Prospective Relations Among Supportive and Victimizing Social Interactions, Cognitive Reactivity, and Depressive Symptoms

By

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CHAPTER I

INTRODUCTION

The current study blends three previously distinct, but complimentary, lines of our research. First, we have studied how social interactions including in-person social support and peer victimization have offsetting effects on depressive outcomes across development. Second, we have studied the emergence of social support and peer victimization in the online world. Third, we have explored whether individuals differ in the strength of relation between negative mood and negative self-referential cognitions, or cognitive reactivity. We hypothesize that cognitive reactivity may explain how frequent social interactions "get under the skin" to predict later depressive symptoms. The following chapter will briefly describe research that points to four major questions about the prospective relations among supportive and victimizing social interactions, cognitive reactivity, and depressive symptoms among adolescents. To answer these questions, we have conducted a two-wave, cross-lagged panel design study among middle school students.

Common social interactions, like receiving social support and experiencing peer victimization, can have meaningful psychological consequences. These consequences may be particularly profound during adolescence, in which the importance of peer social support increases (Brown, 2004) and the importance of parental social support remains high (Collins & Laursen, 2004). Social support from both sources improves a variety of outcomes for adolescents, including academic achievement, social adjustment, conduct, self-concept, and psychological adjustment (Chu et al., 2010). Another outcome of particular concern is depression, the third leading cause of illness and disability among adolescents ages 10-19

(WHO, 2018). As Rueger and colleagues (2016) demonstrated in their large meta-analysis of studies of adolescents, the association of social support with concurrent depression is negative and small to medium in size. Nick and Cole (2018) found similar results in a meta-analysis of the relations among social support, peer victimization, and depressive and related outcomes. The point estimate for the relation between concurrent social support and depressive symptoms was also negative and medium in size (see Appendix A, Table 1).

The occurrence of in-person peer victimization also increases during middle school (Guerra et al., 2011; Nansel et al., 2001), with nearly one third of adolescents reporting involvement with in-person victimization (Nansel et al., 2001). Many of adolescents today also contend with *online* victimization, with most estimates of prevalence falling between 10 and 40% (Kowalski et al., 2014). Both online and in-person victimization have been associated with adverse outcomes, including problems with conduct, peers, academics, and anxiety (Dooley et al., 2012; Kowalski & Limber, 2013) and problems with loneliness, self-worth, anxiety, and depressive symptoms (Hawker & Boulton, 2000), respectively. Nick and Cole's (2018) meta-analysis showed that both the point estimate for the relation between online victimization and concurrent depressive symptoms and that of in-person victimization and concurrent depressive symptoms are positive and medium in size (see Appendix A, Table 1).

Our meta-analytic work has also shown that when pitted against each other, in-person social support and in-person and online peer victimization have similar effects on depressive and related outcomes (Nick & Cole, 2018). Informed by our point estimates, we calculated the standardized beta for the association of social support with depressive symptoms, controlling for the effect of peer victimization; $\beta_{SS} = -.26$. We also calculated the standardized beta for the association of peer victimization with depressive symptoms, controlling for the effect of social

support; β_{PV} = .28. For adolescents, social support and peer victimization were nearly equally associated with concurrent depressive symptoms. Although adolescents who are victimized are at risk of poor psychological outcomes, on average, this risk may be successfully offset via the competing main effect of social support.

As the meta-analysis included papers with either online or in-person peer victimization (or both), we were able to calculate betas for online versus in-person peer victimization; these were similar at $\beta_{\text{online PV}}$ = .28 and $\beta_{\text{in-person PV}}$ = .26. Although calculating betas for online versus in-person *social support* would be a natural next step, the inclusion of online social support in this meta-analysis was impossible as only one study was retrieved that measured all three variables of interest in an adolescent sample (Ybarra et al., 2015). As adolescents are among the most frequent users of the Internet, with 92% of youth aged 13-17 going online daily (Lenhart, 2015), they may be the best poised to seek new social niches online. The social support garnered from online niches may help offset the ill effects of peer victimization, both online and in-person. Now that adolescents access social media, texting, and online gaming so frequently, understanding the potential benefits of online social support in addition to the risks of online victimization is of great importance.

Our research group has conducted a number of studies seeking to explore online social support itself, as well as the relations among online and in-person social support, online and in-person peer victimization, and depressive outcomes. Most of this work, however, has been with adults. Early work found that four commonly studied subtypes of in-person social support pertain in the online world (Nick, Cole, Smith, et al., 2018). *Esteem/emotional* support includes esteem, respect, validation, and acceptance. *Social companionship* support includes spending time with others and belonging. *Informational* support includes advice, gaining information, and help in

understanding problems. *Instrumental* support includes providing material resources, financial aid, and help with tasks. We developed the Online Social Support Scale (OSSS) to measure these online social support subtypes and validated it among three adult samples: one college student sample and two community adult samples (Nick, Cole, Smith, et al., 2018).

Data from the college sample and two community adult samples, as well as from a sample of adults who play massively multiplayer online role-playing games (MMORPGs; Cole et al., 2019), were re-analyzed to determine which subtypes of online social support are predictive, over and above the others, of concurrent depressive symptoms. Among both community adult samples and MMORPG players, esteem/emotional and social companionship support emerged frequently as significant or nearly significant ($p < .1$) predictors over and above the other subtypes (see Appendix A, Table 2).

We conducted similar analyses for in-person social support with two studies measuring support subtypes that are highly similar to those in the OSSS. In both the MMORPG sample and a small sample of high school students (Nick, Cole, Skubel, et al., 2018), esteem/emotional support significantly predicted concurrent depressive symptoms, over and above the other subtypes; in the MMORPG sample, social companionship support was also a significant predictor (see Appendix A, Table 2).

We conducted similar analyses for online and in-person peer victimization and concurrent depressive symptoms among all five samples previously mentioned, as well as among an elementary and middle school sample (Cole, Martin, et al., 2014). Online victimization was a significant predictor in four of six samples and was nearly significant ($p < .1$) in the remaining two. In-person victimization was a significant predictor in all samples (see Appendix A, Table 3).

These studies set a solid foundation for the accurate measurement of online social support and emphasize the importance of online and in-person supportive and victimizing social interactions to depressive outcomes in adults. Our study of high school students, however, was small and cross-sectional. Although larger, our study of elementary and middle school students was also only cross-sectional. Longitudinal work with adolescents is necessary to more fully understand the predictive power of online and in-person victimizing and supportive social interactions during development.

In addition, although this body of work has investigated the associations among supportive and victimizing social interactions and depressive symptoms, it has yet to test *mechanisms* by which peer victimization increases depressive symptoms and social support offsets this effect. One potential mechanism is cognitive reactivity. As Beck posited (1963, 1967; Clark et al., 1999), negative cognitive schemas develop in youth due to negative life events and remain dormant until they are reactivated by events evoking similarly negative emotions. These mood-activated negative schemas are important in the development, maintenance, and recurrence of depression (Kovacs & Beck, 1978). *Cognitive reactivity* is "the relative ease with which maladaptive cognitions or cognitive styles are triggered by mild (nonpathological) mood fluctuations" (Williams et al., 2008, p. 84). Cognitive reactivity is thus a dynamic construct reflecting the strength of association between negative mood and negative self-referential cognitions.

Cole, Martin and colleagues (2014) hypothesized the following about cognitive reactivity and peer victimization: "We speculate that cognitive reactivity is a learned association, forged by a series of recurrent, social-cognitive learning trials (or life events) that simultaneously induce negative mood and convey maladaptive, self-relevant information… Being victimized by peers is

one relatively common set of childhood and early adolescent events that can effectively 'teach' the association between negative mood and maladaptive cognition, an association that is *cognitive reactivity*" (p. 336). Conversely, if peer victimization repeatedly pairs negative self-relevant information and negative mood, social support repeatedly pairs positive self-relevant information (e.g., others care about me) and positive mood. As such, we expect peer victimization will increase cognitive reactivity, whereas social support will disrupt this process.

Esteem/emotional and social companionship may be the most likely social support subtypes to disrupt the increase in cognitive reactivity created by peer victimization. First, both are predictive of depressive symptoms. Second, the meaning conveyed by these forms of support (i.e., that individuals are esteemed, valued, accepted, and belong) may directly counter the messages conveyed by peer victimization. As such, when social support is mentioned in the proposed study, we specifically mean esteem/emotional and social companionship social support.

Four main questions motivate the current study:

1. At time 1, are lower levels of social support (online or in-person) and higher levels of peer victimization (online or in-person) significantly predictive of higher levels of time 2 cognitive reactivity? See Figure 1.
2. At time 1, are higher levels of cognitive reactivity significantly predictive of higher levels of time 2 depressive symptoms? See Figure 2.

The study's half-longitudinal design (Cole & Maxwell, 2003) allows us to ask meditational questions:

3. Is the relation between time 1 online social support and time 2 depressive symptoms partially explained by cognitive reactivity? See Figure 3: is the product of paths A and B

significant? This question will be asked separately for each social interaction predictor (online social support, in-person social support, online victimization, and in-person victimization).

Finally, this design allows us to ask a specific question about online vs. in-person social support and their effects on depressive symptoms:

4. Does online social support at time 1 moderate the effect of lower levels of in-person social support at time 1 on higher levels of depressive symptoms at time 2? See Figure 4.

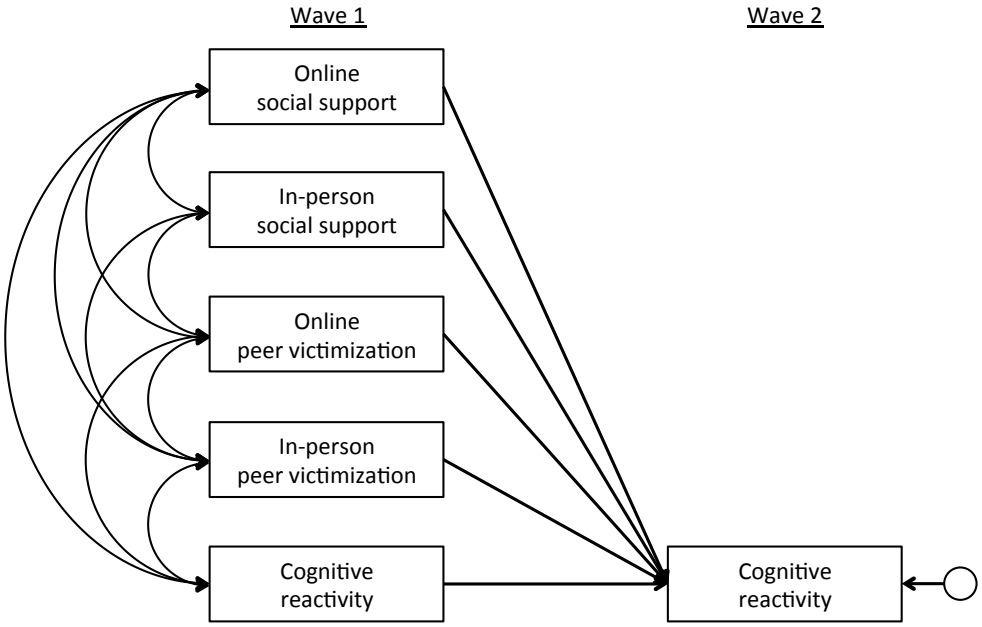


Figure 1. Study question 1: At wave 1, are lower levels of social support (online or in-person) and higher levels of peer victimization (online or in-person) significantly predictive of higher levels of wave 2 cognitive reactivity?

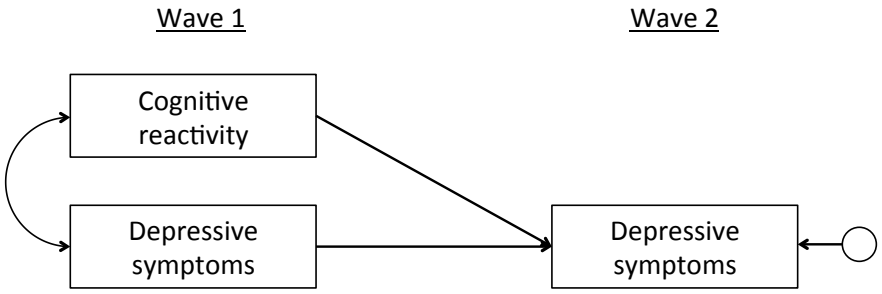


Figure 2. Study question 2: At wave 1, are higher levels of cognitive reactivity significantly predictive of higher levels of wave 2 depressive symptoms?

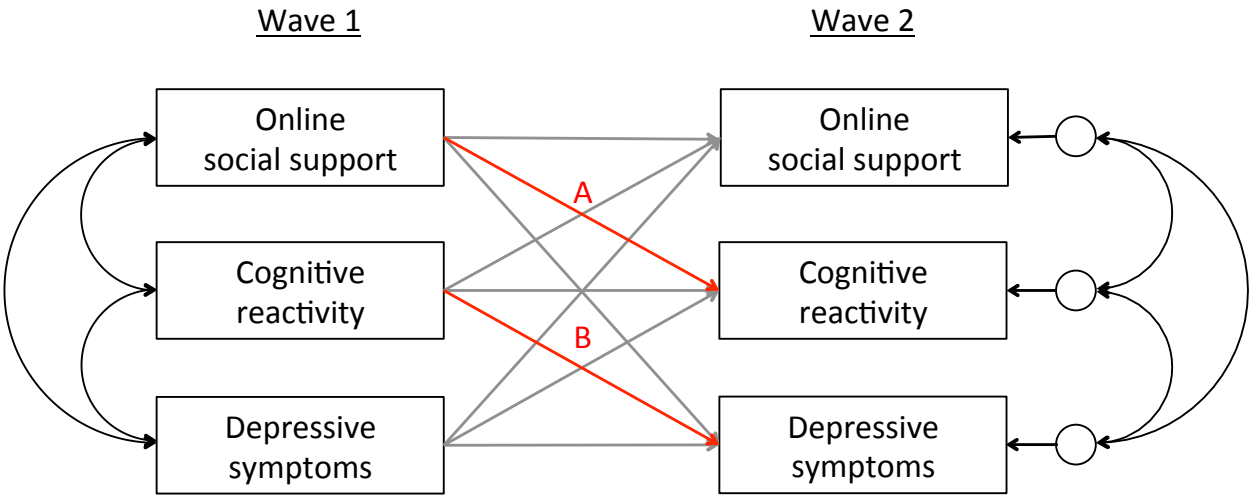


Figure 3. Study question 3: Is the relation between wave 1 online social support and wave 2 depressive symptoms partially explained by cognitive reactivity? That is, is the product of paths A and B (in red) significant? This question will be asked separately for each social interaction predictor (online social support, in-person social support, online victimization, and in-person victimization).

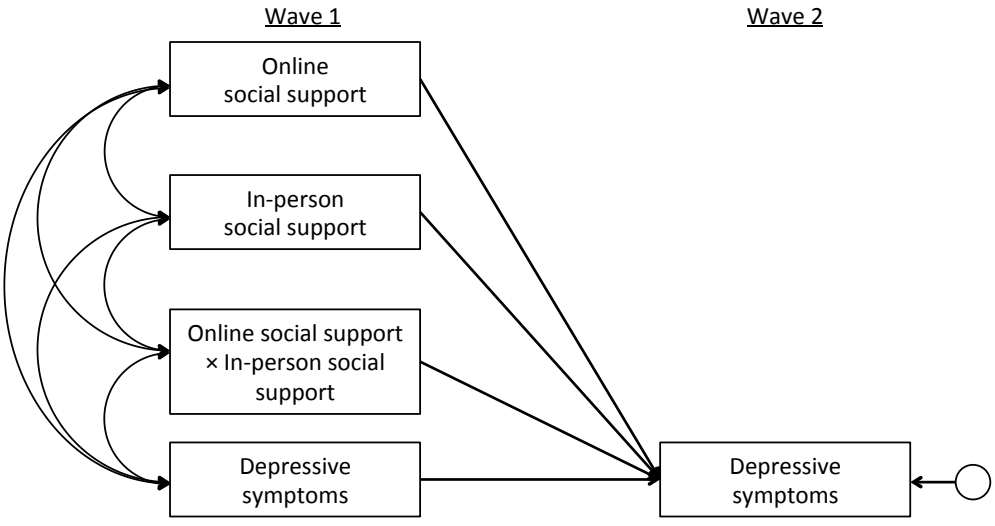


Figure 4. Study question 4: does online social support at wave 1 moderate the effect of lower levels of in-person social support at wave 1 on higher levels of depressive symptoms at wave 2?

CHAPTER II

METHODS

Overview

The current study used a two-wave, cross-lagged panel design to examine prospective relations among social support (both online and in-person), peer victimization (both online and in-person), cognitive reactivity, and depressive symptoms. Institutional Review Board approval was obtained for the research protocol.

Participants

Participants included seventh and eighth grade students from two middle schools in rural Tennessee. At wave 1, 264 students participated; at wave 2, 262 participated. Of these, 234 students participated at both waves. We eliminated entries from a wave of data collection if the participant appeared to have serious difficulty reading or they had completed < ~85% of items on three or more measures. We removed seven entries. This left 263 students at wave 1, 262 at wave 2, and of these, 228 at both waves (some students who participated at both time points had data excluded from only one time point).

For each wave, we compared major study variables, age, gender, and minority race status for participants who participated at both waves versus participants who participated at only one wave. *t* tests and Chi Square tests revealed no significant differences between these groups for either wave. The full sample consisted of 297 participants; 223 participated from school 1 and 74 participated from school 2. The sample consisted of 161 females (54.2%) and 129 males (in addition, three participants identified as "other" at wave 1 and female at wave 2; four students identified as male at one wave and female at another). The mean age of the sample was 13.43

(*SD* = .67). The sample was 89.8% White or Caucasian, 1.3% Asian or Asian American, 4.0% Black or African American, 6.4% Latino or Hispanic, 2.0% Middle Eastern, and 3.0% Other (participants could select more than one ethnicity; 17 participants identified their race differently between wave 1 and wave 2).

Measures

Online social support: The Online Social Support Scale (OSSS). The OSSS (Nick, Cole, Smith, et al., 2018) measures four types of social support historically studied in in-person settings (esteem/emotional, social companionship, informational, instrumental) but in an online context (e.g., on websites, apps, games, over text messaging). The scale also measures other potentially supportive encounters respondents have online (e.g., friending, liking, following). After participants report the frequency with which they use particular online spaces, they rate the frequency of experiencing 40 examples of social support on a 0 (never) to 4 (a lot) scale. Nick, Cole, Smith, et al. (2018) demonstrated the OSSS has a clean factor structure, excellent reliability, and acceptable levels of convergent, discriminant, and construct validity among three samples of adults. For the current study, we used only the esteem/emotional (EE) and social companionship (SC) subscales (20 items total). In the current study, the coefficient α for the entire scale was .95 at wave 1 (EE: .93, SC: .94) and .96 at wave 2 (EE: .94, SC: .94).

In-person social support: The Interpersonal Support Evaluation List (ISEL). The ISEL (Cohen & Hoberman, 1983) measures self-esteem, belonging, appraisal, and tangible in-person social support; these subtypes are highly comparable to the four OSSS subtypes. Respondents rate 40 items on a scale from 0 (definitely false) to 4 (definitely true). Subscales have demonstrated acceptable reliability (Cohen & Hoberman, 1983) and reasonable independence from one another (Brookings & Boldron, 1988; Merz et al., 2014; Young et al.,

2005) and have been used successfully in youth populations (Hyman et al., 2003; Seeds et al., 2010). In a study of 112 high school students, the coefficient α for these two subscales were .78 and .80, respectively (Nick, Cole, Skubel, et al., 2018). In the current study, we used only the self-esteem (SE) and belonging (BEL) subscales (20 items total). In addition, we slightly altered instructions and items to remind participants to focus on in-person, face-to-face experiences only (e.g., "I often meet or talk with my family or friends *in person*"). We slightly altered some items to reach a reading level appropriate for middle school students (e.g., changing "There is someone who takes pride in my accomplishments" to "There is someone who takes pride in things I do"). In the current study, the coefficient α for the entire scale was .88 at wave 1 (SE: .75, BEL: .80) and .89 at wave 2 (SE: .78, BEL: .82).

Online victimization: The Cyberbullying and Victimization Survey (CVS). The CVS (Brown, 2011) assesses the frequency of cyberbullying or victimization online. Respondents rate 17 items on a scale from 0 (has not happened) to 4 (several times per week). The CVS has demonstrated good internal consistency, unidimensionality, and convergent validity (Frederick, 2015). In a study of 112 high school students, we omitted two items that were unclear; the coefficient α for the remaining 15 items was .86 (Nick, Cole, Skubel, et al., 2018). In the current study, we used the same 15 items. Coefficient α for the scale was .86 at wave 1 and .90 at wave 2.

In-person victimization: The Peer Victimization Self Report (PVSR). The PVSR (Cole, Dukewich, et al., 2014; Sinclair et al., 2012) measures various types of peer victimization. Among 20 total items, four questions focus on each of five victimization subtypes: relational, physical, verbal, property-related, and cyber. Respondents rate the frequency of peer victimization experiences from 0 (never) to 3 (a lot). Confirmatory factor analyses have shown

excellent item-level convergent and discriminant validity (Cole, Dukewich, et al., 2014). For the current study, we used the relational, physical, verbal, and property-related subscales only (resulting in 16 items total). In a study of 112 high school students, the coefficient α for these 16 items was .92 (Nick, Cole, Skubel, et al., 2018). For the current study, we slightly altered instructions and items to remind participants to focus on in-person, face-to-face experiences only (e.g., "Called you names *face-to-face*"). Coefficient α for the scale was .91 at wave 1 and .90 at wave 2.

Depressive symptoms: Center for Epidemiologic Studies Depression scale for Children (CES-DC). The CES-DC (Weissman et al., 1980) measures affective, somatic, cognitive, and behavioral depressive symptoms. The scale is based on the Center for Epidemiologic Studies Depression scale (CES-D; Radloff, 1977) and alters some items so children can better understand them. Respondents rate 20 items on a scale from 0 (not at all) to 3 (a lot). The CES-DC has good internal consistency (Weissman et al., 1980), test-retest reliability, and construct validity (Faulstich et al., 1986). In a longitudinal study of elementary and middle school students, coefficient αs ranged from .81 to .87 (LaGrange et al., 2008). In the current study, coefficient α for the scale was .93 at wave 1 and .94 at wave 2.

Cognitive reactivity: The Behind Your Back (BYB) procedure. Cognitive reactivity is conceptualized as the within-person strength of relation between sad mood and negative self-referential cognitions. The BYB procedure (Cole, Martin, et al., 2014) was created to assess negative appraisals, emotion reactivity, and cognitive reactivity to simulations of peer victimization experiences. Respondents listen via mp3 players and noise cancelling headphones to audio recordings of brief conversations between a boy and a girl talking about a third student; respondents are instructed to imagine the conversation is about them, "behind their back."

Different versions use gendered pronouns so the third student is of the same gender as the participant. The content of these conversations ranges from mild to mean. Participants listen to the scenarios and answer corresponding questions on their answer sheets. After respondents listen to each of the 21 scenarios, they rate the perceived meanness of the scenario, how sad the scenario would make them feel, and their likelihood of engaging in two negative self-referential cognitions. All of these questions are on the same scale from 1 (not at all) to 5 (a lot). In the current study, participants listened to 11 of the 21 scenarios at time 1 and the remaining 10 plus one repeat scenario at time 2.

Procedures

Research assistants met with students briefly to describe the study, distribute parental consent forms, and answer questions at the first school visit. During data collection, consented students met with researchers and completed the majority of study measures on the secure Qualtrics survey website on laptops provided by their school (or on paper if requested). They completed the Behind Your Back procedure on paper while using mp3 players and headphones provided by the research team. Approximately 3.5 months elapsed between wave 1 (November 2018) and wave 2 (March 2019) data collection.[1] We thanked students for their participation with a $5 Walmart gift card at wave 1 and a $10 Walmart gift card at wave 2. If any participants scored above 24 on the CES-DC (Chabrol et al., 2002), I contacted their parents within 72 hours to offer referral information and followed up with the student's school counselor.

[1] Due to flooding in the area, wave 2 data collection was delayed.

CHAPTER III

RESULTS

Preliminary Analyses

Processing the cognitive reactivity data. Multilevel modeling is used to interpret the BYB, as scenarios are nested within respondents. Cognitive reactivity is conceptualized as the within-person strength of relation between sad mood (SAD) and negative self-referential cognitions (COG) across scenarios as shown below:

$$\text{Level 1:} \quad COG_{ij} = \beta_{0j} + \beta_{1j} SAD_{ij} + e_{ij} \quad e_{ij} \sim N(0, \sigma_e^2) \tag{1}$$

$$\text{Level 2:} \quad \begin{matrix} \beta_{0j} = \gamma_{00} + u_{0j} \\ \beta_{1j} = \gamma_{10} + u_{1j} \end{matrix} \quad \begin{bmatrix} u_{0j} \\ u_{1j} \end{bmatrix} \sim MVN\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} \tau_{00} & \\ \tau_{10} & \tau_{11} \end{bmatrix}\right) \tag{2}$$

$$\text{Reduced:} \quad COG_{ij} = \gamma_{00} + \gamma_{10} SAD_{ij} + u_{0j} + u_{1j} SAD_{ij} + e_{ij} \tag{3}$$

Within this conceptualization, cognitive reactivity is represented by β_{1j}, the slope of sad mood predicting negative self-referential cognitions. Typically, multilevel path analysis would enable us to enter β_{1j} as a latent predictor of downstream variables. We elected to model the BYB data as described above, but to make β_{1j} manifest and use each individual's slope as a predictor in later (single-level) path analyses. We did so following Curran-Bauer Analytic's suggestions (2020) on using the SPSS MIXED command to model the data and the MATRIX command to compute the intercepts and random effect estimates (slopes).

More specifically, we created the following model (residuals are the same as above):

$$\text{Level 1:} \quad COGavg_{ij} = \beta_{0j} + \beta_{1j} SADcent_{ij} + e_{ij} \tag{4}$$

$$\text{Level 2:} \quad \begin{matrix} \beta_{0j} = \gamma_{00} + \gamma_{01} SADavg_{ij} + u_{0j} \\ \beta_{1j} = \gamma_{10} + u_{1j} \end{matrix} \tag{5}$$

Reduced:

$$COGavg_{ij} = \gamma_{00} + \gamma_{01} SADavg_{ij} + \gamma_{10} SADcent_{ij} + u_{0j} + u_{1j} SADcent_{ij} + e_{ij} \tag{6}$$

Here, *COGavg* is the average of each scenario's two cognition questions (a level one variable), *SADavg* is the average of all of an individual's sadness ratings across scenarios (level two), and *SADcent* is a centered sadness rating (*SADavg* was subtracted from each level-one sadness rating; level one). Centering level one sadness in this way makes it person-centered. *SADavg* was included as a level two predictor of β_{0j}; essentially, it is the *between-person* (rather than within-person) version of cognitive reactivity. Table 1 provides estimates of fixed effects for this model at each wave. The manifest intercepts and slopes calculated by the SPSS MIXED and MATRIX programs were similar to those calculated by R via the "lme" and "coef" functions using the same model.

Table 1. *Estimates of Fixed Effects for the Cognitive Reactivity Model*

Wave	Parameter	Estimate	SE	df	*t*	*p*
1	Intercept	.38	.12	279.18	3.00	.003
	SADcent	.31	.02	248.38	16.09	.000
	SADavg	.76	.05	277.93	15.50	.000
2	Intercept	.13	.11	270.08	1.13	.26
	SADcent	.36	.02	232.23	17.36	.000
	SADavg	.81	.04	269.37	18.16	.000

Note. SADavg = Behind Your Back level two average sadness rating across scenarios. SADcent = Behind Your Back level one centered sadness rating (each sadness rating minus SADavg).

Descriptive statistics and correlations. Sample descriptives for major study variables are presented in Table 2. Correlations are presented in Table 3. At both waves, participants reported using YouTube, Texting, Instagram, and Snapchat most frequently (see Appendix B).

Table 2. *Descriptive Statistics for Major Study Variables*

Measure	*M*	*SD*	*Min*	*Max*	*Skew*	*SE*
W1 OSSS	43.07	18.70	0.00	79.00	–0.51	0.15
W1 EE	21.15	9.47	0.00	40.00	–0.39	0.15
W1 SC	21.68	10.94	0.00	40.00	–0.39	0.15
W1 ISEL	40.34	9.49	7.00	58.00	–0.58	0.15
W1 SE	20.68	4.68	4.00	29.00	–0.69	0.15
W1 BEL	19.70	5.30	3.00	30.00	–0.43	0.15
W1 CVS	5.13	5.66	0.00	35.00	1.71	0.15
W1 PVSR	7.53	8.01	0.00	38.00	1.39	0.15
W1 CES-DC	15.23	12.58	0.00	56.00	1.10	0.15
W1 BYB int.	–0.01	0.71	–1.95	2.46	0.44	0.15
W1 BYB slope	0.00	0.17	–0.42	0.55	0.49	0.15
W2 OSSS	44.43	18.93	0.00	80.00	–0.38	0.15
W2 EE	22.22	9.42	0.00	40.00	–0.28	0.15
W2 SC	22.14	11.06	0.00	40.00	–0.33	0.15
W2 ISEL	40.01	9.47	11.00	58.00	–0.68	0.15
W2 SE	20.59	4.68	3.00	30.00	–0.76	0.15
W2 BEL	19.42	5.42	3.00	30.00	–0.58	0.15
W2 CVS	5.63	6.72	0.00	48.00	2.35	0.15
W2 PVSR	6.53	6.98	0.00	37.00	1.48	0.15
W2 CES-DC	14.55	12.74	0.00	57.00	1.31	0.15
W2 BYB int.	0.00	0.67	–1.96	2.57	0.34	0.15
W2 BYB slope	0.00	0.18	–0.38	0.63	0.75	0.15

Note. W1 = Wave 1, W2 = Wave 2. OSSS = Online Social Support Scale, EE = OSSS Esteem/Emotional, SC = OSSS Social Companionship, ISEL = Interpersonal Support Evaluation List, SE = ISEL Self Esteem, BEL = ISEL Belonging, CVS = Cyberbullying and Victimization Survey, PVSR = Peer Victimization Self Report, CES-DC = Center for Epidemiologic Studies Depression Scale for Children, BYB int. = Behind Your Back scale intercept, BYB slope = Behind Your Back scale slope. No means are significantly different between the two study samples at $p \leq .05$. At W1, 198 students participated at school 1, 65 at school 2; at W2, 202 students participated at school 1, 60 at school 2.

Table 3. *Correlations Among Major Study Variables*

Measure	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. W1 OSSS	1.00										
2. W1 EE	0.91**	1.00									
3. W1 SC	0.93**	0.70**	1.00								
4. W1 ISEL	0.31**	0.37**	0.21**	1.00							
5. W1 SE	0.27**	0.33**	0.19**	0.94**	1.00						
6. W1 BEL	0.31**	0.38**	0.21**	0.96**	0.80**	1.00					
7. W1 CVS	0.03	–0.06	0.12	–0.42**	–0.40**	–0.40**	1.00				
8. W1 PVSR	–0.11	–0.16*	-0.02	–0.46**	–0.46**	–0.41**	0.72**	1.00			
9. W1 CES-DC	–0.21**	–0.26**	–0.13*	–0.70**	–0.69**	–0.65**	0.54**	0.53**	1.00		
10. W1 BYB int.	–0.16*	–0.22**	–0.08	–0.54**	–0.54**	–0.50**	0.35**	0.35**	0.60**	1.00	
11. W1 BYB slope	–0.14*	–0.11	–0.13*	–0.29**	–0.29**	–0.25**	0.16*	0.11	0.29**	0.60**	1.00
12. W2 OSSS	0.66**	0.59**	0.65**	0.27**	0.22**	0.28**	0.00	–0.11	–0.28**	–0.17*	–0.05
13. W2 EE	0.61**	0.62**	0.54**	0.31**	0.24**	0.34**	–0.06	–0.13	–0.29**	–0.18**	–0.04
14. W2 SC	0.62**	0.49**	0.67**	0.20**	0.18**	0.21**	0.03	–0.08	–0.25**	–0.14*	–0.07
15. W2 ISEL	0.28**	0.30**	0.23**	0.68**	0.62**	0.66**	–0.25**	–0.34**	–0.55**	–0.47**	–0.23**
16. W2 SE	0.26**	0.30**	0.21**	0.66**	0.64**	0.61**	–0.26**	–0.34**	–0.54**	–0.44**	–0.21**
17. W2 BEL	0.26**	0.27**	0.21**	0.61**	0.52**	0.63**	–0.21**	–0.29**	–0.50**	–0.44**	–0.22**
18. W2 CVS	0.08	0.02	0.12	–0.29**	–0.26**	–0.29**	0.66**	0.47**	0.35**	0.25**	0.11
19. W2 PVSR	–0.05	–0.08	0.00	–0.42**	–0.40**	–0.41**	0.61**	0.61**	0.47**	0.33**	0.11
20. W2 CES-DC	–0.15*	–0.16*	–0.13	–0.53**	–0.52**	–0.50**	0.46**	0.46**	0.70**	0.49**	0.18**
21. W2 BYB int.	0.01	–0.02	0.02	–0.36**	–0.33**	–0.35**	0.25**	0.20**	0.37**	0.62**	0.35**
22. W2 BYB slope	0.01	–0.02	0.02	–0.13	–0.12	–0.13	0.00	–0.08	0.05	0.22**	0.34**

Note. W1 = Wave 1, W2 = Wave 2. OSSS = Online Social Support Scale, EE = OSSS Esteem/Emotional, SC = OSSS Social Companionship, ISEL = Interpersonal Support Evaluation List, SE = ISEL Self Esteem, BEL = ISEL Belonging, CVS = Cyberbullying and Victimization Survey, PVSR = Peer Victimization Self Report, CES-DC = Center for Epidemiologic Studies Depression Scale for Children, BYB int. = Behind Your Back scale intercept, BYB slope = Behind Your Back scale slope.
** $p \leq .01$, * $p \leq .05$.

(Table continues below)

Table 3. *Correlations Among Major Study Variables (continued)*

Measure	12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.
12. W2 OSSS	1.00										
13. W2 EE	0.91**	1.00									
14. W2 SC	0.94**	0.71**	1.00								
15. W2 ISEL	0.37**	0.40**	0.29**	1.00							
16. W2 SE	0.35**	0.38**	0.28**	0.93**	1.00						
17. W2 BEL	0.35**	0.38**	0.28**	0.95**	0.76**	1.00					
18. W2 CVS	0.03	–0.02	0.06	–0.29**	–0.28**	–0.26**	1.00				
19. W2 PVSR	–0.11	–0.18**	–0.04	–0.40**	–0.39**	–0.37**	0.67**	1.00			
20. W2 CES-DC	–0.21**	–0.23**	–0.17**	–0.69**	–0.65**	–0.65**	0.50**	0.58**	1.00		
21. W2 BYB int.	–0.05	–0.14*	0.04	–0.42**	–0.38**	–0.41**	0.28**	0.35**	0.46**	1.00	
22. W2 BYB slope	–0.04	–0.12	0.03	–0.15*	–0.15*	–0.12	0.11	0.14*	0.17**	0.47**	1.00

Note. W1 = Wave 1, W2 = Wave 2. OSSS = Online Social Support Scale, EE = OSSS Esteem/Emotional, SC = OSSS Social Companionship, ISEL = Interpersonal Support Evaluation List, SE = ISEL Self Esteem, BEL = ISEL Belonging, CVS = Cyberbullying and Victimization Survey, PVSR = Peer Victimization Self Report, CES-DC = Center for Epidemiologic Studies Depression Scale for Children, BYB int. = Behind Your Back scale intercept, BYB slope = Behind Your Back scale slope.
** $p \leq .01$, * $p \leq .05$.

Proposed Analyses

Question 1. At time 1, are lower levels of social support (online or in-person) and higher levels of peer victimization (online or in-person) significantly predictive of higher levels of time 2 cognitive reactivity? We used path analysis with full information maximum likelihood (FIML) to answer this question. The model was just-identified. Over and above the autoregressive cognitive reactivity path and all other wave 1 predictors, no wave 1 social interaction variables were predictive of wave 2 cognitive reactivity at $p \leq .05$ (see Figure 5; Table 1 in Appendix C).

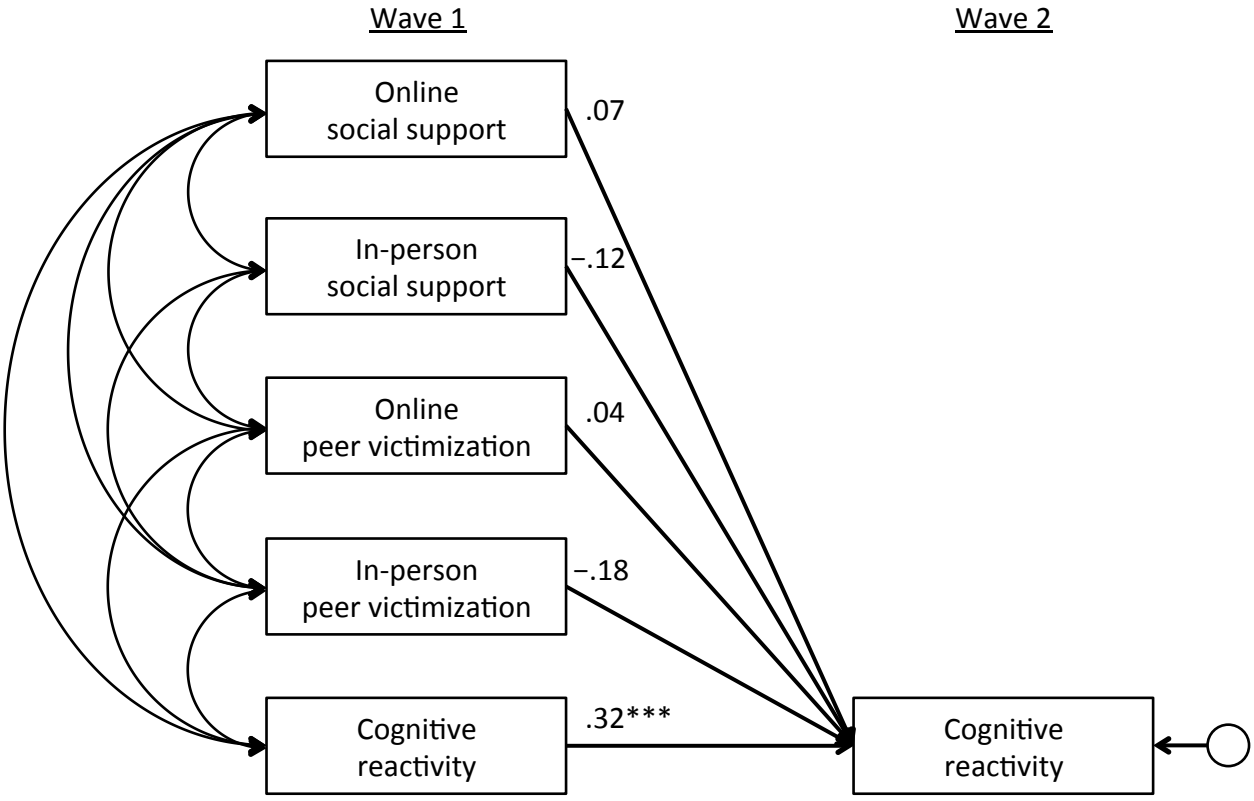


Figure 5. Path analysis for study question 1: wave 1 online social support, in-person social support, online peer victimization, and in-person peer victimization predicting wave 2 cognitive reactivity, over and above wave 1 cognitive reactivity. Standardized βs are presented above. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Question 2. At time 1, are higher levels of cognitive reactivity significantly predictive of higher levels of time 2 depressive symptoms? We used path analysis with FIML to answer this question. The model was just-identified. Over and above the autoregressive depressive symptoms path, wave 1 cognitive reactivity was not predictive of wave 2 depressive symptoms at $p \leq .05$ (see Figure 6; Table 2 in Appendix C).

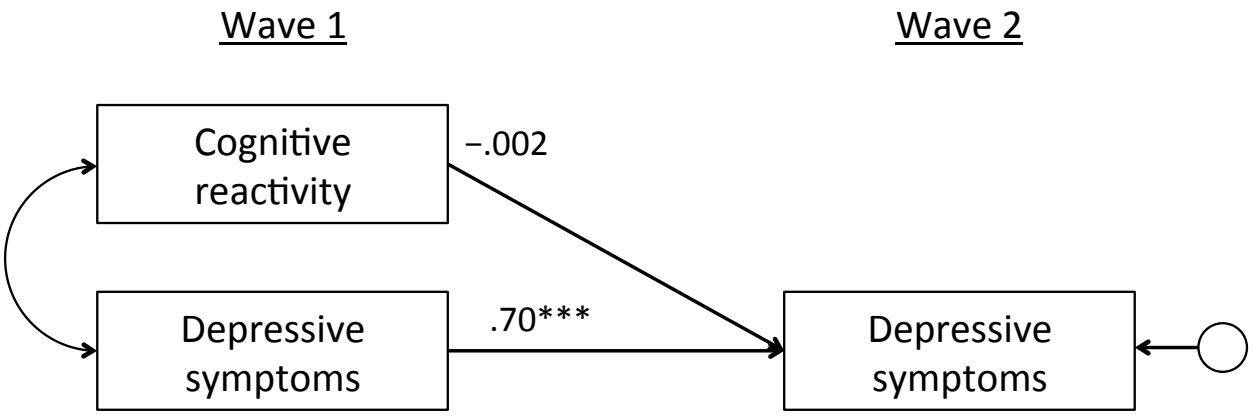


Figure 6. Path analysis for study question 2: wave 1 cognitive reactivity predicting wave 2 depressive symptoms, over and above wave 1 depressive symptoms. Standardized βs are presented above. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Question 3. Is the relation of time 1 online social support and time 2 depressive symptoms partially explained by cognitive reactivity? That is, is the product of paths A and B significant in Figure 3? This question will be asked separately for each social interaction predictor (online social support, in-person social support, online victimization, and in-person victimization). We used path analysis with FIML to answer these questions. The models were just-identified. Over and above the other paths, no models included significant paths A and B; thus, their product was not tested for significance (see Figure 7, Models A-D; Table 3 in Appendix C).

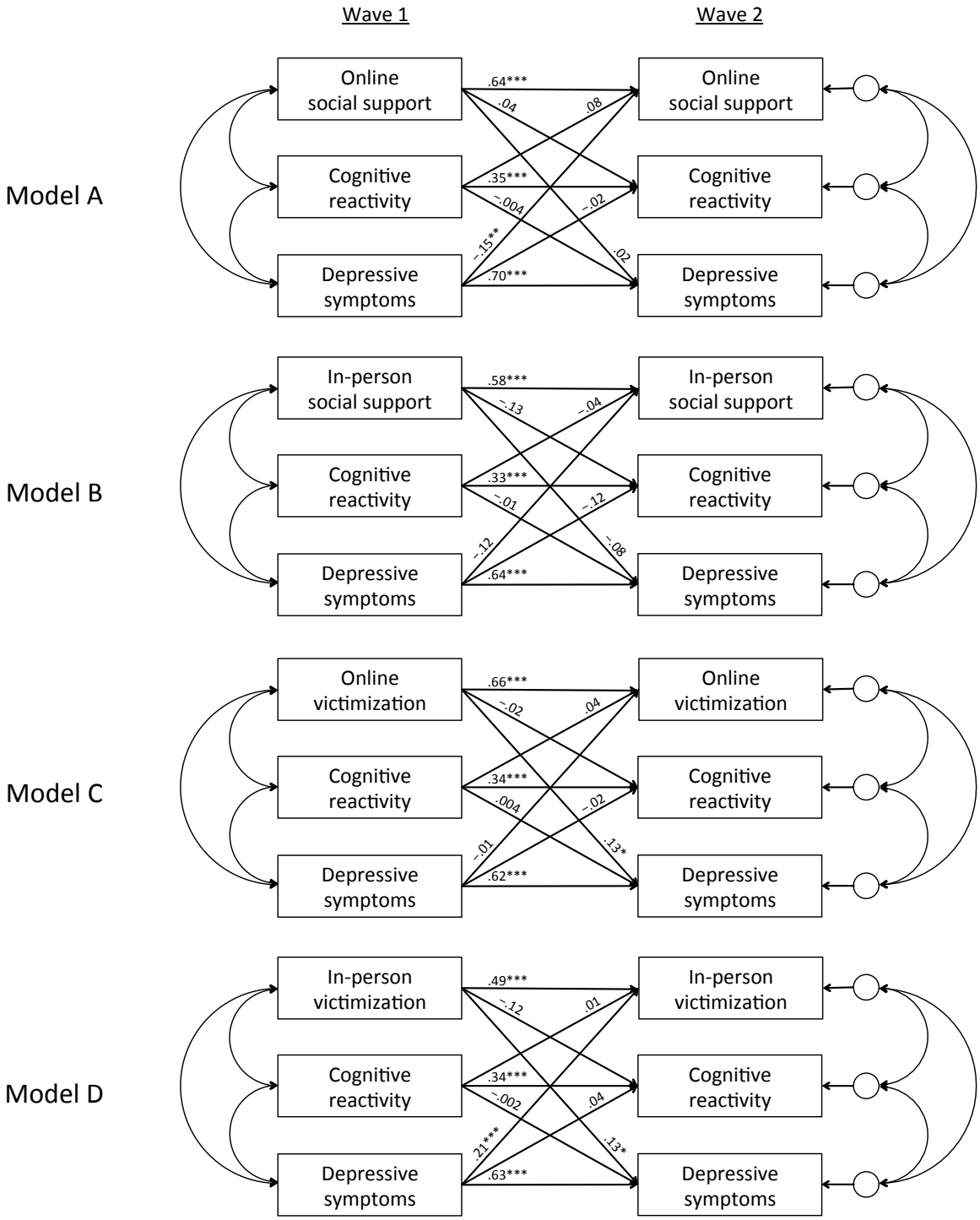


Figure 7. Separate cross-lagged panel path analyses for study question 3: Model A: online social support, cognitive reactivity, and depressive symptoms; Model B: in-person social support, cognitive reactivity, and depressive symptoms; Model C: online victimization, cognitive reactivity, and depressive symptoms; Model D: in-person victimization, cognitive reactivity, and depressive symptoms. Standardized βs are presented above. † $p < .06$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Question 4. Does online social support at time 1 moderate the effect of lower levels of in-person social support at time 1 on higher levels of depressive symptoms at time 2? We used path analysis with FIML to answer this question. The model was just-identified. The interaction term at step 3 was not significant (see Figure 8; Table 4 in Appendix C).

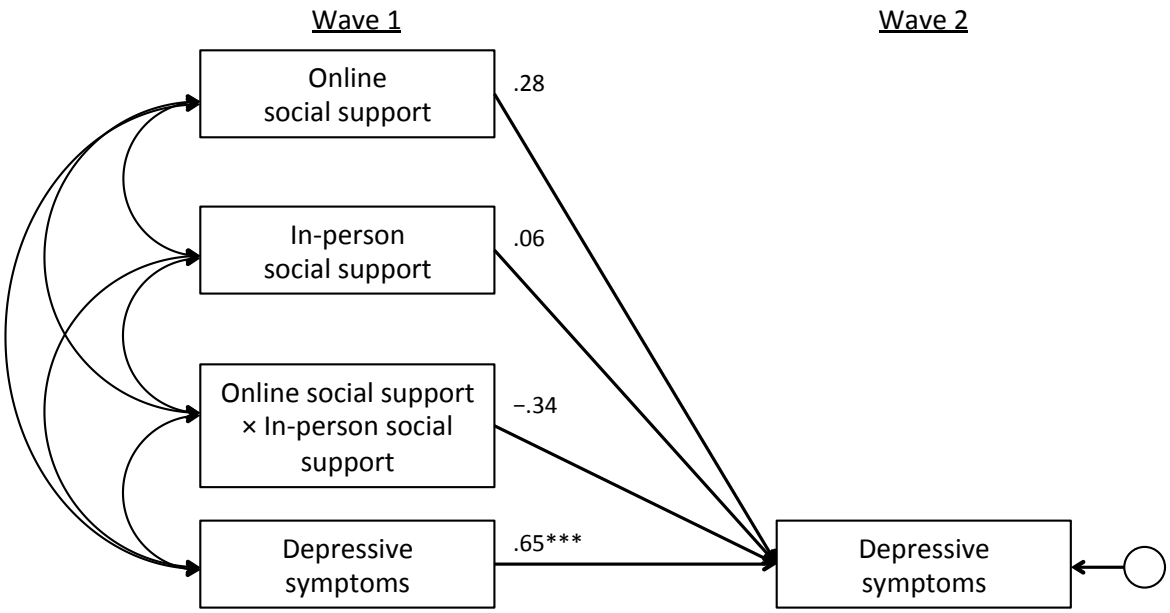


Figure 8. Path analysis for study question 4: wave 1 online social support, in-person social support, and their interaction predicting wave 2 depressive symptoms, over and above wave 1 depressive symptoms. Standardized βs are presented above. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Additional Analyses

Reciprocal relations. Our first three originally proposed questions pertained to the longitudinal relations among social interaction variables, cognitive reactivity, and depression. Results demonstrate that cognitive reactivity is not significantly predicted by earlier social interaction variables, is not a significant predictor of later depressive symptoms, and does not longitudinally mediate the relation between social interaction variables and depressive

symptoms.[2] As such, we re-examined Question 3 by dropping cognitive reactivity at both time points from each path analysis model, as shown in Figure 9; Table 1 in Appendix D.

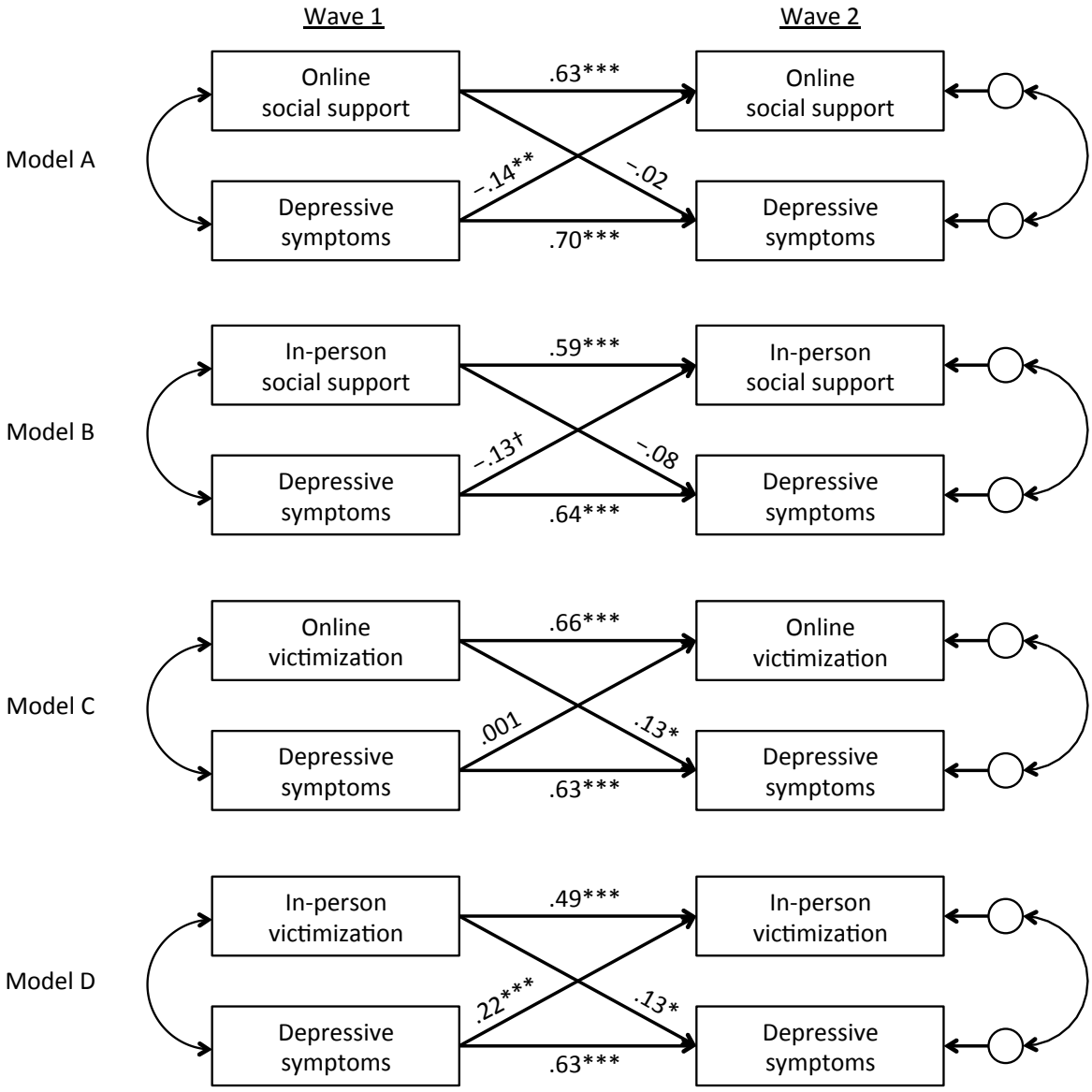


Figure 9. Separate cross-lagged panel path analyses for additional analysis 1: Model A: online social support and depressive symptoms; Model B: in-person social support and depressive symptoms; Model C: online victimization and depressive symptoms; and Model D: in-person victimization and depressive symptoms. Standardized βs are presented above. † $p < .06$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

[2] We also tested the following questions, with no results significant at $p \leq .05$: are single social interaction variables at wave 1 predictive of cognitive reactivity at wave 2, over and above cognitive reactivity at wave 1? Are pairs of social interaction variables at wave 1 predictive of cognitive reactivity at wave 2, over and above cognitive reactivity at wave 1?

Across all of these just-identified models, each variable at wave 1 significantly and positively predicts itself at wave 2, over and above all other paths, as we would expect. In Figure 9, Models A and B, wave 1 depressive symptoms is also predictive of wave 2 online social support (standardized $\beta = -.14$, $p = .01$; $R^2_{\text{W2 OSSS}} = .45$, $R^2_{\text{W2 CES-DC}} = .48$) and wave 2 in-person social support ($\beta = -.13$, $p = .06$; $R^2_{\text{W2 ISEL}} = .47$, $R^2_{\text{W2 CES-DC}} = .48$), respectively. However, wave 1 social support (online or in-person) is not predictive of wave 2 depressive symptoms.

In Figure 9, Model C, wave 1 online victimization is significantly predictive of wave 2 depressive symptoms ($\beta = .13$, $p = .02$; $R^2_{\text{W2 CVS}} = .44$, $R^2_{\text{W2 CES-DC}} = .50$). In Figure 9, Model D, wave 1 in-person victimization is significantly predictive of wave 2 depressive symptoms ($\beta = .13$, $p = .02$), and wave 1 depressive symptoms is significantly predictive of wave 2 in-person victimization ($\beta = .22$, $p < .001$; $R^2_{\text{W2 PVSR}} = .40$, $R^2_{\text{W2 CES-DC}} = .50$).

Interactions. Our fourth originally proposed question pertained to online social support as a moderator of the longitudinal effects of in-person social support on later depressive symptoms. We also explored the other two-way interaction terms possible among online social support, in-person social support, online victimization, and in-person victimization using path analysis. The only significant interaction found in these just-identified models was between online and in-person victimization ($\beta = -.28$, $p = .01$; $R^2 = 51$; see Figure 10; Table 2 in Appendix D). As shown in Figure 11, at low levels of online victimization, depressive symptoms increase as in-person victimization increases from low to high. However, high online victimization is associated with higher later depressive symptoms, regardless of the level of in-person victimization.

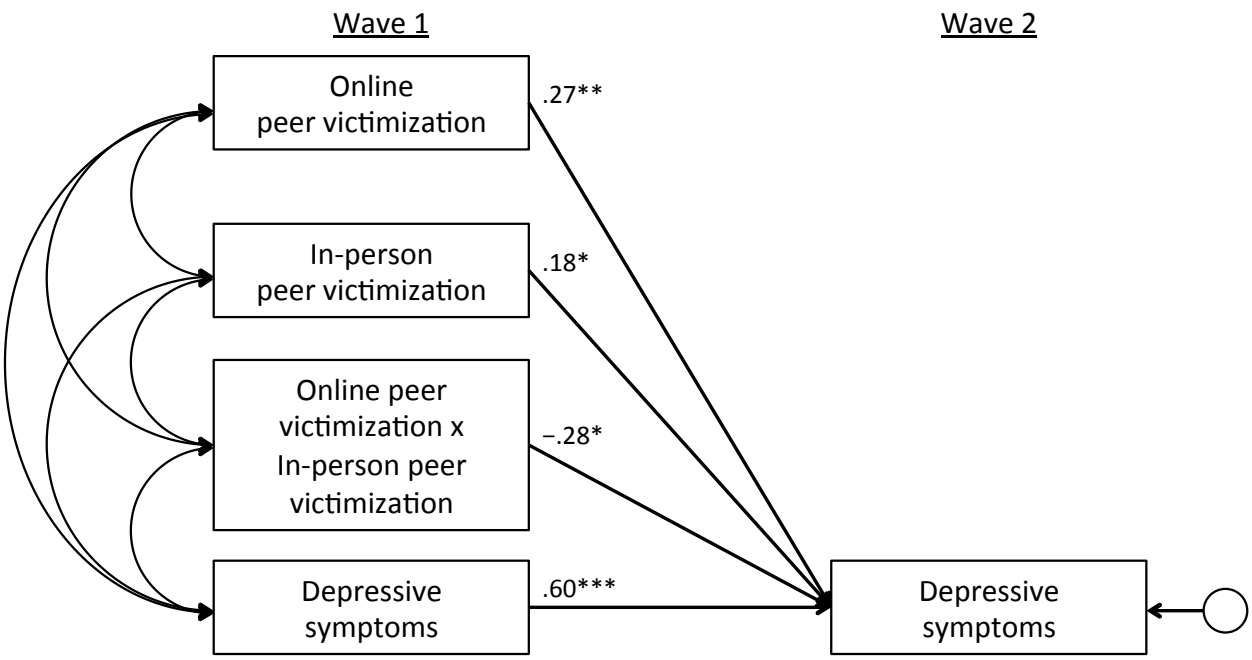


Figure 10. Path analysis for additional analysis 2: wave 1 online peer victimization, in-person peer victimization, and their interaction predicting wave 2 depressive symptoms, over and above wave 1 depressive symptoms. Standardized βs are presented above. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

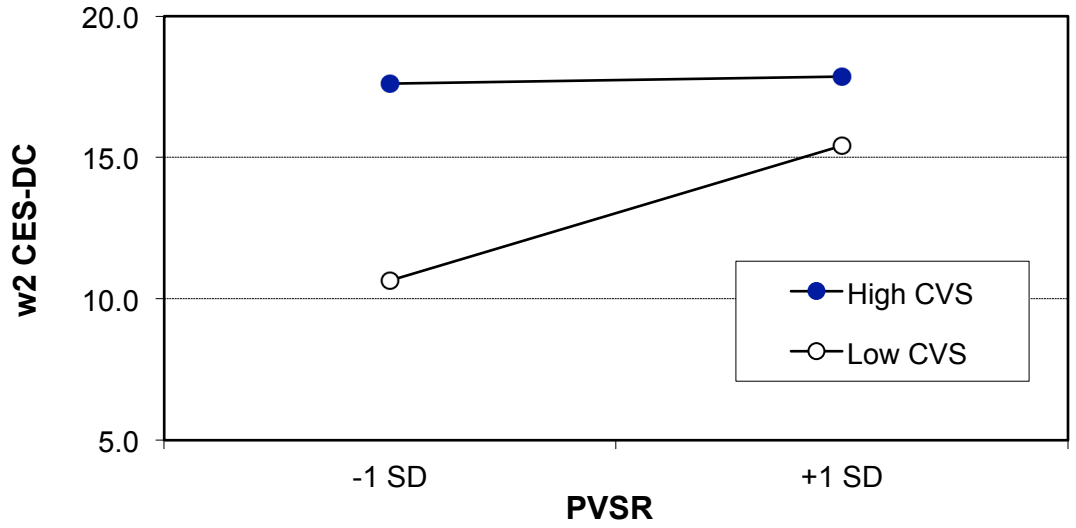


Figure 11. Plotted interaction: between wave 1 online victimization (CVS) and in-person victimization (PVSR) predicting wave 2 depressive symptoms (CES-DC) over and above wave 1 depressive symptoms.

CHAPTER IV

DISCUSSION

Proposed Analyses

Our original aim for this study was to test whether, as hypothesized, cognitive reactivity is a mechanism by which victimizing social interactions increase depressive symptoms over time and supportive social interactions decrease depressive symptoms over time. As part of a related effort to better understand the longitudinal effects of in-person and especially online social interactions on depressive symptoms among adolescents, we also tested whether online social support moderated the effect of in-person social support on depressive symptoms. Two key results emerged. First, cognitive reactivity is not a prospective mediator of the effects of social interaction variables on depression. Second, online social support is not a prospective moderator of the effects of in-person social support on depression.

We reached our first major finding by testing the first three proposed study questions. Path analyses demonstrated that none of the wave 1 social interaction variables were significantly predictive of wave 2 cognitive reactivity, over and above wave 1 cognitive reactivity, and wave 1 cognitive reactivity was not significantly predictive of wave 2 depressive symptoms, over and above wave 1 depressive symptoms. As could be expected, in a cross-lagged panel design, no models included significant paths A and B (see Figure 3), which would be required for a "half-longitudinal" model to test mediation (Cole & Maxwell, 2003). There could be many reasons that cognitive reactivity did not mediate the longitudinal effects of social interaction variables on depressive symptoms in this sample. One reason may have been a suboptimal lag between wave 1 and wave 2. After 3.5 months, the effects of social interaction

variables on cognitive reactivity, or the effects of cognitive reactivity on depressive symptoms, may have worn off. Or, it may be that a higher number of social interaction "trials" over a longer lag (or trials of increased intensity) would be necessary for cognitive reactivity to be altered. Two of our past studies (Cole, Martin, et al, 2014; Cole et al., 2019) have demonstrated a concurrent relation between cognitive reactivity and depressive symptoms, but this is our group's first test of the longitudinal relation between cognitive reactivity as measured by the BYB and depressive symptoms. Further testing of the longitudinal relations among social interaction predictors, cognitive reactivity, and depressive symptoms is necessary.

Our second major finding, reached via path analysis, was that wave 1 online social support does not prospectively moderate the effect of wave 1 in-person social support on wave 2 depressive symptoms, over and above wave 1 depressive symptoms. A path analysis of the model with the interaction term removed showed that the only significant predictor was wave 1 depressive symptoms. The majority of our previous work has demonstrated *cross-sectionally* that, when pitted against each other, in-person social support will consistently "soak up" the variance in depressive symptoms, leaving online social support as a nonsignificant predictor (even if its zero-order correlation with concurrent depression is statistically significant). It is not necessarily surprising in this study that an interaction was not detected; while experimental studies can distribute groups into variables' extremes, observational studies cannot, and thus statistical power to detect interactions can be reduced. What is surprising is that even in-person social support was not a significant *prospective* predictor of depressive symptoms.

Social support measurement may have contributed to this finding, as we only assessed esteem/emotional and social companionship (and not informational or instrumental) support from peers. During adolescence, parents remain an important source of social support even while

peer support rises in importance (Brown, 2004; Collins & Laursen, 2004). Our meta-analysis (Nick & Cole, 2018) calculated standardized betas for the effects of different sources of social support, controlling for the effects of peer victimization, on concurrent depressive and self-esteem outcomes for individuals across the adolescent age group. Although we could not test whether the beta for parental social support (−.29) was significantly different from the beta for peer social support (−.19), it does appear larger. For our sample of seventh and eighth graders, peer support may still be rising to meet parental support, especially regarding the prospective prediction of depressive outcomes.

Again, the lag between waves may also be a contributor here. After a three-month lag, Sybesma (2009) found no effect of perceived social support on later depressive symptoms, over and above previous depressive symptoms, victimization, and demographic control variables among adolescents. After 6 month lags in a four-wave study, Burke and colleagues (2017) found that peer social support was significantly and negatively predictive of later depressive symptoms, over and above previous depressive symptoms as well as peer victimization. However, after one-year lags, other groups studying adolescents found that social cognitions (including perceived social support) were not predictive of later depressive symptoms, over and above previous depressive symptoms (Phung 2004); social support alone was not a prospective predictor (Forster 2013); and that there was no longitudinal correlation between social support and depressive symptoms (Kendrick 2012). Although only a few longitudinal studies are presented here, it may be that an optimal lag exists between three months and one year.

As previously discussed, future studies could include measures of informational and instrumental social support, and could measure social support from additional sources, especially including parents, but also including teachers, counselors, etc. Collecting multiple waves of data

(e.g., at three, six, nine, twelve months) could help elucidate optimal lags among study variables. Finally, studies could utilize other modalities of measuring cognitive reactivity, including self-report measures like the LEIDS (Van der Does, 2002), daily diaries, or mood inductions.

Additional Analyses

After removing cognitive reactivity as a mediator, we tested reciprocal relations among social interaction variables and depressive symptoms. We also tested additional two-way interactions among social interaction variables in the longitudinal prediction of depression. Four key results emerged.

We reached our first major finding by testing two cross-lagged panel models involving online social support and depressive symptoms and in-person social support and depressive symptoms, respectively. Path analyses demonstrated that each wave 1 variable significantly and positively predicted itself at wave 2, but only wave 1 depression predicted wave 2 social support (negatively). Wave 1 social support was not predictive of wave 2 depression in either model. The finding that depressive symptoms prospectively reduce social support may be consistent with Coyne's interactional model of depression (1976b).

One of a number of interpersonal (rather than cognitive) models of depression, Coyne's model posits that depressed individuals' dysphoric behaviors initially elicit help and concern from supporters. However, as supporters' attempts to help fail and dysphoric behavior continues, supporters may become hostile towards the depressed individual and give off negative nonverbal cues even while providing positive verbal support, resulting in feelings of confusion and rejection in the depressed individual. The depressed individual may excessively seek reassurance, even if they are unsure of the supporter's sincerity, and supporters may begin to pull away (Coyne, 1976b). Although empirical support for Coyne's entire model has historically been

mixed, consistent support for the connection between the individual's depression and a supporter's rejection has emerged (see Segrin & Dillard's 1992 meta-analysis), especially between long-term pairs like spouses and roommates (see Marcus & Nardone's 1992 review). In their meta-analysis, Starr and Davila (2008) also found consistent support for the connection between excessive reassurance seeking and rejection, especially when rejection is rated by the depressed individual rather than the supporter.

As Coyne's conception of depression is interpersonal and interactional, input from our participants' peers about the participants themselves would be necessary to truly test his model. However, the finding that depressive symptoms prospectively reduces the esteem/emotional and social companionship support perceived by our participants from their peers echoes some of the more consistent literature, especially Star and Davila's finding that there is a stronger connection between excessive reassurance seeking and rejection perceived by depressed individuals (rather than rated by supporters, although in other literature this finding is mixed).

It is especially intriguing that this finding held in the online world as well as the in-person world. Why would depression prospectively reduce *online* social support? Is it associated with reduced Internet use in general, reduced use of helpful spaces online, or conversely, behavioral changes like excessive reassurance seeking that are the online analogue to those Coyne describes? Wave 1 depressive symptoms were associated significantly and positively with wave 2 average social media use as measured by the OSSS ($r = .13$, $p = .05$),[3] suggesting depression does not pull adolescents away from the Internet. However, it is reasonable to hypothesize that dysphoric behavior online (creating depressing posts, liking/favoriting depressing content, sending messages seeking excessive reassurance) could result in some verbal reassurance (kind

[3] However, depressive symptoms were not predictive of later average social media use, over and above previous average social media use, in a multiple regression model.

responses to texts and messages) but behavioral distancing (not seeking out an individual online for companionship or shared activities). Investigating a related concept among adolescents, Nesi and Prinstein (2015) found that online social comparison and feedback-seeking (e.g., seeking information about one's physical appearance, comparing one's life to others', seeking support when lonely or sad) was predictive of concurrent depressive symptoms, over and above concurrent in-person excessive reassurance-seeking and prior depressive symptoms. Future studies will need to investigate the relations among a variety of online dysphoric behaviors and depressive symptoms longitudinally.

As part of a brief, additional section of our study, we asked participants to name the most supportive online community they knew, then rate how frequently they engaged in that community. Over 120 participants at each wave endorsed currently engaging with their named community "a lot." Unfortunately, these questions were exploratory, and not designed with tests of Coyne's theory in mind. However, in future studies, it would be fascinating to investigate whether perceived esteem/emotional and social companionship support are maintained or lost specifically in these named online communities. Much of the evidence from tests of Coyne's interactional model suggests support is lost from close, long-term partners like spouses and roommates. Due to developmental drives for identity exploration and peer interaction, as well as the transformative nature of online interactions (Nesi et al., 2018, discussed below), however, adolescents may be particularly drawn to close, mutually supportive online spaces. It would be interesting to see if supportive engagement is maintained despite some individuals' dysphoric behaviors in these spaces. Mutual support may be especially important for adolescents who have experienced marginalization due to aspects of their identity. For example, Ybarra and colleagues (2015) found that LGBT youth are more likely than non-LGBT youth to have online-only friends

and rate them as more supportive than their in-person-only friends. As social media grows and diversifies, as do identity-related spaces online (e.g., subreddits, Discord servers, and Amino communities), the study of online social support similarly needs to grow in sophistication and specificity.

We reached our second major finding by testing one cross-lagged panel model involving online victimization and depressive symptoms. Path analysis demonstrated that each wave 1 variable significantly and positively predicted itself at wave 2, but only wave 1 online victimization predicted wave 2 depressive symptoms (positively). Wave 1 depressive symptoms were not predictive of wave 2 online victimization. This finding is consistent with one of our previous longitudinal studies, which found that online victimization significantly predicted later depressive symptoms, over and above previous depressive symptoms as well as concurrent in-person peer victimization, in a multiple regression model (Cole et al., 2016). Rose and Tynes, however, tested a cross-lagged panel model and found that online victimization and depression had a reciprocal longitudinal relation (2015), which the current study did not find. Although they noted that, as in the in-person literature, students who report depressive symptoms may appear more vulnerable online and are thus victimized, they do not speculate about particular behaviors that signal this vulnerability. Gámez-Guadix and colleagues (2013), who also found a reciprocal longitudinal relation, posited that depressed adolescents may be at greater risk for victimization online due to poorer social skills and a tendency to isolate themselves.

It appears for the current study, however, that behaviors associated with depression like these are *not* increasing risk for later online victimization, even if risk for reduced online social support is increasing. Again, it does not appear that depressive symptoms are associated with later reduced use of the Internet in general. It could be that depressive symptoms are associated

with choices adolescents make about where they go online and how they use the Internet. Another potential explanation for why our participants lost online social support, but also why they did not incur online victimization, could be more passive Internet use following depressive symptoms (e.g., looking at, reading, scrolling through, or watching content rather than responding to or creating content). One study of adults (Escobar-Viera et al., 2018) and one study of adolescents (Thorisdottir et al., 2019) found that passive social media use was predictive of concurrent depressive symptoms (though note Frison & Eggermont, 2016 only found this was true for adolescent girls). While these studies provide initial support for a connection between passive social media use and depressive symptoms, future studies will need to investigate this reciprocal relation longitudinally.

We reached our third major finding by testing one cross-lagged panel model involving in-person victimization and depressive symptoms. Path analysis demonstrated that each wave 1 variable significantly and positively predicted itself at wave 2. In-person victimization at wave 1 significantly and positively predicted depressive symptoms at wave 2, and depressive symptoms at wave 1 significantly and positively predicted in-person victimization at wave 2. This finding is consistent with previous literature, which is well described in Reijntjes et al.'s (2010) meta-analysis. The authors found that among 18 prospective studies that controlled for previous levels of each dependent variable, peer victimization was significantly predictive of later internalizing symptoms, and internalizing symptoms were significantly predictive of later peer victimization, both with small to moderate effect sizes. They conclude these effects produce a cycle that could trap an adolescent in a victim role. Unlike the current study's online victimization findings described above, it appears that depressive behaviors are associated with greater risk of later in-person victimization.

We reached our fourth major finding by testing moderation models, revealing that wave 1 online and in-person victimization interact in the longitudinal prediction of wave 2 depressive symptoms, over and above wave 1 depressive symptoms. At lower levels of online victimization, depressive symptoms increase as in-person peer victimization increases. Again, this is consistent with the longitudinal literature demonstrating a positive relation between in-person peer victimization and depressive symptoms. It appears, however, that regardless of the level of in-person victimization, higher online victimization is related to higher depressive symptoms, suggesting online victimization may be uniquely powerful for adolescents.

In their transformational framework, Nesi and colleagues (2018a, 2018b) outline theoretical and empirical reasons why this may be true. Features of the Internet and social media that transform users' experiences and distinguish them from in-person interactions include asynchronicity, permanence, publicness, availability, cue absence, quantifiability, and visualness. Already developmentally motivated to connect with peers, attend to social feedback, and experiment with and present (portions of) their identities, adolescents may be particularly drawn to the online landscape because of these aforementioned features which could facilitate their developmental tasks in compelling ways. However, these same features transform victimization experiences as well, making them: more frequent and immediate, as they can occur anywhere or any time; more quickly disseminated, permanently available, and public; perceived as more harsh and uncontrollable; anonymous; and qualitatively different (e.g., victimization could include impersonation or distributing another's content without permission; Nesi, Choukas-Bradly, & Prinstein, 2018a, 2018b). These features could help explain why, for our participants, online victimization at high levels was so connected with depressive symptoms.

Clinical Implications

Findings from current study agree with a large body of evidence linking in-person peer victimization with later depressive symptoms, and a growing body of work linking online victimization with later depressive symptoms. Although findings from this study suggest online victimization may be particularly powerful for adolescents, clinicians should ask about and take seriously both sources of victimization. Odgers and Jensen (2020) caution clinicians (and researchers) that varying vulnerabilities may worsen this picture; adolescents from low-income families report more overflow of online conflicts into offline fights, and adolescents more sensitive to in-person peer rejection may need more monitoring and support during online interactions. They recommend open discussions about online and offline experiences among parents and adolescents, rather than restrictive and coercive monitoring, as a means to facilitate healthy social interactions.

The current study also highlights the risk of important social outcomes for adolescents with increased depressive symptoms: greater in-person victimization, less online social support, and less in-person social support. This study views these results through Coyne's lens; namely, how dysphoric behaviors like excessive reassurance-seeking might change the nature of interactions with others, resulting in a loss of support (or, outside of his lens, the addition of in-person victimization). However, as clinicians recognize, depression may also result in increased self-isolation, pulling away from previously enjoyable interests or groups, or self-harm or suicide ideation and behavior strong enough to result in movement to inpatient or residential care due to safety concerns. In all, these potential outcomes underline the interpersonal, interactional nature of depression and the importance of considering the interplay between an individual with depression and their social environment.

Finally, the current study, as well as its limitations, emphasizes the importance of understanding the complexities of adolescents' online lives. The amount of "screen time" alone is no longer a useful construct (Odgers and Jensen (2020). Where adolescents are going online (e.g., social media, gaming, forums, therapy apps), with whom, to do what (e.g., active vs. passive use), and what is happening there (e.g., entertainment, validation, social companionship, victimization, social comparison, identity exploration, seeking and sharing information) are more important questions. It is also important to recognize that individuals may use the same platforms for very different reasons and each individual's digital landscape is unique. Clinicians, researchers, and parents should strive to ask open questions about adolescents' online lives and limit the amount they impose their own preconceived notions about Internet use on adolescents' online experiences.

Limitations and Future Directions

A number of limitations of the current study suggest directions for future research. Our sample was limited in racial diversity, gender diversity, age, and did not assess socioeconomic status. The relations found here are reflective of a largely White, cisgender group of seventh and eighth graders in rural Tennessee. Future studies should test these relations among more diverse groups of adolescents. It is also important to note that although 92% of adolescents access the Internet daily (Lenhart, 2015), there still may be a "digital divide, where differences in online experiences are amplifying risks among already vulnerable adolescents" (Odgers and Jensen, 2020, p. 345). Assessing socioeconomic status and its effects on adolescents' online lives will be important in future studies as well.

As discussed above, collecting additional waves of data (e.g., at three, six, nine, twelve months) may help elucidate optimal lags between social interaction variables, cognitive

reactivity, and depressive symptoms. In addition, measuring additional types of social support (informational, instrumental) from additional sources (parents, teachers, counselors, etc.), or measuring cognitive reactivity in different ways (e.g., self-report, daily diary, mood induction) could be important in future studies as well. Creators of future studies could also consider selecting samples of highly victimized and highly supported adolescents. At each wave, on average in the past three months, our participants reported receiving online and in-person social support "sometimes," experiencing online victimization 0-1 time, and experiencing in-person victimization between "never" and "rarely." It may be among highly victimized and highly supported adolescents, compared to a general sample of adolescents, that the "learning trials" theory of social interactions affecting cognitive reactivity occurs.

Finally, fascinating avenues of future research exist at the intersections of online social support, direct tests of Coyne's interactional model of depression, and Nesi and colleagues' transformational framework, perhaps especially for marginalized, victimized, and/or depressed adolescents. Bringing together quantitative methods, network analysis, qualitative methods, and online ethnography could result in highly compelling studies of social interactions and psychopathology among groups of vulnerable adolescents.

Conclusions

In conclusion, common social interactions can have meaningful later psychological consequences, especially for adolescents. This study has shown that in-person and especially online victimization are prospectively predictive of increased depressive symptoms. However, it is important to recognize the social implications and interactional nature of depressive symptoms as well. This study also demonstrated that depressive symptoms are prospectively predictive of reduced online social support, reduced in-person social support, and increased in-person

victimization. Finally, this study begins to expand the sparse longitudinal literature on online social support for adolescents.

APPENDIX A

PREVIOUS COLE LAB RESEARCH INFORMING THE CURRENT STUDY

Table 1. *Meta-analytic results from Nick and Cole (2018)*

Concurrent variables	Point estimate (*r*)	95% confidence interval	Number of independent samples
In-person social support and depressive symptoms	−.31	−.36 to −.26	41
Online victimization and depressive symptoms	.38	30 to .45	7
In-person victimization and depressive symptoms	.30	.27 to .34	24

Note. We retrieved articles presenting at least two correlations among in-person social support, peer victimization, and depressive and related outcomes, resulting in 50 to 59 independent samples.

Table 2. *Regression of Concurrent Depressive Symptoms onto Social Support Subtypes*

Variable	College students		Community adults 1		Community adults 2		High school students		MMORPG players	
Online	Std β	p	Std β	p	Std β	p	Std β	p	Std β	p
EE	−.136	.340	−.221	.038*	−.260	.001*	−.100	.531	−.230	.076†
SC	−.077	.623	−.002	.982	.150	.089†	.040	.824	−.317	.019*
INF	−.031	.838	.150	.126	.047	.625	.148	.414	.223	.078†
INS	.139	.318	−.093	.262	−.029	.664	−.153	.268	.256	.004*
	R^2	p	R^2	p	R^2	p	R^2	p	R^2	p
	.036	.536	.039	.024*	.037	.011*	.024	.678	.061	.000*
In-Person	Std β	p	Std β	p	Std β	p	Std β	p	Std β	p
EE							−.444	.001*	−.290	.005*
SC							.093	.473	−.318	.003*
INF							−.136	.318	.045	.640
INS							−.055	.645	−.024	.981
	R^2	p	R^2	p	R^2	p	R^2	p	R^2	p
							.430	.000*	.296	.000*

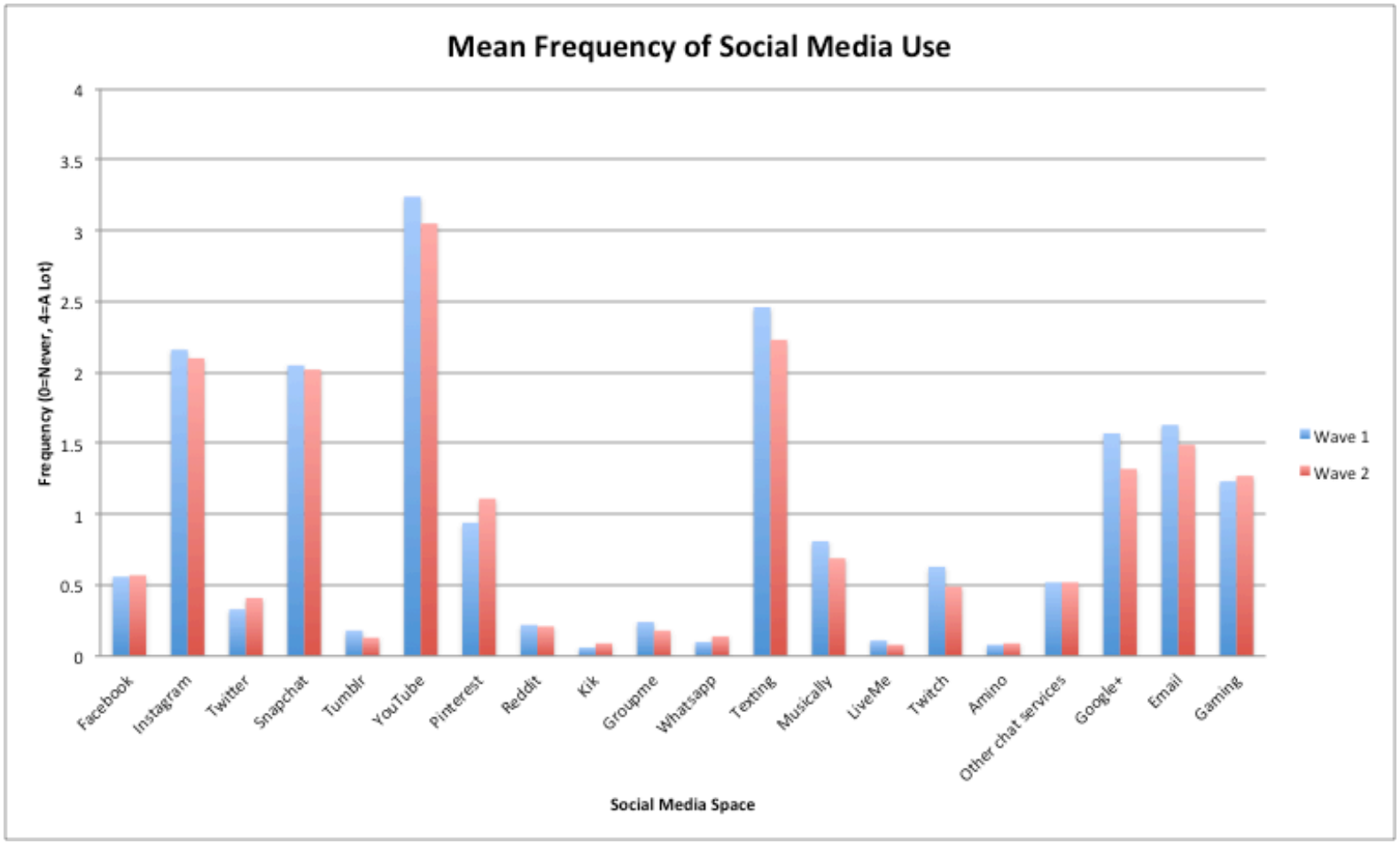
Note. EE = esteem/emotional social support; SC = social companionship social support; INF = informational social support; INS = instrumental social support; Std = standardized. Depressive symptoms were measured by the Beck Depression Inventory II in the college students, community adults, and MMORPG players samples and by the Reynolds Adolescent Depression Scale in the high school student sample. The measure of in-person social support was the Interpersonal Support Evaluation List. The college students and community adult studies did not measure subtypes of in-person social support. † $p \leq .01$, * $p \leq .05$.

Table 3. *Regression of Concurrent Depressive Symptoms onto Peer Victimization (PV)*

Variable	College students		Community adults 1		Community adults 2		High school students		MMORPG players		Elementary and middle school	
Online	Std β	p	Std β	p	Std β	p	Std β	p	Std β	p	Std β	p
PV	.179	.085†	.108	.064†	.199	.000*	.310	.004*	.152	.005*	.164	.000*
	R^2	p	R^2	p	R^2	p	R^2	p	R^2	p	R^2	p
	.032	.085†	.012	.064†	.039	.000*	.096	.004*	.023	.005*	.027	.000*
In-Person	Std β	p	Std β	p	Std β	p	Std β	p	Std β	p	Std β	p
PV	.303	.003*	.265	.000*	.255	.000*	.353	.001*	.395	.000*	.462	.000*
	R^2	p	R^2	p	R^2	p	R^2	p	R^2	p	R^2	p
	.092	.003*	.070	.000*	.065	.000*	.125	.001*	.156	.000*	.214	.000*

Note. PV = peer victimization; Std = standardized. Depressive symptoms were measured by the Beck Depression Inventory II in the college students, community adults, and MMORPG players samples and by the Reynolds Adolescent Depression Scale in the high school and elementary and middle school samples. † $p < .01$, * $p < .05$.

APPENDIX B



Mean frequencies of social media use by wave. Participants rated their general use of the above social media sites on the following scale: 0 = never, 1 = rarely, 2 = sometimes, 3 = pretty often, and 4 = a lot. Participants who endorsed playing online games in which they interact with others were able to write in three games they play, then rated the frequency that they engage in each game. "Gaming" above is an average of the ratings they provided.

APPENDIX C

PATH ANALYSIS RESULTS FOR PROPOSED ANALYSES

Table 1. *Study Question 1: Path Analysis with W1 Social Interaction Variables Predicting W2 Cognitive Reactivity*

Predictor	*B*	SE (*B*)	β	CR	*p*
W1 OSSS	.001	.001	.07	.97	.33
W1 ISEL	−.002	.001	−.12	−1.58	.12
W1 CVS	.001	.003	.04	.38	.71
W1 PVSR	−.004	.002	−.18	−1.92	.06
W1 BYB slope	.34	.07	.32	4.98	.001

Note. CR = Critical Ratio. W1 = Wave 1, W2 = Wave 2. BYB slope = Behind Your Back scale slope, OSSS = Online Social Support Scale, ISEL = Interpersonal Support Evaluation List, CVS = Cyberbullying and Victimization Survey, PVSR = Peer Victimization Self Report.

Table 2. *Study Question 2: Path Analysis with W1 Cognitive Reactivity Predicting W2 Depressive Symptoms*

Predictor	*B*	SE (*B*)	β	CR	*p*
W1 BYB slope	−.15	3.80	−.002	−.04	.97
W1 CES-DC	.71	.05	.70	14.22	.001

Note. CR = Critical Ratio. W1 = Wave 1, W2 = Wave 2. CR = Critical Ratio. CES-DC = Center for Epidemiologic Studies Depression Scale for Children, BYB slope = Behind Your Back scale slope.

Table 3. *Study Question 3: Separate Cross-Lagged Path Analyses Among Social Interaction Predictors, Cognitive Reactivity, and Depressive Symptoms*

Model	Predictor		Dependent	*B*	SE (*B*)	*β*	CR	*p*
A	W1 OSSS	→	W2 OSSS	.65	.05	.64	12.74	.001
	W1 BYB slope	→	W2 BYB slope	.36	.07	.35	5.26	.001
	W1 CES-DC	→	W2 CES-DC	.71	.05	.70	14.05	.001
	W1 OSSS	→	W2 BYB slope	.00	.001	.04	.70	.49
	W1 OSSS	→	W2 CES-DC	.01	.03	.02	.37	.71
	W1 BYB slope	→	W2 OSSS	8.42	5.88	.08	1.43	.15
	W1 BYB slope	→	W2 CES-DC	−.29	3.81	−.004	−.08	.94
	W1 CES-DC	→	W2 OSSS	−.23	.08	−.15	−2.87	.004
	W1 CES-DC	→	W2 BYB slope	.00	.001	−.02	−.33	.74
B	W1 ISEL	→	W2 ISEL	.58	.07	.58	8.68	.001
	W1 BYB slope	→	W2 BYB slope	.34	.07	.33	5.04	.001
	W1 CES-DC	→	W2 CES-DC	.65	.07	.64	9.59	.001
	W1 ISEL	→	W2 BYB slope	−.002	.002	−.13	−1.42	.16
	W1 ISEL	→	W2 CES-DC	−.10	.09	−.08	−1.16	.25
	W1 BYB slope	→	W2 ISEL	−2.09	2.84	−.04	−.73	.46
	W1 BYB slope	→	W2 CES-DC	−1.00	3.79	−.01	−.26	.79
	W1 CES-DC	→	W2 ISEL	−.09	.05	−.12	−1.79	.07
	W1 CES-DC	→	W2 BYB slope	−.002	.001	−.12	−1.37	.17
C	W1 CVS	→	W2 CVS	.79	.07	.66	11.58	.001
	W1 BYB slope	→	W2 BYB slope	.36	.07	.34	5.27	.001
	W1 CES-DC	→	W2 CES-DC	.64	.06	.62	10.95	.001
	W1 CVS	→	W2 BYB slope	−.001	.002	−.02	−.24	.81
	W1 CVS	→	W2 CES-DC	.29	.13	.13	2.33	.02
	W1 BYB slope	→	W2 CVS	1.65	2.07	.04	.80	.43
	W1 BYB slope	→	W2 CES-DC	.30	3.74	.004	.08	.94
	W1 CES-DC	→	W2 CVS	−.01	.03	−.01	−.20	.84
	W1 CES-DC	→	W2 BYB slope	.00	.001	−.02	−.30	.77
D	W1 PVSR	→	W2 PVSR	.43	.05	.49	8.21	.001
	W1 BYB slope	→	W2 BYB slope	.35	.07	.34	5.20	.001
	W1 CES-DC	→	W2 CES-DC	.64	.06	.63	10.97	.001
	W1 PVSR	→	W2 BYB slope	−.003	.002	−.12	−1.67	.09
	W1 PVSR	→	W2 CES-DC	.21	.09	.13	2.39	.02
	W1 BYB slope	→	W2 PVSR	.25	2.21	.01	.11	.91
	W1 BYB slope	→	W2 CES-DC	−.14	3.76	−.002	−.04	.97
	W1 CES-DC	→	W2 PVSR	.12	.04	.21	3.39	.001
	W1 CES-DC	→	W2 BYB slope	.001	.001	.04	.54	.59

Note. CR = Critical Ratio. W1 = Wave 1, W2 = Wave 2. OSSS = Online Social Support Scale, ISEL = Interpersonal Support Evaluation List, CVS = Cyberbullying and Victimization Survey, PVSR = Peer Victimization Self Report, CES-DC = Center for Epidemiologic Studies Depression Scale for Children, BYB slope = Behind Your Back scale slope.

Table 4. *Study Question 4: Path Analysis with W1 Online Social Support, W1 In-Person Social Support, and Their Interaction Predicting W2 Depressive Symptoms*

Predictor	*B*	SE (*B*)	*β*	CR	*p*
W1 OSSS	.19	.16	.28	1.24	.22
W1 ISEL	.08	.18	.06	.43	.67
W1 OSSS*ISEL	−.004	.004	−.34	−1.21	.23
W1 CES-DC	.66	.07	.65	9.72	.001

Note. CR = Critical Ratio. W1 = Wave 1, W2 = Wave 2. OSSS = Online Social Support Scale, ISEL = Interpersonal Support Evaluation List, CES-DC = Center for Epidemiologic Studies Depression Scale for Children.

APPENDIX D

PATH ANALYSIS RESULTS FOR ADDITIONAL ANALYSES

Table 1: *Additional Analysis 1: Separate Cross-Lagged Path Analyses Among Social Interaction Predictors and Depressive Symptoms*

Model	Predictor		Dependent	*B*	SE (*B*)	*β*	CR	*p*
A	W1 OSSS	→	W2 OSSS	.64	.05	.63	12.61	.001
	W1 CES-DC	→	W2 CES-DC	.71	.05	.70	14.63	.001
	W1 OSSS	→	W2 CES-DC	.01	.03	.02	.34	.74
	W1 CES-DC	→	W2 OSSS	−.20	.08	−.14	−2.66	.01
B	W1 ISEL	→	W2 ISEL	.58	.07	.59	8.83	.001
	W1 CES-DC	→	W2 CES-DC	.65	.07	.64	9.66	.001
	W1 ISEL	→	W2 CES-DC	−.10	.09	−.08	−1.14	.26
	W1 CES-DC	→	W2 ISEL	−.10	.05	−.13	−1.89	.06
C	W1 CVS	→	W2 CVS	.79	.07	.66	11.55	.001
	W1 CES-DC	→	W2 CES-DC	.64	.06	.62	11.35	.001
	W1 CVS	→	W2 CES-DC	.29	.13	.13	2.33	.02
	W1 CES-DC	→	W2 CVS	−.000	.03	.001	.01	.99
D	W1 PVSR	→	W2 PVSR	.42	.05	.49	8.21	.001
	W1 CES-DC	→	W2 CES-DC	.64	.06	.63	11.43	.001
	W1 PVSR	→	W2 CES-DC	.21	.09	.13	2.39	.02
	W1 CES-DC	→	W2 PVSR	.12	.03	.22	3.57	.001

Note. CR = Critical Ratio. W1 = Wave 1, W2 = Wave 2. OSSS = Online Social Support Scale, ISEL = Interpersonal Support Evaluation List, CVS = Cyberbullying and Victimization Survey, PVSR = Peer Victimization Self Report, CES-DC = Center for Epidemiologic Studies Depression Scale for Children.

Table 2. Additional Analysis 2: *Path Analysis with W1 Online Victimization, W1 In-Person Victimization, and Their Interaction Predicting W2 Depressive Symptoms*

Predictor	*B*	SE (*B*)	*β*	CR	*p*
W1 CVS	.60	.22	.27	2.74	.01
W1 PVSR	.29	.13	.18	2.18	.03
W1 CVS*PVSR	−.03	.01	−.28	−2.50	.01
W1 CES-DC	.60	.06	.60	10.49	.001

Note. CR = Critical Ratio. W1 = Wave 1, W2 = Wave 2. CVS = Cyberbullying and Victimization Survey, PVSR = Peer Victimization Self Report, CES-DC = Center for Epidemiologic Studies Depression Scale for Children.

REFERENCES

Beck, A. T. (1963). Thinking and depression: I. Idiosyncratic content and cognitive distortions. *Archives of General Psychiatry, 9*(4), 324–333. http://dx.doi.org/10.1001/archpsyc.1963.01720160014002

Beck, A. T. (1967). *Depression: Clinical, experimental, and theoretical aspects*. University of Pennsylvania Press.

Brown, B. B. (2004). Adolescents' relationships with peers. In R. M. Lerner & L. D. Steinberg (Eds.), *Handbook of adolescent psychology*, (pp. 363-394). Hoboken, NJ: Wiley.

Brown, C. F. (2011). Middle school cybervictimization: Outcomes, grade and gender differences, and the overlap with traditional victimization. Unpublished master's thesis.

Brookings, J. B., & Bolton, B. (1988). Confirmatory factor analysis of the Interpersonal Support Evaluation List. *American Journal Of Community Psychology, 16*(1), 137-147. http://dx.doi.org/10.1007/BF00906076

Burke, T., Sticca, F., & Perren, S. (2017). Everything's gonna be alright! The longitudinal interplay among social support, peer victimization, and depressive symptoms. *Journal of Youth and Adolescence, 46*(9), 1999–2014. http://dx.doi.org/10.1007/s10964-017-0653-0

Chabrol, H., Montovany, A., Chouicha, K., & Duconge, E. (2002). [Study of the CES-D on a sample of 1,953 adolescent students]. *L'Encéphale*, *28*(5 Pt 1), 429–432.

Chu, P. S., Saucier, D. A., & Hafner, E. (2010). Meta-analysis of the relationships between social support and well-being in children and adolescents. *Journal of Social and Clinical Psychology, 29*(6), 624–645. http://dx.doi.org/10.1521/jscp.2010.29.6.624

Clark, D. A., Beck, A. T., & Alford, B. A. (1999). *Scientific foundations of cognitive theory and therapy of depression*. New York: John Wiley and Sons Ltd.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences, 2nd edition*. Lawrence Erlbaum Associates.

Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress. *Journal of Applied Social Psychology, 13*(2), 99–125.

Cole, D. A., Dukewich, T. L., Roeder, K., Sinclair, K. R., McMillan, J., Will, E., … Felton, J. W. (2014). Linking peer victimization to the development of depressive self-schemas in children and adolescents. *Journal of Abnormal Child Psychology, 42*(1), 149–160. https://doi.org/10.1007/s10802-013-9769-1

Cole, D. A., Martin, N. C., Sterba, S. K., Sinclair-McBride, K., Roeder, K. M., Zelkowitz, R., & Bilsky, S. A. (2014). Peer victimization (and harsh parenting) as developmental correlates of cognitive reactivity, a diathesis for depression. *Journal of Abnormal Psychology, 123*(2), 336–349. https://doi.org/10.1037/a0036489

Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology, 112*(4), 558–577. https://doi.org/10.1037/0021-843X.112.4.558

Cole, D. A., Nick, E., & Pulliam, K. (2019). Are Massively Multiplayer Online Role-Playing Games healthy or not and why? Preliminary support for a Compensatory Social Interaction model. *Computers in Human Behavior*, *102*, 57–66. doi:10.1016/j.chb.2019.08.012

Cole, D. A., Zelkowitz, R. L., Nick, E. A., Lubarsky, S. R., & Rights, J. D. (2019). Simultaneously examining negative appraisals, emotion reactivity, and cognitive reactivity in relation to depressive symptoms in children. *Development and Psychopathology*, *31*(4), 1527–1540. https://doi.org/10.1017/s0954579418001207

Cole, D. A., Zelkowitz, R. L., Nick, E., Martin, N. C., Roeder, K. M., Sinclair-McBride, K., & Spinelli, T. (2016). Longitudinal and incremental relation of cybervictimization to negative self-cognitions and depressive symptoms in young adolescents. *Journal of Abnormal Child Psychology*, *44*(7), 1321–1332. doi:10.1007/s10802-015-0123-7

Collins, W. A. & Laursen, B. (2004). Parent-adolescent relationships and influences. In R. M. Lerner & L. D. Steinberg (Eds.), *Handbook of adolescent psychology*, (pp. 331-361). Hoboken, NJ: Wiley.

Coyne, J. C. (1976). Toward an interactional description of depression. *Psychiatry*, *39*(1), 28–40. https://doi.org/10.1080/00332747.1976.11023874

Curran-Bauer Analytics. (2020). *Generating and Saving Random Effect Estimates in SPSS (Versions Earlier than 25)*. Curran-Bauer Analytics. Retrieved April 11, 2019 from https://curranbauer.org/resources/spssrandom/

Dooley, J. J., Shaw, T., & Cross, D. (2012). The association between the mental health and behavioural problems of students and their reactions to cyber-victimization. *European Journal of Developmental Psychology, 9*(2), 275–289. https://doi.org/10.1080/17405629.2011.648425

Escobar-Viera, C. G., Shensa, A., Bowman, N. D., Sidani, J. E., Knight, J., James, A. E., & Primack, B. A. (2018). Passive and active social media use and depressive symptoms among United States adults. *Cyberpsychology, Behavior, and Social Networking*, *21*(7), 437–443. https://doi.org/10.1089/cyber.2017.0668

Faulstich, M. E., Carey, M. P., Ruggiero, L., Enyart., P., & Gresham, F. (1986). Assessment of depression in childhood and adolescence: An evaluation of the Center for Epidemiological Studies Depression Scale for Children (CES-DC). *American Journal of*

Psychiatry 143(8), 1024–1027.

Forster, M., Dyal, S. R., Baezconde-Garbanati, L., Chou, C.-P., Soto, D. W., & Unger, J. B. (2013). Bullying victimization as a mediator of associations between cultural/familial variables, substance use, and depressive symptoms among Hispanic youth. *Ethnicity & Health, 18*(4), 415–432. http://dx.doi.org/10.1080/13557858.2012.754407

Frederick, S. S. (2015). The protective role of social support and the relations among cyber and traditional victimization, depression, and suicidal ideation. Unpublished dissertation.

Frison, E., & Eggermont, S. (2016). Exploring the relationships between different types of Facebook use, perceived online social support, and adolescents' depressed mood. *Social Science Computer Review, 34*(2), 153–171. https://doi.org/10.1177/0894439314567449

Gámez-Guadix, M., Orue, I., Smith, P. K., & Calvete, E. (2013). Longitudinal and reciprocal relations of cyberbullying with depression, substance use, and problematic Internet use among adolescents. *Journal of Adolescent Health, 53*(4), 446–452. http://dx.doi.org./10.1016/j.jadohealth.2013.03.030

Guerra, N. G., Williams, K. R., & Sadek, S. (2011). Understanding bullying and victimization during childhood and adolescence: A mixed methods study. *Child Development, 82*(1), 295-310.

Hawker, D. S. J., & Boulton, M. J. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: A meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry, 41*(4), 441–455. https://doi.org/10.1111/1469-7610.00629

Hyman, S. M., Gold, S. N., & Cott, M. A. (2003). Forms of social support that moderate PT5 in childhood sexual abuse survivors. *Journal Of Family Violence, 18(5), 295-300.*

http://dx.doi.org/10.1023/A:1025117311660

Kendrick, K., Jutengren, G., & Stattin, H. (2012). The protective role of supportive friends against bullying perpetration and victimization. *Journal of Adolescence, 35*(4), 1069–1080. http://dx.doi.org/10.1016/j.adolescence.2012.02.014

Kovacs, M., & Beck, A. T. (1978). Maladaptive cognitive structures in depression. *American Journal of Psychiatry, 135*, 525-533.

Kowalski, R. M., Giumetti, G. W., Schroeder, A. N., & Lattanner, M. R. (2014). Bullying in the digital age: A critical review and meta-analysis of cyberbullying research among youth. *Psychological Bulletin, 140*(4), 1073–1137. http://dx.doi.org/10.1037/a0035618

Kowalski, R. M., & Limber, S. P. (2013). Psychological, physical, and academic correlates of cyberbullying and traditional bullying. *Journal of Adolescent Health, 53(*1, Suppl), S13–S20. http://dx.doi.org/10.1016/j.jadohealth.2012.09.018

LaGrange, B., Cole, D. A., Dallaire, D. H., Ciesla, J. A., Pineda, A. Q., Truss, A. E., & Folmer, A. (2008). Developmental changes in depressive cognitions: A longitudinal evaluation of the cognitive triad inventory for children. *Psychological Assessment, 20*(3), 217-226. http://dx.doi.org/10.1037/1040-3590.20.3.217

Lenhart, A. (2015). *Teens, Social Media, & Technology Overview 2015*. Pew Research Center. Retrieved from http://www.pewinternet.org/2015/04/09/teens-social-media-technology-2015.

Marcus, D. K., & Nardone, M. E. (1992). Depression and interpersonal rejection. *Clinical Psychology Review*, *12*(4), 433–449. https://doi.org/10.1016/0272-7358(92)90126-s

Merz, E. L., Roesch, S. C., Malcarne, V. L., Penedo, F. J., Llabre, M. M., Weitzman, O. B., & ... Gallo, L. C. (2014). Validation of Interpersonal Support Evaluation List-12 (ISEL-12)

scores among English- and Spanish-speaking Hispanics/Latinos from the HCHS/SOL Sociocultural Ancillary Study. *Psychological Assessment, 26*(2), 384-394. http://dx.doi.org/10.1037/a0035248

Nansel, T. J., Overpeck, M., Pilla, R. S., & Ruan, W. J. (2001). Bullying behaviors among US youth: Prevalence and association with psychosocial adjustment. *Journal of the American Medical Association, 285*(16), 2094-2100.

Nesi, J., Choukas-Bradley, S., & Prinstein, M. J. (2018a). Transformation of adolescent peer relations in the social media context: Part 1—A theoretical framework and application to dyadic peer relationships. *Clinical Child and Family Psychology Review*, *21*(3), 267–294. https://doi.org/10.1007/s10567-018-0261-x

Nesi, J., Choukas-Bradley, S., & Prinstein, M. J. (2018b). Transformation of adolescent peer relations in the social media context: Part 2 – Application to peer group processes and future directions for research. *Clinical Child and Family Psychology Review*, *21*(3), 295–319. https://doi.org/10.1007/s10567-018-0262-9

Nesi, J., & Prinstein, M. J. (2015). Using social media for social comparison and feedback-seeking: Gender and popularity moderate associations with depressive symptoms. *Journal of Abnormal Child Psychology*, *43*(8), 1427–1438. https://doi.org/10.1007/s10802-015-0020-0

Nick, E. A. & Cole, D. A. (2018). The associations of social support and peer victimization with depressive and self-esteem outcomes in adolescents: A meta-analysis and qualitative review. Manuscript in preparation.

Nick, E. A., Cole, D. A., Skubel, A. E., Carter, G., & Pulliam, K. (2018, April). Social media use as a double-edged sword: Associations with depressive cognitions and symptoms, online

victimization, and online social support. Poster presented at the annual conference of the Anxiety and Depression Association of America, Washington, DC.

Nick, E. A., Cole, D. A., Smith, D. K., Carter, G., & Zelkowitz, R. (2018). The Online Social Support Scale: Measure development and validation. *Psychological Assessment, 30(9),* 1127-1143. doi: http://dx.doi.org/10.1037/pas0000558.

Odgers, C. L., & Jensen, M. R. (2020). Annual Research Review: Adolescent mental health in the digital age: facts, fears, and future directions. *Journal of Child Psychology and Psychiatry*, *61*(3), 336–348. https://doi.org/10.1111/jcpp.13190

Phung, J. A. H. (2004). Understanding the comorbidity of aggression and depression: The role of peer rejection, victimization, social support, and perceived effectiveness. Unpublished dissertation.

Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1,* 385–401.

Reijntjes, A., Kamphuis, J. H., Prinzie, P., & Telch, M. J. (2010). Peer victimization and internalizing problems in children: A meta-analysis of longitudinal studies. *Child Abuse & Neglect, 34*(4), 244–252. https://doi.org/10.1016/j.chiabu.2009.07.009

Rose, C. A., & Tynes, B. M. (2015). Longitudinal associations between cybervictimization and mental health among U.S. adolescents. *Journal of Adolescent Health*, *57*(3), 305–312. https://doi.org/10.1016/j.jadohealth.2015.05.002

Rueger, S. Y., Malecki, C. K., Pyun, Y., Aycock, C., & Coyle, S. (2016). A meta-analytic review of the association between perceived social support and depression in childhood and adolescence. *Psychological Bulletin, 142*(10), 1017–1067. https://doi.org/10.1037/bul0000058

Seeds, P. M., Harkness, K. L., & Quilty, L. C. (2010). Parental maltreatment, bullying, and adolescent depression: Evidence for the mediating role of perceived social support. *Journal of Clinical Child and Adolescent Psychology, 39*(5), 681–692. http://dx.doi.org/10.1080/15374416.2010.501289

Segrin, C., & Dillard, J. P. (1992). The Interactional theory of depression: A meta-analysis of the research literature. *Journal of Social and Clinical Psychology*, *11*(1), 43–70. https://doi.org/10.1521/jscp.1992.11.1.43

Sinclair, K. R., Cole, D. A., Dukewich, T., Felton, J., Weitlauf, A. S., Maxwell, M. A., … Jacky, A. (2012). Impact of physical and relational peer victimization on depressive cognitions in children and adolescents. *Journal of Clinical Child & Adolescent Psychology, 41*(5), 570–583. https://doi.org/10.1080/15374416.2012.704841

Smokowski, P. R., Evans, C. B. R., & Cotter, K. L. (2014). The differential impacts of episodic, chronic, and cumulative physical bullying and cyberbullying: The effects of victimization on the school experiences, social support, and mental health of rural adolescents. *Violence and Victims, 29*(6), 1029–1046. http://dx.doi.org/10.1891/0886-6708.VV-D-13-00076

Starr, L. R., & Davila, J. (2008). Excessive reassurance seeking, depression, and interpersonal rejection: A meta-analytic review. *Journal of Abnormal Psychology*, *117*(4), 762–775. https://doi.org/10.1037/a0013866

Sybesma, C. K. (2009). Social cognitive mediators and moderators of the relation between experiences of community violence and adolescent outcomes. Unpublished dissertation.

Thorisdottir, I. E., Sigurvinsdottir, R., Asgeirsdottir, B. B., Allegrante, J. P., & Sigfusdottir, I. D. (2019). Active and passive social media use and symptoms of anxiety and depressed

mood among Icelandic adolescents. *Cyberpsychology, Behavior, and Social Networking*, *22*(8), 535–542. https://doi.org/10.1089/cyber.2019.0079

Van der Does, W. (2002). Cognitive reactivity to sad mood: Structure and validity of a new measure. *Behaviour Research and Therapy, 40*(1), 105–120. http://dx.doi.org/10.1016/S0005-7967(00)00111-X

Weissman, M. M., Orvaschel, H., & Padian, N. (1980). Children's symptom and social functioning self- report scales: Comparison of mothers' and children's reports. *Journal of Nervous Mental Disorders* 168(12), 736–740.

Williams, J. M. G., Does, A. J. W. V. der, Barnhofer, T., Crane, C., & Segal, Z. S. (2008). Cognitive reactivity, suicidal ideation and future fluency: Preliminary investigation of a differential activation theory of hopelessness/suicidality. *Cognitive Therapy and Research, 32*(1), 83–104. https://doi.org/10.1007/s10608-006-9105-y

World Health Organization (WHO). (2018, February 5). *Adolescents: Health risks and solutions*. Retrieved from http://www.who.int/en/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions

Ybarra, M. L., Mitchell, K. J., Palmer, N. A., & Reisner, S. L. (2015). Online social support as a buffer against online and offline peer and sexual victimization among U.S. LGBT and non-LGBT youth. Child Abuse & Neglect, 39, 123–136. https://doi.org/10.1016/j.chiabu.2014.08.006

Young, J. F., Berenson, K., Cohen, P., & Garcia, J. (2005). The role of parent and peer support in predicting adolescent depression: A longitudinal community study. *Journal Of Research On Adolescence, 15*(4), 407-423. http://dx.doi.org/10.1111/j.1532-7795.2005.00105.x