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A meta-analysis of correlations between depression and first person singular pronoun use

To'Meisha Edwards, Nicholas S. Holtzman *

Georgia Southern University, USA

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ABSTRACT

Depression is a burden. We discuss how theories, identification, assessment, and treatment of depression are at least partially tied to the correlation between first person singular pronoun use and individual differences in depression. We conducted a meta-analysis ($k = 21$, $N = 3758$) of these correlations, including numerous unpublished correlations from the file drawer. Our fixed effects analysis revealed a small correlation ($r = 0.13$, 95% CI = [0.10–0.16]) by modern standards. The correlation was not moderated by gender, nor by whether the effect had been published. These results more firmly establish first person singular pronoun use as a linguistic marker of depression—a marker that appears to be useful across demographic lines.

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Depression is a massive burden to society and to the individuals it afflicts (Ferrari et al., 2013). Accordingly, it is important to be able to (a) understand depression through accurate theories, (b) identify it, (c) assess it, and (d) treat it effectively. In terms of theory, one idea that emerged in the literature is that depression involves intense self-focus (Ingram & Smith, 1984; Pyszczynski & Greenberg, 1987; Smith & Greenberg, 1981). In terms of identification—and to operationalize self-focus—it has been proposed that researchers study first-person singular pronouns (Stirman & Pennebaker, 2001). In terms of assessment, Pennebaker's group found that depression is linked to using more first-person singular pronouns (Rude, Gortner, & Pennebaker, 2004); this effect has been viewed as a fundamental linguistic marker of depression (Ireland & Mehl, 2014). To treat depression, researchers have begun tracking first-person singular pronouns and tried to minimize self-focused rumination (Kross & Ayduk, 2008; Kross et al., 2014; Zimmermann, Brockmeyer, Hunn, Schauenburg, & Wolf, 2016). Thus, arguably, one brick in the foundation of the depression literature is the effect linking first person singular pronoun use to depression. In the paragraphs that follow, we review a key theory of depression, and then we turn to how personal pronouns have emerged as a linguistic marker of depression; then, we consider personal pronouns as a utility for assessment purposes and finally

turn to treatments that have been created based on this correlation between depression and first-person singular pronouns.

In terms of theory, in the early 1980s, it was shown that depression was linked to self-focused attention (Ingram & Smith, 1984; Smith & Greenberg, 1981). Building on this literature, Pyszczynski and Greenberg (1987) posited that the reason for this association is primarily because people who are depressed tend to perseverate on self-relevant information (for review of perseveration, see: Demakis, 2003; Sorg, Vögele, Furka, & Meyer, 2012). Perseveration is a form of repetitive thinking (Ehring et al., 2011); it can be neutral (i.e., reflection) or negative (i.e., brooding [about the past] or worrying [about the future]). One theory is that perseveration is caused in part by a thwarted goal (Pyszczynski & Greenberg, 1987). For instance, if a person is trying to get a job, and cannot get one, then the person may perseverate on the discrepancy between one's current self and one's desired self (Higgins, 1987; Treynor, Gonzalez, & Nolen-Hoeksema, 2003; Wicklund, 1975). This perseveration may constitute an attempt to figure out how to reduce the discrepancy (Carver & Scheier, 1981). Because non-depressed people are not coping with thwarted goals, or because they shift priorities to meet other life goals when indeed goals have been thwarted, in theory they do not focus on themselves as much (Pyszczynski & Greenberg, 1987); they do not get stuck in a cycle of self-focused attention. Thus, at the population level, across individuals varying in depression levels, this manifests in a positive correlation between self-focus and depression.

* Corresponding author at: Department of Psychology, P.O. Box 8041, Georgia Southern University, Statesboro, GA 30469-8041, USA.

E-mail address: nick.holtzman@gmail.com (N.S. Holtzman).

The idea that depressed individuals tend to focus on themselves can be explored with linguistic analysis—such as by examining whether people who are depressed tend to talk about themselves more frequently. At the time the hypothesis emerged, however, there was not a suitable linguistic analytic system in psychology for large scale linguistic projects (but see: Bucci & Freedman, 1981). In a major advance, Pennebaker and colleagues created the LIWC (Pennebaker, Francis, & Booth, 2001). This linguistic system counts how frequently people use words in a number of categories. For instance, the 2001 variant of LIWC captures first person singular pronouns in one category. It includes the following words: *I, I'd, I'll, I'm, I've, me, mine, my, and myself*. This software development set the stage for a linguistic analysis of the idea that self-focus is common among people who are depressed. In brief, some studies found the effect (e.g., Rude et al., 2004), whereas others did not (e.g., Molendijk et al., 2010).

The first person singular pronoun effect is also relevant to the assessment of depression. In the information age, it has become possible to assess individual differences via digital footprints people leave on social media and blogging sites such as Facebook (Back et al., 2010; Buffardi & Campbell, 2008; Kern et al., 2014; Weidman et al., 2012; Youyou, Kosinski, & Stillwell, 2015) and Twitter (Coppersmith, Dredze, & Harman, 2014), and language is one important kind of footprint people leave behind (Kern et al., 2014; Schwartz et al., 2013; Yarkoni, 2010). Thus, it makes sense to use language as a marker of whether people are depressed (Coppersmith et al., 2014). This has opened up a new medium to identify and catch people who are potentially depressed. One of the most prominent effects in this literature is the link between first person singular pronouns and depression. On these grounds, it is important to identify the strength of the effect.

Last but not least, this effect is starting to become potentially important in the treatment literature. On the grounds that self-focused attention is manifest in first person singular pronoun use, it makes sense that minimizing first person singular pronoun use has the potential to decrease self-focus and perhaps down-regulate depressive symptoms and other tightly related internalizing problems. In short, persuading people to use fewer first person singular pronouns could alleviate some of the effects of depression and negative emotion more generally. This reasoning has been used in a few budding programs of research (Kross & Ayduk, 2008, 2011; Nook, Shchleider, & Somerville, *in press*; Park, Ayduk, & Kross, 2016; Zimmermann et al., 2016); indeed some of these articles involve studies that explicitly manipulate pronoun use (Kross et al., 2014) and identify first person singular pronoun use as one key mechanism of action in emotion regulation (Park et al., 2016). For these programs of research, it is important to know the magnitude of the effect—and also to find out for whom using first person singular pronouns may be most troublesome.

Given the implications for theory, assessment, and treatment, the time has come to integrate this research quantitatively. It would be helpful to be confident in the magnitude of the effect—and, at an even more basic level, to more firmly establish whether this effect is real. Accordingly, the goal of the current study is to conduct a meta-analysis of the extant literature as well as the unpublished literature regarding the correlations between depression and first person singular pronoun use. This will help establish whether publication bias exists in this literature.

In addition, we examine whether there is significant variability among the effects. We also explore a few moderators of this effect, in an attempt to identify boundary conditions. This has the potential to point the way to the subpopulations that would most benefit from interventions that are grounded on this effect—or establish that first person singular pronoun use is a robust marker across demographic lines. Of particular interest is whether the association between first person singular pronoun use and depression is larger

among women. Indeed, previous research by Fast and Funder (2010) indicated that first person singular pronoun use is more reflective of depression among women than among men—a finding that appears to be robust in the clinical psychology literature (Lyubomirsky, Layous, Chancellor, & Nelson, 2015; Nolen-Hoeksema, 1987; Nolen-Hoeksema, Larson, & Grayson, 1999). Thus, one goal of this meta-analysis is to determine whether first person singular pronoun use is more reflective of depression among women than among men.

Finally, as part of the moderation analysis, we aim to test the hypothesis that the link between first person singular pronoun use and depression varies as a function of task characteristics. We are especially interested in the link varying due to the public versus private nature of the task. Previous work has shown that the link is more evident among people in private settings (e.g., journals), rather than public ones (Rodriguez, Holleran, & Mehl, 2010). Additionally, we test the hypothesis that the effect varies due to the language task being written versus spoken.

In summary, we have the following goals for this meta-analysis: (a) to test the hypothesis that there is a positive correlation between depression and first person singular pronoun use; (b) to verify that the effect is not due to publication bias; (c) to explore whether there is significant variability among the effects from the studies collected and, if so, to model that variability; (d) to test hypotheses about demographic characteristics as moderators, especially gender (Fast & Funder, 2010); and (e) to test whether task characteristics moderate the effect, especially whether the task is public versus private (Rodriguez et al., 2010).

1. Method

1.1. Inclusion and exclusion of studies

Papers were included in the meta-analysis if (a) they included a correlation between depression and first-person singular pronoun usage as measured by LIWC, and (b) the study used a widely accepted assessment of depression such as the Beck Depression Inventory—II (Beck, Steer, & Brown, 1996). Table 1 lists the sample size for each study, the language tasks used, the depression assessments used in each study (all of which were continuous), and the mean age of participants.

1.2. Search strategy

We found relevant articles by conducting a carefully executed multi-step process. In the first step, we used the Web of Science database. We used two pairs of keywords in the search field including: *depress** AND *pronoun*; *depress** AND *“linguistic style”*. Web of Science yielded 30 potentially relevant articles, of which three were ultimately included (Dunnack & Park, 2009; Molendijk et al., 2010; Zimmermann, Wolf, Bock, Peham, & Benecke, 2013). The second step used Google Scholar as a supplement to the Web of Science database. When using the key words *depress** and *“linguistic style”*, Google Scholar yielded 1170 potentially relevant articles, of which nine were ultimately included (Bernard, Baddeley, Rodriguez, & Burke, 2016; Castorena, 2012; Fast & Funder, 2010; Jarrold et al., 2011; Mehl, 2006; Rodriguez et al., 2010; Sanders, 2013; Van der Zanden et al., 2014; Zimmermann et al., 2016). The Google Scholar search for *depress** and *pronoun*, however, returned over 17,000 potentially relevant articles. Looking through these was not feasible in a timely manner. Therefore, a more tailored search using the keywords *depress** and *“first person singular pronoun”* was used. This process yielded 562 potentially relevant articles, which were thoroughly searched; all of the pertinent articles that were captured by this process had

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