

Depressed Individuals Use Negative Self-Focused Language When Recalling Recent Interactions with Close Romantic Partners but Not Family or Friends

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Abstract

Depression is characterized by a self-focused negative attentional bias, which is often reflected in everyday language use. In a prospective writing study, we explored whether the association between depressive symptoms and negative, self-focused language varies across social contexts. College students ($N = 243$) wrote about a recent interaction with a person they care deeply about. Depression symptoms positively correlated with negative emotion words and first-person singular pronouns (or negative self-focus) when writing about a recent interaction with romantic partners or, to a lesser extent, friends, but not family members. The pattern of results was more pronounced when participants perceived greater self-other overlap (i.e., interpersonal closeness) with their romantic partner. Findings regarding how the linguistic profile of depression differs by type of relationship may inform more effective methods of clinical diagnosis and treatment.

1 Introduction

Depression is often characterized by a negative attentional bias, wherein depressed individuals view themselves and their surrounding environment negatively (Beck, 1967). For example, when listening to a string of words, depressed individuals are more likely to identify negative (rather than neutral) homophones (e.g., *weak* rather than *week*; Wenzlaff & Eisenberg, 2001). Depressed individuals also selectively recall negative more than positive experiences (Dalgleish & Werner-Seidler, 2014). Further, people who are currently depressed associate more negative and fewer positive traits with not

only themselves, but also their parents and romantic partners (Gara et al., 1993).

With depression affecting millions worldwide (WHO, 2018) and depression rates increasing for adolescents and young adults in particular (Twenge, Joiner, Rogers, & Martin, 2017), researchers across multiple fields are focused on finding more effective methods of early diagnosis and treatment. Research at the intersection of clinical psychology and computational linguistics has extensively examined depressed individuals' language use as an alternative to more traditional self-report methods of measuring depressive symptomology. Self-reports can be particularly limited when assessing mental health conditions, such as depression, which tend to be stigmatized (Crocker & Major, 1989) and may involve biased self-perceptions (Beck, 1967; Beevers, 2005; c.f. Moore & Fresco, 2012). Given the limitations of self-reports, it is necessary to supplement depression scales (e.g., Beck Depression Inventory-II, Center for Epidemiologic Studies Depression Scale Revised) with less explicit measures.

Language use may serve as an implicit, behavioral measure of depression. Many studies have found that high rates of first-person singular pronouns and negative emotion words correlate with higher levels of depression in a variety of contexts, such as public social media posts (De Choudhury, Counts, Horvitz, & Hoff, 2014; Eichstaedt et al., 2018; Schwartz et al., 2014), private expressive writing tasks (Rude, Gortner, & Pennebaker, 2004), and diagnostic clinical interviews (Zimmerman et al., 2016; see Holtzman, 2017 for a meta-analysis). Depressed individuals' use of negative emotion words coincides with their negative attentional bias (Beevers, 2005) and emotion regulation deficits (Joorman & Stanton, 2016), while their use of first-person singular pronouns corresponds with

their tendency to ruminate (i.e., engage in repetitive negative thinking about the self; Watkins & Teasdale, 2001).

Despite the clinical importance of behavioral indicators of mental health, effect sizes for the associations between language and depressive symptoms tend to be modest, which limits the use of language as a primary clinical outcome or ground truth (Baddeley, Pennebaker, & Beevers, 2012; Holtzman, 2017). For example, recent research suggests that self-focused language in particular may be better understood as an indicator of vulnerability to stress (or neuroticism) rather than depression per se (Tackman et al., 2018). We propose that some questions about the stability of the links between language and mental health symptoms stem from differences in how individuals experience and express depressive symptoms across contexts. In the current study, we consider how linguistic indicators of depression—presumably reflecting depressive symptoms and self-regulatory processes—vary across written descriptions of recent interactions with family, friends, and romantic partners.

Not all language categories are created equal. People tend to be less conscious of their use of function words (i.e., words that define syntax and express *how* people communicate, such as articles and pronouns) than content words (i.e., words that reflect conversation topic or what people are saying, such as nouns and verbs; Tausczik & Pennebaker, 2010). Function words make up a miniscule portion (<.1%) of the total words in an individual's repertoire, yet they comprise over half of the words used in everyday conversation and writing (Chung & Pennebaker, 2007). In some instances, first-person singular pronouns (*I, me, my*) predict levels of depression to a greater degree than do negative emotion words (De Choudhury et al., 2014), perhaps because function words may be less easily regulated than content words (Bell, Brenier, Gregory, Girand, & Jurafsky, 2009; Garrod & Pickering, 2016).

For example, mothers with postpartum depression (a major depressive episode following childbirth) were more likely to use first-person singular pronouns in their Facebook posts than were non-postpartum depression mothers, but their use of negative emotion words did not differ (De Choudhury et al., 2014). Follow-up interviews with those mothers revealed that many

of their concerns with respect to posting about their depression stemmed from possible judgment from friends. Thus, content words (e.g., negative emotion words), which people are more conscious of, may be more easily censored in everyday language use, whereas function words (e.g., first-person singular pronouns) and syntax are less easily censored as they are processed more rapidly (Segalowitz, & Lane, 2000), with less conscious attention and control (Pulvermüller, Shtyrov, Hasting, & Carlyon, 2008).

Other social factors may play a role in the rate at which depressed people use certain content and function word categories. For instance, depressed individuals may disclose more or less while talking with certain people in their daily lives (Altman & Taylor, 1973). Specifically, students with higher levels of depression were more likely to use negative language while having a conversation with a friend rather than a stranger (Segrin & Flora, 1998). Naturalistic recordings of everyday life also show that depressed individuals are more likely to use negative emotion words in conjunction with self-focused speech (e.g., "I feel guilty") as well as when speaking with romantic partners than others (e.g., coworkers; Baddeley et al., 2012). Perhaps depressed individuals feel less obligated to maintain a socially desirable front with and thus are more comfortable communicating negative affect to romantic partners. Alternately, close relationships may be a source of distress or depressive symptoms rather than a buffer against stress for some individuals in distressed relationships (Kiecolt-Glaser & Newton, 2001; Joyner, & Udry, 2000). Romantic breakups, which often follow a pattern of negative interactions with romantic partners (Gottman & Levenson, 2000), are a common trigger for adolescents' first depressive episodes (Monroe, Rhode, Seeley, & Lewinsohn, 1999).

Intimate relationships powerfully impact mental health, having the potential to both protect against and cause significant psychological distress. Close interpersonal relationships are typically viewed a hallmark of mental health, as they foster feelings of belongingness or satisfy the fundamental need to belong (i.e., people have a basic desire to develop long-term close relationships with others; Baumeister & Leary, 1995). Decreased feelings of belongingness are strongly associated with depressive symptoms (Choenarom, Williams, & Hagerty, 2005;

Hagerty & Williams, 1999). Furthermore, chronic self-focus is bidirectionally associated with loneliness (Cacioppo, Chen, & Cacioppo, 2017), and loneliness is a major risk factor for depression, independent of related constructs such as perceived social support and stress (Cacioppo, Hughes, Waite, Hawkley & Thisted, 2006). Thus, decreased belongingness may serve as a possible mechanism that links negative emotion word and first-person singular pronoun use with depression. The social construct of belongingness may help explain why depressed individuals tend to use negative self-focused language in the presence of those close to them.

1.1 Hypotheses

Earlier research has focused on examining depressed individuals' language use in the context of in-person conversations with intimate versus non-intimate others (Baddeley et al., 2012; Segrin & Flora, 1998). We determined to test whether these results would replicate when depressed individuals reflect on and write about—rather than speak with—their significant others. In particular, we predict that when asked to think about and describe the most recent interaction with a romantic partner, close friend, or family member, those with higher levels of depression will be more likely to use negative self-focused language in their written responses.

Furthermore, we hypothesize that depressed individuals' language use in their written recollections of their significant other should be dependent on their level of belongingness or interpersonal closeness. In other words, those with higher levels of depression will use more negative self-focused language to a greater degree if they indicate higher levels of belongingness or interpersonal closeness with their indicated significant other.

Finally, because anxiety is often co-morbid with depression and the two mental health conditions have significant symptomological overlap (i.e., both are characterized by negative affect and self-focus), it is important to determine whether any statistical effects are solely attributable to depression or may stem from anxiety as well (Tennen, Hall, & Affleck, 1995).

2 Method

Texas Tech University undergraduates enrolled in a general psychology course ($N = 243$; $M_{age} = 19.7$, $SD_{age} = 2.94$; 62.6% female) participated in an online survey for course credit. Three participants did not complete the depression scale and thus could not be included in the depression analyses. Upon providing their electronic consent, students were asked to take the time to reflect on one person in their life they deeply care about, such as a family member, a close friend, or a romantic partner. Once they successfully visualized this person in their mind, they were instructed to describe the last interaction they experienced with them in a detailed written response. Interactions were broadly defined, encompassing in-person as well as distant (e.g., over the phone or internet) encounters. Participants were asked to indicate the exact date of their interaction to ensure compliance with the request to write about the *most recent* interaction with a significant other. Less than 8% ($n = 19$) of the 243 participants identified dates that were significantly discrepant from the time of their participation in the study (>4 months, or roughly one semester). For each model reported below, our conclusions were identical when excluding those 19 participants from the sample. Following the writing task, participants completed various questionnaires in order to assess their mental state and demographic information. All questionnaires—including those on depression, anxiety, belongingness, and demographics—were administered after the writing task to avoid any potential carryover effects on individuals' recollections or language use.

2.1 Measures

Depression. The Center for Epidemiologic Studies Depression Scale Revised (CESD-R; Eaton, Smith, Ybarra, Muntaner, & Tien, 2004) was used to measure participants' depressive symptoms and categorize participants as having subclinical depression or not. The CESD-R includes 20 items, each of which belong to various symptom categories of depression: Dysphoria, anhedonia, appetite, sleep, thinking/concentration, worthlessness, fatigue, agitation, and suicidal ideation (Eaton et al., 2004). Participants were asked to indicate how often they felt depressive symptoms (e.g.,

“Nothing made me happy”) over the past two weeks on a scale of 0 (*not at all or less than one day last week*) to 4 (*nearly every day for two weeks*; Eaton et al., 2004). Utilizing the CESD-style scoring system, where the two highest responses are given the same score of 3 (Eaton et al., 2004), 53.8% of the present sample had a score of less than 16 and 46.3% had a score of equal to or greater than 16, meeting the criteria for subclinical depression ($M = 16.6, SD = 13.3$).

Anxiety. In addition to the CESD-R, participants were given the Generalized Anxiety Disorder 7-Item (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006) scale to assess their level of anxiety. Items comprised of GAD-7 are based on diagnostic criteria for generalized anxiety disorder, such as excessive anxiety (e.g., “Worrying too much about different things”), difficulty controlling anxiety (e.g., “Not being able to stop or control worrying”), and key symptoms associated with experiencing anxiety (e.g., “Becoming easily annoyed or irritable”; Spitzer et al., 2006). Participants were asked to rate how often they were experiencing each symptom on a scale of 0 (*not at all*) to 3 (*nearly every day*) within the last two weeks (Spitzer et al., 2006). The current sample had relatively low anxiety ($M = 6.8, SD = 5.8$). Nearly half (46.5%) of the sample reported little to no anxiety (scoring 0-4 on the GAD-7), 22.2% had mild anxiety (scoring 5-9), 19.8% had moderate anxiety (scoring 10-14), and 11.5% were severe (≥ 15).

Belongingness. Three separate scales were used to measure the exploratory mechanism of belongingness: The Need to Belong (NTB; Leary, Kelly, Cottrell, & Schreindorfer, 2013) scale, the Interpersonal Needs Questionnaire (INQ; Van Orden, Cukrowicz, Witte, & Joiner, 2012), and the Inclusion of Other in the Self (IOS; Aron, Aron, & Smollan, 1992) scale.

The NTB scale is a trait measure of belongingness consisting of ten items, wherein participants identify how strongly they agree or disagree (on a scale of 1 = *strongly disagree* to 5 = *strongly agree*) with statements concerning their desire for interpersonal interaction and acceptance from others (e.g., “I do not like being alone” and “I want other people to accept me”; Leary et al., 2013).

The INQ is a state measure of perceived burdensomeness and thwarted belongingness for which participants indicate how they feel each of

15 statements (e.g., “These days, the people in my life would be better off if I were gone” and “These days, I feel disconnected from other people”) accurately represent their beliefs about themselves and others on a scale of 1 (*not at all true*) to 7 (*very true*; Van Orden et al., 2012).

The IOS scale is a single-item measure of interpersonal closeness (Aron et al., 1992). Participants are presented with seven pairs of circles with varying degrees of overlap (Aron et al., 1992). For each pair, one circle represents the self and one circle represents the other (Aron et al., 1992). Participants identify which circle pair correctly embodies their relationship with a specified other (Aron et al., 1992; Figure 1).

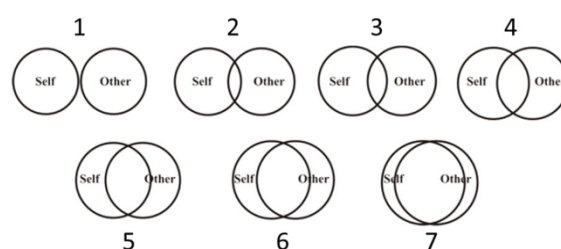


Figure 1: Levels of self and other overlap in the IOS scale (Aron et al., 1992).

In the present study, we asked participants to select the circles that best represented their relationship with the person they had previously described in the writing task.

2.2 Computerized Text Analysis

LIWC. Participant responses were analyzed with the Linguistic Inquiry and Word Count (LIWC; Pennebaker, Booth, Boyd, & Francis, 2015) software. LIWC is an objective measure that facilitates quantitative research in language. Users may import any given text(s) into the software, wherein LIWC outputs the frequency—specifically, the percentage—of word categories in each text. LIWC compares each text to its 125 psychological (affect, cognitive processes), topical (death, family), and grammatical (auxiliary verbs, personal pronouns) language categories. In the current study, we focused on rates of first-person singular pronouns (*I, me, my*) and negative emotion words (*stress, resent, lonely*). The negative emotion language category is made up of anxiety (*upset, worry*), anger (*hate, annoy*), and sadness (*cry, hurt*) words as well as some generic affective terms (*bad, :(, apath**) that

do not easily fit into specific subcategories. With negative emotion words and first-person singular pronouns positively correlated ($r = .20$, $t(241) = 3.15$, $p = .002$, 95% CI [.07, .32]), we created a composite negative self-focus variable by averaging the standardized (i.e., z-scored) rates of negative emotion words and first-person singular pronouns.

2.3 Statistical Analyses

Regression analyses computed on R (version 3.5.2; R Core Team, 2018) assessed whether CESD-R levels of depression predicted negatively self-focused language use moderated by significant other (i.e., romantic partner, close friend, or family member). We also regressed language use on the interaction among depression, significant other, and belongingness (or interpersonal closeness) with separate models for each measure of belongingness (i.e., NTB scale, INQ, and IOS scale). Lastly, all models described were re-analyzed with GAD-7 levels of anxiety in place of CESD-R levels of depression.

Depression, anxiety, as well as perceived burdensomeness and thwarted belongingness (measured by the INQ) were all positively skewed and subsequently log transformed. The remaining variables were either categorical (e.g., interpersonal closeness measured by the IOS scale) or normally distributed (e.g., negative self-focused language, belongingness measured by the NTB scale) and did not require transformation. All variables analyzed were standardized.

3 Results

3.1 Depression

Consistent with our predictions, when writing about a loved one, significant other significantly moderated the association between depression and negative self-focused language, $b = .37$, $SE = .14$, $t(234) = 2.63$, $p = .009$, 95% CI [.09, .65]. Follow-up simple slope analyses revealed that those with higher levels of depression were significantly more likely to use negative self-focused language when writing about the last interaction they had with romantic partners ($b = .33$, $SE = .10$, $t(79) = 3.13$, $p = .002$, 95% CI [.12, .53]) or, to a lesser extent, friends ($b = .20$, $SE = .10$, $t(55) = 2.04$, $p = .046$, 95% CI [.004, .40]), but not family members, $b = -.05$, $SE = .10$, $t(100) = -0.45$, $p = .655$, 95% CI [-.25, .16] (Figure 2).

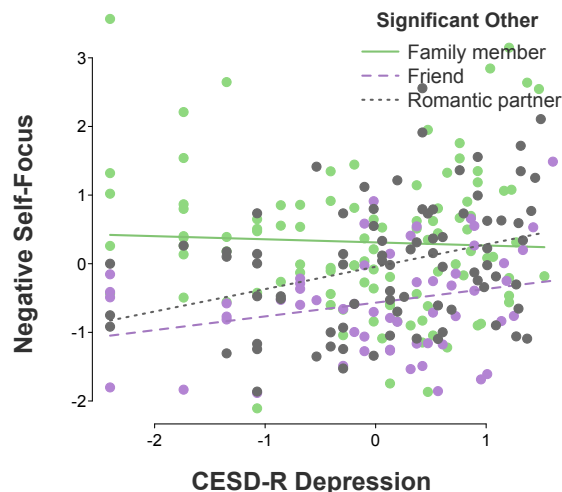


Figure 2: Depression predicting rates of negative self-focused language moderated by significant other.

Scales	<i>b</i>	<i>SE</i>	<i>df</i>	<i>t</i>	<i>p</i>	95% CI
IOS	.17	.09	228	1.87 [†]	.063	-.01, .35
NTB	-.12	.15	228	-0.85	.397	-.41, .16
INQ	-.10	.14	228	-0.74	.459	-.38, .17

Table 1: Results for the three-way interaction effects of depression, significant other, and each measure of belongingness. $p < .1$ [†]

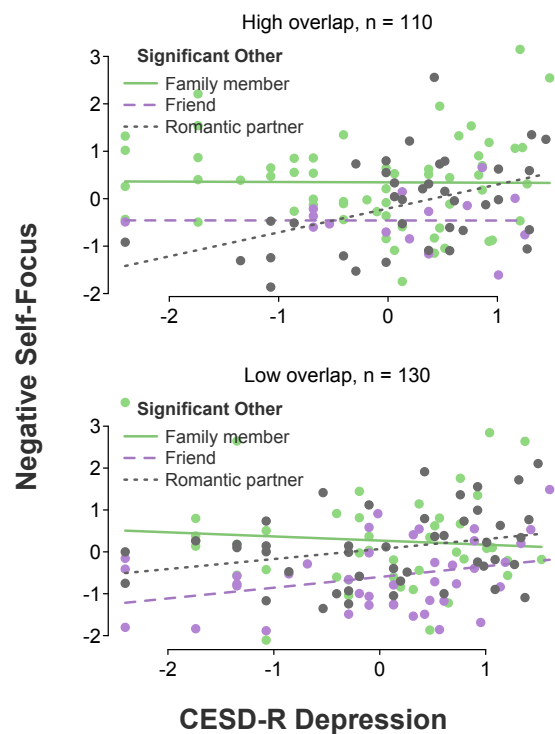


Figure 3: Depression predicting rates of negative self-focused language in recollections of significant others moderated by perceived self-other overlap.

SO	IOS	<i>b</i>	<i>SE</i>	<i>df</i>	<i>t</i>	<i>p</i>	95% CI
Partner	Low	.24	.13	43	1.86 [†]	.070	-.02, .50
	High	.50	.18	34	2.86**	.007	.15, .86
Friend	Low	.26	.12	40	2.15*	.038	.02, .50
	High	-.001	.16	13	-0.01	.995	-.34, .34
Family	Low	-.10	.18	41	-0.54	.592	-.47, .27
	High	-.01	.12	57	-0.07	.947	-.25, .23

Table 2: Simple slope results for the three-way interaction effect of depression, significant other, and IOS. $p < .01^{**}$, $p < .05^*$, $p < .1^{\dagger}$

Partly consistent with our predictions, analyses revealed a marginal three-way interaction effect of depression, significant other, and inclusion of other in the self predicting negative self-focused language ($b = .17$, $SE = .09$, $t(228) = 1.87$, $p = .063$, 95% CI [-.01, .35]; Table 1). To assess the simple slopes of the interaction, we used a median split to convert IOS (median = 5) from a 7-level categorical variable to a 2-level categorical variable (i.e., Low IOS = scores of 5 and lower, High IOS = scores higher than 5). Simple slope analyses demonstrated that those with higher levels of depression were significantly more likely to use negative self-focused language when writing about an interaction with their romantic partner if they indicated high self-other overlap ($b = .50$, $SE = .18$, $t(34) = 2.86$, $p = .007$, 95% CI [.15, .86]; Figure 3).

Simple slope analyses also indicated that those with higher levels of depression were significantly more likely to use negative self-focused language when writing about a friend if they identified low self-other overlap ($b = .26$, $SE = .12$, $t(40) = 2.15$, $p = .038$, 95% CI [.02, .50]; Figure 3). All other simple slopes regarding the interaction effect for depression, significant other, and inclusion of other in the self were nonsignificant (all $ps > .05$; see Table 2). Similarly, the two remaining three-way interaction effects with belongingness (as measured by the NTB scale) as well as with perceived burdensomeness and thwarted belongingness (as measured by the INQ) as separate moderators were nonsignificant ($ps > .1$; Table 1).

3.2 Anxiety

To determine whether the findings might also extend to anxiety, we ran all the aforementioned models replacing CESD-R depression with GAD-7 anxiety. When writing about a loved one, significant other did not significantly moderate

the association between anxiety and negative self-focused language, $b = -.02$, $SE = .14$, $t(237) = -.13$, $p = .898$, 95% CI [-.29, .26]. Three-way interaction effects with interpersonal closeness (as measured by the IOS scale; $b = .11$, $SE = .09$, $t(231) = 1.23$, $p = .218$, 95% CI [-.07, .29]) as well as with perceived burdensomeness and thwarted belongingness (as measured by the INQ; $b = -.12$, $SE = .14$, $t(230) = -.86$, $p = .389$, 95% CI [-.39, .15]) as separate moderators were not significant. Results showed a significant three-way interaction effect of anxiety, significant other, and belongingness (as measured by the NTB scale) predicting negative self-focused language ($b = -.32$, $SE = .16$, $t(231) = -2.02$, $p = .045$, 95% CI [-.62, -.01]). However, follow-up simple slope tests did not reach significance (all $ps > .05$), suggesting that the social mechanisms of negative self-focused language implicated in depression may not extend to anxiety. Alternatively, our sample may simply have had insufficient levels of anxiety. With roughly 32% of the sample identifying as moderately to severely anxious (compared with about half of the sample scoring as subclinically depressed), a lack of power could explain the null effects regarding anxiety.

4 Discussion

Due to stigma against mental illness and individuals' desire to be viewed positively, people may be reluctant to openly disclose depressive symptoms on self-report surveys or in daily interactions. Individuals with depression perceive themselves and the world around them in a negative light (Beck, 1967). Although this negative attentional bias is reflected in everyday language use in conversations with romantic partners (Baddeley et al., 2012) and friends (Segrin & Flora, 1998), depressed individuals tend to not use more negative language than others on average (e.g., in naturalistic recordings of students' conversations over the course of 2 week days; Mehl, 2006).

Extending findings from naturalistic recordings of spoken conversations, we found that depressed individuals are more likely to use negative self-focused language when writing about romantic partners and friends but not family. Such results are consistent with past research on depression and recall, which suggest that depressed individuals have a tendency to attend to (Beavers, 2005) and remember

(Dalglish & Werner-Seidler, 2014) negative stimuli more than positive or neutral stimuli.

In addition, our analyses revealed that interpersonal closeness might serve as a potential mechanism to help understand depressed individuals' recall of and disclosure to romantic partners and friends. Specifically, depressed individuals perceiving a high overlap between themselves and their romantic partner as well as depressed individuals perceiving a low overlap between themselves and their friend were more likely to use negative self-focused language in their written recollections.

Perhaps depressed individuals view their romantic partners as an extension of themselves and, thus, feel more comfortable ruminating while thinking about them. For example, one participant scoring high on CESD-R depression (score = 54), interpersonal closeness (IOS = 7), and negative (4.01%) self-focused (7.66%) language describes their relationship with their partner as such:

“We are two stubborn asses that have everything at our damn finger tips and too stupid, stubborn, and prideful to move forward ... I'm so frustrated I think I'll have to buy a new keyboard when I'm done here.”

In the first sentence, this participant confirms their interpersonal closeness, relaying how they perceive their partner as quite similar to themselves. In the second sentence, the participant demonstrates their negative self-focus, expressing their own frustration of the encounter. In cases like this, perhaps interpersonal closeness with a romantic partner exacerbates depressive symptomology, particularly if the partner shares their negative affective tendencies. Being exposed to negative self-relevant stimuli—such as seeing negative aspects of the self reflected in a romantic partner—triggers episodes of rumination, which in turn aggravates symptoms of depression (Beevers, 2005).

On the other hand, another participant scoring a bit lower on CESD-R depression (score = 29)—but still meeting criteria for subclinical depression—interpersonal closeness (IOS = 6), and negative (1.33%) self-focused (11.95%) language discusses how they feel comfortable disclosing to their close friend:

“In the past, when I have felt like I could not talk to anyone else about my problems and the things that are causing me stress, I have always been able to vent my issues to him.”

The participant's recollection of their close friend appears to embody a more adaptive style of coping than the previous participant's almost violent frustration with their romantic partner. Examining the discrepancy between these two participant responses reveals how interpersonal closeness with a significant other may be helpful for depressed individuals to a certain extent. Specifically, if the depressed individual perceives themselves as indistinguishable from their significant other because of shared negative experiences or traits, such interpersonal overlap may heighten depression by triggering rumination. In contrast, if the depressed individual perceives a strong self-other overlap because they feel that they may rely on that person for support, such interpersonal closeness may alleviate depressive symptomology.

Closeness, rather than the relationship type per se, may be responsible for differences in negativity across recalled interactions. Perceived interpersonal closeness tends to be stronger with romantic partners than with friends (Quintard, Jouffre, Croizet, & Bouquet, 2018), which may account for the significant interaction effect involving depressed individuals' high rates of negative self-focused language when recalling an experience with a friend they were less interpersonally close with. In other words, if perceived self-other overlap is inherently less between friends than romantic partners, then it stands to reason that the positive correlation between depression and negative self-focused language is robust for low rather than high IOS.

In any case, social support is heavily implicated as a proponent of relieving stress and promoting positive (mental and physical) health outcomes (Cohen & Wills, 1985). However, depressed individuals tend to withdraw from their social networks (Segrin, 2000; Segrin & Abramson, 1994). During depressive episodes—when social support is arguably needed most—individuals with depression may feel as though they do not belong and struggle to seek or obtain help (Schaefer, Kornienko, & Fox, 2011). Being able to rely on a significant other may lessen the degree of social repercussions of depression. Thus, differences in

how depressed individuals use language with the people in their lives could potentially inform more effective methods of diagnosis and treatment of the disorder. Future research will explore social-cognitive mechanisms that may explain discrepancies in how depressive symptoms manifest in language use across social contexts.

4.1 Future Directions and Limitations

The present results converge with previous findings regarding everyday interactions with romantic partners (Baddeley et al., 2012). That is, people's recollections of recent interactions align with naturalistic data on how those conversations actually unfold. In particular, the rate at which negative self-focused language is used similarly across recollections and recordings of conversations with romantic partners provides further evidence of depressed individuals' negative attentional bias. However, our results are limited by the fact that—unlike Baddeley et al. (2012)—we cannot compare across interactions within person. It may be useful, in future studies, to use within-person designs to examine how the same person discusses family, friends, romantic partners, and acquaintances or colleagues.

The present study took a simplified approach to analyzing individuals' language use, focusing exclusively on two robust dictionary-based markers of depression: negative emotion words and first-person singular pronouns. We adopted that approach partly because the texts we analyzed were from a modest sample of individuals writing relatively short texts. In larger samples, it would be possible to apply more complex models of depressed and depression-prone language built, in part, on the results of larger social media studies or corpus analyses (Coppersmith, Dredze, Harman, & Hollingshead, 2015; Eichstaedt et al., 2018; Mowery et al., 2017; Resnik, Armstrong, Claudino, Nguyen, Nguyen, & Boyd-Graber, 2015; for a review, see Guntuku, Yaden, Kern, Ungar, & Eichstaedt, 2017). Such models could provide a more complete picture of the degree to which a depressed or at-risk individual “sounds” depressed—or uses linguistic features correlated with depression—across social contexts. Word or phrase-level analyses can be psychologically revealing in large samples ($N > \sim 5,000$) but do not generalize well to smaller samples, where particular word-level indicators of depression

symptoms may only appear in a small percentage of total texts (Schwartz et al., 2013).

The aim of studying a nonclinical population was partly to advance research on preventing depression in individuals with subclinical depression or risk factors for depression. However, because our results are cross-sectional and correlational, it remains unclear whether participants' increased negative self-focus in recollections of interactions with romantic partners represents a risk factor for future depression, a cause of depressive symptoms, or an adaptive way of dealing with early depressive symptoms.

Selectively recalling or disclosing negative affect (or “venting”) with romantic partners and masking depression symptoms from close friends and family may be an effective coping strategy, given that depression tends to cause friends to withdraw (Schaefer et al., 2011). To the degree that people are aware of the stigma against mental health conditions or depression, they may strategically disclose negative emotions to the people with whom they are most securely attached, which for a majority of adults is likely to be romantic partners more often than friends or family (Feeney, 2004). Indeed, although self-disclosure is overall healthy for individuals and relationships (Hendrick, 1981), the most personal disclosures—such as discussing depressive symptoms—are commonly reserved for one or two close friends or partners (Altman & Taylor, 1973; Saramäki et al., 2014).

To further understand how people interact with and think about various others in their lives, future research may focus on separately analyzing recollections of recent versus salient interactions (i.e., asking participants in the same study to recount the most recent and the most impactful or memorable interactions with family, friends, and romantic partners). For romantic partners in particular, it may be the case that currently-depressed individuals' most recent interactions are largely negative (reflecting their present mental state), but their most salient memories of that person will be positive to the degree that they feel close or securely attached with them.

Also of interest for future research is uncovering why recent recollections of family members do not seem to impact depressed individuals' language use. Depressed individuals may mask their negative self-focused symptoms during interactions with family so as to prevent them from

worrying about them. Although depression is stigmatized across multiple social contexts (Halter, 2004), concealing depressive symptoms in order to protect family members may ironically be more prevalent in cultures that are more collectivist or place more importance on family, such as Latinx communities (Uebelacker et al., 2012).

An alternate explanation of our results is that family members may elicit less negative affect than do romantic partners. However, our preliminary (not yet published) results from a comparison of how depression forum users talk about their relationships across diverse forums on Reddit (based on posts containing variations of the phrase “my [social role],” e.g., “my dad”) suggest that family members are described more negatively on social media than are friends or romantic partners. Based on those findings and the present results, we speculate that although depressed or depression-vulnerable individuals’ everyday interactions with family members are low in negative affect, family members elicit at least as much negative affect as romantic partners or friends in general.

Our research may have relevance for therapeutic treatment of depression, especially in the context of family systems therapy or couple therapy. Observing how partners or family members interact, asking about recent interactions, and identifying potentially dysfunctional behaviors in these interactions are typically key parts of family systems and couple therapies, across therapeutic approaches (Barbato & D’Avanzo, 2008; Minuchin, 2013). Quantitative and qualitative text analyses have the potential to further inform how clients’ symptoms vary across interactions with family and romantic partners, which in turn may help clinicians provide tailored advice on how to navigate important relationships in their lives.

Finally, the impact of our conclusions must be tempered by the fact that our results are from one relatively small, correlational study of writing by college students. Our trust in the present findings is buttressed by the fact that they align with previous work (e.g., Baddeley et al., 2012); however, future replications based on larger and more diverse samples are necessary before substantially building on these results. Other limitations include latent (unmeasured) variables, such as relationship length and the flexibility with which participants’ most recent interactions were defined (remote vs. in-person). For instance, perceived belongingness or interpersonal closeness may be a function of how

long the individuals have been romantic partners or friends—that is, longer relationships may predict stronger feelings of belongingness. Also, whether participants’ interactions were over the phone, in person, or computer-mediated may play a role in what they are able to recall (e.g., in-person conversations may be more salient and thus allow for more vivid or accurate recollections). Future research should incorporate such variables into the current models.

4.2 Conclusion

A prospective, exploratory writing study assessed the association between interpersonal closeness, depression, and the language used to describe intimate relationships. We found that self-focused negativity positively correlates with self-reported depressive symptoms in recollections of recent interactions with close romantic partners, but not close family or friends.

Our results underline the importance of considering how symptoms of mental health conditions manifest differently across social contexts. Past mixed results regarding the linguistic signature of depression (Holtzman, 2017; Tackman et al., 2018) or, more broadly, positive and negative affect (Sun, Schwartz, Son, Kern, & Vazire, 2019), may be partly due to the self-regulatory exigencies of different relationships and social interactions. People do not experience mental health symptoms in a vacuum, but rather interact dynamically with their physical and social environments. Individuals take on different roles—and to some degree become different people, who may have different constellations of mental health symptoms and reveal those symptoms in different ways—across various social contexts.

The end goal of most computational linguistics research on mental health is arguably to not only identify linguistic features that correlate with some clinical outcome, but also to improve clinical diagnosis and treatment. We argue, and our results suggest, that we can only advance from the lab to reality, or predictive models to practice, by increasingly taking the nuances of person-situation interactions into consideration. We propose that research in this area should consider not only practical aspects of the environment, such as topics or social media platforms, but also social psychological variables, including individuals’ relationships with and closeness to the people they are discussing.

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