

Online dating applications and risk of youth victimization: A lifestyle exposure perspective

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Abstract

Based on lifestyle exposure theory (LET), this study examined online dating application (ODA) use and victimization experiences among adolescents using large cross-national samples of Finnish, American, Spanish, and South Korean young people between ages 15 and 18. According to logistic regression analyses in two substudies, ODA use was associated with more likely victimization to online harassment, online sexual harassment, and other cybercrimes and sexual victimization by adults and peers. According to mediation analyses, this relationship was mainly accounted for by the fact that ODA users engage in more risky activities in online communication and information sharing. Attention should be paid to the risks ODAs pose to vulnerable groups, such as young people, with insufficient skills to regulate their social relationships online.

KEYWORDS

online dating applications, adolescents, victimization, cybercrime, lifestyle exposure theory

1 | INTRODUCTION

Building meaningful peer relationships is important to young individuals (Steinberg & Morris, 2001), and establishing a romantic relationship with an increased sense of commitment becomes a significant goal for many young people (Arnett, 2004; Shulman & Connolly, 2013). Typically, a young person's romantic choices are influenced by proximal and age-specific factors, as well as peers' approval of the prospective partner (Shulman & Connolly, 2013). The current lives of young people are also characterized by technology and the use of various social media platforms (Anderson et al., 2020). Mainly, youths use these sites

and platforms to enrich their social lives by maintaining or building new friendships (Allen et al., 2014; Schaeffer, 2019), reflecting a change in the way young people meet others and create new relationships (Hynan et al., 2014).

The modern way of communicating and socializing is also evident in young peoples' dating habits. Various dating websites and mobile applications afforded by the popularization of smartphones have had a vast influence on how young people of today find and initiate contact with potential love interests and romantic partners (Sumter & Vandenbosch, 2019). Online dating applications (ODAs) have emerged largely during the past decade (Clement, 2020) and are now a common part of people's lives around the world (Castro &

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Barrada, 2020). These apps have become particularly popular among young adults (Sumter & Vandenbosch, 2019), but they are also used by adolescents (Castro & Barrada, 2020; Sánchez et al., 2015).

A range of dating applications exist, of which Tinder is one of the most popular with almost 8,000,000 users in the United States and an estimate of more than 50,000,000 users worldwide (Statista, 2020). Although dating apps can provide benefits to their users, there are also risks involved, including troublesome interactions and becoming a target of antisocial behavior, such as sexual harassment or abuse (Castro & Barrada, 2020). The risks of dating apps concern vulnerable groups in particular, such as women and sexual minorities (Castro & Barrada, 2020; Douglass et al., 2018).

Of various age groups, adolescents are a notably vulnerable group to sexual harassment (Douglass et al., 2018), and they are at a higher risk of receiving unwanted sexual solicitation online compared to adults (Baumgartner et al., 2010). In line with lifestyle exposure theory (LET; see Hindelang et al., 1978), Internet use creates online lifestyles, some of which are risky and involve unsafe online activities that expose adolescents to various forms of abuse (Choi & Lee, 2017; Choi et al., 2019). In line with this perspective, adolescents' use of ODA represents a risky online lifestyle. Unsafe and potentially careless activities in relationship formation and information sharing exemplify online behaviors that make victimization experiences more likely.

Even though earlier studies have examined ODA use among adolescents (see Castro & Barrada, 2020), they have mainly used small convenience samples and considered limited risks related to ODA use (e.g., meeting ODA contacts in person). The current study is the first to examine the prevalence of ODA use among adolescents using large and cross-national samples and to elaborate on the mechanism that links ODA use to the risk of various victimization experiences both by peers and adults. Our examination is not limited to online victimization experiences, as the analysis of sexual victimization by adults and peers also applies to sexual violence occurring offline. The aim of this study was to analyze the relationships between ODA use and victimization experiences among adolescents in Finland, South Korea, Spain, and the United States. In line with LET, an additional aim was to examine whether the relationship between ODA use and victimization is mediated via risky online activities in information and communication management using a representative sample of Finnish adolescents.

2 | DATING APPLICATIONS AS POTENTIAL RISK FACTORS

Dating apps are typically location-based platforms where the users create a personal profile. On Tinder, for example, users share photos and a short introduction of themselves (i.e., a "bio"). Users can browse through others' profiles based on various filters, such as their GPS location, age, and gender, and either dismiss or like a profile by swiping left or right, respectively. Once two people have liked each other's profiles, they become a match and are able to start chatting via the application. According to a systematic review by Castro and Barrada (2020), motives for using dating apps vary from finding

potential sexual and romantic partners to curiosity, entertainment, and socialization. Tinder is mostly used by heterosexual individuals, whereas some dating apps, such as Grindr, are more specific in their focus and targeted sexual minorities (Castro & Barrada, 2020).

Despite their popularity and potential benefits to social life, dating apps are also platforms for antisocial behavior where sexual harassment and coercion commonly take place (Castro & Barrada, 2020). According to a study by Douglass et al. (2018), a majority (57%) of Australian respondents who had used ODA during the past year had also experienced sexual harassment. Thompson (2018), in turn, found that women receive sexually insulting messages from men on dating apps, such as insulting comments on one's appearance, particularly when being rejected or ignored by a potential date, as well as aggressive sexual invitations, threats of sexual violence, and victim-blaming. Additionally, sexual minority males report encountering negative experiences, such as harassment on dating sites (Lauckner et al., 2019). Thus, women and sexual minorities are at a higher risk of encountering sexual harassment via dating apps (Castro & Barrada, 2020).

The abovementioned hostile and aggressive reactions can occur as a response to frustration in a situation where one is being rejected by a potential date (e.g. Thompson, 2018) but personality traits, such as narcissism or impulsivity, may also play a role in these behaviors. A study by March et al. (2020) found that anger moderated the relationship between narcissism and antisocial behaviors on Tinder, indicating a magnified response to a situation where one's ego was threatened as a consequence of being rejected or ignored by a potential date.

Internet-based dating exposes adolescents to various forms of abuse (Caridade et al., 2019; Stonard et al., 2014), and, importantly, young users perceive online dating to be riskier than more traditional offline dating. The key concerns of online dating are exposure to deception, sexual harassment, and untrustworthy people (Bonilla-Zorita et al., 2020). The risks of online dating are not limited to the internet but often co-occur with offline abuse (Caridade et al., 2019).

The overall quality of online relationships is dependent on how young people manage their information and communication online (Sánchez et al., 2015). These management practices significantly determine whether ODA use fosters positive social contacts or leads to conflicts and abuse. However, adolescents' skills in the safe management of online communication and information sharing vary strongly between individuals. Adolescents show many risky online activities, such as disclosing personal information to people they have never met face-to-face or using the Internet to look for new friends, which, according to earlier research (see, e.g., Lobe et al., 2011), may link adolescents to potentially harmful interaction. Such activities are commonly involved in the use of ODA by young people (Castro & Barrada, 2020; Sumter et al., 2017).

3 | ONLINE VICTIMIZATION AND LIFESTYLE-EXPOSURE THEORY

The Internet is a source for fulfilling social needs (Seidman, 2013). Unfortunately, all internet users are not well-intentioned, but malicious actors are also using the Internet and social media services to

seek out possible targets for online harassment, sexual harassment, and other forms of cybercrime (e.g., cyberfrauds). Online harassment is defined as intentional, repetitive, and aggressive behavior by individuals or groups using electronic devices and the internet against victims who are unable to protect themselves (Smith et al., 2008; Ybarra et al., 2012). Although the terms *online harassment* and *cyberbullying* partly overlap (Lindsay & Krysik, 2012; Näsi et al., 2014), *harassment* is more precise and covers various forms of victimization taking place online. It not only involves peer-to-peer activities but also harassment by adults and strangers.

Online harassment can also be sexual in nature. Online sexual harassment refers to unwanted sexual comments or sexual advances and requests taking place on a digital platform (Barak, 2005; Vitis & Gilmour, 2017). Typical forms of online sexual harassment include receiving nonconsensual content (e.g., images or videos) with sexual material, threats or blackmail (e.g., to publish sexual content about someone), or the pressure to engage in sexual activities (on- or offline).

According to the existing literature, risk factors, such as frequent use of social media and sharing personal information online (Kaakinen et al., 2018; Reyns, 2018; Staksrud et al., 2013) and low self-control (Mikkola et al., 2020; Pratt et al., 2014), are also associated with cybervictimization. Research evidence has been somewhat mixed about the relationship between gender and cybervictimization. Some studies have suggested that sexual victimization is more likely among females (see, e.g., Holt et al., 2016), whereas males seem to be more likely to experience online aggression (e.g., Erdur-Baker, 2010), but victimization can also be explained by other factors, such as the extent of gender stereotypic behavior (Wright & Wachs, 2020).

In addition to personal characteristics, cybervictimization is also related to online users' behaviors and routines. Individuals engaging in risk-driven behavior, such as getting involved with delinquent peers and delinquent activities, alcohol, and substance use, are more likely to be exposed to offenders in a situation lacking guardianship (Turanovic & Pratt, 2014). Adolescents' behavior tends to be particularly risk-driven as they are more susceptible to peer pressure, leading to risky behavior (Akers & Lee, 1999). This can eventually lead to adolescents themselves committing crimes against others and becoming victims of crime or harassment. The victim-offender overlap is well established because people who commit crimes are also likely to become victims of crime (Gottfredson & Hirschi, 1990).

LET states that the likelihood of crime victimization is dependent on the level of exposure to potential offenders and situations in which the risk of victimization is high (Hindelang et al., 1978). Individuals' lifestyles and daily activities differ, for example, in the extent to which they expose themselves to unfamiliar social contacts. Traditionally, substance abuse, sex and dating activities, lack of parental control, and peer delinquency have been considered risk routines that expose young people to a risk of victimization (Engström, 2020). Just like offline lifestyles and routine activities, Internet users have different online lifestyles depending on what services they use and what kind of activities their online behavior consists of. These online lifestyles and activities also explain why some individuals become victims on the internet. For

example, Choi et al. (2019) found that online risky activities related to lifestyle, leisure, and social networking were related to cyberbullying victimization among Korean adolescents.

From the perspective of LET, ODAs are criminogenic online environments that increase the probability of victimization by exposing adolescents to motivated offenders. In addition to situational factors, the risk of crime victimization is determined by what people do in risky environments (Engström, 2020). Thus, the risks involved in adolescents' ODA use might be driven by the risky activities that ODA use enables. Earlier research has suggested that the most relevant routines likely relate to how young people manage communication and their information online (Sánchez et al., 2015). ODA use can encourage risky communication and information-sharing activities, such as networking with or disclosing personal information, to previously unknown people (Sumter et al., 2017).

Earlier studies have suggested that ODA use is linked both to victimization experiences and risky online routines, such as the sharing of personal information and forming potentially unsafe social contacts (Castro & Barrada, 2020; Sumter et al., 2017). However, none of the previous studies have analyzed the role of risky online routines in victimization risk. In this study, we study whether the risky online routines mediate the relationship between ODA use and various sexual and nonsexual victimization experiences while controlling for other relevant risk factors, such as substance abuse (see e.g., Erevik et al., 2020). We will also test the connection between ODA use and online victimization in four national contexts. Although earlier research has established individual differences and motivations in ODA use (Bonilla-Zorita et al., 2020), cross-nationally comparative research on youth ODA use and the related risks is still scarce. Our research aims to contribute to this gap.

4 | HYPOTHESES

The aim of this study was to analyze ODA use among adolescents and the mechanism linking ODA to youth victimization experiences. Previous studies have highlighted that a variety of antisocial behaviors exist on an ODA platform (Castro & Barrada, 2020) and that online-based dating exposes adolescents to interpersonal abuse (Caridade et al., 2019; Stonard et al., 2014). According to LET, crime victimization depends on the degree that individuals' lifestyles expose them to circumstances that make victimization more probable (Hindelang et al., 1978) and how individuals behave in risky environments (Engström, 2020). Risky activities related to communication and information management are commonly involved in the use of ODA by young people (Sumter et al., 2017), and they appear to be especially relevant to the potential negative outcomes of adolescents' ODA use (Sánchez et al., 2015). Based on the previous studies, we state the following hypotheses.

H1: *Adolescents' ODA use is associated with more likely victimization to online harassment, online sexual harassment, sexual victimization by adults and peers, and victimization to cybercrime other than sexual harassment.*

H2: *The relationship between adolescents' ODA use and victimization experiences is mediated via risky online activities in communication and information management.*

5 | STUDY 1

Study 1 analyzed the relationship between ODA use and victimization to online harassment among Finnish, South Korean, Spanish, and American adolescents. All four are economically developed countries with a high level of technology use, yet they represent various cultural contexts from three continents. Due to the scarcity of cross-national research concerning ODA use and related risks, we did not develop any country-specific hypotheses. Our main research question addressed the following.

RQ1: Does adolescents' dating application use predict more likely online harassment victimization?

5.1 | Method

5.1.1 | Participants and design

The participants of this study were young people who took part in the wider YouGamble survey study conducted in Finland, South Korea, Spain, and the United States between March 2017 and January 2019. The initial samples were collected using research panels provided by Dynata (former Survey Sampling International), and they represented the distribution of young people aged 15–25 in their respective countries in terms of age, gender, and living area (Oksanen et al., 2018; Savolainen et al., 2020; Sirola et al., 2019). In this study, we focused on those participants who were 15–18 years old. Participants ($n = 1451$) were 48.7% female ($M_{\text{age}} = 16.6$, $SD = 1.1$) and entered the study from Finland ($n = 236$, 47.0% female, $M_{\text{age}} = 17.0$, $SD = 0.9$), South Korea ($n = 341$, 50.7% female, $M_{\text{age}} = 16.4$, $SD = 1.1$), Spain ($n = 423$, 47.4% female, $M_{\text{age}} = 16.5$, $SD = 1.1$), and the United States ($n = 456$, 49.3% female, $M_{\text{age}} = 16.6$, $SD = 1.1$).

The questionnaire was based on the forced-choice (FC) format in which respondents were forced to respond to each presented question before being allowed to move forward in the survey. The utilization of FC allowed us to conduct analyses without needing to handle missing data. According to previous studies, FC generally produces similar results in relation to other methods when measuring sensitive issues (Wetzel & Frick, 2020).

5.1.2 | Measures

In the first study, we focused on the relationship between online harassment and the use of dating applications. The main dependent variable measured on a general level whether the participants had been a target of online harassment. The initial question was, "In your own opinion, have you ever been a target of online harassment; for

example, have people spread private or unfounded information about you or shared pictures of you without your permission?" The measure has been previously used to study online harassment victimization in cross-national studies (Keipi et al., 2017; Näsi et al., 2017).

Our main independent variable was based on a question inquiring about the respondents' activity in online dating sites and services. More specifically, we asked how often the respondents used "online dating services." Examples of dating applications were given while considering the variation of such services in each country. Tinder was mentioned in all countries, but local popular services, such as Badoo in Spain and Amanda in Korea, were also provided as country-specific examples. Responses were provided using a four-point scale: 1 (*I don't use*), 2 (*seldom*), 3 (*daily*), and 4 (*several times a day*). For analysis purposes, we combined the last two categories.

Control variables included *social media sharing activity* as well as sociodemographic factors that may confound the relationship between dating service usage and online harassment. We measured social media sharing activity with questions considering how often young people were active on social media by sharing content, uploading pictures of themselves, and sending messages that offend and threaten other users. The response options were 0 (*never*), 1 (*less than once a year*), 2 (*at least once a year*), 3 (*at least once a month*), 4 (*several times a month*), 5 (*once a week*), 6 (*several times a week*), and 7 (*daily*).

We also controlled for the participants' age and gender throughout the analysis. Table 1 shows the descriptive statistics of the variables used in Study 1.

5.1.3 | Statistical analysis

Study 1 included both descriptive analysis and multivariate logistic regression analysis on online harassment. The descriptive analysis presented the frequencies and percentages for the categorical variables, as well as the mean values and standard deviations for the continuous variables. We conducted logistic regression analyses to model the relationship between online harassment and ODA as the control variables (age, gender, and content-sharing activities) were incorporated. We also tested the effect of the preferred social media platform by adding variables measuring the use of Facebook, Twitter, and Instagram into the models, but due to slight and insignificant effects, we excluded those variables from the final models. Finally, we conducted the interaction analysis between gender and ODA.

We conducted all of the analyses with Stata (version 16.1) software, and we reported odds ratios and average marginal effects with standard errors. Moreover, we used the user-written *coefplot* package to illustrate the results of the interaction analysis (Jann, 2014).

5.2 | Results

The descriptive findings presented in Table 1 indicate that experiences of online harassment were relatively common in our data: In

TABLE 1 Descriptive statistics of Study 1 variables

Variable	Coding	All		Female		Male	
		N	%	n	%	n	%
Target of online harassment	No	1232	84.9	581	82.2	651	87.5
	Yes	219	15.1	126	17.8	93	12.5
Use of dating applications	Never	138	85.3	616	87.1	622	83.6
	Sometimes	144	9.9	62	8.8	82	11.0
	Daily	69	4.8	29	4.1	40	5.4
Country	FIN	230	15.9	108	15.3	122	16.4
	US	456	31.4	225	31.8	231	31.1
	SK	341	23.5	173	24.5	168	22.6
	SPA	424	29.2	201	28.4	223	30.0
Gender	Male	744	51.3				
	Female	707	48.7				
Continuous variables	Range	M	SD	M	SD	M	SD
Age	15–18	16.6	1.1	16.6	1.1	16.5	1.1
Share content on social media	0–7	3.7	2.1	3.9	2.1	3.4	2.0
Upload pictures on social media	0–7	3.1	2.0	3.4	2.0	2.9	1.9
Online hate offending	0–7	1.2	1.9	0.9	1.8	1.4	2.0

Abbreviations: M, mean; SD, standard deviation.

total, 15% of respondents between ages 15 and 18 had been a target of online harassment. The use of dating services was also popular, especially occasional usage, as about 15% of all participants under the age of 19 used dating services at least sometimes. About 5% of young people were active and daily ODA users.

Table 2 reports the logistic regression analysis on the likelihood of being a target of online harassment. Model 1 indicates that daily ODA use was highly associated with online harassment (OR = 3.52, $p < .001$). The results show that occasional use was also associated with harassment experiences (OR = 2.26, $p < .001$). Regarding the effect of the control variables, female participants were more likely to be targets of online harassment (OR = 1.55, $p < .001$). In addition, the results showed that harassment experiences increase with age (OR = 1.16, $p = .043$) among young people. We also found that uploading pictures to social media (OR = 1.17, $p = .007$) and online hate offending (OR = 1.09, $p = .025$) were associated with a higher likelihood of online harassment. The country effects showed that harassment was less common in Spain (OR = 0.49, $p < .01$) and South Korea (OR = 0.33, $p < .001$) when compared to Finland.

Figure 1 illustrates the results of the interaction analysis between gender and ODA. The predicted probability of experiencing online harassment clearly increased among both genders according to whether the participants used dating services. Although the likelihood of online harassment appeared to increase with the daily use of ODA more strongly among females, we did not find a statistically significant interaction (OR = 1.50, $p = .41$).

5.3 | Discussion

In this study, we found that ODA use was associated with more likely victimization to online harassment in a cross-national sample of Finnish, American, Spanish, and South Korean adolescents. This finding supports our first hypothesis and is in line with earlier studies indicating that online dating exposes youths to various interpersonal risks (Caridade et al., 2019; Stonard et al., 2014). ODA users report that diverse forms of discrimination, racism, and harassment exist on dating platforms (see Lauckner et al., 2019), especially in situations involving frustration, and rejection aggression is likely to occur

TABLE 2 Predicting the likelihood of being a target of online harassment by the usage of online dating applications and control variables

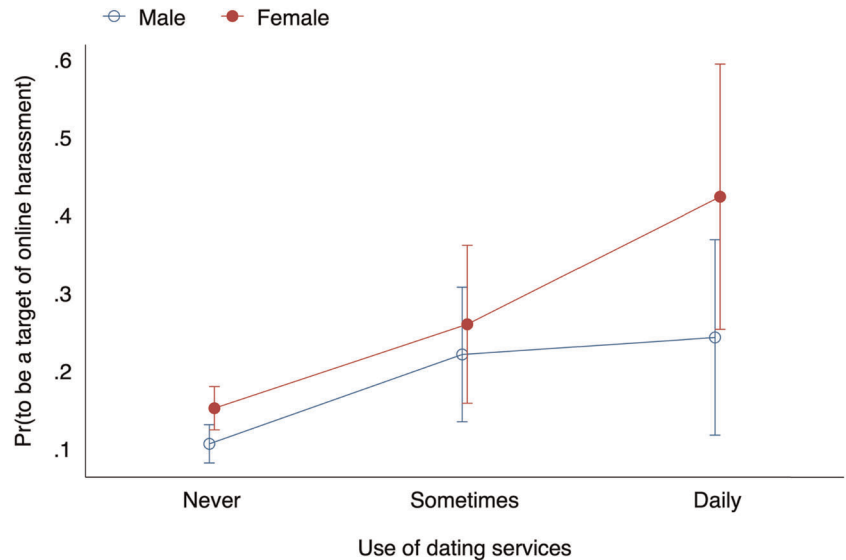
	OR	AME	SD
Use of online dating applications (ODA)			
ref. never			
Sometimes	2.26***	(0.50)	.11** (.04)
Daily	3.52***	(0.99)	.19*** (.05)
Female (ref. male)	1.55**	(0.24)	.05** (.02)
Age	1.16*	(0.08)	.02* (.01)
Social media sharing activity			
Share content on social media	1.04	(0.06)	.00 (.01)
Upload pictures to social media	1.17**	(0.07)	.02** (.01)
Online hate offending	1.09*	(0.04)	.01* (.00)
Country effects			
ref. FIN			
US	0.73	(0.16)	-.05 (.03)
SK	0.33***	(0.09)	-.13*** (.03)
SPA	0.49**	(0.11)	-.09** (.03)
Observations	1,451		
Wald Chi	101.4***		
Pseudo R ²	0.09		

Abbreviations: AME, average marginal effects; OR, odds ratio; SD, standard deviation; ref, reference category.

Robust standard errors in parentheses.

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

FIGURE 1 Probability of being a target of online harassment among genders by the use of online dating applications



(March et al., 2020). Notably, the relationship between ODA use and victimization remained after controlling for factors, such as online sharing activity and aggression.

The study also confirmed previous results from comparative studies by indicating that young people in Finland were more likely to be exposed to and experience online harassment (Keipi et al., 2017; Näsi et al., 2017). However, the difference between Finland and the United States was not significant. This finding is in line with previous studies in which Finland and the United States have been found to be close to each other when it comes to the presence of hate content on social media (Keipi et al., 2017). In this respect, Finland offers a good context to study various forms of harassment occurring via dating applications.

These results add to previous research investigating various forms of youth victimization. For instance, previous cross-national research has found that youth in Finland, Spain, South Korea, and the United States have similar prevalence rates when it comes to cybercrime victimization: 7% in the United States, 4% in South Korea, 8% in Finland, and 7% in Spain (Mikkola et al., 2020).

6 | STUDY 2

In Study 2, we analyzed whether adolescents' ODA use is related to more likely victimization to online sexual harassment and cybercrimes other than sexual harassment. In addition, we analyzed whether ODA use predicted more likely sexual victimization by adults and peers that may have happened on- or offline. To elaborate on the victimization mechanism, we analyzed whether the relationship between ODA use and victimization experiences was mediated via risky online activities. Our analyses were based on a large representative dataset of Finnish adolescents. Our research questions in Study 2 included the following.

RQ2: Does adolescents' ODA use predict more likely victimization to online sexual harassment and cybercrime other than sexual harassment?

RQ3: Does adolescents' ODA use predict more likely sexual victimization both by adolescents and adults?

RQ4: Is the relationship between adolescents' ODA use and victimization experiences mediated via risky online activities?

6.1 | Method

6.1.1 | Participants and design

Study 2 uses the Finnish Self-Report Delinquency (FSRD) survey collected in spring 2020. Nationally representative FSRD surveys are collected from ninth graders (mainly between 15 and 16 years of age) in randomly sampled schools. Data collection takes place every 4 years and is conducted by the Institute of Criminology and Legal Policy (University of Helsinki). FSRD surveys are based on stratified cluster samples (sampling probability proportional to school size) that reflect various geographical areas in Finland. The sample represents the Finnish ninth-grade student population.

The survey is intended to monitor and investigate juvenile delinquency in Finland. It includes measures on various offenses, victimization experiences, and background and risk factors. The 2020 data were collected from 5,674 respondents in 74 schools with a response rate of 78.8%. Of the respondents, 49.5% self-identified as females, 48.5% as males, and 2.0% as other gender. The mean age for the sample was 15.2 ($SD = 0.46$). No children under the age of 15 were included in the study. This was ensured by instructing the teachers that students under 15 years old were not allowed to participate. In addition, respondents who reported their age as less than 15 years were removed from the data. Of all the respondents, 98.8% were 15–16 years old. Those respondents who reported being 18 years or older ($n = 22$, 0.49%) were included in the analysis,

although the correctness of their age could not be verified. The study was based on an FC questionnaire. However, as some of the respondents did not finalize the survey, some data are missing depending on the measure. The amount of missing data was lowest (none) on the drug and alcohol questions placed at the beginning of the survey and highest in the social media question (3%) in the case of social media questions placed at the end of the survey.

The data were collected via an anonymous online survey to which students responded during the school day under the guidance of a teacher. On average, the survey took about 27 min. Participation in the study was based on informed consent. All respondents were informed about the study and its purpose before asking for their consent, and they were told that participation is voluntary and that they can cancel their participation at any time without any consequences. The participants' parents were also informed about the study and were given an opportunity to deny their child's participation in the study. The study was subjected to an ethical pre-assessment before it was conducted.

6.1.2 | Measures

Youth victimization experiences were measured with four variables included in the FSRD surveys. *Victimization to online sexual harassment* was based on a screening question asking respondents to indicate whether they had been a victim of a crime on the internet in the past 12 months. Respondents who reported having been a victim of a crime were then asked a follow-up question about what kind of crime they fell victim to. The options for the follow-up question included defamation, illegal threat, identity theft, fraud, sexual harassment, and other crime (respondents could choose more than one option). This measure of cybercrime victimization has been applied to FSRD surveys from the previous international research literature (e.g., Keipi et al., 2017). A dichotomous variable was coded based on this information, indicating whether the respondent had experienced online sexual harassment. *Victimization to other cybercrime* was measured with a dichotomous variable indicating whether the respondent had experienced some sort of cybercrime but not sexual harassment (0 = no, 1 = yes). *Sexual victimization by adults* was measured with a survey question concerning whether the respondent had experienced sexual harassment or had been involved in sexual activities with an adult or a person at least 5 years older than them in the last 12 months. This measurement is in line with earlier items on adverse childhood sexual experiences (see, e.g., Reavis et al., 2013). A dichotomous variable was coded to indicate whether the respondent had been exposed to sexual harassment or involved in sexual activity by an adult (0 = no, 1 = yes). *Sexual victimization by peers* was measured with a survey question asking whether another adolescent had subjected the respondent to sexual harassment or violence in the last 12 months. A dichotomous variable was coded to indicate whether the respondent had experienced sexual harassment by another adolescent. It

should be noted here that victimization to sexual harassment by another adolescent or adult is not limited to the online environment.

ODA use was measured with a survey question asking the respondents how often they used ODAs such as Tinder. The response categories included the following: *I don't use* (0), *sometimes* (1), *daily* (2), and *several times a day* (3). A dichotomous variable indicating whether the respondent used ODAs at least sometimes (0 = no, 1 = yes) was coded based on this information.

Risky online activities were measured with three questions adapted from the EU Kids Online survey (see Lobe et al., 2011). These items concern how often the respondents did the following activities on the Internet: pretended to be a different kind of person on the internet from what they really are, sent personal information to someone they have never met face-to-face, and looked for new friends on the internet. A similar measurement approach has been utilized in earlier research on youth online risk behavior (see, e.g., Notten & Nikken, 2016). The response options ranged from 0 (*never*) to 4 (*very often*). The Cronbach's alpha coefficient for the scale was .66, which can be considered acceptable (Taber, 2018).

Offline risk behavior was measured as alcohol and drug use. Respondents were asked whether they had consumed an amount of alcohol in the past year that made them feel drunk. A dichotomous variable was coded to indicate whether the respondent had been drunk in the past 12 months. For drug use, the respondents were asked if they had used (a) marijuana or hashish and (b) any other drugs within the past year. A dichotomous variable was coded indicating whether the respondent had used some type of drug in the past 12 months.

Peer delinquency was measured with three items in which the respondents were asked to indicate how many of their friends had (a) used marijuana or hashish; (b) stolen from a store or kiosk; and (c) participated in a fight in a public place. The response options were *none of my friends* (0), *one of my friends* (1), and *several of my friends* (2). The scale had a good internal consistency with a Cronbach's alpha coefficient of .79.

Parental control was evaluated with a measure developed by Stattin and Kerr (2000). The scale consists of six items concerning perceived parental monitoring (e.g., "Must you have your parents' permission before you go out during the weeknights?" and "If you go out on a Saturday evening, must you inform your parents beforehand about who will be going along as well as where you will be going?") with response options ranging from 0 (*never*) to 4 (*always*). The scale had very good internal consistency with a Cronbach's alpha coefficient of .87.

Low self-control was measured with the International Self-Reported Delinquency study version (Marshall & Enzmann, 2012) of the Grasmick Self-Control Scale (self-centered orientation, Grasmick et al., 1993; Walters, 2016). It consists of nine items relating to the dimensions of impulsivity (e.g., "I often act on the spur of the moment without stopping to think"), risk-seeking (e.g., "Sometimes I will take a risk just for the fun of it"), and self-centered orientation (e.g., "I try to look out for myself first, even if it means making things difficult for other people"). The response options are *disagree completely*, *somewhat disagree*, *somewhat agree*, and

agree completely. The scale had very good internal consistency with a Cronbach's alpha coefficient of .84.

In addition, our models controlled for the respondents' Instagram and instant messaging app use (*no, sometimes, daily, and several times a day*), gender (*female, male, and other*), and relationship status (0 = *not in a relationship*, 1 = *currently in a relationship*). Table 3 reports the descriptive statistics of our Study 2 variables.

6.1.3 | Statistical analysis

We analyzed the relationships between adolescents' victimization experiences and our independent variables using logistic regression

modeling. To analyze the possible indirect associations, we performed the logistic regression analyses in two steps. For each analysis, Model 1 included the use of ODA and other explanatory variables except for online risky activities. Online risky activities were then added to Model 2. With this approach, we were able to assess whether the association between ODA use and youth victimization experiences was mediated through risky online activities. We conducted the logistic regression analyses using the Karlson–Holm–Breen (KHB) method and the corresponding user-written Stata package (Kohler et al., 2011). KHB is a decomposing method that accounts for the rescaling effect related to the comparison of estimated coefficients between nested nonlinear models. It allows mediation analyses for nonlinear models by partitioning the

TABLE 3 Descriptive statistics of Study 2 variables for the total sample and separately by gender

Categorical variables	Coding	All		Females		Males		Other	
		n	%	n	%	n	%	n	%
Online sexual harassment	No	5442	96.0	2594	92.9	2717	99.3	99	90.8
	Yes	227	4.0	198	7.1	19	0.7	10	9.2
Sexual victimization by adults	No	5414	95.4	2596	92.4	2716	98.8	100	89.3
	Yes	260	4.6	214	7.6	34	1.2	12	10.7
Sexual victimization by peers	No	5159	90.9	2396	85.3	2663	96.8	99	88.4
	Yes	515	9.1	414	14.7	88	3.2	13	11.6
Other cybercrime	No	5449	96.0	2718	97.3	2597	94.9	102	92.7
	Yes	225	4.0	77	2.8	140	5.1	8	7.3
Dating app use	No	4951	90.0	2511	91.2	2359	89.2	81	77.9
	Yes	550	10.0	241	8.8	286	10.8	23	22.1
Been drunk	No	3535	62.3	1767	62.9	1699	61.8	69	61.6
	Yes	2139	37.7	1044	37.1	1052	38.2	43	38.4
Drug use	No	5228	92.1	2638	93.9	2498	90.8	92	82.1
	Yes	446	7.9	173	6.2	253	9.2	20	17.9
In a relationship	No	4440	79.4	2165	77.7	2198	81.4	77	72.6
	Yes	1151	20.6	621	22.3	501	18.6	29	27.4
Gender (ref. female)	Female	2811	49.5	-	-	-	-	-	-
Male	Male	2751	48.5	-	-	-	-	-	-
Other	Other	112	2.0	-	-	-	-	-	-
Continuous variables	Range	M	SD	M	SD	M	SD	M	SD
Online risk routines	0–12	2.11	2.09	2.12	1.90	2.06	2.22	3.16	2.95
Peer delinquency	0–6	1.83	1.83	1.62	1.91	2.03	2.05	2.09	2.25
Parental control	0–24	12.47	6.16	13.99	5.80	11.02	6.09	9.70	7.32
Low self-control	0–27	9.84	5.16	9.30	5.00	10.38	5.21	10.58	6.40
Instagram use	0–3	2.22	0.93	2.46	0.77	1.99	1.01	1.86	1.16
Instant messaging use	0–3	2.63	0.66	2.75	0.55	2.52	0.73	2.29	0.97
n			5674		2811		2751		112

total effect of an independent variable into direct and indirect (via a mediator variable) effects similarly to linear models (Kohler et al., 2011; Sobel, 1982).

We conducted the logistic regression models separately for our dependent variables: victimization to online sexual harassment, sexual victimization by adults, sexual victimization by adolescents, and victimization to cybercrime other than sexual harassment. For these models, we report odds ratios and their statistical significance (Table 4). For our mediation analyses, we report odds ratios with corresponding statistical significance and average partial effects (APEs) for the total effect and direct and indirect effects (Table 5). APEs indicate the change in the probability of a given victimization experience in terms of a one-unit increase in the dependent variable. The standard errors of all our models were estimated as robust Huber-White errors that account for the within-schools clustered data structure.

6.2 | Results

Descriptive analyses (Table 3) showed that 10% of adolescents in our sample used ODA at least sometimes. The most prevalent victimization experience was sexual victimization by peers with 9% of respondents reporting such experience within the past 12 months. Five percent of respondents had experienced sexual victimization by an

adult, and 4% reported being a victim of online sexual harassment or cybercrime other than sexual harassment in the past 12 months.

Victimization to online sexual harassment was significantly associated with ODA use (OR = 1.75, $p = .013$) in Model 1, but this association was no longer significant after adding risky online activities in Model 2 (OR = 1.12, $p = .609$; Table 4). This indicates that there was no significant direct association between ODA use and online sexual harassment victimization. Risky online activities were positively associated with the risk of victimization to online sexual harassment (OR = 1.26, $p < .001$). According to our mediation analyses, there was a significant indirect effect between ODA use and victimization to online sexual harassment via risky online routines (OR = 1.56, $p < .001$; Table 5). Due to this indirect association, the risk of online sexual harassment victimization was 2% higher for younger ODA users than for other adolescents (APE = .019).

Of our control variables, peer delinquency (OR = 1.25, $p < .001$), being in a relationship (OR = 1.81, $p = .002$), and parental control (OR = 1.04, $p = .002$) were positively associated with the likelihood of online sexual harassment victimization. In addition, the odds for victimization were substantially larger for females (OR = 12.68, $p < .001$) and those identifying as other gender (OR = 12.67, $p < .001$) than for males.

Sexual victimization by adults was significantly associated with ODA use in Model 1 (OR = 1.47, $p = .024$) but not in Model 2 (OR = 1.13, $p = .521$), indicating that there was no direct relationship

TABLE 4 Logistic regression models predicting adolescents' victimization experiences

	Online sexual harassment		Sexual victimization by adults		Sexual victimization by peers		Other cybercrime	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
	OR	OR	OR	OR	OR	OR	OR	OR
Been drunk	1.12	1.11	2.01***	2.00***	2.04***	2.03***	1.45*	1.44*
Drug use	1.43	1.44	1.92***	1.92***	1.50*	1.50*	1.46	1.46
Peer delinquency	1.27***	1.25***	1.26***	1.24***	1.26***	1.24***	1.23***	1.22***
In a relationship	1.85**	1.81**	1.03	1.02	1.40**	1.38**	0.90	0.89
Parental Control	1.04**	1.04**	0.98	0.98	1.02*	1.02*	1.02	1.02
Low self-control	1.02	1.00	1.01	1.00	1.04**	1.02*	1.04**	1.04**
Instagram use	1.06	1.01	1.02	0.99	1.05	1.02	0.91	0.89
Instant messaging use	1.09	1.11	0.80	0.80	1.01	1.03	1.03	1.04
Gender (ref. male)								
Female	13.03***	12.68***	9.56***	9.41***	7.01***	6.86***	0.57***	0.57***
Other	15.56***	12.67***	9.24***	8.19***	4.30***	3.67***	1.16	1.05
Dating app use	1.75*	1.12	1.47*	1.13	1.44*	1.02	2.31***	1.86***
Risky online routines	.	1.26***	.	1.15***	.	1.20***	.	1.12***
Constant	0.00***	0.00***	0.01***	0.01***	0.00***	0.00***	0.01***	0.01***

Abbreviations: OR, odds ratio; ref., reference category.

*Significant with $< .05$ level.

**Significant with $< .01$ level.

***Significant with $< .001$ level.

TABLE 5 Decomposed indirect effects of dating application use on victimization experiences via social media risk routines

	Online sexual harassment			Sexual victimization by adults			Sexual victimization by peers			Other cybercrime		
	OR	<i>p</i>	APE	OR	<i>p</i>	APE	OR	<i>p</i>	APE	OR	<i>p</i>	APE
Total effect	1.75	.013	.023	1.47	.024	.016	1.44	.014	.027	2.31	<.001	.037
Direct effect	1.12	.609	.004	1.13	.521	.004	1.02	.909	.001	1.86	<.001	.026
Indirect effect	1.56	<.001	.019	1.30	<.001	.012	1.41	<.001	.026	1.24	<.001	.012

Abbreviations: APE, average partial effect; OR, odds ratio.

between ODA use and sexual victimization by adults (Table 4). Risky online activities were positively associated with the probability of sexual victimization by adults (OR = 1.15, $p < .001$). There was a significant indirect association between ODA use and sexual victimization by adults via risky online activities (OR = 1.30, $p < .001$; Table 5). Due to this indirect effect, the risk of sexual victimization by adults was 1% unit higher for ODA users than for others (APE = .012).

The likelihood of sexual victimization by adults was also more likely among adolescents who had been drunk (OR = 2.00 = 1.30, $p < .001$) or used drugs (OR = 1.92, $p < .001$) during the past 12 months, as well as among those who had a high amount of associations with delinquent peers (OR = 1.24, $p < .001$). Sexual victimization by adults was substantially more likely among females (OR = 9.41, $p < .001$) and adolescents identifying as other gender (OR = 8.19, $p < .001$) than among males.

Sexual victimization by peers was positively associated with ODA use in Model 1 (OR = 1.44, $p = .014$), but this direct association did not remain after the risky online activities were added into Model 2 (OR = 1.02, $p = .909$; Table 4). Risky online activities were positively associated with the likelihood of sexual victimization by peers (OR = 1.20, $p < .001$). According to our mediation analysis, online risky routines significantly mediated the indirect association between ODA use and sexual victimization by peers (OR = 1.41, $p < .001$). Due to this indirect association, the risk of sexual victimization by peers was 3% units higher among those who used ODA than among other adolescents (APE = .026).

Of our control variables, being drunk (OR = 2.03, $p < .001$) and drug use (OR = 1.50, $p = .023$), delinquent peer associations (OR = 1.24, $p < .001$), being in a relationship (OR = 1.38, $p = .009$), high parental control (OR = 1.02, $p = .013$), and low self-control (OR = 1.02, $p = .045$) were all positively associated with the likelihood of sexual victimization by peers. Sexual victimization by peers was also more likely among females (OR = 6.86, $p < .001$) and individuals identifying as other gender (OR = 3.67, $p < .001$) than among males.

Victimization to cybercrime other than sexual harassment was positively associated with ODA use in Model 1 (OR = 2.31, $p < .001$) and Model 2 (OR = 1.86, $p < .001$). This means that the direct association between ODA use and victimization to other cybercrime remained after including risky online activities into the model. Due to this direct association, the probability of victimization to other cybercrime was 3% units higher for ODA users than for other adolescents (APE = .026; Table 5). Risky online activities were also positively

associated with other cybercrime victimization (OR = 1.12, $p < .001$). The indirect association between ODA use and victimization to other cybercrime via risky online activities was also significant (OR = 1.24, $p < .001$). Due to this indirect association, the probability of victimization to other cybercrime was 1% unit higher for ODA users than for other adolescents (APE = .012).

The likelihood of *victimization to other cybercrime* was also associated with being drunk during the past 12 months (OR = 1.44, $p = .031$), delinquent peer associations (OR = 1.22, $p < .001$), and low self-control (OR = 1.03, $p = .006$). Victimization to other cybercrime was less likely among females (OR = 0.57, $p < .001$) than males.

6.3 | Discussion

In Study 2, we found that the most prevalent victimization experience was sexual victimization by peers. The second most prevalent was sexual victimization by adults, followed by victimization to online sexual harassment and to other cybercrime. The cybercrime prevalence rates are in line with the earlier international research literature on cybercrime victimization among adolescents and young adults (Keipi et al., 2017; Mikkola et al., 2020). We also found that ODA use was associated with more likely sexual harassment victimization, sexual victimization both by adolescents and peers, and cybercrime victimization, and that this relationship is driven by risky online activities. Thus, our findings support our first and second hypotheses. However, in the case of the first hypothesis, it should be noted that the use of ODA was directly related only to the victimization of cybercrime other than sexual harassment.

These indirect effects between ODA use and the likelihood of victimization are of relevant size given the low prevalence of studied victimization experiences. For example, the prevalence of online sexual harassment victimization was 4% in the studied population, but the risk of victimization was 2% higher for younger ODA users than for other adolescents. These findings are in line with earlier research suggesting that the consequences of online dating for adolescents are largely determined by how adolescents manage their online communication and information sharing (Sánchez et al., 2015). Only for cybercrime victimization, the relationship between ODA use and victimization remained after controlling for these risky online activities. This suggests that on top of risky information and communication management, there are other mechanisms in play, making ODA use risky for young people.

7 | GENERAL DISCUSSION

Based on the LET and using large cross-national samples of adolescents from the United States, Finland, Spain, and South Korea, this study examined the risks involved in adolescents' use of ODA and the mechanism linking ODA use to various victimization experiences. According to LET, ODA use among adolescents reflects a risky online lifestyle and activities that expose young users to potential offenders. However, previous studies have not elaborated on this mechanism. This was the first study to utilize large cross-national datasets to examine ODA use and victimization experiences among adolescents. In Study 1, we examined whether ODA use was associated with more likely online harassment, using large cross-national datasets from four nations. Study 2 analyzed the associations between ODA use and victimization to online sexual harassment, sexual victimization by adults and peers, and victimization to cybercrime other than sexual harassment, using a wide nationally representative delinquency survey of Finnish adolescents. In addition, this study analyzed whether risky online activities in communication and information management mediated the relationship between ODA use and victimization.

The results showed systematically that ODA use was related to a higher likelihood of victimization experiences. These findings are in line with previous research reporting that a variety of antisocial behaviors exist on ODAs (Castro & Barrada, 2020) and that online-based dating exposes adolescents to various forms of abuse (Caridade et al., 2019; Stonard et al., 2014). Young ODA users have reported they encounter sexual harassment, such as unwanted and insulting sexual messages and aggressive sexual invitations and threats on ODA (Thompson, 2018), but other forms of antisocial behavior such as discriminatory and racist communication and harassment exist as well (Lauckner et al., 2019; March et al., 2020). ODA use was also associated with more likely sexual victimization both by adults and peers. This suggests that ODAs are risky environments that expose adolescents to various types of offenders. These offenders can be other adolescents or adult ODA users interested in sexual communication or activities with minors. Our study did not differentiate whether the reported sexual victimization has taken place on- or offline. Thus, future studies should further elaborate on the extent to which ODA use leads to victimization in offline environments.

According to our mediation analyses, the relationship between ODA use and sexual victimization was accounted for by the fact that ODA users engage in more risky communication and information-sharing management activities (e.g., share personal information with someone they have never met face-to-face). Earlier research has reported that youth who engage in similar risky activities are more likely to be victimized by cyberbullying (Choi et al., 2019) and to meet their online acquaintances offline (Lobe et al., 2011). This is in line with LET, which states that the probability of crime victimization reflects the level of exposure to potential offenders in unsafe environments (Hindelang et al., 1978).

According to our results, ODAs are indeed risky environments for adolescents, and adolescents' risky behavior on these online platforms makes them more vulnerable to sexual victimization. When including risky online activities in the analyses, online lifestyle involving the use of ODA was not directly related to increased risk of sexual victimization. This conclusion is in line with earlier research findings suggesting that certain activities increase the risk of crime victimization (Engström, 2020) and that risky online activities predict youth victimization experiences (Choi et al., 2019). However, risky online activities in communication and information management did not fully explain the relationship between ODA use and victimization to other types of cybercrime. This indicates that other risky activities such as aggressive behavior or cyber delinquency should be considered.

Our analyses also revealed other risk factors for adolescents' victimization experiences. Online harassment victimization was more likely experienced among individuals who are most active in uploading pictures to social media and those who engage in aggressive behavior online. These results are in line with earlier research suggesting that the most active social media users and those engaging in online deviance are also more exposed to interpersonal abuse online (e.g., Reyns, 2018). In Study 2, the likelihood of all studied sexual victimization experiences was positively associated with the number of delinquent peer associations one has, which is in line with earlier studies, indicating that delinquent peers are a robust risk factor for youth victimization (Engström, 2020). A perhaps surprising finding was that parental control was not associated with adolescents' cybercrime victimization and sexual victimization by adults, and it was positively associated with more likely victimization to online sexual harassment and sexual victimization. This indicates that high parental monitoring may not be effective or could be even counterproductive in the case of some risks related to online behavior and peer relationships.

Our results on the role of gender in adolescents' victimization experiences were mixed. In Study 2, female gender and identification as other gender were associated with more likely sexual victimization, whereas males were more likely than females to experience other cybercrimes. These findings support earlier research findings reporting that online sexual victimization is more prevalent among females and sexual minorities and that males are more likely to encounter online aggression (Castro & Barrada, 2020; Erdur-Baker, 2010; Holt et al., 2016). In Study 1, however, online harassment victimization was more prevalent among females than males. In addition, the risks involved in ODA use were not dependent on gender.

Our analyses are limited by the cross-sectional design of the studies and self-reported data. In addition, we were unable to address the potential issues related to shared method variance and the problem of reversed or reciprocal causality with the current research design. Thus, we were unable to analyze causal relations between ODA use and adolescents' victimization experiences. The direction or the estimated relationships and studied mediation mechanisms, as well as their interpretation, are based on our theoretical framework.

Another limitation relates to the used measures because the operationalization of the victimization experiences was mainly based on broad single-item measures, and the reliability of some of the used scales (i.e., risky online behavior) was only acceptable. A more concrete measurement of victimization experiences and more reliable scales would have reduced the amount of measurement error and probably enabled us to observe stronger effects. The strengths of the data lie in the large cross-national surveys from three continents that provide new information about ODA use among adolescents and the risks involved.

8 | CONCLUSION

ODAs have become an increasingly important part of youths' online lifestyles as they are extensively used in forming and maintaining romantic relationships. Thus, it is important to acknowledge the risks and protective factors related to the use of this technology. This study has provided a novel perspective on the risk factors by elaborating the mechanism that links ODA use to different victimization experiences using large cross-national datasets. Based on the results, studied victimization experiences are more common among young people using ODA, and this connection is mediated through risky online routines. Adolescents' unsafe activities in communication and information management online seem to make them more vulnerable to the risks related to ODA use and sexual victimization.

ODAs and online relationship formation practices have a significant cultural impact on the interpersonal risks that young people currently face. It is worth noting, however, that ODA users are also more vulnerable to nonsexual cybercrime, which underlines the importance of the overall security of these online platforms. Our results imply that certain attention should be paid to the risks ODA poses to vulnerable groups, such as young people, with insufficient skills to regulate their social relationships online. Moreover, educating children and adolescents about safe online behavior, such as digital privacy control, would be necessary to minimize and prevent further risks and harms.

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

DATA AVAILABILITY STATEMENT

The Finnish data used in Study 1 is fully available via the Finnish Social Science Data Archive: Oksanen, Atte (University of Tampere) & Sirola, Anu (University of Tampere) & Kaakinen, Markus (University of Tampere): YouGamble 2017 Finland [dataset]. Yhteiskuntatieteellinen tietoaarkisto [distributor] <http://urn.fi/urn:nbn:fi:fsd:T-FSD3399>. All data used in Study 1 and Study 2 will be made fully

available via the Finnish Social Science Data Archive in 2021–2022. Before that, data will be available on reasonable request.

ETHICAL APPROVAL

Approval was obtained from the the Academic Ethics Committee of the Tampere Region (Study 1) and the University of Helsinki Ethical Review Board in the Humanities and Social and Behavioural Sciences (Study 2). The procedures used in this study adhere to the tenets of the Declaration of Helsinki. Informed consent was obtained from all individual participants included in the study.

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