Spring 2023

The Impacts of COVID-19 on Friendship Reciprocity in Adolescents

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THE IMPACTS OF COVID-19 ON FRIENDSHIP RECIPROCITY IN

ADOLESCENTS

by

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A Thesis Submitted in Partial Fulfillment
of the Requirements for a Degree with Honors
(Psychology)

The Honors College

University of Maine

May 2023

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ABSTRACT

The current study looks at how COVID-19 affected adolescents' interpersonal relationships due to safety restrictions. Adolescent friendships are particularly important in adolescence (Yu and Deutsch, 2021; Adler & Adler, 1995; Parker et al, 2006). Emerging research suggests that interpersonal relationships were impacted during COVID-19 (Shoshani & Kor, 2022), but there is more to understand about precisely how adolescent friendships were impacted. Specifically, it is not known whether the onset of the pandemic impacted the number of reciprocated friendships, the stability of reciprocation in best friendships, and both positive and negative friendship quality in adolescents' lives. The current study tests whether these friendship indices were impacted during the early pandemic. Moreover, we do not know what factors may have been responsible for such changes. The current study further considers COVID-19-related media exposure and health anxiety as two possible factors influencing friendship changes. Although there were no significant changes observed from media exposure and or health anxiety, there were significant changes in best friend reciprocation pre-pandemic to post-pandemic. These findings suggest that having an in-person best friendship prior to the pandemic was crucial to maintaining that friendship through the pandemic.

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INTRODUCTION

<u>Onset of COVID-19 in Maine</u>

In November of 2019, the Coronavirus Disease (COVID-19) was first discovered in Wuhan, China. The initial origin of COVID-19 is still unknown, but many who were first infected were associated with the Huanan Seafood Wholesale Market in Wuhan. This market is known for selling live or recently killed birds, fish, and mammals (Burke & Wexler, 2022). COVID-19 began to spread globally, and the first recorded case in the United States was in January 2020.

Researchers found that COVID-19 is transmitted between humans through talking, singing, coughing, sneezing, or breathing as this exposes an uninfected person to the respiratory aerosols of the infected person. Because of how quickly COVID-19 spread, social distancing, face coverings, and isolation from public places began to be enforced. Eventually, there was a worldwide shutdown in March 2020. On March 15, 2020, Maine's Governor Mills declared a Civil State of Emergency and recommended that all public schools stop in person learning as soon as possible (Response Timeline, 2021). At the same time, many states began to implement shutdowns to stop the spread of COVID-19 (CDC Timeline, 2022). On March 31, 2020, there was an official "Stay Healthy at Home directive" issued by Governor Mils requiring Maine residents to stay at home unless there was an essential reason to leave; getting food, medicine, health care, etc. (Response Timeline, 2021). Many other countries also had isolation mandates, similar to the United States.

The lockdown also had a big impact on the global and local economy as many people began to work from home and, therefore, were not making in-store purchases. Our

world became virtual; doctors appointments, schools, social gatherings, even exercise was facilitated online. This abrupt shift to online living took a toll on the population's physical health, as many were unable to access equipment or participate in activities they would normally do to stay active (Siani & Marley, 2021). With this, a decrease in people's mental health was observed; this is perhaps not surprising, since physical health has shown to have impacts on mental health (Siani & Marley, 2021). Due to this, mental health became a bigger topic of conversation as many people became lonely and or depressed due to the isolation (Pierce et al, 2020). There were many people who were in isolation either alone or in difficult situations, such as domestic abuse, food insecurity, and other challenges (Parrott, 2022). Overall, this lack of socialization that many people experienced is thought to have created lasting effects on people's mental health (Pierce et al, 2020). One population that may have been particularly affected is adolescents. The following section discusses the developmental stage of adolescence and why this context may have been especially negatively impacted.

Social Relationships and Adolescence

Social relations are vital to adolescent development. There are many theories that attempt to explain the importance of these relationships. Although there are various perspectives with emphasis on different aspects of the friendships, they all recognize the significance of these types of relationships for adolescents (Parker et al, 2006). Underscoring just how much these relationships impact adolescent development is a study that found that high school students spend about 29% of their daily hours with

peers compared to 13% of their time spent with adults (Csikszentmihalyi & Larson, 1984).

There are various types of social relationships that can influence adolescent development. One important relationship for adolescents is the non parental adult. With evidence suggesting that adolescents have high rates of conflict with their parents, the non parental relationship can be very beneficial and influential for the adolescent. Specifically, a study found that this type of relationship aids developmental needs and self esteem issues (Yu and Deutsch, 2021). Another type of social relationship is friendship. These function as the foundation for adulthood and the dynamics of friendships influence the cohesion of their relationships (Adler & Adler, 1995). One type of relationship is cliques, also known as friendship circles. Researchers have observed that these types of groups function based on popularity and, because of this, often are considered to have power in relation to the other groups (Adler & Adler, 1995). Outside of academic settings, researchers have found that extracurricular activities including sports and clubs are important to adolescent friendships. Researchers found that these interactions are even more vital to maintaining friendships because these settings allow adolescents to have more of an opportunity to connect with their peers in a more meaningful way (Eder & Parker, 1987).

With this in mind, it's vital to understand how children interact with one another and the effects of these interactions on development. One way researchers have addressed this is to study the presence and qualities of friendships. General qualities of positive peer relationships are trust, compassion, and support, and negative correlates include dishonesty and arguing. These aspects influence peer perception; Children that are

viewed as friendly tend to be more helpful and prosocial whereas children that are viewed as aggressive are more inclined to have antisocial behaviors and future aggressive tendencies (Parker et al, 2006). These characteristics influence the reciprocity of the relationship. One study found that friendships with high levels of satisfaction had positive friendship qualities whereas those with low levels of satisfaction had negative qualities (Parker & Asher, 1993).

Peer relationships also have an effect on the self, as one of the most important aspects of these relationships is validation (Bukowski & Raufelder, 2018). Social acceptance into peer groups is vital to the development of adolescents. Studies have found that children who report high levels of loneliness were children who did not report having a best friend and children whose friendships had low levels of acceptance. This same study reported that the acceptance level of the child into the friend group was a strong negative predictor of loneliness (Parker & Asher, 1993). Another study examining loneliness in children found that children who are actively disliked in their peer groups are likely to experience more stress in their social lives (Cassidy & Asher, 1992). In understanding the importance of acceptance in friendships, we are able to better understand why friendship qualities are so important.

There are many different ways of assessing friendships, such as surveys, observations, and interviews. A common process of collecting friendship data is through sociometric assessment. This helps researchers gather information regarding who is friends with who and how peers perceive a given child (e.g., the participants' ratings of liked and disliked peers; Parker et al, 2006). Friendship nominations are a type of sociometric assessment that involves asking children to identify their friends from a list

of other children in the peer group. From this, researchers can determine the reciprocity of the friendships (Parker et al, 2006). Another frequent technique used in sociometric assessment is the use of a Likert-type scale where children can rank their classmates by how much they like the other child or how much a child exhibits a particular behavior (e.g., aggression). This scale typically ranges from "not at all" (1) to "a lot" (5). Another way to measure liking can be through a ranking-type scale where students are given a list of peers in their grade and told to rank them from their favorite to least favorite (Parker et al, 2006).

The current study considers whether friendships were impacted by the COVID-19 pandemic. From emerging research, it appears that the isolation that adolescents experienced during this time negatively impacted their social relationships as the only people they could safely interact with were the people they lived with. Specifically, one study found that during the lockdown, adolescents reported an increased use in screen time (i.e., TV, video games) and had significantly higher levels of anxiety, depression, and panic symptoms (Shoshani & Kor, 2022). Shoshani and Kor also found a decrease in the positive emotions, overall life satisfaction, social media use, and peer support (2022). The majority of their social interactions occur during school. Due to school being virtual during the height of COVID-19, they lost a lot of their social time. They became limited to socializing with whoever they isolated with and any friends they could text, call, and video calls. We think this has created not only lasting effects on their mental health but also has impacted their friendships; in reciprocity, quantity, and quality of these friendships. The current study will test whether changes in the number of reciprocal

friendships, whether the best friendship was reciprocated, positive friendship quality, and negative friendship quality were impacted by the pandemic.

Mechanisms of Change in Friendships

Besides distance from peers due to lockdown, there also could have been other factors that have impacted changes in adolescents' friendships. It is important to understand why these friendships may have changed over time. Changes in friendships prior to the pandemic could occur because of grade changes, diverging interests, or even how often someone sees someone else in their classes throughout the day. Due to the pandemic, a lot of the normal activities where friends would see one another changed. There was social distancing, masks, and many other safety precautions that prevented the entire world from living as they normally would. The current study considers two COVID-related variables, media exposure and health anxiety, as potential factors that may have influenced changes in friendship functioning early in the pandemic.

Media exposure could have been one of these factors that influenced their relationships. Media exposure can be defined as "the extent to which audience members have encountered specific messages or classes of messages/media content" (Slater, 2004, p. 168) Since the world was unable to socialize as they typically would, people turned to media. With the increased use in media, there came increased exposure to the reality of COVID-19. It was almost always on some sort of media page that it was nearly impossible to not hear about COVID-19 on a daily basis. Constant media exposure could have elevated COVID-related stress. One study found that COVID-19 related stress correlated with higher levels of loneliness and depression, specifically those who reported

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spending more time on social media platforms (Ellis et al., 2020). Media exposure could impact friendships based on the content that is being viewed. If friends are viewing similar content and/or a similar amount of content, then this could result in more to talk about and/or create more conflict if the friends' views on the topics differ. If there is different content being accessed by the friends or differing amounts of exposure, this could also either create conflict or facilitate conversations about different topics (Pouwels et al., 2021).

With this increase in media exposure came the possibility of increased health anxiety– the constant worry of getting ill that can become obsessive (NHS, 2020). Health anxiety can impact a person's level of functioning, creating even more anxiety and fear. People knew so little about COVID-19 at the time–what it was, where it came from, and how to stop it. This intense wave of anxiety seemed to spread worldwide. The fact that typical activities were limited and media exposure was high may have contributed to increased health anxiety. If an adolescent's household was very cautious and anxious about COVID-19, adolescents may have developed more health anxiety. This could have strained friendships, if one friend was more cautious than the other.

The Current Study

The current study aimed to extend the available research and further explore the impact of COVID-19 on adolescents' friendships early in the pandemic. Using a large sample of middle- and high-school adolescents, the association between adolescents' pre-pandemic friendship adjustment and post-pandemic-onset friendship adjustment was

examined as a function of COVID-19-related media consumption and COVID-19-related health anxiety.

The first research question was: how did friendships change from pre-pandemic to post-pandemic onset? Changes in friendship adjustment from pre- (January 2020) to post-pandemic onset (June 2020) were compared to changes observed during a comparable time interval occurring prior to the pandemic (October 2019 to January 2020). Four friendship variables were considered: changes in the number of reciprocated friendships (consistency of mutual friendships), changes in best friend reciprocation (consistency of best friend status), positive friendship quality (e.g., support, companionship, validation), and negative friendship quality (e.g., conflict). It was hypothesized that the change in friendship functioning would be greater from January 2020 to June 2020 than it would be from October 2019 to January 2020, due to the onset of the pandemic in March 2020.

The second research question was: did the amount of COVID-19-related media consumption and/or health anxiety impact changes in friendships from pre-pandemic to post-pandemic onset? It was hypothesized that increased media consumption or health anxiety would negatively impact friendship reciprocity in each case.

METHOD

Participants

Data were collected from adolescent students from two middle and two high schools in rural Maine. These participants were drawn from data collected during the first year (2019-2020) of an ongoing project that looks into rural adolescents' socioemotional health (Schwartz-Mette, et al., in press). In the first year of the project, consent forms were received back from 766 of the 1,248 possible participants (61.4%). From this, 572 received parental/guardian consent (74.7%) and 194 denied (25.3%). For inclusion in the current project, participants had to contribute EMA data; thus, the final sample for the current project was 362 (middle school M age = 12.61 years, SD = 0.93; high school M age = 16.04 years, SD = 1.16). Participants reported their gender identity (63.4% females, 33.0% male, 3.7% non-binary), sexual orientation (79.9% heterosexual, 20.1% sexual minority) and racial/ethnic identity (76.4% white, 2.1% American Indian/Alaskan Native, 4.9% Asian, <1% Black, or <1% Hawaiian or Pacific Islander, 6.0% more than one race; 3.5% Hispanic/Latinx; 9.8% not reported).

Procedure

Consent was obtained from the participant's parent/guardian as well as youth assent. Pre-pandemic surveys were distributed at school in the fall (Time 1) and winter (Time 3). Participants were able to complete the EMA during the first week of the statewide shutdown of schools during March 2020 (Time 4) and were able to complete a final survey in June 2020 online (Time 5). Compensation was given to participants in the form of E-gift cards after each part of the project (Time 1: $10, Time 3: $10; Time 4: $20,

Time 5: $15). The larger project involved a Time 2 assessment that was not relevant to the current study.

<div align="center">Survey Measures</div>

Demographics.

Participants reported their age, grade, gender identity, sexual orientation, racial identity, and ethnic identity.

Sociometric Friendship Nominations.

Each participant selected up to 10 friends from all the students in their grade. From this, they picked their best friend. The list of friends from each participant were compared to one another to determine whether or not the friendships were reciprocated. Each participant received a score for the number of reciprocated friendships at each time point and a dichotomous score for whether or not the best friendship was reciprocated (0 = no, 1 = yes).

Friendship Quality.

The Network Relationships Inventory (NRI) was used to observe individual perceptions of participants' friendship qualities. From this, researchers can explore how interactions, negative and positive, impact friendship relationships. Each participant received a score for positive friendship quality (T1 α = .95, T3 α = .95, T5 α = .95) and negative friendship quality (T1 α = .89, T3 α = .90, T5 α = .91) at each time point.

Ecological Momentary Assessment (EMA).

EMA was used to assess the amount of media consumption related to COVID-19 and health anxiety related to COVID-19 that participants experienced each day. EMA surveys were administered to participants via smartphone app or computer survey for

seven days, three times a day (Schwartz-Mette et al., in press). These data were obtained during the first week of the statewide school shutdowns due to COVID-19 in March 2020.

COVID-19 Media Consumption.

Participants reported on the number of hours and minutes of media (e.g., news, social media) they consumed related to COVID-19 since the last EMA prompt. A daily average was calculated, and media consumption scores were the mean of daily averages during the EMA period.

COVID-19 Health Anxiety.

Health anxiety regarding COVID-19 was measured using the EMA. Those with high health anxiety indicated worries about oneself and or others getting infected by the virus and having health problems because of this. This could also indicated a sense of helplessness during this time which could lead to depression and or suicidal thoughts (Schwartz-Mette et al., in press). A 1-5 rating scale was used reflecting the extent to which participants were anxious about COVID-19, where 1: not at all to 5 very much. A daily average was taken, then averaged across days to get an overall average during the EMA period.

<div align="center">Data Analysis Plan</div>

Research Question 1: How did friendships change from pre-pandemic to post-pandemic onset?

To test differences between average number of reciprocated friendships at Time 1 versus Time 3 (and at Time 3 versus Time 5), a series of paired (dependent) samples t tests were conducted to compare means across the various time points.

To assess changes in best friend reciprocation across Time 1 to Time 3 and from Time 3 to Time 5, a pair of logistic regression models were tested, as the outcome variable was dichotomous (i.e., best friendship was reciprocated or not). In the first model, Time 1 number of best friend reciprocations was the independent variable, and Time 3 number of best friend reciprocations was the dependent variable. In the second model, Time 3 number of best friend reciprocations was the independent variable, and Time 5 number of best friend reciprocations was the dependent variable.

A series of paired, simple linear regression models were used to examine changes in friendship quality across the 2019-2020 academic year. Specifically, one model in each pair examined changes from Time 1 (October 2019 to Time 3 January 2020), and the second model examined changes from Time 3 to Time 5 (January 2020 to June 2020).

In the first pair of regression models, positive friendship quality was examined. In the first model, Time 1 number of positive friendship qualities was the independent variable and Time 3 number of positive friendship qualities was the dependent variable. In the second model, Time 3 number of positive friendship qualities was the independent variable and Time 5 number of positive friendship qualities was the dependent variable.

In the second pair of regression models, negative friendship quality was examined. In the first model, Time 1 number of negative friendship qualities was the independent variable and Time 3 number of negative friendship qualities was the dependent variable. In the second model, Time 3 number of negative friendship qualities was the independent variable and Time 5 number of negative friendship qualities was the dependent variable.

A series of moderated regression models were then tested to examine whether media consumption and/or health anxiety impacted changes in friendships from January 2020 to June 2020. A total of 8 moderated regressions were tested; two moderation models (one each for media consumption and health anxiety) were tested for each of the 4 friendship variables (number of reciprocated friendships, best friendship reciprocation, positive friendship quality, and negative friendship quality). In each model, the Time 3 friendship variable, the moderator (media consumption or health anxiety), and the interaction between the moderator and the relevant Time 3 variable were the independent variables, and the Time 5 friendship variable was the dependent variable.

RESULTS

Descriptive Statistics

Means and standard deviations were calculated for all study variables. These

descriptive statistics are presented in Table 1. On average, participants had 3.41, 3.63,

and 2.94 reciprocated friendships at Times 1, 3, and 5, respectively. Approximately 29%

of participants had a reciprocal best friend at Time 1, with 31.2% and 25.4% at Times 3

and 5 respectively. Participants reported having moderate levels of positive friendship

quality and low levels of friendship conflict at each time point. In terms of health anxiety,

youth reported low-to-moderate levels, and participants reported an average of

approximately 45 minutes per day of COVID-related media exposure.

Correlations

Correlations among all study variables are presented in Table 1. The Time 1

values of each positive index of friendship functioning (number of reciprocal friends, best

friendship reciprocation, and positive friendship quality) was positively and significantly

correlated with the Time 3 and Time 5 values of that index. Significant, positive

intercorrelations among the positive indices of friendship functioning within and across

the three time points also were observed, with the exception of the non significant

correlation between Time 5 number of reciprocal friendships and Time 1 positive

friendship quality. Intercorrelations among the three negative friendship quality scores

also were positive and significant. Negative friendship quality was not correlated with

any positive index of friendship functioning at any time point. Media exposure was

negatively correlated with the number of reciprocal friends at Time 1 and Time 5 and

with best friend reciprocation at Time 3, and media exposure was positively correlated with negative friendship quality at Time 1. Health anxiety was not significantly correlated with any study variables.

Research Question 1: How Did Friendships Change From Pre-Pandemic to Post-Pandemic Onset?

Number of Reciprocal Friends

Paired samples t tests were conducted to compare T1 number of reciprocal friends with T3 number of reciprocal friends. The number of participants with data for the number of reciprocal friends at both Time 1 and Time 3 was 420. At Time 1, the mean number of reciprocal friends was 3.83; at Time 3, the mean number of reciprocal friends was 3.65. The difference in means was statistically significant, $\beta = .66$, $p < .001$.

We next compared T3 number of reciprocal friends with T5 number of reciprocal friends. The number of participants contributing reciprocated friendship data at both Time 3 and Time 5 was 274. At Time 3, the mean number of reciprocal friends was 3.91; at Time 5, the mean number of reciprocal friends was 3.00. The difference in means was statistically significant, $\beta = .67$, $p < .001$. The reduction in mean number of friends from Time 1 to Time 3 was .18, and the reduction from Time 3 to Time 5 was .91, suggesting that greater decreases in mean number of reciprocal friendships were observed during the time frame in which participants experienced onset of the pandemic.

Best Friendship Reciprocation

Regarding changes in best friendship reciprocity from Time 1 to Time 3, Participants with a reciprocal best friend at Time 1 were .077 times more likely than participants without a reciprocal best friend at Time 1 to have a reciprocal best friend at Time 3, $p < .001$. Interestingly, participants with a reciprocal best friend at Time 3 were 13.08 times more likely to also have a reciprocal best friend at Time 5, as compared to those without a reciprocal friend at Time 3, $p < .001$. These results suggest that having a reciprocal best friendship at Time 3 had more of an impact on later best friendship reciprocity after onset of the pandemic than before.

Positive Friendship Quality

In the first model, Time 1 positive friendship quality predicted positive friendship quality at Time 3 ($\beta = .57$, $p < .001$). In the second model, Time 3 positive friendship quality predicted adolescents' positive friendship quality at Time 5 ($\beta = .69$, $p < .001$), and this effect was stronger than the effect observed from Time 1 to Time 3.

Negative Friendship Quality

In the first model, Time 1 negative friendship quality predicted negative friendship quality at Time 3 ($\beta = .45$, $p < .001$). In the second model, Time 3 negative friendship quality predicted adolescents' negative friendship quality at Time 5 ($\beta = .49$, $p < .001$), and this effect was similar to the effect observed from Time 1 to Time 3.

Research Question 2: Did The Amount of COVID-19-Related Media Consumption and/or Health Anxiety Impact Changes in Friendships From Pre-Pandemic to Post-Pandemic Onset?

To test whether media consumption and/or health anxiety moderated changes in friendships from January 2020 to June 2020, a series of moderated regression models were tested.

Number of Reciprocal Friends

Media Exposure. The main effect of the number of reciprocated friendships at Time 3 was significant (b = .61, $p < .001$), but the main effect of media exposure was not significant (b = .00, $p = .81$). The interaction between Time 3 number of reciprocated friendships and media exposure also was not significant (b = .00, $p = .51$), suggesting that the relationship between Time 3 and Time 5 number of reciprocated friendships does not depend on media exposure.

Health Anxiety. The main effect of the number of reciprocated friendships at Time 3 was significant (b = .51, $p < .001$), but the main effect of health anxiety was not significant (b = -.01, $p = .94$). The interaction between Time 3 number of reciprocated friendships and health anxiety was also not significant (b = .04, $p = .36$), suggesting that the relationship between Time 3 and Time 5 number of reciprocated friendships does not depend on health anxiety.

Best Friendship Reciprocation

Media Exposure. The main effect of Time 3 best friend reciprocation was significant (b = 2.21, $p < .001$). However, neither the main effect of media exposure (b = -.02, $p = .23$) nor the interaction was significant (b = .02, $p = .14$). This suggests that the

effect of Time 3 best friend reciprocation on Time 5 best friend reciprocation does not depend on media exposure.

Health Anxiety. The main effect of Time 3 best friend reciprocation was significant (b = 1.88, $p < .05$). However, neither the main effect of health anxiety (b = -.06, $p = .83$) nor the interaction was significant (b =.32, $p = .37$), suggesting that the relation between Time 3 and Time 5 best friend reciprocation does not depend on health anxiety.

Positive Friendship Quality

Media Exposure. The main effect of Time 3 positive friendship quality (IV) was significant (b = .64, $p < .001$), and the main effect of media exposure was marginally significant (b = -.41, $p < .06$). The interaction between Time 3 positive friendship quality and media exposure was marginally significant as well (b = .38, $p = .08$). This suggests that the association between Time 3 positive friendship quality and Time 5 positive friendship quality may depend on the level of media exposure.

To probe this marginally significant interaction, simple slopes were calculated for the association between Time 3 and Time 5 positive friendship quality at high (+1 SD) and low (-1 SD) levels media exposure. The association between initial and later positive friendship quality was stronger at high levels of media exposure (b = .79, $p < .0001$) than at low levels of media exposure (b = .65, $p < .0001$), but simple slopes were significant.

Health Anxiety. The main effect of Time 3 positive friendship quality (IV) was significant (b=.58, $p <.001$), and the main effect of health anxiety was not significant (b = -.12, $p = .48$). The interaction between Time 3 positive friendship quality and health anxiety was not significant (b = .19, $p =.33$). This suggests the association between T3

positive friendship quality and T5 positive friendship quality does not depend on health anxiety.

Negative Friendship Quality

Media Exposure. The main effect of Time 3 negative friendship quality (IV) was significant (b=.42, $p < .001$), and the main effect of media exposure was not significant (b = .00, $p = .91$). The interaction between Time 3 negative friendship quality and media exposure was also not significant (b = .00, $p = .91$). This suggests the association between Time 3 negative friendship quality and Time 5 negative friendship quality does not depend on media exposure.

Health Anxiety. The main effect of Time 3 negative friendship quality (IV) was significant (b=.60, $p < .001$), but the main effect of health anxiety was not significant (b = .08, $p = .30$). The interaction between Time 3 negative friendship quality and health anxiety also was not significant (b = -.67, $p = .17$). This suggests the association between Time 3 negative friendship quality and Time 5 negative friendship quality does not depend on health anxiety.

Table 1. *Descriptive Statistics and Correlations*

	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
1. # of recip. friends (T1)	3.41	2.36	-	**.66**	**.61**	**.27**	**.24**	**.22**	**.14**	**.14**	**.17**	-.07	-.06	-.06	**-.12**	-.03
2. # of recip. friends (T3)	3.63	2.04		-	**.67**	**.12**	**.19**	**.18**	**.15**	**.15**	**.18**	-.01	.00	.01	-.08	-.07
3. # of recip. friend (T5)	2.94	1.74			-	**.12**	**.22**	**.24**	**.15**	**.16**	**.20**	.00	-.12	.00	**-.14**	.02
4. BF recip. (T1)	-	-				-	**.54**	**.44**	**.23**	**.24**	**.19**	.04	.02	.04	-.09	.08
5. BF recip. (T3)	-	-					-	**.52**	**.14**	**.26**	**.19**	-.03	-.01	.01	**-.15**	.07
6. BF recip. (T5)	-	-						-	.08	**.20**	**.22**	-.05	.03	.04	-.11	.07
7. Positive FQ (T1)	3.25	.831							-	**.57**	**.63**	.04	.00	-.03	-.04	.08
8. Positive FQ (T3)	3.30	.805								-	**.69**	.00	-.07	-.04	-.02	01
9. Positive FQ (T5)	3.30	.810									-	-.02	-.02	-.02	-.07	.02
10. Negative FQ (T1)	1.59	.663										-	**.45**	**.35**	**.18**	.03
11. Negative FQ (T3)	1.59	.650											-	**.49**	.06	.01
12. Negative FQ (T5)	1.46	.612												-	.03	-.01
13. Media exposure (T4)	44.7	91.4													-	.09
14. Health anxiety (T4)	2.40	.952														-

Notes. Correlations appearing in **bold** are significant at at least the *p* < .05 level. Recip = reciprocal. BF = best friend. FQ = friendship quality.

DISCUSSION

The primary objective of the current study was to examine for potential changes in adolescent friendship functioning from pre-pandemic to post-pandemic. A second primary aim was to examine whether COVID-19-related media consumption and/or health anxiety impacted changes in friendship functioning during this time period. This is important to study as friendship interactions aid in the development of adolescents. Results supported hypotheses regarding changes in the number of friendships and reciprocation of best friendships over time. Regarding the number or reciprocated friendship, we observed a significant change from both Time 1 to Time 3 and from Time 3 to Time 5. However, there were greater changes observed from Time 3 to Time 5 data. Closer examination of the data suggests that, on average, participants lost approximately one reciprocal friendship from January to June 2020. These results supported our hypothesis that greater changes in the number of reciprocated friendships would be observed during this time frame due to the onset of the pandemic in March 2020.

Analyses also tested whether the change in reciprocal friendships from pre- to post-pandemic onset was impacted by media exposure and/or health anxiety. Regarding media exposure, there were no significant impacts of COVID-19-related media exposure on changes in the number of reciprocal friendships from pre- to post-pandemic onset. It is possible that because friends tend to be similar to one another (Urberg et al, 1998), reciprocal friends experienced similar levels of COVID-19 media consumption and had similar views of the pandemic. As such, friends may have had less pandemic-related conflicts that may have impacted friendship status. Future research could test whether similarity in content viewed or amount of content viewed relates to friendship changes.

Health anxiety also did not impact changes in the number of reciprocal friendships from pre- to post-pandemic onset. There were low to moderate levels of health anxiety in this sample, and the study took place in a rural setting where cases were relatively low during the time period studied. It is possible that these low levels of health anxiety did not contribute to any friendship conflicts, which could have impacted friendship status. Future research could perhaps examine specific subpopulations of youth, such as those with high (i.e., clinical) levels of anxiety, as perhaps health anxiety in these populations may have had stronger effects.

For best friend reciprocation, it was found that having a past reciprocated best friend was important to predicting whether or not the best friendship would be reciprocated at a later time point both *pre-pandemic and during the pandemic.* Interestingly, having a past reciprocal best friend seemed to matter more during the pandemic. From the current study's findings, it was observed that adolescents with a reciprocated best friend at Time 1 were .077 times more likely to have a reciprocated best friend at Time 3, compared to those without a reciprocated best friend at Time 1. However, adolescents with a reciprocated best friend at Time 3 were 13.08 times more likely to have a reciprocal best friend at Time 5, compared to those without a reciprocated best friend at Time 3. These results suggest that having a best friend right before the pandemic started was important to whether or not these best friendships were reciprocally stable. This could have been because the isolation created more of a bond between the two, as they had no one else to interact with besides those who they were quarantined with and those who they consistently interacted with on social media. This further suggests that solidifying an in-person friendship pre-pandemic was essential in order to

maintain that relationship during quarantine. It is likely that these friendships often

viewed similar media, tv shows, etc. that could have also been considered trending during

that time (e.g., the Netflix series, *Tiger King*). In this case, it is probable that this allowed

for more conversation topics between the best friends, resulting in a closer bond. Future

research that investigated other types of media consumption during this period of the

pandemic may be able to test this possibility.

Whether a pre-pandemic, reciprocal best friendship also was reciprocated post-

pandemic onset did not depend on media exposure or health anxiety. For media

exposure, this is likely due to the fact that these best friends viewed similar and even the

same type of media whether it be online or on TV. With this in mind combined with no

in-person interactions, there may have been less opportunities for the duos to have any

conflicts. Since the location was in rural Maine where COVID-19 case counts were

relatively low during this period of the pandemic, health anxiety overall was likely

minimal. Without this anxiety, the best friends may have been able to possibly see one

another, especially as the weather got warmer outside. Presumably they were socially

distanced and possibly still wearing a mask, as the requirement to wear a face mask

outside was not lifted in Maine until April 27th, 2021 (Response Timeline, 2021). Future

research could inquire more specifically about the types of interactions friends had during

this period of the pandemic to better address this possibility.

Regarding positive friendship qualities, it was found that health anxiety had no

significant effects on changes in positive friendship quality from before to after onset of

the pandemic. It is likely because there were less cases of COVID-19 in these rural

settings compared to other more urban locations. Without many cases, there likely was

minimal stress related to health anxiety. Associations between initial and later positive friendship quality were significant across both time periods studied, but stronger associations were observed from just before the pandemic to June 2020. A possible explanation for this is that there were fewer in-person interactions during the Time 3 to Time 5 time frame. This could have resulted in lower levels of overall conflict as the friends were not seeing one another as regularly as they had during Time 1 to Time 3.

Interestingly, it was found that media exposure significantly moderated changes in positive friendship qualities from Time 3 to Time 5. From the calculated simple slopes, it was observed that positive friendship qualities increased across this time period as a function of both low and high levels of media exposure, but the increase was stronger for those experiencing high levels. This is likely due to friends following the same or similar accounts on social media and viewing similar TV shows that were trending at the time, likely giving the pair something to talk about with little to no conflict. This combined with minimal in-person interactions could be a reason why higher levels of media exposure were associated with positive friendship qualities. However, it is important to note that the simple slopes also showed that low levels of media exposure were associated with positive friendship qualities. This is likely due to lower levels of conflict that resulted from the minimal media exposure. Similar to the high levels of exposure, another possible reason could have been the decrease in in-person interactions; with no regular in-person activities, there could have been fewer opportunities for conflict to arise. Future research could compare the similarity between friends with regard to type and amount of media consumption to more directly test this possibility.

For negative friendship qualities, there were similar results observed from the positive friendship qualities in regards to the first research question. Overall, there were low levels of conflict, which is to be predicted as these relationships are friendships which are, typically, positive. Due to the lack of in-person interactions during the lockdown, this could have resulted in lower levels of conflict as there could have been fewer issues to argue about. In terms of the second research question, there were no significant impacts on changes in negative friendship quality due to health anxiety or media exposure. Again, this could have been due to similarity between friends in terms of media exposure, relatively low levels of health anxiety, and/or minimal change in friendship conflict over time.

Limitations

One limitation of this study was that the participants were all from rural Maine. Had this study been conducted in a more urban setting, we may have seen more impacts from health anxiety or even different results overall with regards to patterns of change in friendships. Health anxiety in more urban settings was more prevalent as COVID-19 outbreaks were spreading more rapidly in those areas, causing more concern (Liu et al, 2021). Due to the study being in a rural location, this is likely why we saw little to no impact from health anxiety on friendship reciprocity.

As noted, only the amount of media exposure to COVID-19-related content was assessed. It is not known where the youth obtained their information or whether and how the content impacted them. More detailed assessments of media consumption could be

utilized in future studies to better address the questions of whether media exposure impacted social relationships.

Another limitation potentially impacting all of the findings was the lack of research about COVID-19 at the time. COVID-19 was new to our world during the time periods studied, and there is still much to be researched regarding this. It is important to note that, because of this, there are likely to be other findings regarding how COVID-19 affected friendships, adolescents, and mental health on a wider scale. The current study looks at a small portion of the impacts of COVID-19, and future research is needed to examine the longer-term and ongoing impacts of the pandemic.

<u>Applied Implications</u>

For teachers, these findings are important in order to better understand how their students may be interacting with one another in the post-pandemic world. Specifically adolescents who had begun transitioning schools during the pandemic (i.e., elementary to middle school; middle to high school) may be facing a new social world. Based on the findings from the best friend reciprocity, it is likely that adolescents who transitioned schools maintained their past friendships and hesitated to reach out to new peers. This could have limited the friend group that adolescents chose to spend their time with, resulting in less time getting to know other peers. With this in mind, it is important that teachers encourage students to get to know all their classmates (e.g., through group work, projects, etc.).

For parents, the results of this study could better help how they approach their children regarding their friends. It is possible that many parents observed these

consistencies of friendships through their children. Due to this, it could be likely that some parents would want their children to branch out more to other people resulting in the parent approaching the adolescent about this.

For clinicians working with adolescents, this study gives more insight into how adolescents maintain their friendships and factors that could influence them. While health anxiety and media exposure had a small impact on the current study, it is important to understand how, specifically media usage, may have positively affected friendships. In gaining a stronger understanding of how media influences adolescents' friendships, clinicians could better understand the impacts of social media, trending content, TV shows, or other media content on adolescents' social and emotional lives.

Conclusion

Friendships are vital to adolescents' development and it is important to understand how COVID-19 affected these relationships. The current study supported our first hypothesis; there would be a change in friendship reciprocation due to the onset of the pandemic. Whereas our second hypothesis was not supported; health anxiety and media exposure did not negatively impact friendships. Despite this, the current study's findings have the potential to spur new and ongoing research into the impacts of the pandemic on youths' socioemotional adjustment.

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