



Research article

What awareness variables are associated with motivation for changing risky behaviors to prevent recurring victims of cyberbullying?



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ABSTRACT

The detrimental consequences for victims of cyberbullying is becoming a major public health problem in many countries. However, it is a possibility that such victims will experience repeated cyberbullying in future. Therefore, a sustainable, long-term solution is to train victims to prevent cyberbullying and cope effectively with future situations. This aim of this study was to further our understanding of the factors involved in both raising awareness and increasing motivation in relation to the process of changing risky social media behaviors in order to reduce future incidences of cyberbullying. The study was conducted with a group of 541 late adolescents, who studied at university level and were victims of cyberbullying, and 397 parents. Data was collected using online questionnaires, which were designed according to I-Change Model (ICM) theory, and statistically analyzed to determine the presence of a causal relationship using Structural Equation Modeling (SEM). The results of this study showed that family communication, loneliness, perceived susceptibility, and message and channel type had direct influences on victims' awareness of risky behaviors. Based on parental views, the channel had a direct influence on the awareness of victims and this, in turn, had a direct influence on motivation for enacting changes in health behavior (including both psychological and physical health). It was also found that motivation for improving psychological health has a strong influence on physical health. The study results were consistent for both victims and parents. Therefore, in future, issues that should be prioritized and acted upon include promoting cooperation between victims, parents, schools, and mental health professionals in order to train and educate victims and develop an intervention program that takes into account family and personal relationships. These actions may reduce behaviors among adolescents that put them at risk of being ongoing victims of cyberbullying.

1. Introduction

Social media consists of channels that permit communication between messengers and recipients through online activities in both active forms (e.g., writing private messages, status updating, sharing posts) and passive forms (e.g., viewing photos, reading friends' conversations) (Deters and Mehl, 2013). Social media is extremely popular, especially among teenagers, who spend the majority of their time engaged in social media activities (Durak, 2018) such as sharing information about their interests (Oeldorf-Hirsch and Sundar, 2015), posting statuses, and presenting themselves online to meet their own psychological needs (Deters and Mehl, 2013) (Yang and Ying, 2020). While the use of social media is beneficial for communication, it also has some problematic features that negatively impact upon adolescents. Sun and Zhang (2020) reviewed the issue of social media addiction and found that it leads to a reduction in

social relationships, which affects both health and lifestyle. Interestingly, it has also been found that social media addiction could put users at risk of cyberbullying (Jain and Agrawal, 2020).

Cyberbullying among teenagers is one of the negative outcomes of social media use. This phenomenon has become an increasing concern among scholars, parents and educators, due to the speed at which young people are adopting new technologies (Yıldız-Durak and Seferoğlu, 2018). In particular, initiating online communication can also increase an individual's probability of becoming a victim (Navarro et al., 2013). However, there are also studies identifying the negative impact and suffering of victims of cyberbullying. For example, Kim et al. (2018) reported that cyberbullying in men has a strong correlation with both emotions and behavior. This is consistent with a study by Yubero et al. (2021), which reported that chronic bullying victims had the lowest level of subjective well-being when comparing emotional, social and

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subjective well-being in a cohort of 1122 university students in central Spain. In Tokunaga (2010) study of youths in the United States, it is explained that victims are emotionally affected by cyberbullying, and they also experience psychosocial effects and academic problems. In terms of health effects, a positive association between cyberbullying and depression and anxiety has been reported in victims (Chu et al., 2018) (Gómez-Guadix et al., 2015). It has also been found that there are positive associations with higher rates of risky health behaviors such as alcohol and substance use and sexual frequency (Graham and Wood, 2019) (Kim et al., 2019).

In terms of research into the negative effects on victims, many previous studies have attempted to determine the underlying causes of cyberbullying. These causes may be divided into three groups, with the first being social media behavior. Jain and Agrawal (2020) explain that the disclosure of personal information (self-disclosure) results in social media addiction, which leads to increased risk of becoming a victim of cyberbullying. The is consistent with a study from Won and Seo (2017), which discusses the way that active self-disclosure affects the victim experience. The second group of underlying causes is related to personal psychology (i.e., the psychological group). Previous research has discussed the effects of hopelessness and low self-esteem on adolescents (Chu et al., 2018) (Martínez-Monteagudo et al., 2020). These features are the mediators of the relationship between cyberbullying victimization and mental health issues (e.g., depression and anxiety). In addition, university students with low levels of self-compassion are more severely affected by victimization (Chu et al., 2018; Ho et al., 2021). Zeng et al., (2020), Martínez-Monteagudo et al. (2020) reported that training teenagers and university students in self-compassion reduced their likelihood of experiencing cyberbullying, as did their levels of personal, emotional, and social adaptation. Thirdly, it is the environment and a vast amount of previous research has focused on describing family-level variables related to overall family features that influence internet victimization. Indeed, parenting style (indulgent parenting is characterized by reasoning and warmth practices) (Martínez et al., 2019), and communication with parents indicate the presence of warmth and positive relationships within the family (Romero-Abrio et al., 2019) (Elsaesser et al., 2017) (Larrañaga et al., 2016). In turn, poor family relationships and family conflict are both risk factors for victimization (Buelga et al., 2017) (Martínez-Monteagudo et al., 2019) (Boniel-Nissim and Sasson, 2018). The school environment, both at the level of the student and the school is also linked to bullying among students (Bevilacqua et al., 2017).

Several studies have been conducted to identify the variables that are associated with individuals experiencing cyberbullying situations, and to study the effects of cyberbullying on the mental and behavioral health of the victims. However, limitations have been observed in terms of elucidating the behavior modification process of the victim. In practice, the process of personal behavior modification involves cognition, including awareness, motivation, and behavior, as is proposed by the I-change Model (ICM) theory (De Vries, 2017). ICM is a popular theory that has been applied to various health behavior modification processes, such as exercise motivation (Kasten et al., 2019) (Moreau et al., 2015), motivation for quitting smoking (Smit et al., 2018) (Smit et al., 2013), prenatal alcohol use (van der Wulp et al., 2015), and preventing dating violence (Murta et al., 2020). ICM has also been applied to the design and development of health recommender system for a smoking cessation support clinical trial (Hors-Fraile et al., 2019). However, there have been no studies thus far using ICM theories to explain the behavior modification process of cyberbullying victims. Additionally, there have only been a limited number of studies examining the factors involved in dealing with future victimization situations. Indeed, most studies have focused on developing cognitive behavioral therapy-based psycho-educational programs for victims to cope with cyberbullying (Chillemi et al., 2020).

Therefore, this study aimed to better understand the factors that are involved in the motivation driving the health risk behavior modification process in victims of cyberbullying. The goal of this understanding is to

support victims to enhance their self-defense skills and to cope with similar situations that may arise in the future. Insights were obtained from both youths and parents in order to gain an understanding from multiple perspectives. Understanding the relevance of these motivational factors is important as it will be beneficial for victims in terms of both coping with and reducing the effects of cyberbullying. It will also support the design of behavioral intervention programs to reduce the incidence of cyberbullying victimization. The research questions that were raised based on these objectives are as follows:

- 1) Do family environmental factors influence awareness factors in potential future victims of social media cyberbullying?
- 2) Does information related to advice and strategies for coping with cyberbullying situations influence awareness in potential future victims of cyberbullying on social media?
- 3) Do personal factors influence awareness in potential future victims of social media cyberbullying?
- 4) In terms of coping with potential cyberbullying situations in the future, do awareness factors influence motivation regarding mental health care and positive health behaviors?

This paper comprises 9 parts in total. Part 2 presents a literature review, the theoretical framework of cyberbullying, and the ICM. Part 3 presents information regarding the research model used and the formulation of hypotheses in this study. Part 4 outlines the research method, including the tools used for measuring and evaluating results, and the results are presented in Part 5. Part 6 comprises a discussion of the research results and implications for practice, while the research limitations and directions for future research are presented in parts 7 and 8, respectively. Finally, Part 9 offers an overall summary of the research results.

2. Literature and theoretical framework

With the increasing popularity of the internet in recent years, communication has become much more convenient, especially via social media (SM). According to the statistics regarding global social media usage in 2020, Facebook is the most popular SM channel, with 2.449 billion users (Kemp, 2020). From the perspective of marketers, social media users represent more than half of the world's adult population aged from 18 to 34 (Kemp, 2020). As a result, large amounts of data are generated by SM users. On the other hand, this rise in popularity has been accompanied by certain negative effects; one particular negative outcome is cyberbullying, which has become a public health problem in many countries (Xu et al., 2012).

2.1. Cyberbullying victims

Cyberbullying is a form of aggressive and intentional action against a victim through electronic communication (Smith et al., 2008). The nature of cyberbullying is similar to traditional bullying (Tokunaga, 2010), but the effects are even more damaging to victims (Aoyama et al., 2011). Over the years, the prevalence of cyberbullying among children and young people has increased. Kowalski and Limber (2007) studied 3,767 middle school children in the United States who had experienced at least one incident of cyberbullying in the previous two months. Problematically, cyberbullying can be anonymous, and it is easy for the perpetrators to connect with their victims throughout the day. As has been seen with regard to the COVID-19 pandemic, students and learners need to use SM as a communication tool in order to support both online learning and online community building (Sobaih et al., 2020). However, this increased use of social media may motivate cyberbullying perpetrators as they have greater opportunity to bully their victims. This factor will likely lead to an increase in frequency of cyberbullying.

Research in the past has sought to examine the negative effects of cyberbullying on victims. Indeed, there is evidence to suggest that the

negative effects include behavioral problems such as aggression (Fisher et al., 2016), health risk behaviors such as alcohol use, substance use, and sexual frequency (Graham and Wood, 2019) (Kim et al., 2019), lower academic performance, and lower life satisfaction (Okumu et al., 2020) (Chai et al., 2020). Issues that have received a great deal of attention include emotional and mental health problems, including psychological insecurity, anger, anxiety, and depression (Chu et al., 2018; Niu et al., 2020) (Ho et al., 2020) (Gámez-Guadix et al., 2015). In particularly serious situations, the effect on emotional and mental health could increase the risk of suicide. In particular, victims with lower emotional intelligence (EI) tend to have a higher number of suicidal thoughts (Extremera et al., 2018) (Hinduja and Patchin, 2019) (Bai et al., 2021). All together, these results indicate that cyberbullying causes many types of suffering and negative consequences for victims. Van Royen et al. (2015) suggest that it is important to monitor the ongoing effects of cyberbullying after discovering its existence, as well as to develop strategies to prevent future incidents of bullying. The satisfaction of adolescents and their parents with the developed strategies should also be studied. Therefore, this paper examines the factors involved in becoming a recurring victim of cyberbullying. In particular, the factors with more severe consequences are highlighted. Certainly, it is important to focus on ways to both prevent and address the future risk facing victims of cyberbullying.

2.2. Behavioral factors that influence the likelihood of being a cyberbullying victim

For the teenagers of today, growing up in a digital society has made technology and social media more influential in their daily lives, and has also increased their chances of being victims of cyberbullying. Experiencing cyberbullying has been linked to a number of factors. The impulse factor is the most influential factor for predicting cyberbullying (Song

and Song, 2021). Particularly among university students who are separated from their families to study, social media may be used more actively to help reduce loneliness (Deters and Mehl, 2013). There is some evidence that spending time on the internet or social media may increase the risk of becoming a victim of cyberbullying and experiencing mental health problems, and the situation may become even more serious when users disclose large amounts of personal information via social media (Jain and Agrawal, 2020) (Won and Seo, 2017). There are also studies showing a link between the risk of being a victim of cyberbullying and psychological factors, including hopelessness, low self-esteem, and low self-compassion (Yubero et al., 2017) (Chu et al., 2018) (Ho et al., 2021). Social and family environments also play an important role in the risk of social media users becoming victims of cyberbullying. For example, a study suggested that having good friendship closeness can prevent individuals being potential victims of cyberbullying and wrongdoing (See Table 1) (Leung et al., 2018). Therefore, it is imperative to investigate impulse factors that may increase the risk of cyberbullying. It is important that action be taken to reduce user impulse and prevent the individual becoming a victim of cybercrime, which may then repeat in future.

Based on this, there is a vast amount of evidence indicating that social media, alongside personal, behavior, and environmental factors, can motivate users to behave in a way that increases the probability that they will become victims of cyberbullying. As mentioned previously, this cyberbullying can then lead to a number of negative effects on the victim in terms of psychological and physical health, and academic performance. Previous studies have mainly focused on the specific behaviors that play a role in vulnerability to cyberbullying. However, in practice, the effects of cyberbullying on physical and mental health are linked to the factors that are involved in the individual's behavior modification process. Therefore, the development of education, self-defense and risk-behavior modification for handling future victim situations should also consider the factors involved in the behavior modification process in an

Table 1. An overview of studies that present factors influencing the victim of cyberbullying.

Authors, Year	Sample	Input (Factors)			Output (Effects of victims)				
		Use of social media behavior	Psychological	Environment	Social media addiction	Depression/ Mental health	Experience of cyberbullying	Academic performance	Protect
Zhong et al. (2021) Wang (2021)	Wuhan residents, Adolescents	/			/				
Jain and Agrawal (2020)	Social media users (age group of 15–25 years)	/			/				
Won and Seo (2017)	Undergraduate Student (public university)	/					/		
Chu et al. (2018); Ho et al. (2021)	Early adolescents and Vietnamese university students		/			/			
Yubero et al. (2017) Martínez-Monteagudo et al. (2020)	Undergraduate Students (Spanish university)		/				/		
Romero-Abrio et al. (2019)	Adolescents (aged between 11 and 16 years old)			/		/			
Martínez-Monteagudo et al. (2019)	Spanish university students (public and private universities of the Valencia community)		/	/			/		
Ho et al. (2020)	Vietnamese university students			/		/			
Strom et al. (2013)	Adolescents (aged between 15 and 16 years old)			/				/	
Leung et al. (2018)	Hong Kong Chinese college students (aged 18–25 years old)			/					/

attempt to modify the users' risk behavior and reduce the severity of the impact as far as possible.

2.3. I-Change Model

Online health behavior interventions are considered a sustainable treatment strategy for cyberbullying victims. For the purpose of addressing behavioral issues to ensure optimal health and well-being (Maher et al., 2014), health behavior is presented differently according to the context of the social group (Conner, 2010). A large number of theories exist that attempt to explain the cognitive health behavior of individuals. Specifically, Protection Motivation Theory (PMT) put forward by Rogers (1975) relates to the behavioral explanation for the protection of personal risk, involving both threat appraisal (perceived severity and perceived susceptibility) and coping response (response efficacy and self-efficacy) factors. PMT theory has been applied to victims of cyberbullying, as it is predicted that increased cyberbullying victimization can be caused by risky electronic communication. In terms of PMT, it has been found that higher perceived susceptibility to cyberbullying is related to higher cyberbullying victimization (Doane et al., 2016). Wu (2020) used PMT to describe withholding behavior in cyberspace and found that appraisal and coping response had a positive relationship with attitudes towards withholding knowledge. PMT theory has also been applied to explain user behavior regarding cybercriminals, and a study observed that self-efficacy was directly related to smartphone security intentions (Verkijika, 2018). This result indicates that measures to make users more aware of security data and disclosure of personal data via SM may help to reduce the risk posed by cybercriminals and the risks of individuals becoming victims of cyberbullying. Similarly, obtaining information and advice in terms of healthcare from professionals and family members increases motivation to change health behaviors in individuals with mental health problems (Jattamart and Leelasantham, 2019). However, previous research has shown the limitations of PMT theory in terms of its inability to explain individual hedging behavior in relation to receiving and obtaining information and advice.

I-change Model (ICM) theory is popular for describing the process of human cognitive behavioral modification and includes four related factors. The first is predisposing factors, including biological factors (e.g., lifestyle), psychological factors (e.g., personality), behavioral factors, and environmental factors. The second is information factors, including the message, channel, and source type. The third is awareness factors, and the fourth is motivation factors, which is the intent to behave in a way that leads to modifications in the actual health behaviors of an individual (De Vries, 2017). ICM theory has been applied to motivation for modifying health behaviors (Kasten et al., 2019) (Moreau et al., 2015) (Smit et al., 2018) (Smit et al., 2013), preventing risky behavior (Murta et al., 2020), and developing recommendation system for a smoking cessation support clinical trial (Hors-Fraile et al., 2019). The ICM has been integrated into the optimization of intervention programs suitable for aerobic physical activity. For example, ICM was used in the development an automated, web-based intervention for promoting exercises in patients with type 2 diabetes. Using ICM, it is also possible to explore factors that have a long-term, positive impact on the acceptance of the physical activity, meaning the effectiveness of the development of the type 2 diabetes intervention at the later stages could be evaluated (Moreau et al., 2015).

In terms of the goals of ICM in large number of studies, it is clear that the aims of the early stages of ICM were to explore and explain the factors that directly and indirectly influence behavior, thus leading to the design and development of appropriate behavioral intervention programs. The next steps were to implement the interventions, and then assess their effectiveness for long-term behavioral modification. However, no studies to date have adopted ICM theory to explain the behavioral modifications in cyberbullying victims that result from the victim obtaining information and advice for self-defense, as well as the response of victims to recurring situations in future. Therefore, there is a need to investigate the

causal relationship between the factors of behavioral modification and future responses and coping. This would be useful for designing behavioral intervention programs that are able to reduce the impact of cyberbullying in a sustainable manner.

3. Research model and hypotheses formulation

Many risky health behaviors affect the victims of cyberbullying, and these have effects on both physical and mental health. One vital method for reducing the rate of cyberbullying involves modifying the person's risky behaviors. Therefore, this study will investigate the motivation variables associated with modifying risky behaviors to prevent cyberbullying re-victimization, specifically from the perspective of young people and parents. In this way, this study will consider the important factors involved in the process of changing an individual's health behavior. Furthermore, the work will be conducted based on the conceptual framework of ICM theory (De Vries, 2017). The primary goal of the study is to explore factors that influence long-term behavior modification of cyberbullying victims. The results will be useful for future longitudinal studies, such as those aiming to design and develop intervention programs, carry out a follow-up of individual behavior modification, and evaluate of the overall effectiveness of the intervention. Indeed, ICM theory can explain the relationship between factors that influence cognitive behavioral modification. According to ICM theory, we will discuss the relationship of the factors involved in the process of modifying health behavior, as shown in Figure 1.

3.1. Predisposing factors

Predisposing factors include biological factors (e.g., lifestyle), psychological factors (e.g., personality), behavioral factors, and environment factors (e.g., family and school) (De Vries, 2017) (Bevilacqua et al., 2017). Previous research has found a link between the timing and behavioral characteristics of SM use, and the individual's risk of victimization (Zhong et al., 2021) (Jain and Agrawal, 2020) (Won and Seo, 2017). In this case, these timing and behavioral factors may be related to the victim's perception of social media use (Keating et al., 2016). In addition, family characteristics, which emerge from parenting style, the communication between parents and children, and family relationships influence internet victimization (Martínez et al., 2019) (Romero-Abrio et al., 2019) (Boniel-Nissim and Sasson, 2018). Some studies suggest that parent-child communication and limiting the time that adolescents use online media may help to prevent pathological internet use (Liu et al., 2012; Sela et al., 2020). Therefore, the present study included baseline data for the respondents (including gender, age, current property characteristics, daily social media time, and most active social media platforms) and the predisposing environmental vulnerability factors in the factor of perception of family communication between parent and victim. As a result, a hypothesis was formed as follows:

H1. Family Communication (FAM) has a negative correlation with awareness of victims (AWV) in potential victims of social media cyberbullying.

3.2. Personal factors

Loneliness is defined as the subjective feeling of a disconnection in a relationship. The sub-dimensions of loneliness can be distinguished into emotional loneliness (no feeling of close attachment to others) and social loneliness (lack of quality social networks and friendships) (Buecker et al., 2020) (Gubler et al., 2021) (Landmann and Rohmann, 2021). Deters and Mehl (2013) explain that university students may use SM to help reduce their feelings of loneliness because they have to be separated from their families when attending university, and this, in turn, leads to an increased risk of becoming a victim of cyberbullying. In addition, previous studies have found that the feeling of loneliness is associated

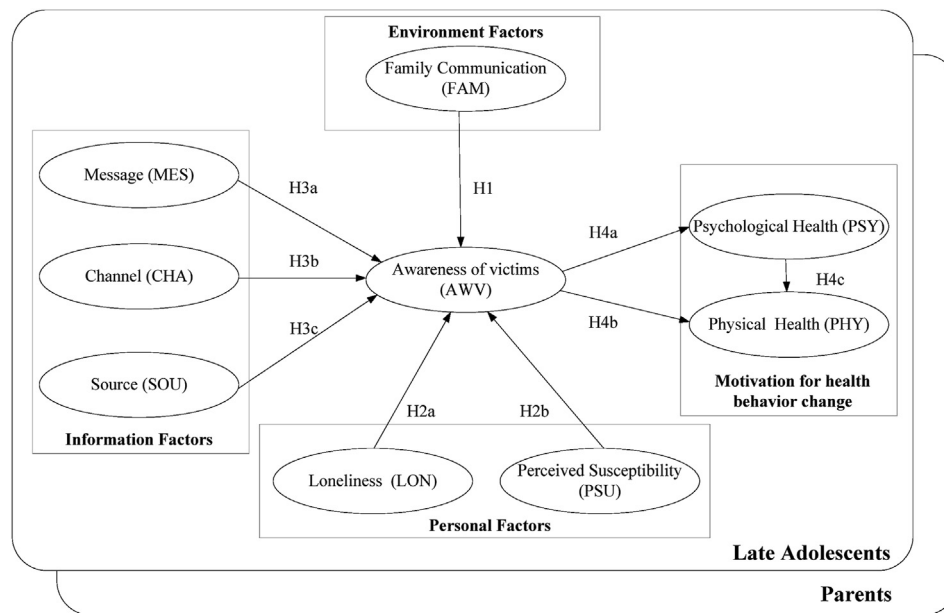


Figure 1. A proposed conceptual model for prevention recurring victims of cyberbullying.

with and mediates the relationship between emotional regulation and adolescent cyberbullying (Larrañaga et al., 2016) (Cava et al., 2020) (Jiang et al., 2020). However, contrary to this, a study by (Yubero et al., 2017) analyzed the relationship between cyberbullying victimization and social and emotional factors (including perpetration, loneliness, self-esteem, and perceived acceptance by friends) in university students, and found that loneliness was not associated with being a victim of cyberbullying. This finding demonstrates that loneliness must be studied further in terms of its relationship with cyberbullying victimization among university students.

The factor of perceived susceptibility refers to a person's belief and perception regarding their risk of illness, and it directly affects compliance with health advice (Rogers, 1975). Doane et al. (2016) study suggests that perceived susceptibility to cyberbullying victimization is related to actual cyberbullying victimization. This finding shows that the individual may exhibit self-defense behaviors against suffering or illness when they perceive that a possible risk to themselves exists. Therefore, this study examines personal factors in terms of both loneliness and perceived susceptibility, which are associated with the victim's awareness of the situation of repeated bullying in future. The hypotheses is as follows:

H2a. Loneliness (LON) has a negative correlation with AWV in potential re-victimization through social media use.

H2b. Perceived susceptibility (PSU) is positively associated with AWV in potential victims social media cyberbullying.

3.3. Information factors

Health behavior modification is influenced by an individual's perceived level of information. This perception relates to factors including the message (type and quality of content), channel (social media platform) and source (De Vries, 2017) (de Vries et al., 2005) (Jattamart and Leelasantitham, 2020). Past research reports that SM content creators and readers experience the transmission of emotional expression during communication (Lin and Utz, 2015) (Cheshin et al., 2011). In particular, obtaining reliable health information and advice from experts has a significant effect on motivation and intention to change health behaviors (Jattamart and Leelasantitham, 2019). During the COVID-19 pandemic, SM use has been useful for the public. Indeed,

informational, emotional, and peer support can be obtained from health information shared on SM (Zhong et al., 2021) (Eastin, 2001). On the other hand, if users are exposed to inaccurate information or risky content, such as content related to disordered eating, via SM, it can lead to potentially harmful behaviors towards the body and incidences of cyberbullying (Bae, 2021; Branley and Covey, 2017). Therefore, this study will discuss information factors in order to evaluate the impact of information on the development of public health interventions. These information factors include: including: 1) messages that explain how to provide information safely when using SM, to prevent and respond to recurring victim situations in the future, 2) channels that make recommendations for the appropriate use of SM for each platform and 3) sources that explain the importance of the informant and offer appropriate SM recommendations to. Therefore, the hypotheses are as follows:

H3a. Message (MES) has a positive correlation with the AWV in potential victims of social media cyberbullying.

H3b. Channel (CHA) has a positive correlation with the AWV in potential revictimization through social media use.

H3c. Source (SOU) has a positive correlation with the AWV in potential revictimization through social media use.

3.4. Awareness factors

Awareness factors describe a person's awareness of good health, as assessed by knowledge, risk perception, and cues to action (De Vries, 2017). Kasten et al. (2019) grouped the ICM theoretical factors into pre-motivational factors (knowledge, risk perceptions, and cues), motivational factors (attitudes, self-efficacy, intention, and social influences), post-motivational factors (planning), and awareness factors, which together induce motivation and drive behavior. The results of the study demonstrated that pre-motivational factors influence exercise motivation, but have no direct influence on intentions or behaviors with regard to exercise. ICM has also been applied in the development of recommender systems that send messages via mobile applications to support individuals to quit smoking (Hors-Fraile et al., 2019). Therefore, this study assesses the relationship between the awareness factors and behavior change motivation (including both psychological health and physical health) for potential victims of cyberbullying. The hypotheses are as follows:

H4a. AWV positively correlates with care motivation for psychological health (PSY), in potential victims of social media cyberbullying.

H4b. AWV positively correlates with care motivation for physical health (PHY) in relation to coping of potential victims of social media cyberbullying.

3.5. Motivation for health behavior change

Motivation is a level factor for assessing the potential positive and negative effects on health when behavior is modified. The motivation factor is based on attitude, social support, and self-efficacy (De Vries, 2017). This is particularly relevant for individuals with positive attitudes and a good social environment, both of which will help guide the motivation to modify health behaviors due to these individuals having more accurate self-assessment of positive and negative effects (Pajor et al., 2017). Therefore, this study will assess the impact of motivation for psychological health care on physical health. The hypothesis is as follows:

H4c. PSY is positively correlated with PHY in potential victims of social media cyberbullying.

4. Research method

4.1. Participants

Purposive sampling was used in this study to meet the research objectives. The sample consisted of 952 late adolescents studying at Bachelor's degree level at a university in Thailand, who were aged between 18 and 23 and were able to read and write in Thai. This study was a cross-sectional study carried out between January 2021 and March 2021. The selection of the study participants was carried out in line with the in-person research ethics (IRB) process. The researcher has participated in the Human Research Ethics Training for Social Sciences, Class 1/2020 at Mahidol University, Thailand. The study began by sending the first online questionnaire to the students in the Line group. This process was approved by an advisor who administrates and manages the Line group. The objectives of the research were clarified, including delineating measures to protect the student's confidentiality and anonymity (Majeed et al., 2020). The online contact information of the investigators and the research assistants were provided on the online participant information sheet in case the students had questions about the procedure or research. The students confirmed that they were prepared to participate voluntarily in the research by completing an online informed consent form. They then completed the online questionnaire as the next item in the online menu. Participants were able to withdraw at any time during the study. Finally, the questionnaire data will be destroyed immediately after use (Moreno et al., 2013).

After the participants had confirmed their participation in the study, the researchers set a condition for responding to the questionnaire, which was that the participants had to have experienced being a victim of cyberbullying via social media in the 6 months before the survey. If the participants had no experience of being victims of social media cyberbullying in the 6 months prior to the questionnaire, they were given information explaining that this was the end of the questionnaire and research process. This condition was set to ensure participants were able to recognize and be aware of the most common social media bullying situations, as well as to reduce the likelihood of bias in the survey responses. This ensures that the data analysis has external validity in terms of reflecting real-world situations. In the questionnaire, participants were asked to answer questions about their experiences of being a victim of cyberbullying via social media. After data collection was completed, 952 university students were identified that had experience of being victims of social media bullying, especially on Facebook, Instagram, Line, and Youtube within the last 6 month. Overall, 554 university students participated in the data collection. The university students were also

invited to send the second set of online questionnaires to their parents for them to answer. The second questionnaire clarified the objectives of the research, including measures to protect confidentiality, which were carried out in the same way as with Questionnaire 1 (late adolescents) in line with Human Research Ethics for Social Sciences procedures. Self-report measures were used for both samples.

4.2. Measurement instrument

The questionnaire was designed according to the conceptual framework of the I-Change Model (ICM) theory. The questionnaire was divided into 2 sections. Section 1 comprised the data collected from late adolescents, and this questionnaire consisted of 6 parts. Part 1 asked about general information such as gender, age, education level, current accommodation, time spent on social media per day, the most-used social media platform per day, and their social media experience over the previous 6 months. This part was adapted from Jain and Agrawal (2020). Part 2 assessed predisposing factors using 4 questions related to parent-victim communication. This part focused on protection, avoidant communication, and offensive communication models, which were adapted from the Spanish version of the parent-child communication scale (Ochoa et al. (2007) and the Parent – Adolescent Communication Scale (PACS) (Barnes and Olson, 1985) (Larrañaga et al., 2016) (Romero-Abrio et al., 2019). Part 3 focused on personal factors, and used 6 questions to assess personal characteristics including loneliness, perceived susceptibility, awareness factors when facing repeated bullying situations. Part 4 related to information factors, and used 9 questions relating to the effects of message, channel, and source type on both awareness of and ability to cope with recurring victimization on social media. Part 5 assessed awareness factors using 3 questions, which evaluated the relationship between awareness and health motivation in recurring victims of cyberbullying. Part 6 investigated motivation regarding relation to health behavior change through 7 questions that focused on evaluating the relationship between motivation and caring for psychological and physical health. Participants answered the questions using Likert scales with 5 levels ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Section 2 of the questionnaire collected information from parents. This part of the questionnaire used the same questions but asked for responses from the point of view of parents, as shown in Table 2. Cronbach's alpha was 0.888 for late adolescents' responses and 0.895 for parents' responses.

4.3. Data analysis

The causal relationship analysis of related factors was performed using the partial least squares structural equation modeling (PLS-SEM) technique in SmartPLS version 3.3.3 (Ringle et al., 2015). PLS-SEM was considered appropriate for this study because it is able to explain and predict the variance in target constructs and sub-constructs, thus allowing the theory underpinning this research to be tested. It has commonly been used to describe individual behavior, including for tourist behavior, consumer behavior, physical and mental health behavior, and intention to accept the use of mobile banking apps or technology (Majeed et al., 2020) (Marmaya et al., 2019) (Abdala et al., 2020) (Kamdjoug et al., 2021). Secondly, PLS-SEM is able to analyze the results of measurement models and structural models. Finally, the content validity and classification validity were tested with composite reliability (CR) and average variance extracted (AVE) statistics. The results of the PLS-SEM analysis are presented for both adolescent and parent data.

5. Results

5.1. Characteristics of the participants

For questionnaire set 1 (late adolescents), a total of 952 participants reported having experience of social media cyberbullying (on Facebook,

Table 2. Measurement items of the questionnaire for late adolescents.

Construct	Items	Survey Item	References
Family Communication (FAM)	FAM1	Good communication within the family reduces the likelihood of becoming a potential victim of social media use.	Adapted from Larrañaga et al. (2016) Romero-Abrio et al. (2019)
	FAM2	Talking about the stories you encounter (reducing avoiding discussing) reduces the likelihood of becoming a potential victim of social media use.	
	FAM3	Staying open to family concerns reduces the likelihood of becoming a potential victim of social media use.	
	FAM4	Rational and non-emotional communication with your family reduces your chances of becoming a potential victim of social media use.	
Loneliness (LON)	LON1	Using social media can help reduce feelings of loneliness.	Adapted from Deters and Mehl (2013)
	LON2	Using social media to reduce feelings of loneliness may increase your chances of being a repeat victim.	
	LON3	Finding activities other than using social media can reduce your feelings of loneliness and reduce your chances of being a repeat victim.	
Perceived Susceptibility (PSU)	PSU1	Engaging in social media activities may increase your chances of becoming a repeat victim.	Adapted from Doane et al. (2016) Jain and Agrawal (2020) Zhong et al. (2021)
	PSU2	Being a victim of cyberbullying is likely to be repeated.	
	PSU3	Spending too much time on social media can increase your chances of becoming a repeat victim.	
Message (MES)	MES1	Getting clear advice on how to use social media will reduce your chances of becoming a potential victim of a repeat.	Adapted from Murta et al. (2020) Jattamart and Leelasantitham (2019)
	MES2	Personalized advice will help reduce your chances of becoming a repeat victim.	
	MES3	Advice for safe social media use, such as not spending too much time on social media, not sharing personal information. It reduces the chances of becoming a potential victim of a recurring outcome.	
Channel (CHA)	CHA1	Health information shared on social media will reduce your chances of becoming a repeat victim.	Adapted from Zhong et al. (2021) Jattamart and Leelasantitham (2020)
	CHA2	Health information that is communicated through Word of mouth reduces the likelihood of becoming a potential victim of a recurring victim.	
	CHA3	The health information obtained through eHealth will help reduce the chance of becoming a potential victim of eHealth.	
Source (SOU)	SOU1	Expert advice on how to use social media will help reduce your chances of becoming a repeat victim.	Adapted from Zhong et al. (2021) Jattamart and Leelasantitham (2019)
	SOU2	Peer recommendations on social media will reduce your chances of becoming a repeat victim.	
	SOU3	Family advice on social media will help reduce your chances of becoming a repeat victim.	
Awareness of victims (AWV)	AWV1	Awareness factors in repeated victimization provide an incentive to protect against potential re-victim situations.	Adapted from Pajor et al. (2017) Walthouwer et al. (2015)
	AWV2	Awareness Factors of repeated victims provide incentives in dealing with potential repeated victim situations.	
	AWV3	Awareness Factors in re-victimization influence the motivation to prevent a recurring victim situation.	
Psychological Health (PSY)	PSY1	Being prepared for a potentially repetitive victim situation can help reduce the risk of emotional impact.	Adapted from Chu et al. (2018); Niu et al. (2020) Ho et al. (2020)
	PSY2	Being prepared to deal with a potential victim situation can help reduce your risk of depression effects.	
	PSY3	Being prepared to deal with a potential victim situation is positive for your mental health.	
	PSY4	Being prepared to deal with a potential victim situation can help you experience less serious victim effects.	
Physical Health (PHY)	PHY1	Being prepared to cope with a potential victim situation can help reduce your alcohol consumption behavior.	Adapted from Graham and Wood (2019) Kim et al. (2019)
	PHY2	Being prepared to deal with a potential victim situation will help you get enough sleep.	
	PHY3	Being prepared to deal with a repetitive victim situation can have a positive impact on the body.	

Instagram, Line and Youtube) in the 6 months prior to participation. Data was collected from 544 people. There were three participants with incomplete data, leaving a group of 541 participants who met the criteria for the data analysis process. For questionnaire set 2 (parents), a total of 462 questionnaires were answered, 397 of which were fully completed. There were 28 unqualified and 37 incomplete questionnaires. The difference between the number of adolescents and their parents may have

arisen because some adolescents did not submit the second online questionnaire to their parents. Table 3 shows the demographic characteristics of the sample. It was observed that the majority of late adolescents were female (60.4%) and aged between 18 and 23 (100.0%), living in a rented house or dorm (61.7%), spending more than 4 h a day on social media (59.1%) and social media platforms they use the most per day is Facebook (45.5%).

5.2. Assessment of measurement model

The measurement model was tested for the quality of the variables according to the principles outlined by Hair et al. (2016). The confidence of Cronbach's α for the late adolescent sample was 0.841–0.910 and for the parental sample was 0.846–0.930, with a minimum of 0.70. The composite reliability (CR) showed that each component was higher than the criterion value of 0.70, with the late adolescent sample between 0.904–0.941 and the parental sample between 0.905–0.950. The average variance extracted (AVE) evaluation of each element required at a value of least 0.50, and it was found that the value was between 0.717–0.843 for the late adolescent sample and between 0.731–0.826 for the parental sample. In addition, the weight of the variables in each component (loading) had a criterion of no less than 0.70, indicating that the variable in each component was able to describe the measurement model in the component to a good extent, as shown in Table 4.

In Tables 5 and 6, Fornell and Larcker (1981) were used to assess the relationship between variables in the form of a diagonal matrix. It was found that the square roots of AVEs in each construct (bold letters) were greater than the values in the horizontal row and in the corresponding vertical row, which showed that the variables were discriminating, and can be analyzed for use in structural equation models.

Table 3. Baseline demographic characteristics of the participants.

Characteristics	Number		Percentage	
	Late Adolescents (N = 541)	Parents (N = 397)	Late Adolescents	Parents
Gender				
Female	327	275	60.4	69.3
Male	214	122	39.6	30.7
Age				
18–23 years	541	0	100.0	0.0
40–45 years	0	2	0.0	0.5
46–50 years	0	264	0.0	66.5
51 years and above	0	131	0.0	33.0
Education level				
Below high school	0	36	0	9.1
High school	0	98	0	24.7
Diploma	0	114	0	28.7
Bachelor's degree	541	81	100.0	20.4
Master's degree	0	65	0.0	16.4
Doctoral degree	0	3	0.0	0.8
Current places to stay				
Private house	168	325	31.1	81.9
Rental house or dormitory	334	72	61.7	18.1
Condos	39	0	7.2	0.0
Time spent on social media per day				
Does not play social media	0	67	0	16.9
Less than 2 h	5	191	0.9	48.1
2–3 h	67	103	12.4	25.9
3–4 h	149	34	27.5	8.6
More than 4 h	320	2	59.1	0.5
The most used social media platform per day				
Does not play social media	0	70	0.0	17.6
Facebook	246	224	45.5	56.4
Line	187	103	34.6	25.9
Instagram	71	0	13.1	0.0
Twitter	33	0	6.1	0.0
Tiktok	1	0	0.2	0.0
YouTube	3	0	0.6	0.0

5.3. Assessment of structural model

The structural model analysis was performed by resampling 5,000 bootstrap data to increase confidence in the construct correlation analysis. Consider the Structural Path Coefficients, VIF and Stone-Geisser Q^2 , which are analyzed according to the guidelines of Henseler et al. (2016) and Hair et al. (2016):

1) Structural Path Coefficients to analyze the influence between variables. The corresponding path, coefficients, P-value and T-value are T-value higher than 1.96 (significance level = 5%), 2.58 (significance level = 1%) and 3.29 (significance level = 0.1%). The study results from a sample of adolescents found that Support 8 hypotheses: H1, H2a, H2b, H3a, H3b, H4a, H4b and H4c. While the study results of the parents' sample found that 4 hypotheses: H3b, H4a, H4b and H4c are supported in Table 7.

2) VIF to verify multi collinear of causal variables, which must have a criterion of relationship, not more than 3.3. The results showed that the VIF of both adolescents and their parents did not exceed the threshold. This means that the causal variables from the structural model analysis not have a multi collinearity correlation.

3) Stone-Geisser Q^2 to describe the relevance of endogenous constructs for predictive relevance of the model using a blindfolding technique. The test results from a sample of both adolescents and parents found that the endogenous latent variables of Q^2 values must be greater than 0. This shows that Awareness of victims (AWV), Psychological Health (PSY) and Physical Health (PHY) were involved in the predictive relevance of the model.

From Table 7 and Figures 2, 3, it can be seen that the analysis of the late adolescent's data supported 8 hypotheses. For H1, it was found that family communication (FAM) significantly influenced awareness factors (AWV) in potential victims of social media cyberbullying at the 0.001 significance level ($\beta = 0.181, t = 3.389$). For H2a, loneliness (LON) had a significant negative correlation with AWV in potential re-victimization through social media use at the significance level of 0.01 ($\beta = -0.197, t = 2.948$). For H2b, perceived susceptibility (PSU) was positively associated with AWV in potential victims of social media cyberbullying at the significance level of 0.001 ($\beta = 0.187, t = 3.615$). For H3a, message (MES) type was positively correlated with AWV in potential re-victimization through social media use at the significance level of 0.05 ($\beta = 0.261, t = 2.416$). For H3b, channel (CHA) type was positively correlated with AWV in potential re-victimization through social media use at the significance level of 0.001 ($\beta = 0.494, t = 5.644$). For H4a, AWV positively correlated with care motivation for psychological health (PSY) in potential victims of social media cyberbullying at the significance level of 0.001 ($\beta = 0.270, t = 3.488$). For H4b, AWV was positively correlated with physical health care motivation (PHY) in relation to coping of recurring victims of social media cyberbullying at the significance level of 0.01 ($\beta = 0.170, t = 2.578$). For H4c, PSY was positively correlated with PHY in potential victims of social media cyberbullying at the significance level of 0.001 ($\beta = 0.665, t = 11.670$).

The parental data analysis supported four hypotheses. For H3b, CHA had a significant positive correlation with AWV in potential re-victimization through social media use at the significance level of 0.001 ($\beta = 0.485, t = 3.822$). For H4a, AWV positively correlated with PSY in potential victims of social media cyberbullying at the significance level of 0.001 ($\beta = 0.355, t = 4.310$). For H4b, AWV positively correlated with PHY in relation to coping of recurring victims of social media cyberbullying at the significance level of 0.01 ($\beta = 0.167, t = 3.042$). For H4c, PSY was positively correlated with PHY in potential victims of social media cyberbullying at the significance level of 0.001 ($\beta = 0.723, t = 16.692$).

The results of the measurement model and structural models in Tables 4, 5, 6, 7 and Figures 2, 3 were tested for fit according to the criteria outlined by Hair et al. (2017) and Henseler et al. (2016). It was found that the Stone-Geisser Q^2 values were 0.398 for AWV, 0.055 for PSY, and 0.375 for PHY, indicating that these constructs were associated with the predictive capability of the model. The standardized root mean square

Table 4. Measures of internal consistency reliability, and convergent validity.

Construct	Cronbach's α		Composite reliability		Average Variance Extracted	
	Late Adolescents	Parents	Late Adolescents	Parents	Late Adolescents	Parents
Message (MES)	0.910	0.907	0.937	0.934	0.788	0.781
Channel (CHA)	0.902	0.903	0.931	0.932	0.772	0.774
Source (SOU)	0.885	0.911	0.921	0.937	0.744	0.789
Family Communication (FAM)	0.841	0.846	0.904	0.905	0.758	0.760
Awareness of victims (AWV)	0.907	0.930	0.941	0.950	0.843	0.826
Loneliness (LON)	0.900	0.909	0.930	0.936	0.769	0.786
Perceived Susceptibility (PSU)	0.868	0.884	0.910	0.920	0.717	0.742
Psychological Health (PSY)	0.907	0.891	0.935	0.924	0.783	0.753
Physical Health (PHY)	0.869	0.877	0.911	0.916	0.719	0.731

Table 5. Fornell–Larcker criterion analysis of late adolescent-report.

Construct	Correlation Matrix								
	MES	CHA	SOU	FAM	AWV	LON	PSU	PSY	PHY
Message (MES)	0.888								
Channel (CHA)	0.691	0.879							
Source (SOU)	0.613	0.676	0.862						
Family Communication (FAM)	0.224	0.216	0.159	0.871					
Awareness of victims (AWV)	0.626	0.371	0.487	0.065	0.918				
Loneliness (LON)	0.261	0.359	0.446	-0.090	0.129	0.877			
Perceived Susceptibility (PSU)	0.562	0.700	0.500	0.315	0.181	0.386	0.847		
Psychological Health (PSY)	0.443	0.309	0.581	-0.001	0.540	0.405	0.270	0.885	
Physical Health (PHY)	0.565	0.355	0.432	0.076	0.687	0.336	0.349	0.711	0.848

Bold values in represent are the square roots of average variance extracted values in each construct that are higher than the values in the horizontal row and in the corresponding vertical row.

Table 6. Fornell–Larcker criterion analysis of parents-report.

Construct	Correlation Matrix								
	MES	CHA	SOU	FAM	AWV	LON	PSU	PSY	PHY
Message (MES)	0.883								
Channel (CHA)	0.777	0.880							
Source (SOU)	0.742	0.790	0.888						
Family Communication (FAM)	0.219	0.151	0.152	0.872					
Awareness of victims (AWV)	0.572	0.451	0.537	0.209	0.909				
Loneliness (LON)	0.278	0.374	0.384	0.065	0.105	0.886			
Perceived Susceptibility (PSU)	0.645	0.733	0.641	0.198	0.311	0.385	0.862		
Psychological Health (PSY)	0.415	0.404	0.478	0.153	0.577	0.284	0.355	0.868	
Physical Health (PHY)	0.562	0.487	0.564	0.166	0.728	0.361	0.424	0.782	0.855

Bold values in represent are the square roots of average variance extracted values in each construct that are higher than the values in the horizontal row and in the corresponding vertical row.

residual (SRMR) was tested according to criteria from [Wetzels et al. \(2009\)](#), which was lower than 0.08, and values of 0.060 and 0.061 were obtained for the adolescents model and parents model, respectively. The results showed that the model met goodness of fit criteria.

6. Discussion

This is the first study that has developed a model under the conceptual framework of the I-Change Model (ICM) to describe the causal relationships between factors related to the victims of cyberbullying and their motivation to modify the health risk behaviors related to cyberbullying, using the perspective of late adolescent and parents. The results of this study will support the development of appropriate

behavioral intervention strategies that can prevent future cyberbullying victimization.

6.1. Predisposing factors

Based on the first objective, the study found that the predisposing family factors were positively correlated with awareness factors in potential victims of social media cyberbullying. According to the late adolescent self-reports, aspects of family communication, such as avoiding discussions or the use of open-minded discussions, reduces the likelihood of re-victimization in terms of social media use. Specifically, a higher level of communication between parents and adolescents predicted a lower chance of using social media. This highlights the

Table 7. Assessment of structural model using bootstrapping.

Hypotheses	Proposed relationship	Late Adolescents (n = 541)				Parents (n = 397)				Supported
		β	T-Value	P-Value	VIF	β	T-Value	P-Value	VIF	
H1	FAM -> AWV	0.181	3.389	0.001***	1.145	0.080	1.529	0.126	1.065	Adolescents
H2a	LON -> AWV	-0.197	2.948	0.003**	1.878	-0.111	1.787	0.074	1.612	Adolescents
H2b	PSU -> AWV	0.187	3.615	0.000***	1.319	0.111	2.011	0.044	1.217	Adolescents
H3a	MES -> AWV	0.261	2.416	0.016*	2.862	0.198	1.306	0.191	3.212	Adolescents
H3b	CHA -> AWV	0.494	5.644	0.000***	2.552	0.485	3.822	0.000***	3.497	Adolescents, Parents
H3c	SOU -> AWV	-0.010	0.089	0.929	2.378	0.115	0.983	0.326	3.287	Not Supported
H4a	AWV -> PSY	0.270	3.488	0.000***	1.000	0.355	4.310	0.000***	1.000	Adolescents, Parents
H4b	AWV -> PHY	0.170	2.578	0.010**	1.078	0.167	3.042	0.002**	1.144	Adolescents, Parents
H4c	PSY -> PHY	0.665	11.670	0.000***	1.078	0.723	16.692	0.000***	1.144	Adolescents, Parents

Note: * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$, β = Path Coefficients, FAM = Family Communication, LON = Loneliness, PSU = Perceived Susceptibility, MES = Message, CHA = Channel, SOU = Source, AWV = Awareness of victims, PSY = Psychological Health and PHY = Physical Health.

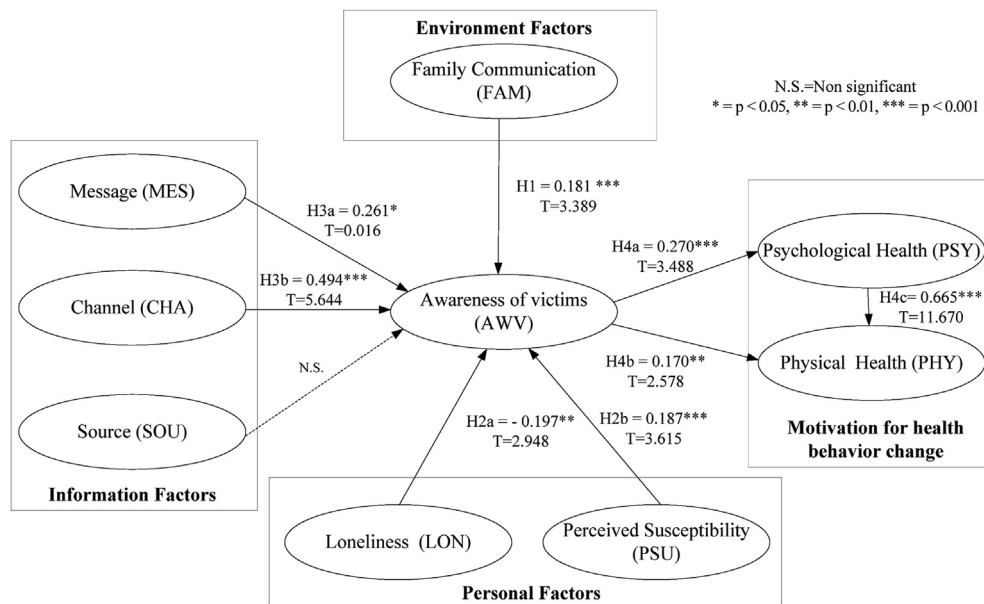


Figure 2. Structural model results of late adolescents.

importance of increasing family communication for these adolescents. Indeed, when an individual spends less time on social media, there is less time for them to become victims. On the other hand, if late adolescents have lower family communication, they may spend more time on social media, which may increase their risk of becoming repeat victims. These findings are consistent with previous studies that show that negative communication and family relationships were associated with internet addiction (Sela et al., 2020) (Liu et al., 2012), because teenagers may use the internet to escape society and their home situation.

There are conflicting opinions between the views of the late adolescents and those of their parents because the parent's self-report data indicated that there was no positive association between family communication and awareness factors in potential victims through social media cyberbullying. This result can be interpreted in terms of the behavioral modifications that affect an individual's cognitive assessment during stressful situations, which lead to different responses (Lam, 2020) (Lazarus and Folkman, 1984). This indicates that, from the parents' perspective, the stressful situations that late adolescent experience on social media has a more direct influence on the likelihood of future victimization than family communication. However, if late adolescents have healthy family relationships and discuss concerns during stressful situations, this can help parents to assess the risks and prepare themselves to cope with potential victimization from cyberbullying in future. It can also help reduce the impact of violence on adolescent bullying victims.

6.2. Information factors

The second objective focused on the information factors that are related to advice and coping strategies in cyberbullying situations. These factors also relate to awareness factors in potential future victims of cyberbullying. Based on the self-report data of late adolescents, message and channel have a positive relationship with awareness factors in potential future victims of cyberbullying. These findings are consistent with previous research demonstrating that exposure to health information and advice generates health awareness and motivation to implement beneficial behaviors. This behavioral modification may reduce the risk of cyberbullying situations (Bae, 2021) (Jattamart and Leelasantitham, 2019). In particular, the information and advice presented through popular social media plays an important role for users as it can reach a wide audience. However, the comments of adolescents and parents regarding the sources of information indicated that there was no relationship with awareness factors in potential future victims of cyberbullying. This lack of relationship could be caused by distrust of the sources of advice. Indeed, victims may have experienced that their parents and authorities respond inadequately to cyberbullying or attempt to only resolve low-level cyberbullying incidents (Navarro et al., 2013) (Walker, 2014) (Khine et al., 2020), thus making late adolescents resistant to help and less accepting of advice. Therefore, it is important to enhance the trust that late adolescent's have in parents

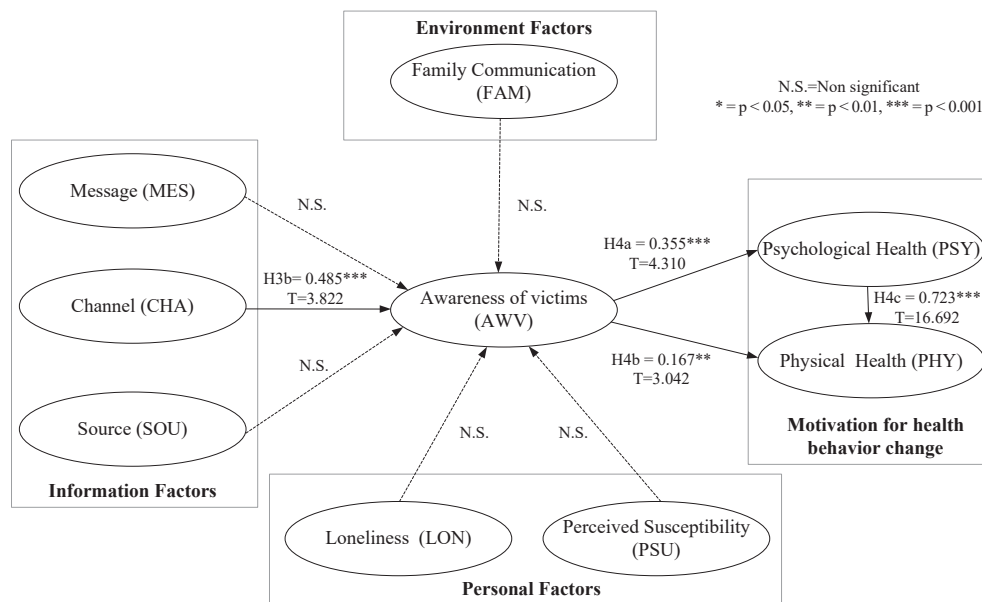


Figure 3. Structural model results of parents.

or professionals as this will, in turn, lead to the adoption of health advice and behavioral interventions that may reduce the risk of revictimization.

6.3. Personal factors

The third objective assessed the personal factors, including loneliness and perceived susceptibility to awareness, in potential future victims from extensive use of social media. Adolescent reports showed that loneliness was negatively associated with awareness factors in potential future victims of social media cyberbullying. Indeed, late adolescents with low levels of loneliness were more likely to have higher awareness factors in terms of coping with the danger of becoming a recurring victim of cyberbullying. This result may explain some of the findings showing that, based on past experience, adolescents recognize that spending time on social media activities in order to reduce loneliness may lead to an increased risk of victimization (Deters and Mehl, 2013). As adolescents perceive this risk, it can encourage them to switch to activities other than social media to help reduce feelings of loneliness. Research has also shown that there is a positive association between perceived susceptibility and awareness factors in potential future victims (Doane et al., 2016). This is because awareness of the physical and mental risks and impacts of being a victim helps late adolescent identify ways to prevent and cope with future situations.

From a parental point of view, there was no relationship between perceived susceptibility and awareness factors in potential future victims of social media cyberbullying. This may be due to differences in stress exposure (Lazarus and Folkman, 1984), which leads parents to perceive that different bullying situations influence the likelihood of future victimization more than personal factors. However, our results indicate that loneliness and perceived susceptibility are two of the motivating factors that can influence the reduction of future risk and violence against victims. Therefore, parents who are close to late adolescents and understand their personalities can play a key role in behavioral intervention and risk assessment with regard to social media use.

6.4. Awareness of victims

As is clear from the self-report results of both late adolescents and parents, the awareness of victims has a positive correlation with the motivation for care of psychological health (PSY) and physical health (PHY), in relation to coping with potential victimization from the use of

social media. In particular, awareness of victims was highly correlated with PSY. The findings show the sensitivity and concern among university students experiencing mental health issues regarding social media bullying. Therefore, these students should be monitored for potential impacts on health risk behaviors including alcohol use, cannabis use, and sexual frequency (Gámez-Guadix et al., 2015) (Graham and Wood, 2019) as well as increased suicidal thoughts (Kim et al., 2019). It has been shown that the motivation for health behavior modification is directly influenced by awareness (De Vries, 2017) (Kasten et al., 2019) (Jattamart and Leelasantham, 2019). Therefore, late adolescents with knowledge and perception of risk regarding the health impacts of being victimized will be more motivated to prevent situations that increase the likelihood of re-victimization.

Regarding the issue of motivation to change health behaviors, our study confirmed the high association between PSY and PHY when dealing with potential revictimization related to social media use. In this study, the results demonstrated that the subjects reported concerns about mental health problems that directly affected the victim's physical health. This is an indication that the motivation for maintaining PSY is an important factor affecting PHY, because good mental health has a direct influence on physical health. Therefore, raising awareness and ensuring victims are motivated to care for their psychological and physical health is vital in dealing with recurring victimization. The victims may try to prevent situations that may arise in future and identify ways to cope with them (Garrousteigt et al., 2021).

7. Implication to practices

One strength of the study is that it presents the views and opinions of late adolescents who have been victims of social media cyberbullying, as well as those of their parents. Although this study observed some differences between the opinions of the adolescents and parents, the results support a better understanding of the perceptions of both victims and parents. The results of the study indicated that obtaining appropriate information and advice on preventing and dealing with social media bullying situations is an important factor in raising victim awareness about social media bullying in the future. Once the victim has become aware, it can motivate them to modify risky behaviors that may adversely affect their physical and mental health. Cooperation with universities to ensure positive learning environments and development of good communication with families may be beneficial for achieving long-term, sustainable solutions. However, the issue of individuals being reluctant

to seek help from universities and families should not be ignored (Byrne, 2021). Therefore, individuals should also develop their own strategies for self-defense and coping with future bullying situations (e.g., taking care regarding disclosing personal information, monitoring privacy settings, using social media at appropriate times, and blocking bullies).

Therefore, we suggest that a unit should be established within universities with the primary goal of preventing and resolving cyberbullying among students. This unit should include counseling services that promote collaboration between victims, parents, schools and, most importantly, mental health professionals from local health care settings (e.g., psychiatrists, psychologists). The intervention should begin by raising awareness among victims and parents of the risks of social media bullying. The next step should be educational training by psychologists, who can play an important role in providing accurate information and advice to victims, parents, and schools regarding risky situations (Navarro et al., 2013). Subsequently, they should jointly assess the situation to identify risk groups and help them. The support process may be organized in the form of a behavioral intervention program aimed at reducing risky social media behaviors that may result in repeat victimization (e.g., disclosure of personal information on social media, spending excessive time on social media). In addition, during development of the intervention program, the family relationship factors and victim's personality should also be taken into consideration (Martínez-Monteagudo et al., 2019). The final step should be to assess and monitor the effects of the intervention after a case of social media bullying has been identified.

8. Limitations and directions for future research

The study explores late adolescent and parental self-reports of perceptions of social media bullying. The results of the study have certain limitations. Firstly, this study is a cross-sectional, meaning that the results only describe short-term victim behavior. Additionally, the results lack demographic diversity because the sample was obtained in one particular location. Secondly, the use of a survey model with self-reports to assess victims' previous experiences and perceptions of future relevant factors may have resulted in obtaining incomplete information. We planned to mitigate this limitation by using opinion polls with parents who are close to victims, in order to confirm the information obtained about the victims' behavior. However, this method of the analysis indicated some conflict between the late adolescent and family samples. Thirdly, we requested the late adolescent participants to send the questionnaires to their parents for them to complete. However, it was not possible to verify that the adolescents sent these to their parents, thus making the number of parental responses different from that of the late adolescents. Fourthly, the study recruited a sample of college students who had experience of being victimized by social media bullying (on Facebook, Instagram, Line and YouTube) during the six months prior to their participation. However, in the analysis of the data we did not assess the social media platform on which users were most likely to experience cyberbullying. Therefore, future studies may explain individual differences to additional victims. Finally, this study is an analysis of health behavior in the field. In future, an in-depth analysis should be conducted to assess the extent to which aspects of psychological health (e.g., anger, anxiety, depression), and aspects of physical health (e.g. alcohol use, sleep problems, smoking, substance abuse), are affected by cyberbullying. This would allow the issue to be viewed from a clearer perspective.

9. Conclusions

This study has applied the I-Change Model (ICM) theory to explain the process of modifying health behaviors, as results from an individual's cognitive processes. For victims of social media bullying, this study analyzed the influence of environment factors (family communication), personal factors (loneliness and perceived susceptibility), information factors (message, channel, and source) on victim awareness, as well as the influence of victim awareness on motivation for health behavior

change (psychological and physical health). The results of this victim-perspective study demonstrated that family communication, loneliness, perceived susceptibility, message, and channel had direct influences on the awareness of victims, while such awareness also had a direct influence on motivation for health behavior change (psychological health and physical health). This result was consistent across both the victims' and the parents' perspectives. Motivation for pursuing good psychological health was also explored, and it was found that this had a strong influence on physical health. As before, the study results are aligned for both victims and parents.

Declarations

Author contribution statement

Aungkana Jattamart: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Achaporn Kwangsawad: Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data included in article.

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

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References

- Abdala, G.A., Meira, M.D.D., Rodrigo, G.T., Fróes, M.B.d.C., Ferreira, M.S., Abdala, S.A., Koenig, H.G., 2020. Religion, age, education, lifestyle, and health: structural equation modeling. *J. Relig. Health* 1–12.
- Aoyama, I., Saxon, T.F., Fearon, D.D., 2011. Internalizing problems among cyberbullying victims and moderator effects of friendship quality. *Multicult. Educ. Technol. J.*
- Bae, S.-M., 2021. The relationship between exposure to risky online content, cyber victimization, perception of cyberbullying, and cyberbullying offending in Korean adolescents. *Child. Youth Serv. Rev.* 123, 105946.
- Bai, Q., Huang, S., Hsueh, F.-H., Zhang, T., 2021. Cyberbullying victimization and suicide ideation: a crumbled belief in a just world. *Comput. Hum. Behav.* 120, 106679.
- Barnes, H.L., Olson, D.H., 1985. Parent-adolescent communication and the circumplex model. *Child Dev.* 438–447.
- Bevilacqua, L., Shackleton, N., Hale, D., Allen, E., Bond, L., Christie, D., Jones, R., 2017. The role of family and school-level factors in bullying and cyberbullying: a cross-sectional study. *BMC Pediatr.* 17 (1), 1–10.
- Boniell-Nissim, M., Sasson, H., 2018. Bullying victimization and poor relationships with parents as risk factors of problematic internet use in adolescence. *Comput. Hum. Behav.* 88, 176–183.
- Branley, D.B., Covey, J., 2017. Is exposure to online content depicting risky behavior related to viewers' own risky behavior offline? *Comput. Hum. Behav.* 75, 283–287.
- Buecker, S., Maes, M., Denissen, J.J., Luhmann, M., 2020. Loneliness and the Big Five personality traits: a meta-analysis. *Eur. J. Pers.* 34 (1), 8–28.
- Buelga, S., Martínez-Ferrer, B., Cava, M.J., 2017. Differences in family climate and family communication among cyberbullies, cybervictims, and cyber bully-victims in adolescents. *Comput. Hum. Behav.* 76, 164–173.

- Byrne, V.L., 2021. Blocking and self-silencing: undergraduate students' cyberbullying victimization and coping strategies. *TechTrends* 65 (2), 164–173.
- Cava, M.-J., Tomás, I., Buelga, S., Carrasco, L., 2020. Loneliness, depressive mood and cyberbullying victimization in adolescent victims of cyber dating violence. *Int. J. Environ. Res. Publ. Health* 17 (12), 4269.
- Chai, L., Xue, J., Han, Z., 2020. Excessive weight and academic performance among Chinese children and adolescents: assessing the mediating effects of bullying victimization and self-rated health and life satisfaction. *Child. Youth Serv. Rev.* 119, 105586.
- Cheshin, A., Rafaeli, A., Bos, N., 2011. Anger and happiness in virtual teams: emotional influences of text and behavior on others' affect in the absence of non-verbal cues. *Organ. Behav. Hum. Decis. Process.* 116 (1), 2–16.
- Chillemi, K., Abbott, J.-A.M., Austin, D.W., Knowles, A., 2020. A pilot study of an online psychoeducational program on cyberbullying that aims to increase confidence and help-seeking behaviors among adolescents. *Cyberpsychol., Behav. Soc. Netw.* 23 (4), 253–256.
- Chu, X.-W., Fan, C.-Y., Liu, Q.-Q., Zhou, Z.-K., 2018. Cyberbullying victimization and symptoms of depression and anxiety among Chinese adolescents: examining hopelessness as a mediator and self-compassion as a moderator. *Comput. Hum. Behav.* 86, 377–386.
- Conner, M., 2010. Cognitive determinants of health behavior. In: *Handbook of Behavioral Medicine*. Springer, pp. 19–30.
- De Vries, H., 2017. An integrated approach for understanding health behavior; the I-change model as an example. *Psychol Behav Sci Int J* 2 (2), 555–585.
- de Vries, H., Mesters, L., Van de Steeg, H., Honing, C., 2005. The general public's information needs and perceptions regarding hereditary cancer: an application of the Integrated Change Model. *Patient Educ. Counsel.* 56 (2), 154–165.
- Deters, F.G., Mehl, M.R., 2013. Does posting Facebook status updates increase or decrease loneliness? An online social networking experiment. *Social Psychol. Personal. Sci.* 4 (5), 579–586.
- Doane, A.N., Boothe, L.G., Pearson, M.R., Kelley, M.L., 2016. Risky electronic communication behaviors and cyberbullying victimization: an application of Protection Motivation Theory. *Comput. Hum. Behav.* 60, 508–513.
- Durak, H.Y., 2018. What would you do without your smartphone? Adolescents' social media usage, locus of control, and loneliness as a predictor of nomophobia. *Addicta: The Turkish J. Addictions* 5 (2), 1–15.
- Eastin, M.S., 2001. Credibility assessments of online health information: the effects of source expertise and knowledge of content. *J. Computer-Mediated Commun.* 6 (4), JCMC643.
- Elsaesser, C., Russell, B., Ohannessian, C.M., Patton, D., 2017. Parenting in a digital age: a review of parents' role in preventing adolescent cyberbullying. *Aggress. Violent Behav.* 35, 62–72.
- Extremera, N., Quintana-Orts, C., Mérida-López, S., Rey, L., 2018. Cyberbullying victimization, self-esteem and suicidal ideation in adolescence: Does emotional intelligence play a buffering role? *Front. Psychol.* 9, 367.
- Fisher, B.W., Gardella, J.H., Teurbe-Tolon, A.R., 2016. Peer cybervictimization among adolescents and the associated internalizing and externalizing problems: a meta-analysis. *J. Youth Adolesc.* 45 (9), 1727–1743.
- Fornell, C., Larcker, D.F., 1981. Evaluating structural equation models with unobservable variables and measurement error. *J. Market. Res.* 18 (1), 39–50.
- Gómez-Guadix, M., Gini, G., Calvete, E., 2015. Stability of cyberbullying victimization among adolescents: prevalence and association with bully-victim status and psychosocial adjustment. *Comput. Hum. Behav.* 53, 140–148.
- Garrousteigt, C., Broc, G., Legrand, A., Quintard, B., Beylot-Barry, M., 2021. Facilitators of and obstacles to consultation in patients with advanced basal cell carcinoma: a French pilot study. *Arch. Dermatol. Res.* 1–7.
- Graham, R., Wood Jr., F.R., 2019. Associations between cyberbullying victimization and deviant health risk behaviors. *Soc. Sci. J.* 56 (2), 183–188.
- Gubler, D.A., Makowski, L.M., Troche, S.J., Schlegel, K., 2021. Loneliness and well-being during the Covid-19 pandemic: associations with personality and emotion regulation. *J. Happiness Stud.* 22 (5), 2323–2342.
- Hair Jr., J.F., Hult, G.T.M., Ringle, C., Sarstedt, M., 2016. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Sage publications.
- Hair Jr., J.F., Hult, G.T.M., Ringle, C., Sarstedt, M., 2017. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*, second ed. Sage publications.
- Henseler, J., Hubona, G., Ray, P.A., 2016. *Using PLS Path Modeling in New Technology Research: Updated Guidelines*. Industrial management & data systems.
- Hinduja, S., Patchin, J.W., 2019. Connecting adolescent suicide to the severity of bullying and cyberbullying. *J. Sch. Violence* 18 (3), 333–346.
- Ho, M., Thi Truc Quynh, Gu, P., Chuanhua, 2021. Cyberbullying victimization and depression: self-esteem as a mediator and approach coping strategies as moderators. *J. Am. Coll. Health* 1–8.
- Ho, T.T.Q., Li, C., Gu, C., 2020. Cyberbullying victimization and depressive symptoms in Vietnamese university students: examining social support as a mediator. *Int. J. Law Crime Just.* 63, 100422.
- Hors-Fraile, S., Malwade, S., Luna-Perejon, F., Amaya, C., Civit, A., Schneider, F., De Vries, H., 2019. Opening the black box: explaining the process of basing a health recommender system on the I-change behavioral change model. *IEEE Access* 7, 176525–176540.
- Jain, S., Agrawal, S., 2020. Perceived Vulnerability of Cyberbullying on Social Networking Sites: Effects of Security Measures, Addiction and Self-Disclosure. *Indian Growth and Development Review*.
- Jattamart, A., Leelasantham, A., 2019. The influence of social media lifestyle interventions on health behaviour: a study on patients with major depressive disorders and family caregivers. *Open Publ. Health J.* 12 (1).
- Jattamart, A., Leelasantham, A., 2020. Perspectives to social media usage of depressed patients and caregivers affecting to change the health behavior of patients in terms of information and perceived privacy risks. *Heliyon* 6 (6), e04244.
- Jiang, Q., Zhao, F., Xie, X., Wang, X., Nie, J., Lei, L., Wang, P., 2020. Difficulties in emotion regulation and cyberbullying among Chinese adolescents: a mediation model of loneliness and depression. *J. Interpers. Violence*, 0886260520917517.
- Kamdjoug, J.R.K., Wamba-Taguimdje, S.-L., Wamba, S.F., Kake, I.B.E., 2021. Determining factors and impacts of the intention to adopt mobile banking app in Cameroon: case of SARA by afriland First Bank. *J. Retailing Consum. Serv.* 61, 102509.
- Kasten, S., van Osch, L., Candel, M., de Vries, H., 2019. The influence of pre-motivational factors on behavior via motivational factors: a test of the I-Change model. *BMC psychology* 7 (1), 1–12.
- Keating, R.T., Hendy, H.M., Can, S.H., 2016. Demographic and psychosocial variables associated with good and bad perceptions of social media use. *Comput. Hum. Behav.* 57, 93–98.
- Kemp, S., 2020. *Digital 2020: Global Digital Overview*, 30 JANUARY 2020. Retrieved from. <https://datareportal.com/reports/digital-2020-global-digital-overview>.
- Khine, A.T., Saw, Y.M., Htut, Z.Y., Khaing, C.T., Soe, H.Z., Swe, K.K., Cho, S.M., 2020. Assessing risk factors and impact of cyberbullying victimization among university students in Myanmar: a cross-sectional study. *PLoS One* 15 (1), e0227051.
- Kim, S., Colwell, S.R., Kata, A., Boyle, M.H., Georgiades, K., 2018. Cyberbullying victimization and adolescent mental health: evidence of differential effects by sex and mental health problem type. *J. Youth Adolesc.* 47 (3), 661–672.
- Kim, S., Kimber, M., Boyle, M.H., Georgiades, K., 2019. Sex differences in the association between cyberbullying victimization and mental health, substance use, and suicidal ideation in adolescents. *Can. J. Psychiatr.* 64 (2), 126–135.
- Kowalski, R.M., Limber, S.P., 2007. Electronic bullying among middle school students. *J. Adolesc. Health* 41 (6), S22–S30.
- Lam, L.T., 2020. The roles of parent-and-child mental health and parental internet addiction in adolescent internet addiction: Does a parent-and-child gender match matter? *Frontiers in public health* 8.
- Landmann, H., Rohmann, A., 2021. When loneliness dimensions drift apart: emotional, social and physical loneliness during the COVID-19 lockdown and its associations with age, personality, stress and well-being. *Int. J. Psychol.*
- Larrañaga, E., Yubero, S., Ovejero, A., Navarro, R., 2016. Loneliness, parent-child communication and cyberbullying victimization among Spanish youths. *Comput. Hum. Behav.* 65, 1–8.
- Lazarus, R.S., Folkman, S., 1984. *Stress, Appraisal, and Coping*. Springer publishing company.
- Leung, A.N.M., Wong, N., Farver, J.M., 2018. Cyberbullying in Hong Kong Chinese students: life satisfaction, and the moderating role of friendship qualities on cyberbullying victimization and perpetration. *Pers. Individ. Differ.* 133, 7–12.
- Lin, R., Utz, S., 2015. The emotional responses of browsing Facebook: happiness, envy, and the role of tie strength. *Comput. Hum. Behav.* 52, 29–38.
- Liu, Q.-X., Fang, X.-Y., Deng, L.-Y., Zhang, J.-T., 2012. Parent-adolescent communication, parental Internet use and Internet-specific norms and pathological Internet use among Chinese adolescents. *Comput. Hum. Behav.* 28 (4), 1269–1275.
- Maher, C.A., Lewis, L.K., Ferrar, K., Marshall, S., De Bourdeaudhuij, I., Vandelandotte, C., 2014. Are health behavior change interventions that use online social networks effective? A systematic review. *J. Med. Internet Res.* 16 (2), e40.
- Majeed, S., Zhou, Z., Lu, C., Ramkissoon, H., 2020. Online tourism information and tourist behavior: a structural equation modeling analysis based on a self-administered survey. *Front. Psychol.* 11, 599.
- Marmaya, N.H., Zakaria, Z., Desa, M.N.M., 2019. Gen Y consumers' intention to purchase halal food in Malaysia: a PLS-SEM approach. *Journal of Islamic Marketing*.
- Martínez-Monteagudo, M.C., Delgado, B., García-Fernández, J.M., Ruiz-Esteban, C., 2020. Cyberbullying in the university setting. Relationship with emotional problems and adaptation to the university. *Front. Psychol.* 10, 3074.
- Martínez-Monteagudo, M.C., Delgado, B., Inglés, C.J., García-Fernández, J.M., 2019. Cyberbullying in the university setting. Relationship with family environment and emotional intelligence. *Comput. Hum. Behav.* 91, 220–225.
- Martínez, I., Murgui, S., García, O.F., García, F., 2019. Parenting in the digital era: protective and risk parenting styles for traditional bullying and cyberbullying victimization. *Comput. Hum. Behav.* 90, 84–92.
- Moreau, M., Gagnon, M.-P., Boudreau, F., 2015. Development of a fully automated, web-based, tailored intervention promoting regular physical activity among insufficiently active adults with type 2 diabetes: integrating the I-change model, self-determination theory, and motivational interviewing components. *JMIR Res. Protocol.* 4 (1), e25.
- Moreno, M.A., Goniou, N., Moreno, P.S., Diekema, D., 2013. Ethics of social media research: common concerns and practical considerations. *Cyberpsychol., Behav. Soc. Netw.* 16 (9), 708–713.
- Murta, S.G., de Oliveira Parada, P., da Silva Meneses, S., Medeiros, J.V.V., Balbino, A., Rodrigues, M.C., de Vries, H., 2020. Dating SOS: a systematic and theory-based development of a web-based tailored intervention to prevent dating violence among Brazilian youth. *BMC Publ. Health* 20 (1), 1–14.
- Navarro, R., Serna, C., Martínez, V., Ruiz-Oliva, R., 2013. The role of internet use and parental mediation on cyberbullying victimization among Spanish children from rural public schools. *Eur. J. Psychol. Educ.* 28 (3), 725–745.
- Niu, G., He, J., Lin, S., Sun, X., Longobardi, C., 2020. Cyberbullying victimization and adolescent depression: the mediating role of psychological security and the moderating role of growth mindset. *Int. J. Environ. Res. Publ. Health* 17 (12), 4368.
- Ochoa, G.M., Lopez, E.E., Emler, N.P., 2007. Adjustment problems in the family and school contexts, attitude towards authority, and violent behavior at school in adolescence. *Adolescence* 42 (168).
- Oeldorf-Hirsch, A., Sundar, S.S., 2015. Posting, commenting, and tagging: effects of sharing news stories on Facebook. *Comput. Hum. Behav.* 44, 240–249.

- Okumu, M., Kim, Y.K., Sanders, J.E., Makubuya, T., Small, E., Hong, J.S., 2020. Gender-specific pathways between face-to-face and cyber bullying victimization, depressive symptoms, and academic performance among US adolescents. *Child Indic. Res.* 13, 2205–2223.
- Pajor, E., Eggers, S., Curfs, K., Oenema, A., De Vries, H., 2017. Why do Dutch people use dietary supplements? Exploring the role of socio-cognitive and psychosocial determinants. *Appetite* 114, 161–168.
- Ringle, C.M.a.W., Sven, Becker, Jan-Michael, 2015. SmartPLS 3. Retrieved from. <http://www.smartpls.com>.
- Rogers, R.W., 1975. A protection motivation theory of fear appeals and attitude change. *J. Psychol.* 91 (1), 93–114.
- Romero-Abrio, A., Martínez-Ferrer, B., Musitu-Ferrer, D., León-Moreno, C., Villarreal-González, M.E., Callejas-Jerónimo, J.E., 2019. Family communication problems, psychosocial adjustment and cyberbullying. *Int. J. Environ. Res. Publ. Health* 16 (13), 2417.
- Sela, Y., Zach, M., Amichay-Hamburger, Y., Mishali, M., Omer, H., 2020. Family environment and problematic internet use among adolescents: the mediating roles of depression and fear of missing out. *Comput. Hum. Behav.* 106, 106226.
- Smit, E.S., Brinkhues, S., de Vries, H., Hoving, C., 2018. Subgroups among smokers in preparation: a cluster analysis using the I-Change model. *Subst. Use Misuse* 53 (3), 400–411.
- Smit, E.S., de Vries, H., Hoving, C., 2013. Determinants of practice nurses' intention to implement a new smoking cessation intervention: the importance of attitude and innovation characteristics. *J. Adv. Nurs.* 69 (12), 2665–2674.
- Smith, P.K., Mahdavi, J., Carvalho, M., Fisher, S., Russell, S., Tippett, N., 2008. Cyberbullying: its nature and impact in secondary school pupils. *JCPP (J. Child Psychol. Psychiatry)* 49 (4), 376–385.
- Sobaih, A.E.E., Hasanein, A.M., Abu Elnasr, A.E., 2020. Responses to COVID-19 in higher education: social media usage for sustaining formal academic communication in developing countries. *Sustainability* 12 (16), 6520.
- Song, T.-M., Song, J., 2021. Prediction of risk factors of cyberbullying-related words in Korea: application of data mining using social big data. *Telematics Inf.* 58, 101524.
- Strøm, I.F., Thoresen, S., Wentzel-Larsen, T., Dyb, G., 2013. Violence, bullying and academic achievement: a study of 15-year-old adolescents and their school environment. *Child Abuse Negl.* 37 (4), 243–251.
- Sun, Y., Zhang, Y., 2020. A review of theories and models applied in studies of social media addiction and implications for future research. *Addict. Behav.* 106699.
- Tokunaga, R.S., 2010. Following you home from school: a critical review and synthesis of research on cyberbullying victimization. *Comput. Hum. Behav.* 26 (3), 277–287.
- van der Wulp, N.Y., Hoving, C., de Vries, H., 2015. Partner's influences and other correlates of prenatal alcohol use. *Matern. Child Health J.* 19 (4), 908–916.
- Van Royen, K., Poels, K., Daelemans, W., Vandebosch, H., 2015. Automatic monitoring of cyberbullying on social networking sites: from technological feasibility to desirability. *Telematics Inf.* 32 (1), 89–97.
- Verkijika, S.F., 2018. Understanding smartphone security behaviors: an extension of the protection motivation theory with anticipated regret. *Comput. Secur.* 77, 860–870.
- Walker, C.M., 2014. Cyberbullying redefined: an analysis of intent and repetition. *Int. J. Educ. Soc. Sci.* 1 (5), 59–69.
- Walthouwer, M.J.L., Oenema, A., Candel, M., Lechner, L., de Vries, H., 2015. Eating in moderation and the essential role of awareness. A Dutch longitudinal study identifying psychosocial predictors. *Appetite* 87, 152–159.
- Wang, L., 2021. The Effects of Cyberbullying Victimization and Personality Characteristics on Adolescent Mental Health: an Application of the Stress Process Model. *Youth & Society*, 0044118X211008927.
- Wetzels, M., Odekerken-Schröder, G., Van Oppen, C., 2009. Using PLS path modeling for assessing hierarchical construct models: guidelines and empirical illustration. *MIS Q.* 177–195.
- Won, J., Seo, D., 2017. Relationship between Self-Disclosure and Cyberbullying on Sns. In: Paper Presented at the European, Mediterranean, and Middle Eastern Conference on Information Systems.
- Wu, D., 2020. Empirical study of knowledge withholding in cyberspace: integrating protection motivation theory and theory of reasoned behavior. *Comput. Hum. Behav.* 105, 106229.
- Xu, J.-M., Jun, K.-S., Zhu, X., Bellmore, A., 2012. Learning from bullying traces in social media. In: Paper Presented at the Proceedings of the 2012 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies.
- Yang, T., Ying, Q., 2020. Online self-presentation strategies and fulfillment of psychological needs of Chinese sojourners in the United States. *Front. Psychol.* 11.
- Yıldız-Durak, H., Seferoğlu, S., 2018. Factors associated with smartphone use and addiction among middle school students. *J. Educat. Technol. Theory Pract.* 8 (1), 1–23.
- Yubero, S., de las Heras, M., Navarro, R., Larrañaga, E., 2021. Relations among chronic bullying victimization, subjective well-being and resilience in university students: a preliminary study. *Curr. Psychol.* 1–12.
- Yubero, S., Navarro, R., Elche, M., Larrañaga, E., Ovejero, A., 2017. Cyberbullying victimization in higher education: an exploratory analysis of its association with social and emotional factors among Spanish students. *Comput. Hum. Behav.* 75, 439–449.
- Zeng, P., Wang, P., Nie, J., Ouyang, M., Lei, L., 2020. Gratitude and cyberbullying perpetration: the mediating role of self-compassion and moral disengagement. *Child. Youth Serv. Rev.* 119, 105608.
- Zhong, B., Huang, Y., Liu, Q., 2021. Mental health toll from the coronavirus: social media usage reveals Wuhan residents' depression and secondary trauma in the COVID-19 outbreak. *Comput. Hum. Behav.* 114, 106524.