

The Other Side of the Screen: The Impact of Perspective-Taking on Adolescents' Online
Communication

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Abstract

Introduction: In recent decades, adolescents' interactions with peers have increasingly transitioned online. While socially interactive technologies provide multiple avenues for positive communication between peers, adolescents may experience harmful online peer interactions, with such interactions negatively impacting their well-being. A paucity of work exists investigating how adolescents' characteristics are related to their communicative choices on social media and if such choices can be influenced by cues to consider a recipient. Addressing this gap, this work examines experimental manipulations of perspective-taking and individual differences in socio-cognitive skills as they relate to adolescents' communicative choices online.

Method: Within individual sessions, 12- to 15-year-old Canadian participants ($N = 72$, 36 girls) viewed pictures of other adolescents on a simulated social media app similar to Snapchat and chose between pre-written aggressive or prosocial comments to send to a recipient under three conditions: a perspective-taking cue, a time-delay, no delay. Participants also completed self-report questionnaires assessing emotion regulation and empathy.

Results: Following perspective-taking cues, participants chose more prosocial comments to send compared to when participants were permitted to choose a comment immediately after viewing another adolescent's picture, while controlling for a brief time-delay. Adolescents' individual characteristics (e.g., Social Media Use, State Mood, Affective Empathy, Gender) were associated with their communicative choices online.

Conclusions: Findings from this work provide new insights into the ways adolescents navigate their complex and increasingly online peer interactions. Further, the results suggest that adolescents' social media communication is malleable with a brief perspective-taking cue to consider a recipient.

Keywords: adolescents; social media; perspective-taking; empathy; online communication; peer interactions

The Other Side of the Screen: The Impact of Perspective-Taking on Adolescents' Online Communication

In recent decades, adolescents' communication with peers has increasingly transitioned online, with 89% of youth reporting they are online constantly or several times per day (Pew Research Center, 2018a). Several features of online communication distinguish it from in-person communication, creating a unique interpersonal context, including asynchronicity, availability, permanence, cue absence, publicness, quantifiability of friendships, and visualness (Nesi et al., 2018). While these features are considered mechanisms by which positive communication is facilitated, they also cultivate an online environment conducive to negative interactions. With 59% of adolescents reporting experiencing negative online interactions (Pew Research Center, 2018b), understanding how adolescents navigate online communication is essential. In the present work, we examine the impact of prompting perspective-taking on adolescents' communicative choices on a social media app similar to Snapchat. Further, we examine associations between adolescents' gender, empathy, and emotion regulation with their communicative choices, while assessing and controlling social media use and mood.

Online Communication: Benefits and Risks

While social networking sites provide multiple avenues for positive peer communication (Valkenburg & Peter, 2011), adolescents also experience negative interactions. Depending on the nature of the interaction, adolescents' experiences online can be beneficial or harmful for their well-being (Best et al., 2014).

Speaking to the positive aspects, adolescents' time spent online is associated with a host of relational and emotional benefits, including higher-quality relationships, more time spent with friends in-person, enhanced romantic relationships, enhanced self-esteem, increased sense of

belonging, and less distress (Blais et al., 2008; Davis, 2012; Dolev-Cohen & Barak, 2013; Gomez-Baya et al., 2018; Valkenburg & Peter, 2007a). Yet, such benefits are affected by individual characteristics, in that adolescents with more competent social skills in offline contexts reap greater benefits and receive less negative feedback online relative to less socially skilled youth (Abbas & Mesch, 2018; Kraut et al., 2002; Koutamanis et al., 2015; Lee, 2009).

Indeed, there are darker sides to online communication, with just under half of adolescents reporting distress due to online “drama” and pressure to post socially-enhancing content (Pew Research Center, 2018c). In recent work, 42% of adolescents reported being called offensive names online, while 32% reported having a rumour spread about them (Pew Research Center, 2018b). Experiencing cybervictimization (i.e., intentional acts of aggression committed through means of social technologies; Álvarez-García et al., 2017) has been connected to a plethora of adverse social, emotional, behavioural, and academic outcomes for adolescents (Marciano et al., 2020; Nixon, 2014), with cybervictimization predicting depression, suicide, and social anxiety over and above in-person victimization (Bonanno & Hymel, 2013; van Geel & Vedder, 2020; Wigderson & Lynch, 2013).

The unique features of the online environment interact to create the online disinhibition effect (Suler, 2004), the tendency to be less restrained and concerned with the consequences of one’s behaviour online. This effect can result in positive consequences (benign disinhibition), such as relationship-enhancing self-disclosure; yet, it may also result in negative consequences such as perpetrating cybervictimization (toxic disinhibition; Charaschanya & Blauw, 2017). Indeed, this effect fosters risky and aggressive online communication, with social cue absence (e.g., lack of eye contact) being the strongest predictor of the toxic online disinhibition effect (Lapidot-Lefler & Barak, 2012). Interventions to compensate for the effects of social cue

absence by highlighting the recipients of online messages may play a pivotal role in facilitating more positive interactions among adolescents. Given the adverse outcomes associated with negative online experiences, such efforts are crucial.

Enhancing Online Communication

Interventions to facilitate positive interactions online have begun to explore the conditions that foster prosocial behaviour. Effective programs often involve virtual activities that encourage adolescents to adopt the perspectives of others (e.g., virtual reality; Nocentini et al., 2015). However, these programs involve substantial time and resources, and it is unclear whether briefer interventions within social media platforms might also facilitate more positive communication.

Van Royen and colleagues (2017) investigated whether reflective messages (i.e., brief prompts to consider the consequences of posting online) decreased aggressive online communication of 15-16 year-olds. After seeing a Facebook post (about promiscuity), participants who indicated they were “somewhat” to “very likely” to post an aggressive comment (i.e., “slut”) were randomly exposed to one of three reflective message conditions (i.e., indicating that comments would be read by parents, result in disapproval, or harm recipients). A brief time-delay between seeing the post to responding was also included to assess if the time taken to read the message, not the message itself, inhibited adolescents’ likelihood of victimization. Findings revealed a reduction in the intention to victimize others online in all conditions, including the time-delay.

The current study extends this meaningful work to adolescents’ most frequently used online social media app, Snapchat (Pew Research Center, 2018a), by investigating whether

prompting an adolescent to adopt the perspective of an unfamiliar peer who sent a picture in Snapchat influences their communicative choices.

User Characteristics and Online Communication

The online disinhibition effect has been found to influence online communication generally, though the characteristics of users (e.g., personality) are associated with the degree to which individuals are predisposed to the effects of online disinhibition (Suler, 2004).

Given that online communication lends itself to interaction styles in which the perspective or feelings of others are considered less than during in-person interactions, empathy may play a significant role in predicting online communicative behaviour. For instance, adolescents high in callous-unemotional traits exhibit more online disinhibition, which may be related to (reduced) empathetic capabilities (Wright et al., 2019). Empathy research frequently differentiates between affective empathy, experiencing others' emotions, and cognitive empathy, understanding others' emotions, with both playing a role in adolescents' online interactions (Barlińska et al., 2013). That is, in both in-person and online contexts, youth who victimize others are found to be less empathetic (Steffgen et al., 2011; Zych et al., 2019).

Emotion regulation, the ability to monitor, evaluate, and modify emotions, may too relate to adolescents' behaviour online (Thompson, 1994). Given the immediacy of social media, the ability to regulate one's emotional reactions may be an important factor in the prosociality of adolescents' behaviour online (Arató et al., 2020). Indeed, higher levels of frustration and negative affect elevate aggressive online behaviour (Bai et al., 2020), suggesting that emotion management may be associated with more prosocial communication. Evidence supports this notion, with perpetrators of cybervictimization rating themselves as proficient in perceiving others' emotional states while reporting challenges regulating and using their own emotions

(Baroncelli & Ciucci, 2014). While some emotion regulation strategies are considered adaptive, such as cognitive reappraisal (i.e., thinking about an experience differently), others are considered to be maladaptive, such as expressive suppression (i.e., inhibiting and concealing emotions; McMahon & Naragon-Gainey, 2018). Perpetrators of cybervictimization tend to utilize less adaptive emotion regulation strategies (den Hamer & Konijn, 2016).

Recent work suggests that gender is related to adolescents' susceptibility to online disinhibition, with boys experiencing the toxic online disinhibition effect more strongly than girls, thereby increasing the likelihood of behaving in an aggressive and uninhibited manner (Huang et al., 2020). Yet, the relationship between gender and online behaviour remains unclear, with some research suggesting that boys are more likely to perpetrate cybervictimization (Barlett & Coyne, 2014; Kiriakidis & Kavoura, 2010), while others show that girls engage in less prosocial behaviour than boys due to the relational nature of online contexts (Connell et al., 2014). Given these conflicting findings, the present work aims to investigate the role of participants' and, importantly, recipients', gender on a social media task, the latter being a factor often omitted in past work. If adolescents' behaviour online differs as a function of their gender or a recipients' gender, this must be considered in interventions to facilitate more positive interactions online.

Additionally, past research finds that adolescents' behaviour on social media may also be influenced by the amount of time they spend online. For instance, adolescents who spend more time online are more likely to be both perpetrators and targets of cybervictimization than targets alone (Ybarra & Mitchell, 2004). Further, negative mood states such as anger have been found to be specific predictors of aggressive online behaviour in adolescents (De Pasquale et al., 2021). Thus, both social media use and mood were controlled for in the current study.

While the above studies highlight the importance of examining the role individual differences on adolescents' online communication, gaps remain, including reliance on self-report measures rather than experimental tasks, despite findings that self-reports of social media behaviour are often inaccurate (Scharkow et al., 2016; Verbeij et al., 2021). Further, extant research often focuses on extreme behaviour (e.g., Van Royen et al., 2017), rather than communicative behaviours that fall within typical exchanges online (e.g., sarcastic remarks; Whalen et al., 2013), while neglecting control variables such as social media use and mood. These gaps must be addressed to inform interventions effective in facilitating more prosocial online communication among adolescents.

Present Investigation

This study's overarching purpose was to investigate how contextual and individual factors are associated with adolescents' communicative choices within social media. This aim was addressed by designing a simulated social media application (i.e., Snapchat), where participants viewed other adolescents' profiles and chose between pre-written aggressive or prosocial comments. More specifically, our first aim was to determine whether prompting perspective-taking would influence adolescents' communicative choices online. As Van Royen and colleagues (2017) found that a time-delay reduced online victimization, we also included a condition that involved a time-delay as well as a no-delay condition. We anticipated that prompts to consider the recipients' perspective would elicit more prosocial choices and that this gain would not just be attributed to a time-delay. Further, we examined whether the gender of a photo played a role in adolescents' communicative choices. Our second aim was to examine how adolescents' individual characteristics (i.e., gender, empathy, emotion regulation) related to their communicative choices online, controlling for mood and social media use. We anticipated that

those adolescents with greater empathy and more adaptive emotion regulation skills would endorse more prosocial communicative choices. Moreover, we hypothesized that girls would make more prosocial choices on the social media app than boys, given that past work finds that boys endorse riskier communicative choices (Mewhort-Buist et al., 2020).

Method

Participants

Adolescents aged 12- to 15-years-old were recruited for participation from a lab database¹ and research flyers distributed to local schools² in a medium-sized city ($N = 78$, $M_{age} = 13.33$, $SD = 0.96$; 39 girls). Data for six participants who reported neurodevelopmental diagnoses, including autism spectrum disorder ($n = 2$) and attention-deficit/hyperactivity disorder ($n = 4$) were excluded. The final sample consisted of 72 participants ($M_{age} = 13.32$, $SD = 0.99$; 36 girls). The majority of participants indicated that English was their first language (90%), and 91% of parents had a college degree or higher. In an open-ended question, the majority of the sample reported their ethnicity as Canadian (57%), while the rest of the sample varied considerably, with the second most commonly reported ethnicity being Chinese (7%).

Procedure

Caregivers completed a consent form and demographic questionnaire. Adolescents were tested individually during one 30-minute session.

Social Media Communication Task

Participants were told they would view pictures of others their age on a social media app similar to Snapchat, displayed on a tablet. The pictures were manipulated to depict ‘atypical’

¹ The lab database consists of families who expressed an interest in participating in research following community recruitment.

² Private and public schools in the region were contacted to distribute research flyers.

interests and appearances (e.g., violating gender or age norms; Ybarra et al., 2019). Adolescents' responses to these atypical pictures was the dependent measure of interest. However, pictures of 'typical' adolescents (i.e., no manipulation to characteristics) were included to make the task appear more naturalistic. There were 24 pictures of White adolescents in total (12 girls; 18 atypical; six typical).

There were three within-subject conditions under which participants viewed and responded to the stimuli (described below), with the order counterbalanced across participants. The pictures were blocked into three sets: participants saw one set of pictures within one condition before seeing another set in a different condition. The eight photos viewed within each of the sets were always presented in the same predetermined pseudorandom order, six pictures (three girls) of atypical adolescents and two pictures (one girl) of typical adolescents.

Upon clicking each trial, participants were shown a picture for five seconds. They were then exposed to one of three conditions before a taskbar prompting a response appeared at the bottom of the screen. Participants then choose a comment option to send to the recipient. In the No-delay condition, participants viewed comment options immediately after the taskbar appeared. In the Delay condition, participants viewed a loading symbol for nine seconds before they viewed response options. Finally, in the Perspective-taking condition, participants viewed a message (i.e., 'Put yourself in ____'s shoes. Imagine how ____ will feel receiving comments on their picture), that appeared on the screen nine seconds before viewing response options (Figure 1).

The two comment choices displayed with each trial were the same regardless of condition and included an aggressive response (conveying criticism), which appeared first, and a prosocial response (conveying support or friendliness), which appeared second. The pre-written comments

were piloted on an adolescent focus group, and comments were revised to reflect how adolescents typically ‘speak’ online.

Following participation, participants were informed that the recipients of their comments were fictitious individuals³.

Questionnaires

Control Variables.

Mood Rating Scale. To control for participants’ state mood, adolescents first completed the 9-point Self-Assessment Manikin (SAM; Bradley & Lang, 1994). The SAM is a visual scale that displays faces depicting negative (1) to positive (9) mood across a continuum. Due to its non-verbal nature, the SAM is well-established (Bynion & Feldner, 2017) and frequently used cross-culturally.

Social Media Use Questionnaire. Participants were asked how long they spend on social media during a typical day using a 7-point Likert scale ranging from 1 (*I do not use social media*) to 7 (*5 or more hours per day*). Participants were also asked to rate their familiarity with Snapchat on a 5-point Likert scale ranging from 1 (*very unfamiliar*) to 5 (*very familiar*). The time and familiarity variables were correlated ($r = .34$), and thus, a social media composite score was created by averaging z-scores.

Empathy and Sympathy Questionnaire. Participants completed the Adolescent Measure of Empathy and Sympathy (AMES; Vossen et al., 2015), a 12-item questionnaire for 10- to 15-year-olds. The AMES asks adolescents to report on their affective empathy, cognitive empathy, and sympathy using a 5-point Likert scale ranging from 1 (*never*) to 5 (*always*).

Subscales were scored by averaging responses to the four items within each subscale. The

³ Prior to debriefing, participants were administered three executive functioning tasks, described in the supplemental material.

AMES is a reliable measure, demonstrating an acceptable internal consistency for the subscales ($\alpha = .75-.86$; Vossen et al., 2015). For this sample, the AMES had acceptable internal consistency for the affective empathy subscale ($\alpha = .72$); however, the cognitive empathy ($\alpha = .69$) and sympathy subscales ($\alpha = .58$) were found to have low internal consistency and were excluded from analyses.

Emotion Regulation Questionnaire. Participants completed the self-report Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone & Taffe, 2012). The ERQ-CA is a 10-item questionnaire for youth aged 10- to 18-years-old to measure cognitive reappraisal and expressive suppression, using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Raw scores for each of the subscales were summed. The ERQ-CA has sound internal consistency and stability (Gullone & Taffee, 2012) on both ($\alpha = .75-.83$) subscales. For this sample, the ERQ-CA demonstrated sound internal consistency for both cognitive reappraisal ($\alpha = .78$) and expressive suppression ($\alpha = .80$).

Analytic Approach

Given the hierarchical nature of the data whereby social media task photos (level-1) were nested within participants (level-2), logistic multilevel models were conducted with a maximum likelihood estimator in SPSS Statistics (Nezlek, 2008; Snijders & Bosker, 2011; Statistics 26). Analyses were considered adequately powered to estimate unbiased regression coefficients, standard errors, and variance components as more than 50 units were available at the participant-level (Maas & Hox, 2005; Paccagnella, 2011). To minimize participant burden, while also taking into account suggestions to maximize statistical power at the within-persons level (Bell et al., 2010), we deemed 18 social media photos as optimal. Before carrying out analyses, continuous level-2 predictors (i.e., Age, State Mood, Social Media Use, and Affective Empathy) were grand-

mean centred, and Participant Gender was dummy-coded (Boy = 1, Girl = 0; Ronald et al., 2014; Snijders & Bosker, 2011). Additionally, two dummy codes were created for the binary level-1 predictor condition, with Perspective-taking as the reference group (Enders & Tofighi, 2007). The dependent variable used in all analyses was participants' raw response to each social media task photo (Prosocial = 1, Aggressive = 0). Improved fit of each model iteration was assessed using likelihood-ratio tests (Peugh, 2009; Snijders & Bosker, 2011), where a significant test indicates that the newer model with added predictors is a better fit for the data than earlier iterations. Further, Snijders and Bosker's (2011) model specification recommendations were followed, and accordingly, nonsignificant predictors were trimmed from the final model to avoid overfitting⁴.

Results

Descriptive and Preliminary Analyses

Prior to conducting analyses, it was determined that no variables violated normality assumptions (i.e., $|\text{skew}| \leq 3$; $|\text{kurtosis}| \leq 10$) or were outlying values (i.e., ± 3 SD) based on Kline's (1998) criterion. No missing values were identified. An item analysis was conducted to ensure participants were not responding differently to one or a few items (i.e., no item outliers were found).

Table 1 presents means and standard deviations for individual differences measures split by gender, and Table 2 presents bivariate correlations between individual difference measures and responses on the Snapchat app. On average, participants' number of prosocial and aggressive

⁴ The pattern of results is the same when the full model with all variables is analyzed. That is, significant predictors in the trimmed model are also significant within the full model.

responses across the 18 ‘atypical’ photos were 15.73 and 2.23, respectively⁵. Overall, 53% of the sample made at least one aggressive response. In terms of social media use, most adolescents reported being somewhat or very familiar with Snapchat (57%; see Figure 2a).

To examine whether the order of conditions affected responses on the social media app, independent t-tests were conducted between all possible order combinations. Participants who experienced the No-delay condition first (order: No-delay, Delay, Perspective-taking) made significantly more prosocial choices than those who received this condition last (order: Perspective-taking, Delay, No-delay), $p = .047$. However, this pattern did not hold when participants who viewed the No-delay condition first (order: No-delay, Perspective-taking, Delay) were compared to those who viewed it last (order: Delay, Perspective-taking, No-delay), $p = .243$. Further, no other order comparisons emerged as statistically significant, $ps > .059$. Thus, order was not considered further in the analyses.

Primary Analyses

An unconditional model was first conducted to determine the Intraclass Correlation (ICC) for the probability of prosocial choices. The ICC was 0.41, indicating that approximately 41% of the variability in probability of prosocial choices was due to between-person differences.

To test the first hypothesis, Condition and Photo Gender were entered as level-1 fixed effects with a random intercept (see Model 1 in Table 2). Photo Gender did not emerge as a significant predictor of prosocial choices ($B = 0.34$, $SE = 0.19$, $p = .623$) and was trimmed from the model. Likelihood ratio tests revealed that the addition of Condition significantly improved the model, $\chi^2(2) = 16.27$, $p < .001$. Specifically, the odds that a participant chooses a prosocial response was 0.64 times lower when they were in the No-delay condition compared to the

⁵ Participants’ proportion of prosocial choices for ‘atypical’ profiles was significantly lower than the ‘typical profiles’ ($p = .003$), suggesting that the design of the stimuli to elicit greater negative commentary was appropriate.

Perspective-taking condition, while controlling for when participants were in the Delay condition. Conversely, the probability of prosocial responding did not differ significantly when participants were in the Delay condition versus Perspective-taking condition or when participants were in the Delay condition compared to the No-delay condition ($B = 0.05$, $SE = 0.19$, $p = .800$). Overall, results indicate that, compared to when adolescents did not view a message, a perspective-taking prompt increased their prosocial choices. However, when adolescents' experienced a time-delay versus a perspective-taking prompt, there was no difference in their prosocial choices.

To test the second hypothesis, State Mood, Social Media Use, Participant Gender, Affective Empathy, Cognitive Reappraisal, and Expressive Suppression were added to Model 1 as level-2 fixed effects with a random intercept (see Model 2 in Table 2). To retain the most parsimonious model and avoid overfitting the model, Cognitive Reappraisal ($B = 0.07$, $SE = 0.05$, $p = .127$) and Expressive Suppression ($B = -0.05$, $SE = 0.06$, $p = .458$) were trimmed. Likelihood ratio tests showed Model 2 was a significantly better fit than Model 1, $\chi^2(4) = 210.90$, $p < .001$.

Results indicated that State Mood, Social Media Use, Participant Gender, and Affective Empathy emerged as significant predictors of the probability of prosocial choices. Specifically, the probability of choosing a prosocial response was 1.52 times greater for adolescents reporting higher state mood than the average of the sample. In contrast, the probability of making a prosocial choice was 0.54 times lower for adolescents higher than the sample mean on Social Media Use. Boys were 0.37 times less likely than girls to select a prosocial choice. Further, the probability of making a prosocial choice was 2.12 higher for adolescents with greater levels of affective empathy than the average of the sample.

Discussion

Perspective-taking and Communicative Choices

Consistent with our predictions, after viewing a brief perspective-taking message encouraging consideration of another adolescent's feelings (but not a time-delay), participants more often chose to send prosocial comments to a recipient, compared to when they were able to respond immediately. Reflecting on these findings, because there are fewer cues online that give insight into another's internal state, there may be a greater propensity to ignore the impact of a hurtful message for a recipient. Yet, actively taking the recipient's perspective may compensate for the otherwise paucity of social feedback provided within the online context. That is, the perspective of recipients may not have been automatically considered. Indeed, recent work suggests that perspective-taking is not automatic, yet it is elicited once perspective-taking cues are prompted (O'Grady et al., 2020). This pattern is in line with the online disinhibition effect (Suler, 2004), in that social cue absence may account for less prosocial behaviour (e.g., in No-delay condition), but that prompts to consider a recipient may diminish this effect. An alternative, but not mutually exclusive, explanation is that, when cued to consider the feelings of another, adolescents experience emotional congruence with recipients (i.e., sharing of emotions) and are more mindful about how an aggressive message could be hurtful. In turn, they may communicate more prosocially to mitigate any negative emotional consequences for recipients. Indeed, perspective-taking has been linked to increased prosocial reasoning and behaviour among adolescents (Eisenberg et al., 2001; Tamnes et al., 2018). Yet, this relationship has not yet been examined within social media platforms.

It is important to note that there were no significant differences between the Perspective-taking and Delay conditions. Although the present study is congruent with sample size

recommendations from simulation studies at the participant-level for multilevel modelling (Moineddin et al., 2007), it is possible the non-significant difference between the Delay and Perspective-taking condition is due to the restricted number of social media photos that participants saw. These restrictions were due to pragmatic considerations (i.e., participant burden) that are typical in applied multilevel research (Bell et al., 2010). Hence, future work should replicate the current findings with a larger sample and in a research design (e.g., experience sampling method) that allows for an augmented number of social media posts. This being said, past work has found that social media users report regrets after posting content fuelled by intense emotions and impulsivity (Wang et al., 2011), suggesting that delaying responses may change communicative behaviour. Indeed, Van Royen and colleagues (2017) found both reflective messages and a time-delay to be advantageous in promoting prosocial behaviour online. This suggests that merely slowing down adolescents' time to respond may cause them to adopt less impulsive communicative styles and consider their online behaviour more carefully. Importantly though, contrasting this notion, we did not find that a time-delay resulted in more prosocial comments relative to immediate responding. It is possible that methodological differences between our study and Van Royen and colleagues' (2017) study account for this difference (e.g., our stimuli were relatively benign versus conveying promiscuity; we proactively cued participants prior to their choice).

Individual Differences Associated with Adolescents' Communicative Choices

The second goal of the current study was to examine whether adolescents' characteristics were associated with their communicative choices online. While the focal variables were gender, empathy and emotion regulation, we also looked at adolescents' mood, and social media use to

examine if such factors were important for adolescents' communicative choices – with these findings reported first.

Mood and Social Media Use

Adolescents who reported a lower mood chose fewer prosocial comments on the social media task. While there are known associations between mood and aspects of various social functioning for online cybervictimization (Bonanno & Hymel, 2013; Olenik-Shemesh et al., 2012), the present findings are novel in that they show an association between mood and communicative behaviour in less extreme online exchanges. This being said, because we did not ask participants to report on their trait mood, it is difficult to know whether these findings relate to state-specific mood versus affective trait characteristics of adolescents.

Youth who reported greater familiarity with social media chose fewer prosocial comments on the social media task. Past work has shown that increased time spent online increases adolescents' risk of experiencing cybervictimization (Athanasίου et al., 2018). Thus, it may be the case that, over time, these adolescents become desensitized to the culture of negative communicative interactions on social media, and as a result, adopt critical communicative styles themselves. There is some work supporting this notion, albeit studying more extreme communicative behaviours. That is, adolescents who both experience and perpetrate cybervictimization (e.g., victim-perpetrators) are more likely to report being heavy users of the internet compared to adolescents who self-report only one experience (Ybarra & Mitchell, 2004). Future work could examine relations between exposure to social media, experiences of negative online interactions, and interpretations of various communication styles conveyed online.

Gender

A fixed effect of gender emerged, with girls endorsing more prosocial choices compared to boys. Past work has found mixed results with respect to the communicative styles of boys and girls in online contexts. For instance, some research has found that boys are most likely to perpetrate cybervictimization (Li, 2006), while other work has found that girls are more likely to perpetrate cybervictimization due to its relational nature (Connell, 2014). Further, several studies fail to find any gender differences in the communicative styles of boys and girls (Ang & Goh, 2010). The current findings provide some clarity demonstrating that girls make more prosocial choices within social media, at least in a Snapchat-like platform. This finding is consistent with traditional in-person communication literature, which finds that girls are typically more prosocial than boys and endorse less socially risky communicative strategies (Rose & Rudolph, 2006; Mewhort-Buist et al., 2020). This may be due to socialized gender stereotypes that encourage girls to adopt socially affiliative communicative strategies (e.g., cooperative), while boys are encouraged to be dominant and assertive (Koenig, 2018). It would be useful for further work to extend this inquiry to see if findings hold when adolescents are asked to provide comments on familiar peers' posts.

Empathy

We found that greater self-reported affective empathy was associated with more prosocial choices on the social media app, regardless of condition (and while controlling for other factors, such as gender). This finding, emerging in the context of a performance-based social media task, is consistent with past work relying on self-report (Valkenberg & Peter, 2007b) and examining more extreme online behaviours (e.g., cyberbullying; Ang & Goh, 2010). Adolescents with greater affective trait empathy skills may have a disposition to take the perspective of a social partner, and thus, be less prone to the online disinhibition effect. As we took the conservative

approach of removing cognitive empathy and sympathy from the analyses due to low reliability, we are limited in our ability to say whether affective empathy (versus cognitive empathy/sympathy) is uniquely important for online communication. This being said, the association we found between affective empathy and communication appears to emerge within different contexts, including face-to-face interactions wherein adolescents who report higher levels of empathy often demonstrate more prosocial behaviour within peer relationships (Boele et al., 2019; Padilla-Walker et al., 2015). Consistent with our fixed effect of condition (i.e., when perspective-taking was cued), the association between affective empathy and communicative choices suggests that promoting adolescents' affective empathy (e.g., through empathy training or through brief prompts) could lead to more prosocial online exchanges among peers.

Other Factors

Contrary to expectations, there were a few findings that did not yield significant effects. First, no differences emerged in regard to recipients' gender (i.e., whether the photo was of a girl or a boy). This finding suggests that adolescents interact similarly towards girls and boys in terms of their communicative choices on social media. Second, contrary to our predictions, emotion regulation was not found to be related to adolescents' choices on the social media app. We had predicted that adolescents with adaptive emotion regulation abilities would make more prosocial choices, as previous work has found that maladaptive strategies of emotion regulation are related to less prosocial behaviours within peer interactions (McMahon & Naragon-Gainey, 2018). However, this past work has studied emotion regulation within the context of cyberbullying (i.e., in contexts that may elicit strong emotions). It could be the case that because our manipulation included only a minorly negative valence and was in the context of unfamiliar peers, emotion regulation had less of a role.

Limitations and Future Directions

There are limitations of the present study that warrant mention. A central limitation was the use of pre-written forced-choice and unidirectional comments within the social media app. While this methodology allowed for the examination of adolescents' communication on social media in a controlled fashion, we were not able to examine spontaneous, adolescent-driven communicative responses. Further, although the experimenter purposely appeared busy during participation, it is possible that their presence affected participants' responses, particularly when receiving a perspective-taking prompt (e.g., cueing self-presentation). It is also important to note that the social media task utilized in this study involved interactions with unfamiliar peers, which is not as common for platforms such as Snapchat. This said, interacting with unfamiliar peers is common on several popular social media platforms such as Instagram and Reddit. Future work could adopt a more ecologically valid methodology (e.g., open-ended responses, absence of experimenter) to investigate the impact of perspective-taking prompts with familiar peers on more exclusive platforms such as Snapchat.

Further, the current study did not have a sufficient number of participants to study possible interactions between conditions and individual differences. For instance, it may be the case that prompting perspective-taking is more impactful for youth who would otherwise make more aggressive choices (e.g., those with greater social media use).

It is also important to recognize that there may be limitations to how findings generalize broadly. For instance, within the sample, there was limited ethnic diversity, and the education level of caregivers was higher than that reported for the region (Statistics Canada, 2016). There was also a lack of diversity in the stimuli, namely, with all pictures depicting White adolescents. While this allowed for greater consistency in the stimuli across conditions, it would not be

reflective of adolescents' social media networks. Given these limitations, the current study should be replicated with a larger, more diverse sample, including more diverse stimuli.

Conclusion

Recent work points to the importance of within-person characteristics for understanding adolescents' social media use (Beyens et al., 2020; Granic et al., 2020). The present study investigated how contextual and individual factors relate to adolescents' socio-communicative behaviour within a simulated Snapchat app. Adolescents made more prosocial choices after viewing perspective-taking messages. This finding, suggesting that prosocial behaviour on social media is malleable with a brief cue (albeit with a small effect size), has the potential to directly inform social media interventions to promote more positive interactions among adolescents, thereby potentially mitigating the adverse outcomes often associated with negative online peer interactions. The findings open up new avenues of research investigating the conditions that promote more prosocial online communication among adolescents. Future research should aim to investigate the impact of perspective-taking cues within social media platforms such as TikTok, Instagram, and Youtube, where online aggression frequently occurs (Williams, 2021). In regards to individual differences, after controlling for mood and social media use (both of which were associated with adolescent choices), girls and youth who had higher self-reported affective empathy chose more prosocial comments. Together, the findings from this research inform our understanding of the factors associated with adolescents' navigation of online communicative interactions on social media.

Table 1*Descriptive Statistics for Individual Differences Measures by Gender*

Measure	Girls			Boys			Full Sample		
	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range	<i>M</i>	<i>SD</i>	Range
State Mood	6.72	1.17	4 - 9	7.08	0.93	5–9	6.90	1.08	4 -9
Social Media Use									
Time Spent	2.36	1.74	0-6	2.17	1.96	0-6	2.26	1.85	0 – 6
Familiarity	3.39	1.44	1-5	3.25	1.63	1-5	3.32	1.53	1-5
Affective Empathy	3.58	0.67	2–5	2.74	0.53	1.5-3.75	3.16	0.74	1.50 – 5
Cognitive Reappraisal	21.31	4.21	13-29	20.50	3.72	13-26	20.90	3.97	13-29
Expressive Suppression	11.44	3.37	5-19	10.64	3.14	4-18	11.04	3.26	4-19

Table 2

Bivariate Correlations Between Individual Differences Measures and Choices on Social Media Application

Variable	1	2	3	4	5	6	7
1. State Mood	-						
2. Social Media Use	.02	-					
3. Affective Empathy	-.07	-.10	-				
4. Cognitive Reappraisal	.12	.01	.10	-			
5. Expressive Suppression	-.29*	-.03	.05	-.24*	-		
6. Participant Gender	.17	-.06	-.57**	-.10	-.13	-	
7. Participant Age	-.20	.23*	.19	-.01	.01	.04	-
8. Prosocial Choices	.15	-.23**	.47**	-.22**	-.84	.37**	.01

Note. Participant gender (Boy = 1; Girl = 0) and Choices (Prosocial response = 1; Aggressive response = 0) were dummy coded. Social Media Use represents the standardized average of reported time spent on social media and familiarity with Snapchat.

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

Table 3*Logistic Multilevel Models Predicting Probability of Prosocial Choices*

Fixed Effect	Model 1				Model 2			
	<i>B</i>	<i>SE</i>	<i>df</i>	R^2_{β}	<i>B</i>	<i>SE</i>	<i>df</i>	R^2_{β}
Intercept	2.87	0.26	70		3.43	0.36	66	
No-delay Condition	-0.45*	0.20	1293	<.01	-0.45*	0.24	1289	<.01
Delay Condition	-0.40	0.22	1293	<.01	-0.41	0.24	1289	<.01
State Mood					0.42**	0.15	56	.08
Social Media Use					-0.62**	0.22	63	.09
Participant Gender					-1.00*	0.48	64	.06
Affective Empathy					0.75**	0.29	61	.08

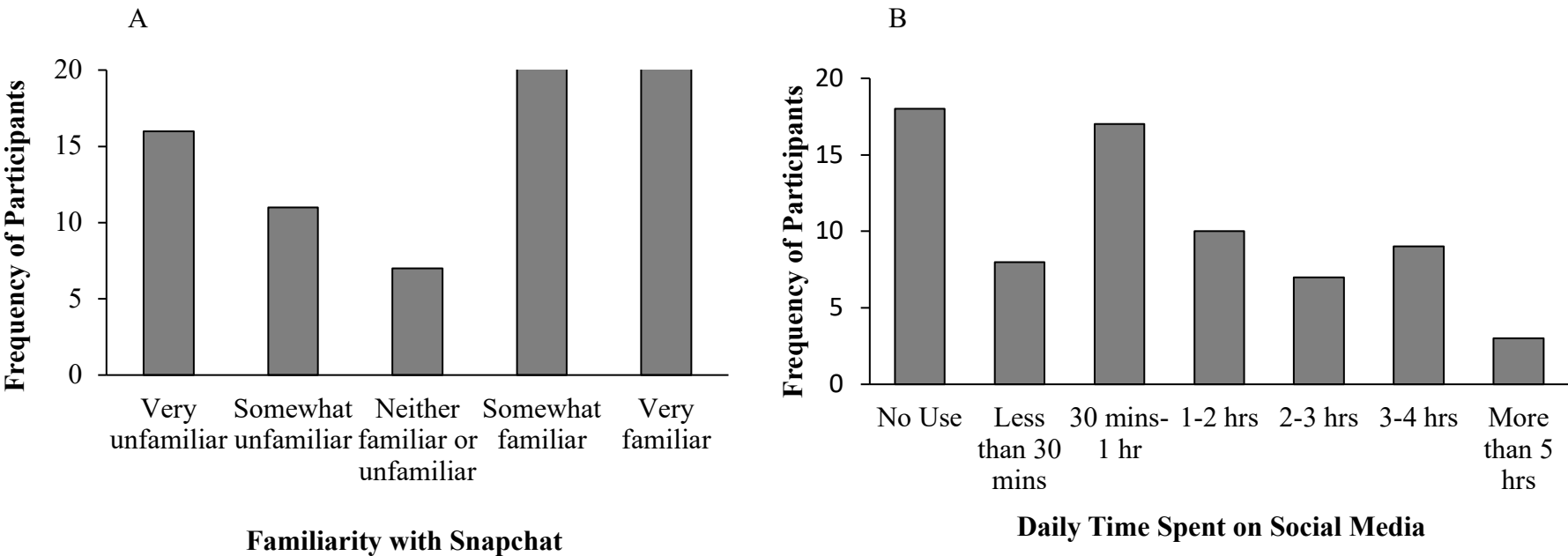
Note. *B*s represent the unstandardized regression coefficients. Condition was dummy-coded (i.e., No-delay condition, Delay condition) with the Perspective-taking condition as the reference group. Adolescent gender was also dummy coded (i.e., Boy = 1; Girl = 0). Continuous predictors were grand-mean centered. Effect sizes were estimated using semi-partial R^2 , whereby .10 = small effect, .30 = medium effect, and .50 = large effect.

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

Figure 1*Social Media Communication Task*

Note. Example of conditions within the social media task: No-delay (Panel A), Delay (Panel B), and Perspective-taking (Panel C).

Figure 2
Distribution of Self-Reported Familiarity and Daily Time Spent on Social Media



Note. Frequency of participant self-reported familiarity with Snapchat (Panel A) and weekly time spent (Panel B) on social media.

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