Deviant Behavior

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/udbh20

An Examination of (Proximal Determinants of) Online Aggression Perpetration Among Adults Aged 19 to 79

Sara Pabian & Heidi Vandebosch

To cite this article: Sara Pabian & Heidi Vandebosch (26 Mar 2024): An Examination of (Proximal Determinants of) Online Aggression Perpetration Among Adults Aged 19 to 79, Deviant Behavior, DOI: 10.1080/01639625.2024.2334872

To link to this article: https://doi.org/10.1080/01639625.2024.2334872

Published online: 26 Mar 2024.

DEVIANT BEHAVIOR
https://doi.org/10.1080/01639625.2024.2334872

Routledge
Taylor & Francis Group

An Examination of (Proximal Determinants of) Online Aggression Perpetration Among Adults Aged 19 to 79

Sara Pabian[a,b] and Heidi Vandebosch[b]

[a]Tilburg University, Tilburg, The Netherlands; [b]University of Antwerp, Antwerp, Belgium

ABSTRACT

Online aggression is not only prevalent among adolescents, but also among adults of all ages. Most of the previous studies among adults have focused on limited age cohorts, for instance, university populations. The present study's aim is to investigate how age is related to online aggression, as well as to potential risk factors of this behavior among adults. To this aim, a cross-sectional survey was administered among 2,000 Belgian adults aged 19–79. Results showed a negative linear association between age and online aggression perpetration. Age was also negatively linearly related to victimization and acceptance of online aggression, whereas quadratic (U-parabola) relationships were found between age and online moral disengagement strategies (OMD). Different potential risk factors of online aggression perpetration were found for different age groups. Significant associations between (some) OMD strategies and perpetration were only found in the age groups 46–55 and 56–65. Acceptance of online aggression was associated with perpetration among 18–25- and 66±year-olds. For all age groups, online victimization was associated with perpetration. This association was the strongest among 26–36- and the lowest among 66±year-olds. The results imply that for developing effective intervention and/or prevention campaigns aiming adults, a one-size-fits-all strategy should be avoided.

ARTICLE HISTORY
Received 28 March 2023
Accepted 20 March 2024

Introduction

Information and Communication Technologies (ICT) have been adopted by Belgian adults of all ages, including middle (36–65) and late (66+) adults (De Marez et al. 2022). Recent numbers among Belgian adults showed that 85% use daily at least one chat service or social media platform, with the highest percentages found among young adults (98%) and the lowest among adults aged 75+ (66%). Similar to children and adolescents, adults are involved in different kinds of behaviors online, including maladaptive online behaviors, such as online aggression (e.g., Nocera et al. 2022, 2022b). Online aggression, also often called cyber aggression, can be defined as "intentionally delivering harm via ICT to a person or a group of persons who perceive(s) such acts as offensive, derogatory, harmful, or unwanted" (Grigg 2010:152). Online aggression can be considered as a serious public health threat, giving its detrimental outcomes for those that are attacked, including mental health and well-being problems (Musharraf and Anis-Ul-Haque 2018; Wyckoff, Buss, and Markman 2019). Researchers, authorities, and other instances have highlighted the urgent need to prevent and diminish this type of behavior (e.g., European Commission n.d.).

The majority of studies that try to understand online aggression perpetration among adults have focused on younger adults, including college/university populations, while less is known about online

CONTACT Sara Pabian s.j.r.pabian@tilburguniversity.edu Tilburg University, Warandelaan 2, Tilburg 5037 AB, The Netherlands

aggression during middle and late adulthood (e.g., Jenaro, Flores, and Patricia FríFríAs 2018). There are, however, indications in the literature of generational differences in the use of ICT (e.g., Jiang et al. 2016; Vandebosch and Eggermont 2002), including first indications of differences in the perpetration of online aggression (e.g., Barlett and Chamberlin 2017; Wang et al. 2019). For instance, recent research on cyberbullying among a broad age range has indicated age differences among adults for attitudes toward cyberbullying and cyberbullying perpetration (Barlett and Chamberlin 2017). Understanding age differences in online aggression perpetration and determinants of online aggression perpetration among different adult age groups can move the research field on online aggression forward, as it will provide insights on the generalizability of theoretical and empirical findings that have been tested among specific age cohorts, for instance younger adults.

Age and involvement in online aggression

Studies that examine age differences among adults of all ages are scarce (Barlett and Chamberlin 2017). More than a decade ago, Ševčíková and Šmahel (2009) investigated online aggression perpetration and victimization in the Czech Republic among 1,465 internet users between 12 and 88 years old. Respondents of their cross-sectional survey were categorized in six age cohorts: 12–15, 16–19, 20–26, 27–35, 36–49, and 50 +. Their results showed significant differences in age for perpetration and victimization. The highest proportion of perpetrators was found among adolescents (12–19) and the proportion of perpetrations decreased with age. The proportion of victims among adolescents (12–19) and young adults (20–26) were the highest and this percentage decreased with age as well. However, the proportion of victims was somewhat higher again in the age cohort 50 + .

Based upon our knowledge, only three studies built further on the study of Ševčíková and Šmahel (2009) to understand online aggression among a broad age range. Barlett and Chamberlin (2017) investigated cyberbullying perpetration and a proximal determinant of perpetration, cyberbullying attitudes, among a sample of 151 adolescents aged 11 to 18 and 487 adults, divided into four age cohorts (18–26, 27–35, 36–49, and 50+). Their results showed linear and quadratic (inverted U-parabola) relationships between age and cyberbullying perpetration and age and cyberbullying attitudes. More precisely, the age cohort 18–26 was most frequently involved in cyberbullying perpetration and had the most positive cyberbullying attitudes whereas its neighbor age cohorts (11–18 and 27–35) were less involved and had less favorable attitudes. Cyberbullying perpetration frequency and the attitude toward cyberbullying further decreased in the age cohorts 36–49 and 50 + . Another recent study, conducted by Wang et al. (2019), examined cyberbullying victimization among a broad age range; their definition of cyberbullying is similar to the definition of online aggression used in the present study. Their sample consisted of 20,849 adult New Zealanders who were divided into six categories: 18–25, 26–35, 36–45, 46–55, 56–65, and 66+ years. Wang et al. (2019) found that the largest proportion of victims was found among young adults (18–25), followed by a small but steady decrease among older respondents. Finally, Branson, Evita, and Jessica (2022) recently investigated antisocial use of social media, including different forms of online aggression, such as cyberbullying, trolling, and cyberstalking (Ferenczi, Marshall, and Bejanyan 2017), in different age cohorts of young and middle adults (18–25, 26–44, and 45–59). In their study, adults aged 26 to 44 reported the highest frequencies of perpetration of antisocial behavior and differed significantly from the age cohorts 18–25 and 45–59, which seems to suggest an inverted U-parabola relationship between age and perpetration of antisocial behaviors on social media.

Questioning the linearity of age in the relationship with online aggression perpetration

There are a few conclusions that can be drawn based on the studies on online aggression, cyberbullying, or antisocial behavior cited above. The studies compared mean scores of age groups or calculated (linear) associations between age and involvement. All of the cited studies, except for the study on antisocial online behaviors by Branson, Evita, and Jessica (2022), have found the highest perpetration and/or

victimization rates among the youngest adult age cohort and an overall decrease of involvement as age increases. Potential explanations for these findings are provided in these studies. A recurring explanation is time spent online. As Barlett and Chamberlin (2017) note, time spent online has been found to positively correlate with online aggression and negatively with age. As older adults spend less time online, they might also have less opportunities to be involved in online aggression as a perpetrator and/or victim. Moreover, the online environment might empower especially young adults whose online skills are more developed to behave aggressively online in contrast to older adults (Ševčíková and Šmahel 2009). Another explanation is that young adults use aggression in general more often and that the general use of aggression decreases with age (Barlett and Chamberlin 2017). Data collected by the Federal Police of Belgium on criminal offenses and offenders indeed show a peak in criminal offenses among the youngest adult cohorts and a decrease when age increases (Politie n.d.).

Not all of the studies found only linear relationships. The studies by Barlett and Chamberlin (2017) and Branson, Evita, and Jessica (2022) seems to suggest quadratic relationships between age and online aggression perpetration. Thus, the linearity assumption of the relationship between age and online aggression perpetration among adults can be questioned and potential explanations for quadratic relationship between age and online aggression perpetration should be further investigated by means of investigating potential mediators in the relationship between age and online aggression perpetration.

In the study of Branson, Evita, and Jessica (2022), adults aged 26–44 reported the highest prevalence of antisocial behaviors on social media. The authors explain this finding by referring to the type of social relationships users have on social media and characteristics of this age period. More precisely, they describe that this age period is characterized by the need to form and maintain close, intimate relationships. On social media, social circles consist of relationships that are less intimate, for instance relationships with acquaintances. As these relationships contribute less to the needs of this age period, Branson, Evita, and Jessica (2022) indicate that it is plausible that adults may place less importance on their online relationships and be more inclined to behave antisocially toward these less intimate relationships, for instance to vent negative emotions, due to the lack of, or limited, consequences compared to performing this behavior toward close relationships. Furthermore, the authors indicate that adults aged 18–25 and 45–59 might attach more importance to these online relationships. Barlett and Chamberlin (2017) found in their study that cyberbullying attitude is related with cyberbullying perpetration. Cyberbullying attitude is perceived as a proximal determinant of cyberbullying perpetration (Pabian and Vandebosch 2014). In the study of Barlett and Chamberlin (2017), linear and quadratic (inverted U-parabola) relationships between age and cyberbullying attitudes were found.

Taken together, research seems to suggest both linear and quadratic relationships between age and online aggression perpetration among a broad age range of adults. Researchers have looked for potential explanations of these associations, including time spent online, type of social relationships users have on social media, and attitudes toward online aggression. The present study builds further on these studies to investigate the relationship between age and online aggression perpetration, and potential explanations (in terms of mediators) for these relationships. After a careful review of the literature, the following potential determinants of online aggression perpetration were included: online aggression victimization, acceptance of online aggression (in different contexts), which can be considered as a positive attitude toward online aggression (Miceli and Castelfranchi 2007), and online moral disengagement strategies.

Potential explanations for the relationship between age and online aggression perpetration

Age, online aggression victimization, and online aggression perpetration

Online aggression victimization has been positively associated with online aggression perpetration in a high number of studies, including in systematic reviews and meta-analyses, both among adolescents and (young) adults (e.g., Camacho et al. 2023; Camerini et al. 2020; Chan and Wong 2020; Lianos and

McGrath 2017; Liu, Ma, and Xia 2022; Marciano, Schulz, and Camerini 2020; Zsila et al. 2019). This association has been supported by theoretical frameworks such as the General Strain Theory (Agnew 1992), Social Cognitive Theory (Bandura 1986), Social Information-Processing Model (Crick and Dodge 1996), lifestyle-routine activities theory, and Ecological System Theory (Urie 1979).

Studies investigating online aggression victimization among a broad age range seem to suggest that the largest proportions of victims can be found among the youngest adult age groups and that victimization decreases as age increases (Ševčíková and Šmahel 2009:16–19 and 20–26; Wang et al. 2019:18–25). However, in the study of Ševčíková and Šmahel (2009), the proportion of victims was somewhat higher again among adults in the age cohort 50+ compared to adults aged 27–35 and 36–49. Although Ševčíková and Šmahel (2009) included both online aggression victimization and perpetration in their study, they did not test associations between these two roles, nor did they test whether these associations differ for different age cohorts.

Taken together, research has indicated positive associations between online aggression victimization and perpetration, both among adolescents and adults; however, studies investigating this association among middle and/or late adults are scarce. Online aggression victimization seems to be most prevalent among young adult age cohorts. A linear relationship between age and online aggression victimization, however, can be questioned. More research is needed to understand the relationships between age, online aggression victimization, and perpetration by testing and comparing these associations among a wide age range of adults.

Age, acceptance of online aggression, and online aggression perpetration

An attitude is a person's global evaluation of a specific behavior (Ajzen 1991). In numerous studies on online aggression, both among adolescents and adults, the attitude toward online aggression has been found to be positively associated with the intention to perform online aggression and the behavior itself, perpetration of online aggression (e.g., Barlett and Chamberlin 2017; Jenaro, Flores, and Patricia FríFríAs 2018; Mussap, Clancy, and Klettke 2023; Pabian and Vandebosch 2014). This association has been supported by theoretical frameworks such as the Theory of Planned Behavior (Ajzen 1991), the General Aggression Model (Anderson and Bushman 2002), the Barlett and Gentile Cyberbullying Model (BGCM; Barlett and Gentile 2012), and many more.

Attitudes toward online aggression seem to be most favorable among young adults. In their study among a broad age range (11–50+), Barlett and Chamberlin (2017) found linear and quadratic (inverted U-parabola) relationships between age and cyberbullying attitudes (and also between age and cyberbullying perpetration, as described earlier). The age cohort 18–26 had the most positive cyberbullying attitudes whereas its neighbor age cohorts (11–18 and 27–35) had less favorable attitudes. The two oldest age categories of their sample, 36–49 and 50+, had the least favorable attitudes toward cyberbullying. Moreover, the authors also tested the relationship between cyberbullying attitude and cyberbullying perpetration for the different age cohorts. Cyberbullying attitudes predicted cyberbullying perpetration significantly positively among all age cohorts; however, the relationship was the strongest among 18–26-year-olds, followed by adults aged 36–49 and 27–35, and the least strong among adults aged 50+ and adolescents aged 12–17.

In sum, research has indicated consistent associations between online aggression attitudes and behaviors. This relationship seems to be true for different adult age cohorts, although the relationship seems to be stronger among the youngest adults age cohorts. Associations between age and online aggression attitudes seems to be represented by both linear and quadratic terms. More research is needed to replicate these findings.

Age, moral disengagement, and online aggression perpetration

Moral disengagement consists of several interrelated cognitive strategies that have a psychological nature and that are used by individuals to excuse their performance of immoral or harmful behavior (Bandura 1986; Marín-López et al. 2020). Techniques of justifying deviant behavior have also been

described by Sykes and Matza (1957) through neutralization theory, which seems to have quite some overlap with Bandura's moral disengagement strategies. However, whereas Bandura (1986, 1999) seems to highlight the psychological nature of these strategies, Sykes and Matza (1957) have emphasized the social nature of learning neutralization techniques (Cardwell and Copes 2021). Bandura (1999) differentiate four moral disengagement strategies: (1) moral justification or the reconstruction of the conduct itself so it is not viewed as immoral, (2) diffusion of responsibility or minimizing one's role in causing harm, (3) distortion of consequences or minimizing the consequences that result from the harmful behavior, and (4) attribution of blame or devaluing targets of harmful behaviors as human beings and blaming them for what is being done to them. Moral disengagement has also been applied to the online environment, taking into account the affordances of ICT, such as the possibility to act anonymously and the paucity of social-emotional cues (Runions and Bal 2015).

Online moral disengagement (OMD) refers to mechanisms of moral disengagement manifested online (Maftei, Holman, and Merlici 2022). (Online) moral disengagement has been linked to adult perpetration of online risk behavior, including online aggression (Califano, Capasso, and Caso 2022; Nocera et al. 2022, 2022b). These studies indicate that perpetrators score higher on (online) moral disengagement mechanisms compared to those who are not involved in online aggression. Moreover, OMD was also found to explain relationships between more distal predictors, such as dark personality traits, and online aggression perpetration among adults (Nocera et al. 2022). However, in the study of Maftei, Holman, and Merlici (2022), OMD was positively associated with a specific form of online aggression, namely cyber-aggression through fake news, among adolescents (aged 11 to 18), but not among adults (aged 18 to 65).

Regarding age and OMD, there was little variation in OMD (as shown by the Standard Deviation) in the subsample 18 to 65-year-olds of the study of Maftei, Holman, and Merlici (2022), indicating that adults within this age group scored more or less the same regarding their agreement on the use of these strategies. No other studies were found that allowed comparison between a broad adult age range. There are, however, studies that have investigated concepts that are the opposite of (offline) moral disengagement among a broad age range, such as moral reasoning (e.g., Armon and Dawson 1997) and moral foundations (e.g., Castilla-Estévez and Blázquez-Rincón 2021). These studies seem to indicate a (small but steady) increase in the use of these (positive) moral strategies as adults age.

Taken together, (online) moral disengagement has been linked to adult perpetration of online aggression. However, this association was not found in all studies on this topic (e.g., Maftei, Holman, and Merlici 2022), indicating mixed findings and highlighting the need for more research. In addition, there are only limited findings available regarding the relationship between age and (online) moral disengagement. Based on related concepts, we could expect that older adults agree less with OMD strategies, compared to younger adults. It is not clear yet whether the relationship between moral disengagement and online aggression perpetration is present in all adults age cohorts and whether there are differences in the size of these relationships.

Method

Procedure and sample

To test relationships between age and (potential proximal determinants of) online aggression perpetration, a quantitative cross-sectional survey was administered among Belgian adults via Qualtrics. APA Ethical Guidelines for Research with Human Subjects were followed during data collection. Data were collected by a market-research facilitator, who distributed the survey link among their panel members. In total, 2,000 adults (53.9% female) aged 19–79 ($M_{age} = 49.89$, $SD_{age} = 16.93$) fully completed the online survey. The survey started with asking for active informed consent. The data were gathered in May 2022. Respondents received a compensation from the market-research facilitator for

their participation in the study. More precisely, they received credits that could be exchanged for vouchers for leisure activities. The study was approved by the Ethics Committee for the Social Sciences and Humanities of [UNIVERSITY BLINDED], approval number SHW_20_41.

Instruments

The questionnaire that was administered had a broader focus on adults' internalizing and externalizing problems. Only a part of the questionnaire was used for the present study. Most of the questions that were used for the present study originated from validated scales (see below). The existing scales were translated from English to Dutch and backtranslated, in order to detect possible language issues. The measures of the survey that are used in the present study are presented below in the same sequence as their appearance in the online survey. Mean scores for each measurement for each age cohort are presented in Table 2.

Online aggression perpetration and victimization

To measure involvement in online aggression, the European Cyberbullying Intervention Project Questionnaire (ECIPQ) was administered, which consists of 11 online aggressive acts, brought together by experts on online aggression (Del Rey et al. 2015). The scale consists of the following acts: (1) saying nasty things or calling names to a target online, (2) saying nasty things about a target to others online, (3) threatening a target online, (4) hacking into an account and stealing personal information of a target, (5) hacking into an account and pretending to be the target, (6) creating a fake account to pretend to be the target, (7) posting personal information of the target online, (8) posting embarrassing videos or pictures of the target online, (9) altering pictures or videos of the target and posting these online, (10) excluding and ignoring the target online, and (11) spreading rumors about the target online. Respondents were first asked to indicate how often they perpetrated in the past three months each of these 11 acts. Five answer options for measuring frequency were provided: never (1), once or twice (2), once a month (3), once a week (4), and more times a week (5). Next, respondents were asked how often they were involved in each of these acts as a victim in the past three months. For each respondent, a mean score for online aggression perpetration ($\alpha = .93$) and online aggression victimization ($\alpha = .92$) was calculated.

Acceptance of online aggression

After assessing respondents' involvement in online aggression perpetration and victimization, respondents were asked to indicate how acceptable they think these behaviors are toward people they know from the following social contexts (7 items): work (e.g., coworkers or other people you interact with in the context of your work), dating (someone you regularly date with or someone with who you have a steady romantic relationship), family (excluding your partner), friends, political context (e.g., politicians, a political leader, monarch, or persons who publicly support politicians, a political leader or a monarch), celebrities and influencers, and the commercial context (interactions with individuals working for a company/brand or other consumers/customers of a company/brand, excluding interactions in the context of your work). Different social contexts were included as adults interact with others in a wide variety of online social contexts. There might be online social contexts in which mechanisms such as (aggressive) social modeling and social learning (Bandura, Ross, and Ross 1961; Zimmerman 2012) and subjective norms in favor of online aggressive behavior (Pabian and Vandebosch 2014) are more common than in others, and, therefore, online aggression is more accepted in these contexts. For instance, research indicates that online aggressive acts toward public figures, such as celebrities, are more accepted compared to online aggression toward peers (Ouvrein, Vandebosch, and De Backer 2017).

For each social context, participants indicated their perceived acceptance on a scale ranging from 1 (totally unacceptable) to 7 (totally acceptable). For each respondent, a mean score of acceptance of online aggression ($\alpha = .92$) was calculated. To further test the one-factor structure of the newly compiled

measurement, a confirmatory factor analysis (CFA) was calculated in Mplus 7 with Maximum Likelihood estimation with robust correction for nonnormal distribution (MLR). The CFA with an acceptable fit (χ^2 (13) = 176.059, $p < .001$; CFI = .952; TLI = .922; RMSEA = .079, 90% CI = [.069–.090]; SRMR = .060) confirmed the one-factor structure with all standardized factor loadings above .55.

Online moral disengagement

The Moral Disengagement through Technology Questionnaire of Marín-López et al. (2020) was used to measure OMD. The scale consists of 16 items. The scale is based on the moral disengagement scale of Bandura et al. (1996) but adapted to online interpersonal interactions. The scale consists of four subscales, each measured with four items, namely, (1) moral justification through technology (e.g., "It is fine to insult or mock someone via mobile phone or the Internet to fight for something important"), (2) diffusion of responsibility through technology (e.g., "It is not fair to blame one person for doing harm through the mobile phone/Internet when many people do the same"), (3) distortion of consequences through technology (e.g., "Nothing really serious happens to people of whom everyone makes fun on the Internet or through mobile phones"), and (4) attribution of blame through technology (e.g., "People who are laughed at through mobile phones or the Internet are usually to blame"). The items were rated on a five-point Likert-type scale, ranging from 1 (strongly disagree) to 5 (strongly agree). For each respondent, a mean score for moral justification (α = .85), diffusion of responsibility (α = .74), distortion of consequences (α = .86), and attribution of blame (α = .76) was calculated. A CFA, calculated in Mplus 7 with MLR estimation, showed an adequate fit for the four-dimensional structure (χ^2 (97) = 687.251, $p < .001$; CFI = .949; TLI = .936; RMSEA = .055, 90% CI = [.051–.059]; SRMR = .041) with all standardized factor loadings of the four dimensions above .45.

Results

In total, 35.2% ($N = 704$) of the respondents admitted having behaved aggressively online at least once in the past three months. Similarly, 35.4% ($N = 708$) indicated to have been the victim of online aggression at least once in the past three months.

Table 1 displays the descriptives and the zero-order correlations between age and the main variables of the present study. The results of these correlation analyses showed that age is significantly negatively correlated with all variables, except for attribution of blame, for which a significant positive correlation was found. Older adults were less involved in online aggression perpetration and victimization, accepted

Table 1. Zero-order correlations between variables ($N = 2{,}000$).

	1	2	3	4	5	6	7	8
1. Age	/							
2. Online aggression perpetration	−.22***	/						
3. Online aggression victimization	−.19***	.81***	/					
4. Acceptance of online aggression	−.12***	.38***	.37***	/				
5. Moral justification	−.10***	.34***	.31***	.51***	/			
6. Diffusion of responsibility	−.08***	.30***	.26***	.47***	.75***	/		
7. Distortion of consequences	−.12***	.37***	.32***	.50***	.78***	.76***	/	
8. Attribution of blame	.18***	.17***	.15***	.36***	.61***	.63***	.58***	/
M	49.89	1.11	1.14	1.85	1.77	1.84	1.65	2.24
SD	16.93	.34	.36	.99	.72	.71	.71	.80
Range	19–79	1–5	1–5	1–7	1–5	1–5	1–5	1–5

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

online aggression less, and scored lower on moral justification, diffusion of responsibility, and distortion of consequences, compared to younger adults, whereas older adults devalue targets of online aggression more strongly as human beings and blame them more strongly for what is being done to them. Furthermore, the correlation analyses indicated that both online aggression perpetration and victimization are significantly positively associated with all included potential proximal determinants of online aggression perpetration. In other words, those adults that have been a perpetrator and/or victim more often in the past three months, scored higher on acceptance of online aggression and on all four moral disengagement strategies. Finally, online aggression perpetration and victimization were also significantly positive correlated with each other, meaning that those who perpetrated online aggression more frequently were also more frequently victimized themselves.

Comparing age groups for the main variables of the present study

To investigate age effects, the age cohort classification of Wang et al. (2019) was used, consisting of six age cohorts: 19–25 ($N = 238$, 11.9%), 26–35 ($N = 286$, 14.3%), 36–45 ($N = 226$, 11.3%), 46–55 ($N = 277$, 13.9%), 56–65 ($N = 603$, 30.2%), 66+ ($N = 370$, 18.5%). A bootstrapped multivariate analysis of variance (MANOVA) was conducted in SPSS (version 28) to assess the age differences in the main variables of the present study. Results showed an overall significant multivariate effect, Wilks $\Lambda = 0.83$, $F(35, 8365.19) = 10.585$, $p < .001$, η^2 $p = 0.036$. Bootstrapped follow-up analyses of variance (ANOVAs) showed a significant main effect of age categorization for all outcomes (Fs > 4,319, *p*s < .001), see Table 2. The means and standard deviations of each dependent variable of each age cohort are presented in Table 2. Inspection of the trends by looking at the means of the variables for each age cohort suggest linear (line) relationships, as well as quadratic (parabola) and cubic (S-shape) relationships between age and some of the variables.

The significance of a linear, quadratic, and/or cubic curve was tested using regression procedures with age as a continuous variable. In a first step, the linear effect of age was tested for each main variable, as shown in Table 3. These results are the same as the results of the zero-order correlations presented earlier. As a reminder, all variables correlated significantly negative with age, except for attribution of blame which correlated significantly positive with age.

In a next step, the quadratic effect of age was added to the regression analyses, as shown in Table 3. Adding this term resulted in significant linear and quadratic standardized regression coefficients for some of the variables, but not all of them. For the four OMD strategies, both significant linear and quadratic relationships between age and these variables were found. The quadratic relationships suggest a decrease in the scores of these variables as participants get older and then an increase, which matches a U-parabola. For the moral disengagement strategy attribution of blame, the means in

Table 2. Means and SDs for each age cohort for the main variables of the study and ANOVA results ($N = 2,000$).

	19–25 ($n = 238$) M (SD)	26–35 ($n = 286$) M (SD)	36–45 ($n = 226$) M (SD)	46–55 ($n = 277$) M (SD)	56–65 ($n = 603$) M (SD)	66+ ($n = 370$) M (SD)	F(df)= value, *p* value, η^2 p
Online aggression perpetration	1.25 (.02)	1.21 (.02)	1.11 (.02)	1.11 (.02)	1.06 (.01)	1.03 (.02)	F(5,1994) = 20,502, $p < .001$, .049
Online aggression victimization	1.28 (.02)	1.20 (.02)	1.15 (.02)	1.14 (.02)	1.09 (.01)	1.06 (.02)	F(5,1994) = 15.991, $p < .001$, .039
Acceptance of online aggression	2.12 (.06)	1.87 (.06)	1.93 (.07)	1.84 (.06)	1.81 (.04)	1.69 (.05)	F(5,1994) = 6.216, $p < .001$, .015
Moral justification	2.00 (.05)	1.77 (.04)	1.82 (.05)	1.68 (.04)	1.74 (.03)	1.72 (.04)	F(5,1994) = 6.569, $p < .001$, .016
Diffusion of responsibility	2.03 (.05)	1.83 (.04)	1.89 (.05)	1.79 (.04)	1.81 (.03)	1.80 (.04)	F(5,1994) = 4.319, $p < .001$, .011
Distortion of consequences	1.88 (.05)	1.68 (.04)	1.74 (.05)	1.60 (.04)	1.59 (.03)	1.57 (.04)	F(5,1994) = 7.758, $p < .001$, .019
Attribution of blame	2.14 (.05)	1.95 (.05)	2.15 (.05)	2.20 (.05)	2.30 (.03)	2.49 (.04)	F(5,1994) = 17.479, $p < .001$, .042

Table 3. Linear and quadratic relationships between age and the main variables ($N = 2{,}000$).

	Linear effect				Quadratic effect					Cubic effect					
	R^2	F (1,1998)	β age	Equation[a]	R^2	F (2,1997)	β age	β age^2	Equation[a]	R^2	F (3,1996)	β age	β age^2	β age^3	Equation[a]
Online aggression perpetration	**.047**	**98.04** ***	**−.22** ***	**Y= −0.004X + 1.328**	.048	50.50 ***	−.46 ***	.24	Y= −.009X + 0,000X^2 +1.426						
Online aggression victimization	**.036**	**75.35** ***	**−.19** ***	**Y= −0.004X + 1.338**	.037	38.89 ***	−.41 **	.22	Y= −.009X + 0,000X^2 +1.433						
Acceptance of online aggression	**.014**	**27.98** ***	**−.12** ***	**Y= −0.007X + 2.193**	.014	14.03 ***	−.16	.05	Y= −.009X + 0,000X^2 +2.245						
Moral justification	.009	19.03 ***	−.10 ***	Y= −0.004X + 1.977	**.015**	**15.34** ***	**−.58** ***	**.49** ***	**Y= −.025X + 0,000X^2 +2.396**	.017	11.17 ***	−1.61 *	2.66 *	−1.17	Y= −.068X + 0,001X^2 + −0,000X^3 +2.977
Diffusion of responsibility	.006	12.05 ***	−.08 ***	Y= −0.003X + 2.006	**.010**	**10.49** ***	**−.51** ***	**.43** *	**Y= −.021X + 0,000X^2 +2.371**	.010	7.05 ***	−.77	1.00	−.31	Y= −.032X + 0,000X^2 +0,000X^3 +2.52
Distortion of consequences	.015	29.98 ***	−.12 ***	Y= −0.005X + 1.908	**.019**	**18.97** ***	**−.52** ***	**.41** **	**Y= −.022X + 0,000X^2 +2.251**	.019	12.66 ***	−.40	.14	.14	Y= −.017X + 0,000X^2 +0,000X^3 +4.85
Attribution of blame	.032	65.32 ***	.18 ***	Y = 0.008X + 1.815	**.039**	**41.03** ***	**−.39** **	**58** ***	**Y= −.019X + 0,000X^2 +2.363**	.040	27.60 ***	−.91	1.68	−.59	Y= −.043X + 0,001X^2 +0,000X^3 +2.69

***$p < .001$, **$p < .01$, *$p < .05$; Results in **bold** present the best fitted model for each main variable. [a]All unstandardized regression coefficients are rounded to the nearest thousandth.

Table 2 show that the age cohort 26 to 35 scored lower on this variable compared to the neighbor age cohorts 19 to 25 and 36 to 45, and lower compared to all older age cohorts, meaning that 26 to 35-year-olds devalue targets of online aggression as human beings and blame them for what is being done to them the least. For the ages 36 to 66+, there seems to be a positive relationship between age and attribution of blame. The oldest age cohort (66+) had, on average, the highest score on attribution of blame.

Quadratic relationships were also found for the OMD strategies moral justification, diffusion of responsibility, and distortion of consequences. For these variables, the age cohort 26 to 35 scored again lower compared to the neighbor age cohorts 19–25 and 36–45. The youngest age cohort (19–25) had the highest scores for these three variables. For the other age cohorts (46–55, 56–65, 66+), a less clear trend can be observed. For moral justification and diffusion of responsibility, the age cohort 56–65 scored higher than its neighbor age cohorts 46–55 and 66 +. For distortion of consequences, the age cohort 46–55 scored higher compared to its neighbor age cohorts 56–65 (and 66+), but the mean sores are close to each other.

For all other main variables, excluding the four OMD strategies, the quadratic term was not significant, which indicates the existence of only a linear relationship between age and these variables. The means of the age cohorts show that the youngest age cohort, 19–25, is more frequently involved in online aggression perpetration and victimization, compared to the older age cohorts, and they accept online aggression more in different social contexts. Online aggression perpetration frequency, victimization frequency, and acceptance of online aggression in different contexts decreases as age increases.

In a final step, the cubic effect (S-shape) of age was added to the regression analyses with the four OMD strategies as dependent variables to further examine these non-linear relationships. None of the cubic regression coefficients were significant, indicating that the best degree for the polynomial for these variables is two and that the linear and quadratic regression coefficients represent the relationship the best.

Full model

To investigate the independent effect of age on online aggression perpetration, a path model was calculated with online aggression perpetration as dependent variable, and age, online aggression victimization, acceptance of online aggression, and the four OMD strategies as independent variables (see Figure 1). Moreover, indirect relationships between age and online aggression perpetration were tested, with online aggression victimization, acceptance of online aggression, and the four OMD strategies as potential mediators. Building further on the results of the earlier described regression procedures, observed age was entered into the model as a potential predictor of all included variables, the quadratic term of age was only included to predict the four OMD strategies. The path model was calculated using Mplus 7 with MLR estimation. The fit indices of the path model indicated a good fit: $\chi 2(3) = 2.582$, p=.461; CFI = 1.000; TLI = 1.001; RMSEA = 0.000, 90% CI[.000–0.036]; SRMR = 0.001. Table 4 present all (un)standardized coefficients of the included regression paths.

The explained variance of online aggression perpetration by the model was 67.5%. The path model showed direct associations between online aggression perpetration and age (β =-.05, p < .01), online aggression victimization (β =.75, p < .001), acceptance of online aggression (β =.04, p < .05), and the OMD strategy distortion of consequences (β =.09, p < .01). Age was also significantly associated with online aggression victimization (β =-.19, p < .001) and acceptance of online aggression (β =-.12, p < .001). In line with the bootstrapped MANOVA analysis, both age and its quadratic term were significantly associated with the four moral disengagement strategies. The indirect paths provided evidence for the mediating role of online aggression victimization and distortion of consequences in the relationship between age and online aggression perpetration. First, the results showed a significant indirect partly mediated

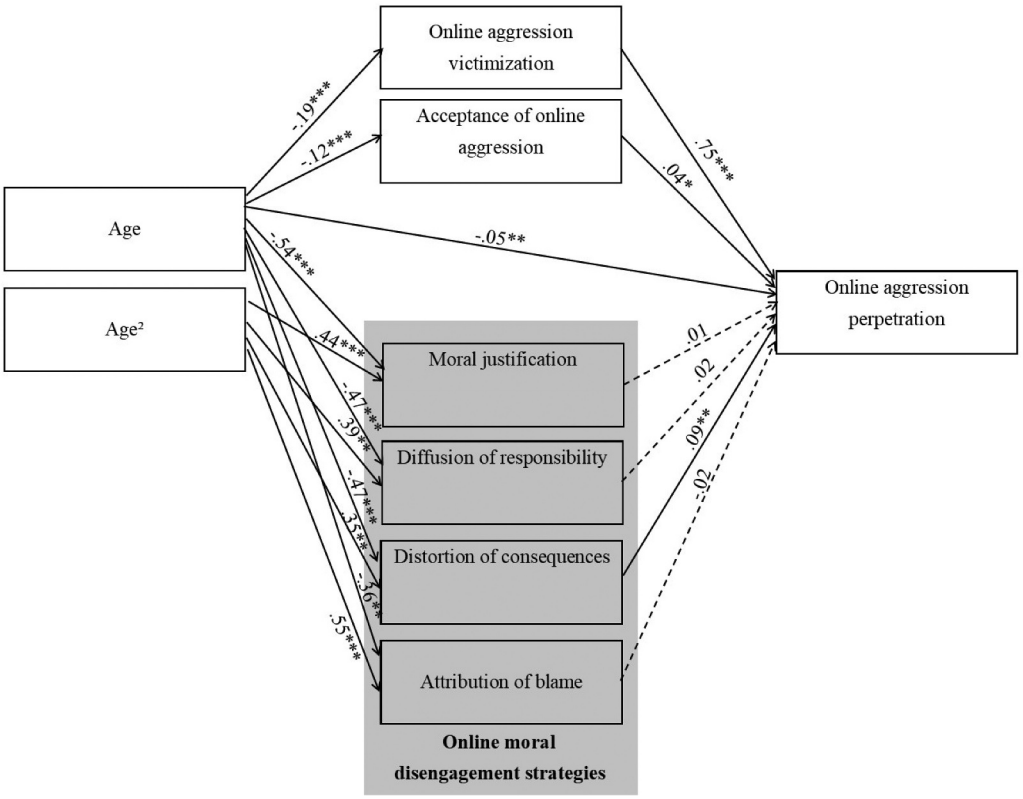

Figure 1. Standardized regression coefficients of the direct paths of the path model with age included ($N = 2{,}000$). Note. *$p < .05$, **$p < .01$, ***$p < .001$

relationship between age and online aggression perpetration via online aggression victimization (β =-.14, $p < .001$; 95% CI [−.18– −.11]). Second, the model showed a significant indirect partly mediated relationship between age and online aggression perpetration via distortion of consequences (β =-.04, $p < .05$; 95% CI [−.08– −.01]). Likewise, a significant indirect partly mediated relationship between the quadratic term of age and online aggression perpetration via distortion of consequences (β =.03, $p < .05$; 95% CI [.002–.06]) was also found. Finally, the path model showed that the indirect association between age and online aggression perpetration via acceptance of online aggression was borderline insignificant (β =-.005, $p = .05$; 95% CI [−.01 – .00]).

Regression coefficients for each age group

To calculate and test regression coefficients for each age group, the earlier described path model was calculated again for each age group, by means of a multigroup analysis, but without the age variables included in the model (without the (in)direct paths with age). In other words, a multigroup path model with MLR estimation was calculated in Mplus 7 with online aggression perpetration as dependent variable and online aggression victimization, acceptance of online aggression, and the four moral disengagement strategies as independent variables, split for the six age groups. Fit indices were not available for this model. The results are presented in Table 5. The explained variance of online aggression perpetration was for age group 18–25, 26–35, 36–45, 46–55, 56–65, and 66+ respectively 60.8%, 84.2%, 73.6%, 73.4%, 38.2%, and 25.3%. For all age groups, victimization was found to be significantly positively associated

Table 4. Full path model with age included ($N = 2{,}000$).

Path	B(SE)	Beta	95%CI Beta	*p*-value
Direct paths				
Age to OA perpetration	−.001(.00)	−.05	−.08 – −.02	.001
OA Victimization to OA perpetration	.72(.04)	.75	.69 – .81	.000
Acceptance of OA to OA perpetration	.02(.01)	.04	.01 – .08	.033
Moral justification to OA perpetration	.00(.01)	.01	−.04 –.06	.719
Diffusion of responsibility to OA perpetration	.01(.01)	.02	−.03 – .06	.470
Distortion of consequences to OA perpetration	.05(.02)	.09	.04 – .15	.002
Attribution of blame to OA perpetration	−.01(.01)	−.02	−.05 – .01	.250
Age to OA victimization	−.004(.00)	−.19	−.23 – −.15	.000
Age to Acceptance of OA	−.007(.00)	−.12	−.16 – −.07	.000
Age to moral justification	−.02(.01)	−.54	−.79 – −.29	.000
Age^2 to moral justification	.20(.06)	.44	.20 – .69	.000
Age to diffusion of responsibility	−.02(.01)	−.47	−.72 – −.21	.000
Age^2 to diffusion of responsibility	.17(.06)	.39	.14 – .65	.003
Age to distortion of consequences	−.02(.01)	−.47	−.73 – −.22	.000
Age^2 to distortion of consequences	.16(.06)	.35	.11 – .60	.005
Age to attribution of blame	−.02(.01)	−.36	−.63 – −.10	.007
Age^2 to attribution of blame	.27(.07)	.55	.29 – .81	.000
Indirect paths				
Age on OA perpetration via OA victimization	−.003(.00)	−.14	−.18 – −.11	.000
Age on OA perpetration via acceptance of OA	.00(.00)	−.01	−.01 – .00	.050
Age on OA perpetration via moral justification	.00(.00)	−.01	−.03 – .02	.720
Age^2 on OA perpetration via moral justification	.001(.002)	.00	−.02 –.03	.720
Age on OA perpetration via diffusion of responsibility	.00(.00)	−.01	−.03 – .01	.476
Age^2 on OA perpetration via diffusion of responsibility	.001(.002)	.01	−.01 – .02	.479
Age on OA perpetration via distortion of consequences	−.001(.00)	−.04	−.08 – −.01	.020
Age^2 on OA perpetration via distortion of consequences	.007(.003)	.03	.00 – .06	.038
Age on OA perpetration via attribution of blame	.00(.00)	.01	−.01 – .02	.277
Age^2 on OA perpetration via attribution of blame	−.002(.002)	−.01	−.03 – .01	.260

OA stands for online aggression.

with online aggression perpetration. The largest standardized regression coefficients for this relationship (Betas) were found in the age group of 26 to 35-year olds ($\beta = .87$, $p < .01$) and 36–45 ($\beta = .83$, $p < .001$), followed by the age group 46–55 ($\beta = .78$, $p < .001$), 18–25 ($\beta = .63$, $p < .001$), 56–65 ($\beta = .58$, $p < .001$), and, finally, 66+ ($\beta = .45$, $p < .001$). Acceptance was significantly positively associated with online aggression perpetration among respondents in the age groups 18–25 ($\beta = .15$, $p < .05$) and 66+ ($\beta = .16$, $p < .05$). The standardized regression coefficients showed little difference between these two age groups in the size of these associations. The OMD strategy moral justification was found to be significantly positively associated with online aggression perpetration only among respondents aged 56–65 ($\beta = .14$, $p < .001$), whereas distortion of consequences was significantly positively associated with online aggression perpetration only among respondents aged 46–55 ($\beta = .23$, $p < .05$). Attribution of blame was only in the age group 56–65 significantly negatively associated with online aggression perpetration ($\beta = -.07$, $p < .05$). The OMD strategy diffusion of responsibility was not found to be significantly associated with online aggression perpetration in all age groups.

Discussion

The aim of the present cross-sectional study was to investigate online aggression perpetration among a wide variety of adults in terms of age, as well as explain the relationships between age and online aggression perpetration in different adult age groups by looking at potential (proximal) determinants. The data revealed important age-related conclusions about online aggression perpetration.

The data showed that online aggression perpetration has a linear relationship with age. Younger adults perpetrate this behavior more frequently, and perpetration seems to diminish with age. These

Table 5. Predicting online aggression perpetration for each age group ($N = 2{,}000$).

	F-test	Variable	B(SE)	Beta	*p*-value
18–25 ($n = 238$)	$F(6,231) = 59.746$, $p < .001$	Victimization	.58(.09)	.63	.000
		Acceptance	.06(.03)	.15	.021
		Moral justification	.04(.05)	.08	.440
		Diffusion of responsibility	.04(.06)	.05	.557
		Distortion of consequences	.03(.04)	.06	.447
		Attribution of blame	−.03(.04)	−.05	.479
26–35 ($n = 286$)	$F(6,279) = 247.435$, $p < .001$	Victimization	.93(.06)	.87	.001
		Acceptance	.01(.02)	.02	.495
		Moral justification	.06(.04)	.08	.108
		Diffusion of responsibility	−.02(.03)	−.03	.374
		Distortion of consequences	.03(.04)	.04	.454
		Attribution of blame	−.01(.03)	−.01	.821
36–45 ($n = 226$)	$F(6,219) = 101.617$, $p < .001$	Victimization	.77(.11)	.83	.000
		Acceptance	−.01(.02)	−.02	.646
		Moral justification	−.03(.04)	−.06	.410
		Diffusion of responsibility	−.00(.03)	−.01	.924
		Distortion of consequences	.06(.04)	.14	.100
		Attribution of blame	.03(.02)	.06	.138
46–55 ($n = 277$)	$F(6,270) = 124.055$, $p < .001$	Victimization	.73(.10)	.78	.000
		Acceptance	.01(.02)	.03	.495
		Moral justification	−.06(.05)	−.11	.212
		Diffusion of responsibility	.04(.04)	.07	.335
		Distortion of consequences	.12(.05)	.23	.014
		Attribution of blame	−.02(.02)	−.05	.258
56–65 ($n = 603$)	$F(6,5961) = 61.369$, $p < .001$	Victimization	.49(.11)	.58	.000
		Acceptance	.01(.01)	.04	.429
		Moral justification	.04(.01)	.14	.000
		Diffusion of responsibility	.01(.01)	.02	.612
		Distortion of consequences	−.01(.02)	−.04	.440
		Attribution of blame	−.02(.01)	−.07	.004
66+ ($n = 370$)	$F(6,363) = 20.447$, $p < .001$	Victimization	.21(.04)	.45	.000
		Acceptance	.01(.01)	.16	.017
		Moral justification	−.01(.01)	−.06	.437
		Diffusion of responsibility	.01(.01)	.10	.246
		Distortion of consequences	.00(.01)	.02	.851
		Attribution of blame	.00(.01)	.01	.818

results are similar to most of the studies that investigated (a) form(s) of negative online behavior (Ševčíková and Šmahel 2009; Wang et al. 2019); however, these studies did not calculate other curve estimation statistics (i.e. quadratic and cubic). Barlett and Chamberlin (2017) questioned the linearity of the relationship between cyberbullying perpetration and age and found both linear and quadratic relationships (inverted U-parabola). No evidence for quadratic associations between age and online aggression perpetration was found in the present study.

The main goal of the present study was to explain the relationship between age and online aggression perpetration by looking at online aggression victimization, acceptance of online aggression in different contexts, and OMD strategies. First, correlation results indicated negative correlations between age and these potential risk factors of online aggression perpetration (except for attribution of blame, which correlated positively with age), and positive correlations between the potential risk factors and online aggression perpetration.

Second, our analyses showed that age groups differ from each other regarding their scores on these potential risk factors. For online aggression victimization and acceptance of online aggression, (only) a linear relationship with age was found, showing that young adults (19–25) are more frequently victimized and accept online aggression in different contexts more strongly, and that victimization frequency and the degree of acceptance are lower in older age groups. For victimization frequency, this finding was in line with the study of Wang et al. (2019) and partly with Ševčíková and Šmahel (2009). The latter also found the highest victimization rates among the youngest adult group and a decrease in victimization as age increases, except for the age cohort 50 +. However, the studies of Wang et al. (2019)

and Ševčíková and Šmahel (2009) did not test quadratic terms within the association of age and online aggression victimization. For the acceptance of online aggression, the existence of only a linear relationship with age and not a quadratic one was in contrast with the study of Barlett and Chamberlin (2017) in which both linear and quadratic (inverted U-parabola) relationships between age and cyberbullying attitudes were found. Furthermore, for the four OMD strategies, both linear and quadratic relationships with age were found, indicating that the scores on these variables follow a rather U-shaped trend in their relationship with age. Based on the available literature (e.g., Armon and Dawson 1997; Castilla-Estévez and Blázquez-Rincón 2021), we expected that older adults agree less with OMD strategies compared to younger adults, which seems only partly true, given the U-shaped trend.

Third, the path model among all adults showed that besides age, online aggression victimization, acceptance of online aggression and the OMD strategy distortion of consequences are potential risk factors of online aggression perpetration, meaning that adults who score higher on these factors are more frequently involved in online aggression perpetration. Note that causal conclusions cannot be made as the nature of our data was cross-sectional. Therefore, these variables might be potential risk factors, but they could (also) be outcomes of online aggression perpetration. Our results were in line with earlier research showing consistent associations between victimization and perpetration (e.g., Camacho et al. 2023; Camerini et al. 2020; Chan and Wong 2020; Lianos and McGrath 2017, Liu et al. 2022; Marciano, Schulz, and Camerini 2020; Zsila et al. 2019) and between attitudes and perpetration (e.g., Barlett and Chamberlin 2017; Jenaro, Flores, and Patricia FríFríAs 2018; Mussap, Clancy, and Klettke 2023; Pabian and Vandebosch 2014).

While controlling for the relationship between age and online aggression perpetration, the three other moral disengagement strategies (moral justification, diffusion of responsibility, and attribution of blame) were not found to be associated with online aggression perpetration among adults. In the study of Nocera et al. (2022), among adults aged 18 to 29, attribution of blame was also not associated with the four included forms of cyber aggression (deception, unwanted contact, public humiliation and malice). In their study, moral justification was only associated with malice and diffusion of responsibility only with deception. Future research on this topic might want to include and differentiate different forms of online aggression as some forms might be more driven by certain online moral disengagement beliefs than others. Furthermore, indirect associations showed that online aggression victimization, acceptance of online aggression in different contexts, and distortion of consequences can (partly) explain the relationship between age and online aggression perpetration as indirect relationships were found between age and online aggression perpetration via online aggression victimization and via distortion of consequences (mediators). Note that the indirect relationships between age and online aggression perpetration via acceptance of online aggression in different context was borderline insignificant ($p = .05$). These indirect findings show the need to further investigate the associations between these potential risk factors and online aggression perpetration for each age cohort separately.

In a final step of the analyses, the associations between the potential risk factors and online aggression perpetration were tested for each age group separately and the size of these relationships were compared between age groups. These analyses confirmed that there are different potential risk factors of online aggression perpetration in different age groups. We want to highlight again that our data were cross-sectional and therefore we cannot establish causal associations, meaning that (potential) risk factors can be outcomes of online aggression perpetration, instead of determinants, or both. For the youngest adult age group (18–25) and the oldest (66+), acceptance of online aggression in different contexts seems to be a risk factor of online aggression perpetration. This finding contrasts the results of the study of Barlett and Chamberlin (2017) where the attitude was found to be positively associated with cyberbullying perpetration among all included age cohorts (range 11–50+). Based on our study, it seems that for adults aged 26 to 65 acceptance of online aggression in different contexts is not related to perpetration of online aggression. Perhaps some of those adults with strong acceptance of online aggression in different contexts in this age group might perceive online aggression as "part of today's online world," but not feel the urge or have the need to perform this behavior themselves and/or protective factors might

impede performing this behavior, such as a busy family and/or work life. Distortion of consequences seems a potential risk factor of online aggression perpetration among adults aged 46–55, whereas moral justification and attribution of blame seems a potential risk factor of online aggression perpetration among adults aged 56 to 65. The absence of significant associations between OMD strategies and online aggression perpetration among the youngest adult age groups (18–25, 26–35, and 36–45) might be explained by literature indicating that younger age cohorts rather act out on impulse, to vent negative emotions, potentially coming from other sources (displaced aggression), without moral processes being activated (Vranjes et al. 2021). For all age groups, online victimization seems to be a moderate to strong potential risk factor for online aggression perpetration. This relationship was the strongest in the age group 26–36 and the lowest among 66 +. This might mean that younger adults feel a stronger urge to retaliate when they are victimized, compared to older adults.

The results of the present study have important theoretical implications, but also some limitations. Based on the results, it has become clear that researchers and practitioners that want to understand and diminish online aggression cannot treat adults as one group. If researchers want to understand online aggression perpetration, separate models need to be calculated for different adult age cohorts. In addition, tailored campaigns for different adult age groups are needed for effective intervention and/or prevention campaigns. For instance, if interventions want to change OMD beliefs, they need to focus on different types of OMD beliefs in different adult populations.

A first limitation of the study is that the data used for the present study were collected with a cross-sectional survey, and thus present a snapshot of online aggression involvement and potential proximal determinants of online aggression perpetration for each age cohort. The nature of these data does not allow to establish the directionality of the associations between online aggression perpetration and victimization, acceptance of online aggression, and OMD, and how online aggression involvement, attitudes, and OMD develop across the lifespan. Future generations might score differently on the main variables of the present study. In other words, the data of older age cohorts cannot be used to predict how younger age cohorts will behave online and how they think about online aggression in the future. It should also be noted that the current age cohorts differ from each other with regard to the role of ICT in their childhood and adolescence. While the youngest adult cohort (19–25) grew up with ICT since they were a child, ICT were slowly introduced and developed during childhood and adolescence of those in the age cohorts 26–35 and 36–45. Those in the age cohorts 46–55, 56–65, and 66+ did not grow up with ICT during childhood and/or adolescence and adopted technologies as adults. Whether or not adults grew up (partly) with ICT potentially influences how they behave online today and potentially has influenced our results.

Another limitation was that the present study included only a (small) selection of potential risk factors of online aggression perpetration. More research is needed including other potential proximal determinants of online aggression perpetration that were found in other studies but not yet investigated among a broad age range, such as the subjective norm or what relevant others think of online aggression (Pabian and Vandebosch 2014) and previous involvement in offline aggressive behavior (Kowalski, Toth, and Morgan 2018). Qualitative in-depth interviews among perpetrators could provide a better understanding of motivations to perpetrate within each age cohort. Related to this, the present study started from the observation that there are age differences in online aggression perpetration found in previous research and looked for explanations why these age differences exist, focusing on cognitions/cognitive processes. Future research might want to also consider investigating more closely other socio-demographics such as sex, race, education, and income.

A final limitation we want to address is about the measurement of online aggression perpetration and victimization that was used in the present study. Although the ECIPQ scale by Del Rey et al. (2015) is widely used to measure online aggression, it should be noted that the scale does not operationalize the harmful intention of the perpetrator in all items, nor does the scale operationalize the perception of harm by the victim. Therefore, the scale does not completely match with the definition of Grigg (2010) of online aggression, on which our study was based. Future research might want to match operationalizations more closely to definitions used.

Conclusion

The present study investigated online aggression perpetration among a broad age range of adults (19 to 79). The main aim was to investigate potential (proximal) determinants (in different adult age groups), including online aggression victimization, acceptance of online aggression in different contexts, and OMD strategies, to explain the relationship between age and online aggression perpetration. The results showed linear as well as quadratic relationships between age and (some of) the variables. The results of the path analyses and multigroup analyses showed that age groups differ from each other regarding their potential risk factors for online aggression perpetration. The results imply the need to differentiate adults for understanding adult online aggression perpetration and for the development of effective intervention and prevention campaigns. The results should be interpreted with caution as the temporal order of the associations could not be established, given the cross-sectional nature of the data.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the University Research Fund UAntwerp [grant number BOF.KP.41693].

Notes on contributors

Sara Pabian (Ph.D.) is Assistant Professor at the Department Communication and Cognition of Tilburg School of Humanities and Digital Sciences, Tilburg University (the Netherlands). Since 2011, she conducts research on different forms of online aggression, such as cyberbullying. Her research is focused on understanding why adolescents and adults are involved in online aggression, but she also looks at (long-term) outcomes of online aggression. She is also involved in research projects aimed at developing and testing technological intervention and prevention tools. Besides online aggression, Sara is interested in online persuasive communication, including influencer marketing.

Heidi Vandebosch is full professor at the Department of Communication Studies of the University of Antwerp (Belgium). She has been conducting research on cyberbullying since 2005. Heidi Vandebosch has investigated the prevalence of cyberbullying, the profiles of victims, bullies and bystanders, and the impact of this specific form of online aggression. She has also studied how cyberbullying can be addressed: what is the role of schools, parents, teachers, the police and social media platforms?; and how can technologies (e.g. reflective interfaces, automatic detection systems, digital serious games . . ..) be used to prevent, detect and solve cyberbullying?

References

Agnew, Robert. 1992. "Foundation for a General Strain Theory of Crime and Delinquency." *Criminology* 30(1):47–87. doi:10.1111/j.1745-9125.1992.tb01093.x.

Ajzen, Icek. 1991. "The Theory of Planned Behavior." *Organizational Behavior and Human Decision Processes* 50 (2):179–211. doi:10.1016/0749-5978(91)90020-T.

Anderson, Craig. A. and Brad J. Bushman. 2002. "Human Aggression." *Annual Review of Psychology* 53:27–51. doi:10.1146/annurev.psych.53.100901.135231.

Armon, Cheryl and Theo L. Dawson. 1997. "Developmental Trajectories in Moral Reasoning Across the Life Span." *Journal of Moral Education* 26(4):433–53. doi:10.1080/0305724970260404.

Bandura, Albert. 1986. *Social Foundations of Thought and Action: A Social Cognitive Theory*. Upper Saddle River, NJ: Pearson.

Bandura, Albert. 1999. "Moral Disengagement in the Perpetration of Inhumanities." *Personality and Social Psychology Review: An Official Journal of the Society for Personality and Social Psychology, Inc* 3(3):193–209. doi:10.1207/s15327957pspr0303_3.

Bandura, Albert, C. Barbaranelli, G. V. Caprara, and C. Pastorelli. 1996. "Mechanisms of Moral Disengagement in the Exercise of Moral Agency." *Journal of Personality & Social Psychology* 71(2):364–74. doi:10.1037/0022-3514.71.2.364.

Bandura, Albert, D. Ross, and S. A. Ross. 1961. "Transmission of Aggression Through Imitation of Aggressive Models." *The Journal of Abnormal and Social Psychology* 63(3):575–82. doi:10.1037/h0045925.

Barlett, Christopher P. and Kristina Chamberlin. 2017. "Examining Cyberbullying Across the Lifespan." *Computers in Human Behavior* 71:444–49. doi:10.1016/j.chb.2017.02.009.

Barlett, Christopher P. and Douglas A. Gentile. 2012. "Attacking Others Online: The Formation of Cyberbullying in Late Adolescence." *Psychology of Popular Media Culture* 1(2):123–35. doi:10.1037/a0028113.

Branson, Molly, March Evita, and Z. Marrington. Jessica. 2022. "Talkin' Bout My Generation: The Utility of Different Age Cohorts to Predict Antisocial Behavior on Social Media." in Pp. 27–42 in *Social Media and Technology Across the Lifespan*, edited by Tanya Machin, Charlotte Brownlow, Susan Abel, and John Gilmour. New York, NY: Palgrave Macmillan.

Califano, Giovanbattista, Miriam Capasso, and Daniela Caso. 2022. "Exploring the Roles of Online Moral Disengagement, Body Esteem, and Psychosexual Variables in Predicting Sexting Motivations and Behaviors." *Computers in Human Behavior* 129(107146):107146. doi:10.1016/j.chb.2021.107146.

Camacho, Antonio, Kevin Runions, Rosario Ortega-Ruiz, and Eva M. Romera. 2023. "Bullying and Cyberbullying Perpetration and Victimization: Prospective Within-Person Associations." *Journal of Youth and Adolescence* 52:406–18. doi:10.1007/s10964-022-01704-3.

Camerini, Anne-Linda, Laura Marciano, Anna Carrara, and Peter J. Schulz. 2020. "Cyberbullying Perpetration and Victimization Among Children and Adolescents: A Systematic Review of Longitudinal Studies." *Telematics and Informatics* 49:101362. doi:10.1016/j.tele.2020.101362.

Cardwell, Stephanie M. and Heith Copes. 2021. "Neutralization." in Pp. 451–64 in *The Cambridge Handbook of Compliance*, edited by Benjamin van Rooij and D. Daniel Sokol. Cambridge, UK: Cambridge University Press.

Castilla-Estévez, David and Desirée Blázquez-Rincón. 2021. "Age and Moral Foundations: A Meta-Analytic Approach." *The Spanish Journal of Psychology* 24(e41):e41. doi:10.1017/SJP.2021.35.

Chan, Heng Choon (Oliver) and Dennis S.W. Wong. 2020. "The Overlap Between Cyberbullying Perpetration and Victimisation: Exploring the Psychosocial Characteristics of Hong Kong Adolescents." *Asia Pacific Journal of Social Work and Development* 30(3):164–80. doi:10.1080/02185385.2020.1761436.

Crick, Nicki R. and Kenneth A. Dodge. 1996. "Social Information-Processing Mechanisms in Reactive and Proactive Aggression." *Child Development* 67(3):993–1002. doi:10.2307/1131875.

Del Rey, Rosario, José A. Casas, Rosario Ortega-Ruiz, Anja Schultze-Krumbholz, Herbert Scheithauer, Peter Smith, Fran Thompson, Vassilis Barkoukis, Haralambos Tsorbatzoudis, Antonella Brighi, et al. 2015. "Structural Validation and Cross-Cultural Robustness of the European Cyberbullying Intervention Project Questionnaire." *Computers in Human Behavior* 50:141–47. doi:10.1016/j.chb.2015.03.065.

De Marez, Lieven, Robbe Sevenhant, Floor Denecker, Annabel Georges, Gilles Wuyts, and Dimitri Schuurman. 2022. "Imec Digimeter 2022: Digitale Trends in Vlaanderen [Imec Digimeter 2022: Digital Trends in Flanders]." *Imec.be* Retrieved December 2, 2023 (https://www.imec.be/sites/default/files/2023-03/imec_digimeter_2022.pdf).

European Commission. n.d. "The EU Code of Conduct on Countering Illegal Hate Speech Online." *European Commission*. Retrieved March 23, 2023 (https://ec.europa.eu/info/policies/justice-and-fundamental-rights/combatting-discrimination/racism-and-xenophobia/eu-code-conduct-countering-illegal-hate-speech-online_en).

Ferenczi, Nelli, Tara C. Marshall, and Kathrine Bejanyan. 2017. "Are Sex Differences in Antisocial and Prosocial Facebook Use Explained by Narcissism and Relational Self-Construal?" *Computers in Human Behavior* 77:25–31. doi:10.1016/j.chb.2017.08.033.

Grigg, Dorothy Wunmi. 2010. "Cyber-Aggression: Definition and Concept of Cyberbullying." *Australian Journal of Guidance and Counselling* 20(2):143–56. doi:10.1375/ajgc.20.2.143.

Jenaro, Cristina, Noelia Flores, and Cinthia Patricia FríFríAs. 2018. "Systematic Review of Empirical Studies on Cyberbullying in Adults: What We Know and What We Should Investigate." *Aggression and Violent Behavior* 38:113–22. doi:10.1016/j.avb.2017.12.003.

Jiang, Mengtian, Hsin-yi Sandy. Sandy Tsai, Shelia R. Cotten, Nora J. Rifon, Robert LaRose, and Saleem Alhabash. 2016. "Generational Differences in Online Safety Perceptions, Knowledge, and Practices." *Educational Gerontology* 42 (9):621–34. doi:10.1080/03601277.2016.1205408.

Kowalski, Robin M., Allison Toth, and Megan Morgan. 2018. "Bullying and Cyberbullying in Adulthood and the Workplace." *The Journal of Social Psychology* 158(1):64–81. doi:10.1080/00224545.2017.1302402.

Lianos, Helen and Andrew McGrath. 2017. "Can the General Theory of Crime and General Strain Theory Explain Cyberbullying Perpetration." *Crime & Delinquency* 64(5):674–700. doi:10.1177/0011128717714204.

Liu, Tzu-Hsuan, Zhihao Ma, and Yiwei Xia. 2022. "Cyberbullying-Victimization Overlap Among Chinese University Students: Does Network Structure Matter?" *Crime & Delinquency* 68(13–14):2581–601. doi:10.1177/00111287211057856.

Maftei, Alexandra, Andrei-Corneliu Holman, and Ioan-Alex Merlici. 2022. "Using Fake News as Means of Cyber-Bullying: The Link with Compulsive Internet Use and Online Moral Disengagement." *Computers in Human Behavior* 127(107032):107032. doi:10.1016/j.chb.2021.107032.

Marciano, Laura, Peter J. Schulz, and Anne-Linda Camerini. 2020. "Cyberbullying Perpetration and Victimization in Youth: A Meta-Analysis of Longitudinal Studies." *Journal of Computer-Mediated Communication* 25(2):163–81. doi:10.1093/jcmc/zmz031.

Marín-López, Inmaculada, Izabela Zych, Rosario Ortega-Ruiz, Claire P. Monks, and Vicente J. Llorent. 2020. "Empathy Online and Moral Disengagement Through Technology as Longitudinal Predictors of Cyberbullying Victimization and Perpetration." *Children and Youth Services Review* 116(105144):105144. doi:10.1016/j.childyouth.2020.105144.

Miceli, Maria and Cristiano Castelfranchi. 2007. "Acceptance as a Positive Attitude." *Philosophical Explorations: An International Journal for the Philosophy of Mind and Action* 4(2):112–34. doi:10.1080/10002001058538711.

Musharraf, Sadia and M. Anis-Ul-Haque. 2018. "Impact of Cyber Aggression and Cyber Victimization on Mental Health and Well-Being of Pakistani Young Adults: The Moderating Role of Gender." *Journal of Aggression, Maltreatment & Trauma* 27(9):942–58. doi:10.1080/10926771.2017.1422838.

Mussap, Alexander J, Elizabeth M. Clancy, and Bianca Klettke. 2023. "Attitudes and Beliefs Associated with Cyberbullying and Non-Consensual Sexting in Cisgender and Transgender Adults." *Gender Issues* 40(1):65–85. doi:10.1007/s12147-022-09304-y.

Nocera, Taylor R., Eric R. Dahlen, Richard S. Mohn, Melanie E. Leuty, and Ashley B. Batastini. 2022. "Dark Personality Traits and Anger in Cyber Aggression Perpetration: Is Moral Disengagement to Blame?" *Psychology of Popular Media* 11(1):24–34. doi:10.1037/ppm0000295.

Nocera, Taylor R., Eric R. Dahlen, Alison Poor, Jacqueline Strowd, Amanda Dortch, and Erica C. Van Overloop. 2022. "Moral Disengagement Mechanisms Predict Cyber Aggression Among Emerging Adults." *Cyberpsychology: Journal of Psychosocial Research on Cyberspace* 16 (1). doi:10.5817/cp2022-1-6.

Ouvrein, Gaëlle, Heidi Vandebosch, and Charlotte J. S. De Backer. 2017. "Celebrity Critiquing: Hot or Not? Teen Girls' Attitudes on and Responses to the Practice of Negative Celebrity Critiquing." *Celebrity Studies* 8(3):461–76. doi:10.1080/19392397.2017.1307126.

Pabian, Sara and Heidi Vandebosch. 2014. "Using the Theory of Planned Behavior to Understand Cyberbullying: The Importance of Beliefs for Developing Interventions." *The European Journal of Developmental Psychology* 11 (4):463–77. doi:10.1080/17405629.2013.858626.

Politie, Federale. n.d. "Politiële Criminaliteitsstatistieken [Police Crime Statistics]." Retrieved March 23, 2023 (https://www.politie.be/statistieken/sites/statspol/files/statistics_files_upload/Criminalit%C3%A9%20-%20Criminaliteit/crimi_nl/01_Rapporten/01_Federaal/rapport_2022_trim2_nat_belgie_nl.pdf).

Runions, Kevin C. and Michal Bal. 2015. "Online Moral Disengagement, Cyberbullying, and Cyber-Aggression"." *Cyberpsychology, Behavior, and Social Networking* 18(7):400–05. doi:10.1089/cyber.2014.0670.

Ševčíková, Anna and David Šmahel. 2009. "Online Harassment and Cyberbullying in the Czech Republic: Comparison Across Age Groups." *Zeitschrift Für Psychologie Mit Zeitschrift Für Angewandte Psychologie* 217(4):227–29. doi:10.1027/0044-3409.217.4.227.

Sykes, Gresham M. and Favid Matza. 1957. "Techniques of Neutralization: A Theory of Delinquency." *American Sociological Review* 22(6):664–70. doi:10.2307/2089195.

Urie, Bronfenbrenner. 1979. *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge, Massachusetts: Harvard University Press.

Vandebosch, Heidi and Steven Eggermont. 2002. "Elderly Peoples Media Use: At the Crossroads of Personal and Societal Developments." *Communications* 27 (4). doi:10.1515/comm.2002.002.

Vranjes, Ivana, Elfi Baillien, Sara Erreygers, Heidi Vandebosch, and Hans De Witte. 2021. "You Wouldn't Like Me When I'm Angry: A Daily Diary Study of Displaced Online Aggression in Dual-Earner Couples." *Psychologie Appliquee [Applied Psychology]* 70(4):1463–91. doi:10.1111/apps.12283.

Wang, Meng-Jie, Kumar Yogeeswaran, Nadia P. Andrews, Diala R. Hawi, and Chris G. Sibley. 2019. "How Common is Cyberbullying Among Adults? Exploring Gender, Ethnic, and Age Differences in the Prevalence of Cyberbullying." *Cyberpsychology, Behavior and Social Networking* 22(11):736–41. doi:10.1089/cyber.2019.0146.

Wyckoff, Joy P., David M. Buss, and Arthur B. Markman. 2019. "Sex Differences in Victimization and Consequences of Cyber Aggression: An Evolutionary Perspective." *Evolutionary Behavioral Sciences* 13(3):254–64. doi:10.1037/ebs0000150.

Zimmerman, Adam G. 2012. *Online Aggression: The Influences of Anonymity and Social Modeling*. Jacksonville, Florida: University of North Florida.

Zsila, Ágnes, Róbert Urbán, Mark D. Griffiths, and Zsolt Demetrovics. 2019. "Gender Differences in the Association Between Cyberbullying Victimization and Perpetration: The Role of Anger Rumination and Traditional Bullying Experiences." *International Journal of Mental Health and Addiction* 17(5):1252–67. doi:10.1007/s11469-018-9893-9.