences for an individual's well-being and finances, it is important to acknowledge the factors that facilitate impulsive purchases of young consumers to prevent addictive behaviors and future financial difficulties. Teaching digital skills and improving media literacy are crucial to preventing these problems at a young age ([Koskelainen et al., 2023](#)). As our findings illustrate, low self-control is linked to impulse buying through persuasion in online environments. Developing self-control skills and resistance to persuasion by targeted advertisements may help prevent impulsive purchases. Also, teaching financial skills, such as debt control, is important as young adults frame their future in the financial and occupational domain ([Koskelainen et al., 2023](#); [Ranta et al., 2020](#)).

5.3. Research limitations and future studies

This study has some limitations that open avenues for further research. First, the use of cross-sectional data limits the drawing of causal interpretations. Experimental studies should be conducted to reveal potential causal effects. Second, with cross-sectional data, we cannot draw conclusions about whether and to what extent the pandemic affected the studied phenomena. Thus, longitudinal studies are needed to examine the changes in impulse buying, its online antecedents, and young people's perceived control over their post-pandemic spending. Third, we focused on how the effect of low self-control on impulsive online buying behavior is mediated through impulsiveness of social networks and a positive attitude toward targeted advertisements. Future research should consider how other factors of digital environments, such as distractive smartphone notifications, may impact impulse buying and interact with low self-control. Fourth, this study was limited to data from a Finnish sample of young adults. Additionally, it is important to acknowledge that the scales used were modified during the validation process, which is likely due to the cultural context and the focus on young adults. Consequently, certain original items were excluded from the model. As a result, it would be valuable for future research to explore the extent to which our findings can be generalized to different countries and age groups.

CRedit authorship contribution statement

Jussi Nyrhinen: Formal analysis, Methodology, Writing - original draft, Writing - review & editing. **Anu Sirola:** Writing - original draft, Writing - review & editing. **Tiina Koskelainen:** Writing - original draft, Writing - review & editing. **Juha Munnukka:** Methodology, Writing - original draft, Writing - review & editing. **Terhi-Anna Wilska:** Funding acquisition, Project administration, Writing - original draft, Writing - review & editing.

Declaration of competing interest

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

Data availability

Data will be made available on request.

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