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RESEARCH PAPER

How induced self-focus versus other-focus affect emotional recognition and verbalization

Sara Konrath · **Olivier Luminet**

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Abstract Research finds that people from individualistic cultures prioritize individual emotional expression and recognition compared to collectivistic cultures. Moreover, those with more independent self-construals self-report less difficulty in identifying and describing their emotions (i.e. lower alexithymia). However, it is unclear whether one aspect of self-construal (i.e. self-focus and other-focus) actually causes changes in emotion recognition and emotion expression, or whether there are third variable explanations for the previous correlational research. Therefore, in the current paper, we experimentally manipulated self-focus and other-focus, and examined how this affected participants' emotion recognition and emotion verbalization. Based on previous research, we predicted that temporarily inducing a state of high self-focus may improve emotional skills, while inducing high other-focus may impair them. Across three studies, participants were exposed to self-focused, other-focused, or control stimuli. They then completed standardized tasks assessing emotion recognition (all studies) and verbalization (Study 2), in both an individualistic and collectivistic culture (Study 1), with one study using a pre-post experimental design that controlled for baseline competencies (Study 3). A mini meta-analysis of the three studies found that high self-focus improved emotional skills, but there was no overall effect of high other-focus. We discuss potential explanations, implications, and limitations of the current findings.

Keywords Self-focus · Other-focus · Emotional competence · Emotional verbalization · Emotion recognition

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Introduction

Psychology research has consistently identified self-focus and other-focus as core psychological constructs (Abele & Wojciszke, 2014; Wiggins, 1991). Self-focus involves egocentricity, a sense of independence

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or separateness from others, and high agency, while other-focus involves sociocentricity, feelings of connection and closeness with others, and a high communal orientation. In this paper, we hypothesize that the extent to which one is focused on the self and others may influence emotional competencies. We experimentally manipulated self-focus and other-focus and examined how these two modes affected two central emotional competencies: the recognition of others' emotions and one's own usage of emotional language. Based on prior research, we reasoned that inducing a state of high self-focus (or low other-focus) may improve identification of others' emotions and increase emotion verbalization.

Individualistic cultures prioritize individual emotion recognition and expression compared to collectivistic cultures

People from more individualistic cultures such as the United States are more likely to *recognize* individual expressions of emotion than people from more collectivistic East Asian cultures such as Japan (Matsumoto, 1989, 1992; Matsumoto & Kishimoto, 1983; Schimmack, 1996; van Hemert et al., 2007). This is especially the case for negative emotions such as anger, disgust, and fear (Matsumoto, 1989, 1992; Matsumoto & Kishimoto, 1983; Schimmack, 1996).

As for emotion *verbalization*, people from more individualistic Western cultures are more likely to use, and less likely to suppress, emotional language when communicating, relative to those from more collectivistic East Asian cultures (Bainbridge-Frymier et al., 1990a, b; Fernandez et al., 2000, 2008; Matsumoto et al., 1988; Novin et al., 2009). Although there is debate over whether these differences reflect people's internal emotional states (Matsumoto et al., 1988; Novin et al., 2010), a cross-cultural meta-analysis suggests that more individualism [collectivism] is associated with increased [decreased] use of emotional language (van Hemert et al., 2007).

Since individualism involves, among other attributes, a strong focus on the self as autonomous from others, perhaps one reason that people from individualistic cultures perform better (and people from collectivistic cultures perform worse) at emotion recognition and verbalization tasks may be because of their relative levels of self-focus and other-focus. However, since individualism and collectivism involve more than a focus on the self and others, this is impossible to know without more controlled studies. Thus, in this paper we directly manipulate levels of self-focus and other-focus specifically.

People with independent self-construals show enhanced emotion recognition and expression compared to more interdependent people

Correlational and experimental research on *self-construal* finds results that parallel the cross-cultural literature. For example, one correlational paper finds that independent self-construal is associated with less difficulty in identifying and describing one's own emotions (i.e. alexithymia), and vice versa for interdependent self-construal (Konrath et al., 2011). Another paper found physiological implications of such chronic tendencies: individuals with more interdependent self-construals showed stronger brain wave suppression responses to emotional stimuli (Kraus & Kitayama, 2019).

Yet self-construal is a complex construct that includes, but is not limited to, a relative focus on the self or on others. Focusing on the self relative to others is only one aspect of independent and interdependent self-construal, respectively (Vignoles et al., 2016). In the current paper, we specifically focus on how this aspect is related to emotional competencies.

Moreover, although there are individual differences in chronic tendencies to have more independent versus interdependent self-construals, self-construal can also be influenced by a variety of contextual cues. There is much research supporting the idea that small changes in the immediate context can override such chronic tendencies (Oyserman & Lee, 2007). Some of these involve broader processes (e.g. focusing on similarity versus difference with family and friends), while others are more targeted toward a relative focus on the self versus others (Oyserman & Lee, 2008). As examples of the latter, simply circling pronouns related to self-focus (e.g. I, me) or seeing oneself in the mirror activates thoughts and behaviors typically associated with high trait levels of self-focus (Gardner et al., 1999; Scheier & Carver, 1977). We therefore rely on such simple priming procedures to test our hypotheses about one specific aspect of self-construal, that of self-focus versus other-focus.

To date, one known experimental study has confirmed a potential causal relationship in terms of how one aspect of self-construal (similarities versus differences) affects emotional competencies. Students from a collectivist culture (i.e. Greece) were randomly assigned to an independent (i.e. focus on differences from family and friends) or an interdependent condition (i.e. focus on similarities with family and friends), and then rated four emotions (happiness, anger, sadness, neutral) posed by cartoon characters (Kafetsios & Hess, 2013). As expected, participants assigned to the independent (difference) condition recognized more emotions, especially negative ones, compared to those assigned to the interdependent (similarity) condition.

This experimental research represents a significant preliminary step in examining one aspect of self-construal, but makes it difficult to isolate the specific role of self-focus and other-focus (Vignoles et al., 2016; Yang & Vignoles, 2020). We can do so in the current studies, which can help us to understand whether self-focus or other-focus (or both of them) has the strongest effects on emotional competencies. Adding control groups can also help to clarify whether the independent (self-focus) or the interdependent (other-focus) primes are responsible for shifting participants' emotional competencies. In addition, we include a wider variety of stimuli. For example, we increase the number of emotions presented for identification, use human faces rather than cartoons, and also are the first known study to examine the effects of self-focus and other-focus using a validated measure of emotional verbalization. Finally, we examine the effects of self-focus and other-focus within an individualist (United States) and a collectivist (India) culture.

Other correlational and experimental research links increased self-focus with emotional competencies

Beyond cross-cultural and self-construal research, a number of other lines of research suggest that aspects of self-focus may be related to social cognitive skills like emotion recognition. For example, neuropsychological studies in adults confirm that the regions of the brain that are activated during self-referential processing are overlapped with those that are activated when thinking about others' emotions and mental states (Gallup & Platek, 2002; Mitchell et al., 2005). Research in personality/social psychology finds that participants who engage in more self-referential processing also score higher on an emotion recognition task (Dinulescu et al., 2021). Similarly, people who are better able to distinguish between their own emotional states are also better able to recognize emotions in others (Erbas et al., 2016; Israelashvili et al., 2019).

Several studies have directly manipulated self-focus and then examined people's awareness of *their own* internal states. This research finds that people who are induced to be in a high state of self-focus may at times become more aware of their own internal states, including emotions, and may also experience them more intensely (Chentsova-Dutton & Tsai, 2010; Hass & Eisenstadt, 1990; Scheier & Carver, 1977; Scheier et al., 1979, 1981). Thus, it is conceivable that people who are induced to be in a high state of self-focus may also be more likely to verbalize their emotions. We examine this hypothesis in Study 2.

However, this prior research does not examine whether this increased intrapersonal emotional awareness translates into better awareness of *others'* emotions. Other research suggests that this is likely to be the case. People scoring high in alexithymia have difficulty in identifying and describing emotions in themselves (Watters et al., 2015). Yet this emotional impairment is not limited to their own emotions—it also extends to identifying emotions in *others* (Grynberg et al., 2018). Thus, we directly examine whether experimentally inducing temporary states of self-focus versus other-focus affects the recognition of others' emotions. We examine this question in Studies 1–3.

Taken together, past cross-cultural, neuropsychological, and personality/social psychology research finds links between self-focus and social cognitive skills like emotion recognition. Thus, we speculated that temporarily inducing an elevated sense of self-focus may increase people's tendencies to recognize others' facial expressions of emotions.

Why might self-focus and other-focus affect emotional competencies?

The current studies focus on testing the effects of self-focus and other-focus primes on recognizing one's own and others' emotions, and we do not test potential mechanisms of the results. Yet, it is worth considering

potential explanations for why high self-focus (low other focus) might affect emotional competencies.

Differentiation between the self and others: First, developmental research has identified strong links between a sense of self-awareness and social cognitive skills in children, including recognizing others' internal states (Asendorpf et al., 1996; Brownell & Carriger, 1990; Johnson, 1982; Lewis, 2002). This research finds that as young children begin to develop an awareness of themselves as separate and autonomous beings, they simultaneously begin to develop an understanding that others may have needs, desires, thoughts, and emotions that are different from them. Among adults, there are links between being able to distinguish between one's own emotional states and recognizing emotions in others (Erbas et al., 2016; Israelashvili et al., 2019). As for other-focus, some research has also suggested that a communal sense of psychological overlap with others can create a sense of psychological fusion that makes it difficult to differentiate oneself from others (Mashek et al., 2003). Taken together, this research suggests a link between the differentiation of the self and the rudimentary building blocks of understanding others' distinct emotional states.

Motivation to achieve one's goals: A second explanation relies on the nature and function of emotions more generally. Emotions exist as one mechanism to help people achieve their goals (Johnson-Laird & Oatley, 1992; Levine & Edelstein, 2009; Seifert, 1995). It is easy to imagine how activating self-focus could make one's personal goals more salient, and being able to describe and identify one's own and others' emotions might help to serve these goals. Paying attention to others' emotional states could make it easier for people to get what they want from others. For example, people scoring higher in narcissistic exploitativeness, a type of extreme self-focus, have higher emotion recognition scores (Konrath et al., 2014), perhaps so they can use these skills to fulfill their goals. More narcissistic people also show better performance on tasks related to understanding others' emotional states and intentions (Vonk et al., 2015). Finally, more narcissistic individuals can more quickly identify neutral and low intensity emotional stimuli, compared to less narcissistic individuals (De Panfilis et al., 2019). Taken together, this suggests that this motivational explanation is at least theoretically possible.

Cognitive-perceptual styles: Another potential mechanism involves changes in the way individuals think about or perceive the world. Independent and interdependent self-construal are related to more analytic and holistic cognitive and perceptual styles, respectively (Konrath et al., 2009; Nisbett et al., 2001). Similarly, more extreme forms of self-focus (i.e. narcissism) have also been linked to more analytic ways of perceiving the world (Konrath et al., 2009). Indeed, research finds that priming participants with self-focus can create a more "local" (i.e. context-independent and analytic) cognitive style, while priming participants with other-focus can create a more "global" (i.e. context-dependent and holistic) cognitive style (Kühnen & Oyserman, 2002; Lin & Han, 2009).

Thus, it is possible that participants primed with self-focus can recognize emotions better because they are more likely to identify specific features (e.g. a raised eyebrow) that function as clues to each emotional expression (Ekman & Friesen, 1975; White, 2000). Similarly, after exposure to other-focused primes, participants could be more likely to focus their attention on peripheral information in images rather than only the central object and its features (Kühnen & Oyserman, 2002; Lin & Han, 2009). This could make it more difficult to detect emotional facial expressions in photographs. These cognitive-perceptual styles are thus another potential explanation that we revisit in the "General discussion".

The present studies

Various strands of research are consistent with the view that priming self and other focus may impact emotional skills. Admittedly, cross-cultural and developmental evidence are unlikely to involve identical psychological processes as those examined under temporary priming conditions. Yet, the evidence discussed so far suggests that it is reasonable to expect related effects to emerge under priming conditions. We aimed to examine whether the latter possibility is empirically supported. Obtaining a change in relatively stable emotional outcomes with small social psychological manipulations would be remarkable, for both theoretical and practical reasons.

In the current paper, we report one pilot study and three experiments that examined the plausibility of our

hypothesis of better emotional skills under enhanced self-focus or decreased other-focus. In the pilot study, we used a well-established self-other priming task that asked participants to circle pronouns within a paragraph that focused relatively more on the self or on others (Brewer & Gardner, 1996; Gardner et al., 1999), and examined whether this task could activate a state of self-focus and other-focus. In Study 1, an online sample of American and Indian participants completed this same pronoun circling task, then a standardized emotion recognition task. Study 2 had a similar procedure except that participants were American undergraduates within a more controlled laboratory setting, who also completed an emotion verbalization task. Study 3 attempted to conceptually replicate the findings of Studies 1 and 2 by implementing a more ecologically valid manipulation of self-focus and other-focus.

Across these studies, we aimed to demonstrate that manipulating self-focus and other-focus could affect emotional skills. Based on the literature reviewed above, we generally predict that temporarily inducing a state of high self-focus will increase emotion recognition and verbalization, while temporarily inducing a state of high other-focus will impair these emotional competencies. Understanding such processes may bring to light potential ways to improve (or inhibit) emotional competencies, which has practical implications in a variety of settings. It also may help to clarify the origins of previous cross-cultural studies of emotion recognition.

Pilot study introduction

In Studies 1 and 2, we used established priming procedures that are frequently used to induce a relative focus on the self and others (Brewer & Gardner, 1996; Gardner et al., 1999). Participants circled pronouns in a paragraph, with some more focused on the self and some more focused on others. Although this manipulation has been widely used in past research (effect sizes range from 0.2 to 0.5; (Oyserman & Lee, 2008), research has rarely examined whether circling pronouns (e.g. I/me) actually makes people think of the intended construct (i.e. the self). The pilot study provides further evidence for its validity.

Pilot study method

All studies were approved by the University of Michigan Institutional Review Board. De-identified data from all studies are freely available to researchers on the Open Science Framework website (https://osf.io/yr6s3/?view_only=abe1e85df3be4f568df4d2d94e676efe).

Participants

One hundred Americans completed an online Amazon Mechanical Turk (MTurk) survey for a small payment. No demographic information was collected.

Procedure

By random assignment, participants read one of four paragraphs describing a day visiting a city. They were then asked to what extent it activated concepts related to the self or others. The paragraph was identical across conditions, except for the pronouns, which varied in their levels of self-focus and other-focus.

We intersected these dimensions to obtain four conditions (see Fig. 1):

1) *I/me* pronouns were hypothesized to activate high self-focus *and* low other-focus (N = 24).
2) *We/our* pronouns were hypothesized to activate both a high self-focus and a high other-focus, since "we" by definition includes both the self and another (N = 25).
3) *He* or *she* pronouns (counterbalanced) were hypothesized to activate a high other-focus *and* a low self-focus (N = 25).
4) *It* pronouns were hypothesized to be low in both self and other-focus (N = 26).

In Studies 1 and 2, we used four priming conditions, rather than only "I" and "we." We are theoretically

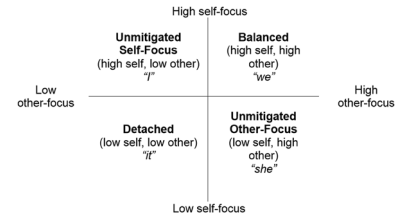

Fig. 1 Four modes of self and other-focus

grounded in research finding that self-focus and other-focus are not necessarily best represented on a unipolar continuum anchored with *self-focus* at one end and *other-focus* at the other. Instead, there is accumulating research evidence that these two traits are orthogonal, or two separate dimensions (Bontempo, 1993; Gudykunst et al., 2006; Konrath et al., 2009; Oyserman et al., 2002; Singelis, 1994; Trafimow et al., 1991; Triandis et al., 1985; Wiggins, 1991). Thus, people can be high in one and low in the other, high in both, or low in both. Four priming conditions are necessary to represent the full range of potential individual differences in self-focus and other-focus. Moreover, research on unmitigated self-focus (i.e. high self-focus, low other-focus) and unmitigated other-focus (i.e. high other-focus, low self-focus) suggests that these distinctions are consequential in their implications for health and well-being (Fritz & Helgeson, 1998; Helgeson & Fritz, 1999).

The researchers who originally developed these primes also included other conditions (i.e. "they/them" represented the broader collective self; "it" was a control; (Brewer & Gardner, 1996), as have other researchers (i.e. "they/them" and "he/she;" (Kühnen et al., 2001). We chose to use the primes "he"/"she" to represent high other-focus with low self-focus. We did not use "you" because participants may have interpreted this as referring to themselves.

Participants first read the paragraph, then answered the following questions: *How much did this paragraph make you think about yourself? How much did this paragraph make you think about other people? How much did this paragraph make you think about animals or objects?* (1 = *not at all*, 7 = *a lot*).

An analysis of variance (ANOVA) examined the effects of self-focus and other-focus on responses to these questions. *I/me* and *We/our* pronouns were coded as high self-focus and *He/she* and *It* were coded as low self-focus. *We/our* and *He/she* were coded as high other-focus and *I/me* and *It* were coded as low other-focus.

Pilot study results

Effect of primes on self-focus

Participants in the high self-focus conditions, $M = 3.90$, $SD = 1.78$, 95% CI [3.42, 4.38], thought about *themselves* more than those in the low self-focus conditions, $M = 3.06$, $SD = 1.58$, 95% CI [2.59, 3.53], $F(1,96) = 6.12$, $p = 0.015$, $d = 0.50$ (see Table 1). Thus, the self-focus primes shift individuals in the direction of increasing self-focus, but do not necessarily shift them to become fully self-focused. No other effects were significant (other-focused primes: $F(1,96) = 0.05$, $p = 0.82$, $d = 0.02$; interaction: $F(1,96) = 0.01$, $p = 0.91$).

Effect of primes on other-focus

Those in the high other-focus conditions, $M = 4.82$, $SD = 1.64$, 95% CI [4.35, 5.29], thought about other people more than those in the low other-focus conditions, $M = 3.60$, $SD = 1.71$, 95% CI [3.13, 4.07], $F(1,96) = 13.29$, $p < 0.001$, $d = 0.73$. Thus, the other-focus primes shift individuals in the direction of increasing other-focus, but do not necessarily shift them to become fully other-focused. No other effects were significant (self-focused primes: $F(1,96) = 1.46$, $p = 0.23$, $d = 0.24$; interaction: $F(1,96) = 1.13$, $p = 0.29$).

Effect of primes on animals/objects

There were main effects of both self-focus, $F(1,96) = 14.18$, $p < 0.001$, $d = 0.70$, and other-focus, $F(1,96) = 10.70$, $p = 0.001$, $d = 0.62$, on the extent to which the paragraphs made participants think about *animals or animate objects.* However, these were driven by an interaction, $F(1,96) = 9.05$, $p = 0.003$, such that the *It* condition (low self, low other) made people think about animals/objects more, $M = 4.23$, $SD = 1.95$, 95% CI [3.61, 4.85], than the other conditions (*Ms* between 2.00 and 2.24, 95% CIs between 1.37 and 2.87), *ps* < 0.001.

Pilot study discussion

These results support the validity of the four priming conditions (see Fig. 1). Priming people with *I/me* and *We/our* both activate higher self-focus, and priming people with *We/our* and *He/she* both activate higher other-focus. Note that the effect size of the self-focus primes is smaller ($d = 0.50$) than those of the other-focus primes ($d = 0.73$). Studies 1 and 2 used these primes to examine the effects of self-focus and other-focus on emotional competencies.

Table 1 Effect of pronoun priming task on activations of self and other focus in pilot study

	Low self; low other ("it")	Low self; high other ("he/she")	High self; low other ("I/me")	High self; high other ("we/our")	Self-focus (F, p)	Other-focus (F, p)	Interaction (F, p)
1. How much did this paragraph make you think about yourself?	3.12 (1.56)	3.00 (1.63)	3.92 (1.64)	3.88 (1.94)	$F(1,96) = 6.12$, $p = 0.015$	$F(1,96) = 0.05$, $p = 0.82$	$F(1,96) = 0.01$, $p = 0.91$
2. How much did this paragraph make you think about other people?	3.58 (1.65)	4.44 (1.81)	3.62 (1.81)	5.20 (1.38)	$F(1,96) = 1.46$, $p = 0.23$	$F(1,96) = 13.29$, $p < 0.001$	$F(1,96) = 1.13$, $p = 0.29$
3. How much did this paragraph make you think about animals or animate objects?	4.23 (1.95)	2.24 (1.72)	2.08 (1.21)	2.00 (1.32)	$F(1,96) = 14.18$, $p < 0.001$	$F(1,96) = 10.70$, $p = 0.001$	$F(1,96) = 9.05$, $p = 0.003$

Note: Standard deviations in parentheses. 1 = not at all, 7 = a lot

Power analysis

Previous research on the psychological effects of these pronoun primes beyond simple manipulation checks has found effect sizes ranging from 0.2 to 0.5 (Oyserman & Lee, 2008). Thus, we used G*Power 3.19.2 to conduct an a priori power analysis with an effect size in the mid-range of previous research (Cohen's d = 0.35), for a repeated measures ANOVA with between-subjects factors. This analysis determined that we would have 0.80 power to detect differences between two groups (in this case, self-focus and other-focus) with two repeated measures (in this case, positive and negative emotions) with 29 participants per group.

Study 1 introduction

In Study 1, online participants from the United States and India completed a pronoun circling task to examine the effects of having an activated sense of self-focus and other-focus on emotion recognition performance.

Study 1 method

Participants: American (more individualistic culture; N = 133; 67.5% female; M_{age} = 36.97, SD = 14.04; 89% White, 4% Asian, 3% Black, 4% Other or Not Reported) and Indian (more collectivistic culture; N = 178; 41.2% female; M_{age} = 30.44, SD = 7.67; 2% White, 91% South Asian, 7% Other or Not Reported) adults participated in an online MTurk survey conducted in English for a small payment.[1] We included participants from a more collectivistic culture to examine whether the results could generalize outside of an individualistic culture. Fourteen participants dropped out immediately after the priming, resulting in a final sample of 297 participants (N = 126 American; 49% female overall; M_{age} = 33.5, SD = 11.53). Note that gender and ethnicity were both unrelated to positive or negative emotion recognition performance in either country (gender: $ps > 0.22$; ethnicity: $ps > 0.11$).

[1] Because there are dozens of regional languages in India, English is the second most commonly spoken language in India (https://en.wikipedia.org/wiki/Indian_English), and India is the country with the second largest number of English speaking people in the world (see https://www.bbc.com/news/magazine-20500312#). We do not think we found the results we did due to language incomprehension, and even if we excluded the Indian sample from our studies, our results and conclusions would remain similar, considering that there were no interactions between Country and Self-Focus or Other-Focus in Study 1. However, we recommend that future researchers interested in cross-cultural differences should provide study materials in national or regional languages.

Procedure: Participants were randomly assigned to one of four conditions by having them click 20 pronouns embedded within a 95-word paragraph about visiting a city (Brewer & Gardner, 1996; Gardner et al., 1999). The four conditions were identical to the pilot study: *I/me* (N = 75), *Our/we* (N = 73), *He/she* (counterbalanced; N = 75), and *It* (N = 74). Participants clicked on 13.5 of the 20 pronouns on average. Results remain similar when controlling for the number of pronouns clicked.

For the emotion recognition task, participants were shown 10 emotional expressions (*anger*, *contempt*, *disgust*, *embarrassment*, *fear*, *happiness*, *pride*, *sadness*, *shame*, *surprise*) posed by two individuals: a White male and a White female (20 photos total; randomly presented). We used the Facial Action Coding System (FACS)-verified University of California, Davis, Set of Emotion Expressions (UCDSEE; (Tracy et al., 2009), cropped to standard headshots. For each presentation, a fixation-cross first appeared on the screen (1 s), followed by a face (1 s), and next, the following emotion options: *anger*, *contempt*, *disgust*, *embarrassment*, excitement, *fear*, *happiness*, *pride*, *sadness*, *shame*, *surprise*, and *none of these emotions*. Participants were asked to pick the emotion that best corresponded to the face that they saw. We summed participants' correct responses into an overall score (ten emotions times two posers; maximum = 20).

We also used published norms on the affective valence of words to classify each emotion word as negative or positive, based on a 1 (more negative) to 9 (more positive) rating scale (Warriner et al., 2013). According to these norms, happiness (M = 8.48, SD = 0.81), pride (M = 6.50, SD = 2.28), and surprise (M = 7.44, SD = 1.58) were rated as more positive. Because participants saw two photos of each positive emotion, the maximum positive emotion score could be 6. Scores were converted to percentages for ease of interpretation.

Seven of the emotion words were classified as negative: anger (M = 2.50, SD = 1.36), contempt (M = 3.22, SD = 1.80), disgust (M = 3.32, SD = 2.40), embarrassment (M = 2.72, SD = 1.60), fear (M = 2.93, SD = 1.79), sadness (M = 2.40, SD = 1.10), and shame (M = 2.62, SD = 2.11). Because participants saw two photos of each negative emotion, the maximum negative emotion score could be 14. Scores were converted to percentages for ease of interpretation.

A t-test verified that the three positive emotions (M = 7.47, SD = 1.56) were rated more positively on average compared to the seven negative emotions (M = 2.82, SD = 1.74), $t(236) = 18.02$, $p < 0.001$.[2]

We also assessed trait self-construal in Studies 1 and 2 (Singelis, 1994). Not surprisingly, Indian participants scored higher (M = 5.24, SE = 0.09) on trait interdependence than Americans (M = 4.59, SE = 0.08; $F(1,266) = 28.07$, $p < 0.001$, d = 1.04), and scored lower on trait independence (M = 4.90, SE = 0.07) than Americans (M = 5.14, SE = 0.08; $F(1,264) = 5.53$, $p = 0.02$, d = 0.36). We also assessed participants' self-esteem and IQ in Study 1. All significant results reported here remain when including these covariates. Detailed analyses with covariates included are available upon request.

Study 1 results

We conducted a 2 (Culture: United States and India) × 2 (Self-Focus: High and Low) × 2 (Other-Focus: High and Low) × 2 (Valence: Positive and Negative; Within Subjects) mixed model ANOVA. See Table 2a and b for Study 1 statistics.

Three significant main effects emerged. First, Americans, M = 74.57%, SE = 1.51, 95% CI [71.59, 77.53], identified more emotions overall than Indians, M = 52.42%, SE = 1.29, 95% CI [49.88, 54.97], $F(1,289) = 124.35$, $p < 0.001$, $d = 1.31$. Next, participants identified more positive, M = 73.95%, SE = 1.25, 95% CI [71.48, 76.41], than negative emotions overall, M = 53.04%, SE = 1.09, 95% CI [50.90, 55.19], $F(1,289) = 277.43$, $p < 0.001$, $d = 1.03$.

Most importantly, there was a significant main effect of self-focused primes on emotion recognition.

[2] We also cross-validated these valence categorizations using the Affective Norms for English Words (ANEW) and the Dictionary of Affect in Language (DAL) ratings, both of which are from earlier time periods (Bradley & Lang, 1999; Whissell, 2009). All positive and negative emotion words would have been similarly classified using the ANEW or DAL ratings. However, we rely on Warriner et al's (2013) ratings because they are more recent. In addition, because there may be a difference in judging emotional words versus facial expressions, we also ran all analyses excluding surprise from the positive emotion category. We found that results and conclusions were similar whether including or excluding surprise from the analyses.

Table 2 (a) Effect of pronoun priming task on emotion recognition in Study 1, (b) full statistical results from Study 1

(a)	Low self; low other ("it") Mean (SD)	Low self; high other ("he/she") Mean (SD)	High self; low other ("I/me") Mean (SD)	High self; high other ("we/our") Mean (SD)
United States				
Emotion recognition positive (%)	82.29 (17.42)	82.29 (16.36)	89.25 (13.98)	83.33 (18.26)
Emotion recognition negative (%)	62.05 (15.86)	62.28 (14.77)	67.97 (19.59)	67.05 (15.94)
India				
Emotion recognition positive (%)	61.90 (21.24)	63.18 (29.00)	67.80 (22.27)	61.51 (23.71)
Emotion recognition negative (%)	36.22 (17.02)	41.36 (20.89)	43.02 (20.87)	44.39 (20.30)

(b)	F, p	Mean (SE)
Main effect of self-focus	$F(1,289) = 4.25$, $p = 0.04$	Low self-focus: 61.45 (1.40); high self-focus: 65.54 (1.41)
Main effect of other-focus	$F(1,289) = 0.10$, $p = 0.75$	Low other-focus: 63.82 (1.40); high other-focus: 63.17 (1.41)
Main effect of valence	$F(1,289) = 277.43$, $p < 0.001$	Emotion recognition positive: 73.95 (1.25); negative: 53.04 (1.09)
Main effect of country	$F(1,289) = 124.35$, $p < 0.001$	United States: 74.57 (1.51); India: 52.42 (1.29)
Self-focus × other-focus interaction	$F(1,289) = 1.34$, $p = 0.25$	It: 60.62 (1.98); he/she: 62.28 (1.97); I/me: 67.01 (1.98); we/our: 64.07 (2.00)
Self-focus × valence interaction	$F(1,289) = 0.68$, $p = 0.41$	*Emotion recognition positive:* Low self-focus: 72.42 (1.77); high self-focus: 75.47 (1.78) *Emotion recognition negative:* Low self-focus: 50.47 (1.54); high self-focus: 55.61 (1.55)
Other-focus × valence interaction	$F(1,289) = 2.78$, $p = 0.10$	*Emotion recognition positive:* Low other-focus: 75.31 (1.77); high other-focus: 72.58 (1.78) *Emotion recognition negative:* Low other-focus: 52.32 (1.54); high other-focus: 53.77 (1.54)
Self-focus × country interaction	$F(1,289) = 0.09$, $p = 0.77$	*United States:* Low self-focus: 72.23 (2.11); high self-focus: 76.90 (2.15) *India:* Low self-focus: 50.67 (1.83); high self-focus: 54.18 (1.82)
Other-focus × country interaction	$F(1,289) = 0.26$, $p = 0.61$	*United States:* Low other-focus: 75.39 (2.13); high other-focus: 73.74 (2.13) *India:* Low other-focus: 52.24 (1.82); high other-focus: 52.61 (1.83)

Table 2 continued

(b)	F, p	Mean (SE)
Valence × country interaction	$F(1,289) = 1.33$, $p = 0.25$	*United States:* Emotion recognition positive: 84.29 (1.90); negative: 64.84 (1.65) *India:* Emotion recognition positive: 63.60 (1.63); negative: 41.25 (1.42)
Self-focus × other-focus × country interaction	$F(1,289) = 0.07$, $p = 0.79$	*United States:* It: 72.17 (2.99); he/she: 72.28 (2.99); I/me: 78.61 (3.04); we/our: 75.19 (3.04) *India:* It: 49.07 (2.61); he/she: 52.27 (2.58); I/me: 55.41 (2.55); we/our: 52.95 (2.61)
Self-focus × valence × country interaction	$F(1,289) = 0.08$, $p = 0.77$	*United States, emotion recognition positive:* Low self-focus: 82.29 (2.69); high self-focus: 86.29 (2.71) *United States, emotion recognition negative:* Low self-focus: 62.17 (2.32); high self-focus: 67.51 (2.36) *India, emotion recognition positive:* Low self-focus: 62.54 (2.32); high self-focus: 64.66 (2.30) *India, emotion recognition negative:* Low self-focus: 38.79 (2.01); high self-focus: 43.70 (2.00)
Other-focus × valence × country interaction	$F(1,289) = 0.40$, $p = 0.53$	*United States, emotion recognition positive:* Low other-focus: 85.77 (2.69); high other-focus: 82.81 (2.69) *United States, emotion recognition negative:* Low other-focus: 65.01 (2.34); high other-focus: 64.66 (2.34) *India, emotion recognition positive:* Low other-focus: 64.85 (2.30); high other-focus: 62.34 (2.32) *India, emotion recognition negative:* Low other-focus: 39.62 (2.00); high other-focus: 42.88 (2.01)
Self-focus × other-focus × valence	$F(1,289) = 0.73$, $p = 0.39$	*Emotion recognition positive:* It: 72.10 (2.51); he/she: 72.74 (2.49); I/me: 78.53 (2.50); we/our: 72.42 (2.53) *Emotion recognition negative:* It: 49.14 (2.18); he/she: 51.82 (2.17); I/me: 55.50 (2.18); we/our: 55.72 (2.20)
Self-focus × other-focus × valence × country interaction	$F(1,289) = 0.01$, $p = 0.92$	See Table 2a

Participants identified more emotions in the High Self, $M = 65.54\%$, $SE = 1.41$, 95% CI [62.77, 68.31], compared to the Low Self conditions, $M = 61.45\%$, $SE = 1.40$, 95% CI [58.69, 64.20], $F(1,289) = 4.25$, $p = 0.04$, $d = 0.24$. There was no main effect of other-focus, $F(1,289) = 0.10$, $p = 0.75$, $d = 0.04$, and no significant interactions, $ps > 0.09$ (see Table 2a, b).

Study 1 discussion

Regardless of culture, participants primed with high self-focus were better at identifying emotions. Hence, the temporary accessibility of self-focus is powerful enough to affect a relatively stable skill set.

Interestingly, we also found that Americans recognized more emotions than Indians, which is in line with prior work on emotion identification and culture (Matsumoto, 1989, 1992; Schimmack, 1996). However, this is difficult to interpret in the current study because the target faces were all White, which could have made emotion recognition more difficult for Indians because of known disadvantages in recognizing emotions of outgroup members (Elfenbein & Ambady, 2002). However, this study was not interested in examining the main effect of culture on emotion recognition, but instead, in whether people from two different cultures had similar effects on emotion recognition after being randomly assigned to self-focused or other-focused mindsets. Since this study cannot disentangle the potential confounding roles of culture versus stimuli, and since the results we found were *not moderated by culture*, we refrain from further discussions of main effects of culture.

Instead, we highlight the key finding of Study 1 that simple self-focus primes caused increases in the emotion recognition performance of both Americans and Indians. Note however that being primed with other-focus did not have an effect on emotion recognition in Study 1, which was contrary to our expectations. It is unclear why there were null effects, however, Study 2 can examine the same research question in a more controlled setting, in case these null results were due to low experimental control in the online participants' environment.

Study 2 introduction

Study 2 sought to further increase experimental control by conducting a priming study in a more controlled laboratory setting among a more homogenous population (American undergraduates). In addition, Study 2 examines whether the effects extend to emotional verbalization in addition to emotion recognition.

Study 2 method

Participants: 118 American undergraduates (74% female; $M_{age} = 19.8$, $SD = 1.3$; 63.6% White, 21.2% Asian, 8.5% Black, 6.8% Other or Not Reported) volunteered for the study for course credit.

Our Study 1 power analysis using the same pronoun circling tasks found that we would have sufficient power to detect statistically significant differences with 29 participants per group. Since the *I/me* group had only 27 participants (see below), Study 2 may have been slightly underpowered.

Note that gender was unrelated to emotion recognition or emotion verbalization, $ps > 0.72$. In addition, the only significant effect of ethnicity was on negative emotion recognition: White = 57.81%, Asian = 48.86%, Black = 56.43%, Other or Not Reported = 58.04%, $F(3,114) = 3.56$, $p = 0.02$ (all other $ps > 0.08$).

Procedure: Participants were first randomly assigned to one of four priming conditions using the same pronoun-circling task as the Pilot Study and Study 1 (Brewer & Gardner, 1996; Gardner et al., 1999), except that this time it was presented on paper: *I/me* (N = 27), *Our/we* (N = 32), *He/she* (counterbalanced; N = 29), and *It* (N = 30). This time they were given 3 min (instead of no time limit) to circle the 20 pronouns in the paragraph, in order to increase experimental control.

Emotion recognition and verbalization tasks were administered via MediaLab. For the emotion recognition task, participants were shown the same ten facial expressions as Study 1, except this time they were posed by four individuals (White man, White woman, Black man, Black woman),[3] or 40 photos in all

[3] We also analyzed Study 2 by adding expresser ethnicity as a factor in the mixed-ANOVA. We found a main effect of expresser ethnicity such that participants accurately recognized fewer emotions in the Black individuals ($M = 63.87\%$, $SE = 0.92$) compared to the White individuals ($M = 68.72\%$, $SE = 1.03$), $F(1,114) = 20.89$, $p < 0.001$. However, there were no interactions between expresser ethnicity and any of the other factors, $ps > 0.36$. This implies that even though participants

(randomly presented; Tracy et al., 2009). The instructions, presentation times, and emotion options were otherwise identical to Study 1. We again created overall (maximum = 40), positive (*happiness*, *pride*, *surprise*; maximum = 12) and negative (*remaining emotions*; maximum = 28) emotion scores. Scores were again converted to percentages for ease of interpretation.

For the emotional verbalization task, participants completed the Alexithymia Provoked Response Questionnaire (APRQ) after the emotion recognition task (Krystal et al., 1986). The APRQ is face-valid, correlates with other alexithymia measures (Krystal et al., 1986; Lumley et al., 1997), and has high test–retest reliability (Kosten et al., 1992). We used three negative (*How would you feel if someone tried to attack you with a knife? How would you feel if you saw a truck coming at you at 90 mph? How would you feel if someone called you a thief*) and one positive emotional experience (*How would you feel if someone complimented you?)* from the APRQ. The APRQ originally included 17 questions, and of those, only two of them were positive. We selected the negative and positive items with the best clinical significance.

Consistent with coding instructions from prior research (Krystal et al., 1986), two coders counted the total number of pure emotional words (e.g. fear, anger) or facial expressions (e.g. smile, cry) in the written descriptions. Bodily sensations (e.g. heart pounding, shaking) or action tendencies (e.g. run away, attack him) were not counted as emotion-related words. This was also consistent with previous coding, which defines emotions as internal psychological or mental experiences, rather than bodily sensations or actions (Krystal et al., 1986). Inter-coder reliabilities ranged from 0.90 to 0.97 for the four questions.

We assessed participants' self-esteem, IQ, and mood in Study 2. All significant results reported here remain when including these covariates. Detailed analyses with covariates included are available upon request.

Manipulation check: We used the Linguistic Inquiry and Word Count (LIWC) program (Pennebaker et al., 2007) to objectively code the number of social references in the APRQ written responses. We expected that participants in the High Other conditions would use more social words (i.e. words relating to people; see Pennebaker et al., 2007) than participants in the Low Other conditions. We also examined whether participants in the high self-focus conditions would be more likely to respond with first person singular pronouns (e.g. *I*, *me*) after being asked how they would feel in the APRQ situations. Since 0% of participants responded with "we," we did not examine the effects on first person plural pronouns.

Study 2 results

For all analyses we conducted a 2 (Self-Focus: High and Low) × 2 (Other-Focus: High and Low) × 2 (Valence: Positive and Negative; Within Subjects) mixed-model ANOVA (see Table 3a and b for all statistics).

Manipulation check: Participants in High Other conditions used significantly more social words, $M = 3.21$, $SD = 2.35$, 95% CI [2.57, 3.84], than those in Low Other conditions, $M = 2.30$, $SD = 2.66$, 95% CI [1.65, 2.95], $F(1,114) = 3.94$, $p = 0.049$, $d = 0.36$. There was no main effect of self-focus ($p = 0.33$, $d = 0.21$), and a marginal interaction ($p = 0.08$). There was no effect of either condition, or their interaction, on the usage of first person singular pronouns, ($ps > 0.60$), perhaps because the question ("*How would you feel?*") demanded an answer that included them (e.g. "*I would feel…*").

Emotion recognition: Participants identified more positive, $M = 76.76\%$, $SE = 1.24$, 95% CI [74.30, 79.20], than negative emotions overall, $M = 55.83\%$, $SE = 1.10$, 95% CI [53.66, 58.01], $F(1,114) = 158.59$, $p < 0.001$, $d = 1.65$. More importantly, there was also a main effect of other-focus on emotion recognition. Participants identified fewer emotions in the High Other, $M = 64.45\%$, $SE = 1.14$, 95% CI [62.18, 66.71], than in the Low Other conditions, $M = 68.14\%$, $SE = 1.18$, 95% CI [65.80, 70.48], $F(1,114) = 5.05$, $p = 0.03$, $d = 0.41$. The main effect of self-focus was not significant, $F(1,114) = 0.09$, $p = 0.76$, $d = 0.06$.

Moreover, the only significant interaction that emerged was between Valence and Other-Focus,

Footnote 3 continued
recognized fewer emotions expressed by Black individuals, the effects of Self-Focus and Other-Focus were similar across both ethnicities of the expressers. All of the other results reported in Study 2 remained the same when including expresser ethnicity in the analysis.

Table 3 (a) Effect of pronoun priming task on emotion recognition and verbalization in Study 2, (b) full statistical results from Study 2

(a)	Low self; low other ("it") Mean (SD)	Low self; high other ("he/she") Mean (SD)	High self; low other ("I/me") Mean (SD)	High self; high other ("we/our") Mean (SD)
Emotion recognition positive (%)	76.39 (16.24)	78.16 (12.48)	77.47 (12.19)	75.00 (12.16)
Emotion recognition negative (%)	60.24 (10.68)	49.38 (12.59)	58.47 (12.88)	55.25 (11.47)
Emotion verbalization positive (#)	1.77 (1.25)	1.59 (0.82)	2.00 (1.00)	1.75 (0.92)
Emotion verbalization negative (#)	4.77 (2.69)	4.45 (2.22)	6.11 (2.65)	4.53 (1.37)

(b)	F, p	Mean (SE)
Emotion recognition		
Main effect of self-focus	$F(1,114) = 0.09$, $p = 0.76$	Low self-focus: 66.04 (1.16); high self-focus: 66.55 (1.17)
Main effect of other-focus	$F(1,114) = 5.05$, $p = 0.027$	Low other-focus: 68.14 (1.18); high other-focus: 64.45 (1.14)
Main effect of valence	$F(1,114) = 158.59$, $p < 0.001$	Emotion recognition positive: 76.76 (1.24); negative: 55.83 (1.10)
Self-focus × other-focus interaction	$F(1,114) = 0.27$, $p = 0.61$	It: 68.31 (1.63); he/she: 63.77 (1.66); I/me: 67.97 (1.72); we/our: 65.12 (1.58)
Self-focus × valence interaction	$F(1,114) = 0.86$, $p = 0.36$	*Emotion recognition positive:* Low self-focus: 77.28 (1.74); high self-focus: 76.24 (1.75) *Emotion recognition negative:* Low self-focus: 54.81 (1.55); high self-focus: 56.86 (1.56)
Other-focus × valence interaction	$F(1,114) = 4.05$, $p = 0.046$	*Emotion recognition positive:* Low other-focus: 76.93 (1.78); high other-focus: 76.58 (1.72) *Emotion recognition negative:* Low other-focus: 59.35 (1.58); high other-focus: 52.32 (1.53)
Self-focus × other-focus × valence interaction	$F(1,114) = 3.19$, $p = 0.08$	See Table 3a
Emotion verbalization		
Main effect of self-focus	$F(1,114) = 2.70$, $p = 0.10$	Low self-focus: 3.14 (0.20); high self-focus: 3.60 (0.20)
Main effect of other-focus	$F(1,114) = 4.40$, $p = 0.038$	Low other-focus: 3.66 (0.20); high other-focus: 3.08 (0.19)
Main effect of valence	$F(1,114) = 358.96$, $p < 0.001$	Emotion verbalization positive: 1.78 (0.09); negative: 4.96 (0.21)
Self-focus × other-focus interaction	$F(1,114) = 1.44$, $p = 0.23$	It: 3.27 (0.28); he/she: 3.02 (0.28); I/me: 4.06 (0.29); we/our: 3.14 (0.27)
Self-focus × valence interaction	$F(1,114) = 2.34$, $p = 0.13$	*Emotion verbalization positive:* Low self-focus: 1.68 (0.13); high self-focus: 1.88 (0.13) *Emotion verbalization negative:* Low self-focus: 4.61 (0.30); high self-focus: 5.32 (0.30)

Table 3 continued

(b)	F, p	Mean (SE)
Other-focus × valence interaction	$F(1,114) = 4.75$, $p = 0.03$	*Emotion verbalization positive:* Low other-focus: 1.88 (0.13); high other-focus: 1.67 (0.13) *Emotion verbalization negative:* Low other-focus: 5.44 (0.30); high other-focus: 4.49 (0.29)
Self-focus × other-focus × valence interaction	$F(1,114) = 3.14$, $p = 0.08$	See Table 3a

$F(1,114) = 4.05$, $p = 0.046$. When splitting the file by Valence, we found that participants primed with High Other-Focus, $M = 52.32\%$, $SE = 1.53$, 95% CI [49.29, 55.34], identified fewer *negative* emotions than participants primed with Low Other-Focus, $M = 59.35\%$, $SE = 1.58$, 95% CI [56.23, 62.48], $F(1,114) = 10.28$, $p = 0.002$, $d = 0.59$. There was no effect of other-focus on the identification of positive emotions, $F(1,114) = 0.02$, $p = 0.89$, $d = 0.03$. No other significant interactions emerged, $ps > 0.08$ (see Table 3a, b).

Emotional verbalization: Participants used more negative, $M = 4.96$, $SE = 0.21$, 95% CI [4.54, 5.38], compared to positive emotion words, $M = 1.78$, $SE = 0.09$, 95% CI [1.59, 1.96], $F(1,114) = 358.96$, $p < 0.001$, $d = 1.76$, which is not surprising since three of the four APQR scenarios were negative. More importantly, there was a main effect of other-focus on emotional verbalization. Participants used fewer emotion words in the High Other, $M = 3.08$, $SE = 0.19$, 95% CI [2.70, 3.46], than in the Low Other, $M = 3.66$, $SE = 0.20$, 95% CI [3.27, 4.06] conditions, $F(1,114) = 4.40$, $p = 0.038$, $d = 0.39$. In addition, participants used marginally more emotion words in the High Self, $M = 3.60$, $SE = 0.20$, 95% CI [3.21, 3.99], than the Low Self conditions, $M = 3.14$, $SE = 0.20$, 95% CI [2.75, 3.53], $F(1,114) = 2.70$, $p = 0.10$, $d = 0.30$.

The only significant interaction that emerged was again between Valence and Other-Focus, $F(1,114) = 4.75$, $p = 0.03$. When splitting by Valence, we found that participants in the High Other conditions, $M = 4.49$, $SE = 0.29$, 95% CI [3.91, 5.07] used fewer *negative* emotions than participants in the Low Other conditions, $M = 5.44$, $SE = 0.30$, 95% CI [4.84, 6.04], $F(1,114) = 5.12$, $p = 0.026$, $d = 0.42$. There was no effect of other-focus on positive emotion verbalization, $F(1,114) = 1.33$, $p = 0.25$, $d = 0.21$. No other significant interactions emerged, $ps > 0.08$ (see Table 3a, b).

Study 2 discussion

Study 2 found that other-focused primes caused a decrease in both emotion recognition and emotional verbalization. This was only true for negative emotions, but not positive emotions. In addition, high self-focus was associated with marginally increased emotion verbalization, however, we do not discuss this effect further since it did not reach traditional levels of significance.

Note that Study 2 results were inconsistent with Study 1, which found a significant effect of self-focus such that it increased emotion recognition, while other-focus had no effect. Given that both studies used identical pronoun primes, it is unclear why such inconsistent effects were found. However, the two studies had a number of other differences that could help to explain why self-focus drove the results in Study 1, but other-focus drove them in Study 2. For example, the studies relied on different participant samples (adults from the US and India in Study 1; college students in Study 2) in different settings (online for Study 1; lab study for Study 2). College students are different in age and socioeconomic status than general adult samples, both of which have been shown to be related to self-focus or other-focus (Chopik & Grimm, 2019; Manstead, 2018; O'Brien et al., 2013). Moreover, Study 2 used two additional emotional expressers than Study 1 (a Black man and woman), which may have increased the difficulty of the task for various reasons (e.g. because it was longer; because they now saw four of each emotional expression instead of two, making it more difficult to keep track).

Regardless of these differences, Study 2 confirmed that focusing on others may at times lead to decreased emotional competencies.

Study 3 introduction

Since we find no interactions between self and other-focused primes in Studies 1 and 2, this suggests that their orthogonality does not matter for emotion recognition tasks. Thus, in Study 3 we expose participants to self-focused stimuli, other-focused stimuli, or a control group.

Unlike the first two studies, Study 3 used a pre-post design, which allowed us to assess changes in participants' performance, compared to their own baseline scores. It used a longer-term exposure (14 days), and a relatively novel method of delivering the experimental manipulation—via daily text messages on participants' cell phones. Although this method is quite common in public health and medical research (Cole-Lewis & Kershaw, 2010), it is relatively new within personality and social psychology. One advantage of it is that it embeds experimental manipulations within participants' everyday lives, rendering them more ecologically valid, although likely at the cost of smaller effect sizes due to less control over participants' environment. Unlike in Studies 1 and 2, where participants were unobtrusively exposed to the experimental manipulation, Study 3 directly asked participants to focus on the self or others. Thus, Study 3 can help us determine whether the type of manipulation matters (direct versus subtle).

We expect that exposure to self-focused or other-focused message will affect participants' emotion recognition abilities. Given that Study 1 found effects for self-focused primes, and Study 2 found effects for other-focused primes, this study can also help to clarify which one of these is most likely to have an effect on emotion recognition.

Study 3 method

Participants: Ninety participants came into the lab at baseline, but eight dropped out of the study so we couldn't assess change in emotion recognition for them. The final sample consisted of 82 American undergraduates (60% female; M_{age} = 21.0, SD = 4.2; 52.2% White, 33.3% Asian, 11.1% Black, 3.3% Other or Not Reported) who received a payment for participating.

We used G*Power 3.19.2 to conduct a post hoc power analysis with an Cohen's d effect size of 0.35, for a repeated measures ANOVA with within-between interactions. This analysis determined that with 82 participants, we had 0.68 power to detect differences between three groups (self-focus, other-focus, control) with 2 repeated measures outcomes. Thus, Study 3 is underpowered and should be interpreted with caution.

Note that gender was unrelated to positive emotion recognition at either time point, and was also unrelated to negative emotion recognition at Time 1. However, at Time 2, males had better negative emotion recognition performance (72.51%) compared to females (65.89%), $F(1,81) = 4.03$, $p = 0.05$. In addition, the only significant effect of ethnicity was on Time 2 positive emotion recognition: White = 91.06%, Asian = 86.91%, Black = 85.00%, Other or Not Reported = 66.67%, $F(3,86) = 2.84$, $p = 0.04$ (all other $ps > 0.13$).

Procedure: The study used a pre-post longitudinal experiment design. Participants came into the lab for baseline measurements, were randomly assigned to one experimental condition, and then returned for follow up measurements.

Baseline lab session: As part of a larger study, participants completed a number of measures and questionnaires, including the same emotion recognition task as in Study 1, with a total of 20 photos (Tracy et al., 2009). As in Study 1, the task was administered via an online survey program (Qualtrics), which allowed us to control timing of stimuli and measure response times. The instructions, presentation times, and emotion options were identical to Study 1. Scores were again converted to percentages for ease of interpretation.

Experimental manipulation: Participants were randomly assigned to one of three conditions. Those in the *other-focus condition* (N = 37) received other-focused messages, 6 times a day, for 14 days (for more details, see (Konrath et al., 2015). Sample messages are: "*Think about somebody close to you. Do a small nice thing for this person today*." or "*Think about someone you have recently had trouble getting along with. For the next 30 s, focus on what you have in common with this person*."

Participants in the *self-focus control condition* (N = 24) received messages that focused participants

on themselves or away from others. Sample messages are: "*Think about all that you deserve. Do something nice for yourself today*." or "*Think about someone you have recently had trouble getting along with. For the next 30 s, think of a good counter argument to prove your point*." These instructions are in line with previous self-construal manipulations that ask participants to describe themselves in relation to others, for example, by focusing on how they are different from others (Kafetsios & Hess, 2013; Silvia & Eichstaedt, 2004).

Participants in the *control condition* (N = 29) did not receive any manipulation messages. But, as part of the larger research project, all participants received a text message asking them to report their mood and recent social interactions. Participants responded to 91.2% of these messages on average.

Follow-up lab session: Participants returned to the lab after the 2 weeks of text messages, an average of 19 days (SD = 5.4 days) after the baseline lab session. Emotion recognition was assessed using an identical procedure as the baseline lab session.

Study 3 results

Manipulation check: The study measured a number of other-oriented outcomes (see Supplementary Materials), and found that those in the other-focus condition had more prosocial motivations and behaviors compared to the control conditions. For example, participants in the other-focus condition were more likely to report volunteering to help others rather than to feel good. Observers also rated them as seeming more prosocial compared to controls. These results have been reported in a separate paper (Konrath et al., 2015).

Data analysis and results: We conducted a 3 (Between Subjects Condition: Self-Focus, Other-Focus, Control) × 2 (Valence: Positive and Negative; Within Subjects) × 2 (Time: Baseline, Post-Intervention; Within Subjects) mixed-model ANOVA (see Table 4a and b for full statistics).

Overall, there was a main effect of Valence, $F(1,79) = 137.4$, $p < 0.001$, d = 1.81, such that participants were better at identifying positive, $M = 86.70\%$, $SE = 1.39$, 95% CI [83.92, 89.47], compared to negative emotions, $M = 66.36\%$, $SE = 1.46$, 95% CI [63.46, 69.26]. In addition, there was a main effect of Time, $F(1,79) = 13.70$, $p < 0.001$, d = 0.39, such that participants improved from 74.12%, $SE = 1.30$, 95% CI [71.53, 76.71] to 78.94%, $SE = 1.46$, 95% CI [76.32, 81.55] emotion recognition over time. However, this effect was qualified by a significant Time X Condition interaction, $F(2,79) = 3.28$, $p = 0.04$. When splitting by Condition, paired samples t-tests found that participants in the Control (71.1–77.7%, $t = -2.96$, $p = 0.007$, $d = 1.21$) and Self-Focus (75.7–82.9%, $t = -3.09$, $p = 0.006$, $d = 1.42$) conditions both increased in their emotion recognition performance, while the Other-Focus messages had no effect on emotion recognition performance (75.6–76.1%, $t = -0.30$, $p = 0.38$, $d = 0.10$). No other effects were significant, ps > 0.26 (see Table 4a, b).

Study 3 discussion

Study 3 again confirmed the causal role of self and other-focus in emotion recognition. It is notable that the control condition and self-focus condition had nearly identical improvements in emotion recognition performance, while the other-focus condition led to an inhibition in this improvement process over time. It is possible that the control condition had similar effects as the self-focus condition because of the undergraduate sample. Young adults tend to be more self-focused than mid-age adults (Chopik & Grimm, 2019; O'Brien et al., 2013), thus, the self-focus messages may reflect the common ego-enhancing parlance that students typically encounter in their day-to-day environments.

Meta-analytic integration

Because of the inconsistent results across the three studies, we conducted two mini meta-analyses (Goh et al., 2016) investigating the average effect of self-focus on emotion recognition (see Fig. 2a) and the average effect of other-focus on emotion recognition (see Fig. 2b). We used SPSS 28 to conduct a random effects meta-analysis on continuous outcomes with raw data. The average effect size across the three studies for self-focus was positive and significant, $d = 0.22$, 95% CI [0.039, 0.410], $Z = 2.38$, $p = 0.018$. However, the average effect size for other-focus was not significant, $d = -0.14$, 95% CI [− 0.392, 0.122], $Z = -1.03$, $p = 0.30$.

Table 4 (a) Effect of condition on emotion recognition in Study 3, (b) full statistical results from Study 3

(a)	Control group Mean (SD)	Self-focus Mean (SD)	Other-focus Mean (SD)
Time 1			
Emotion recognition positive (%)	81.33 (13.88)	86.67 (13.89)	85.59 (16.27)
Emotion recognition negative (%)	60.86 (17.14)	64.64 (11.70)	65.64 (16.99)
Time 2			
Emotion recognition positive (%)	86.00 (14.17)	95.00 (9.52)	85.59 (17.64)
Emotion recognition negative (%)	69.71 (14.18)	70.71 (14.45)	66.60 (15.80)

(b)	F, p	Mean (SE)
Main effect of condition	$F(1,79) = 1.34$, $p = 0.27$	Control: 74.48 (1.99); self-focus: 79.26 (2.22); other-focus: 75.85 (1.63)
Main effect of valence	$F(1,79) = 137.45$, $p < 0.001$	Emotion recognition positive: 86.70 (1.39) Emotion recognition negative: 66.36 (1.46)
Main effect of time	$F(1,79) = 13.70$, $p < 0.001$	Time 1: 74.12 (1.30) Time 2: 78.94 (1.31)
Condition × valence interaction	$F(2,79) = 0.59$, $p = 0.55$	*Emotion recognition positive:* Control: 83.67 (2.45); self-focus: 90.83 (2.73); other-focus: 85.59 (2.01) *Emotion recognition negative:* Control: 65.29 (2.56); self-focus: 67.68 (2.86); other-focus: 66.12 (2.10)
Condition × time interaction	$F(2,79) = 3.28$, $p = 0.04$	*Time 1:* Control: 71.10 (2.28); self-focus: 75.66 (2.55); other-focus: 75.61 (1.87) *Time 2:* Control: 77.86 (2.30); self-focus: 82.86 (2.58); other-focus: 76.09 (1.89)
Valence × time interaction	$F(2,79) = 0.10$, $p = 0.75$	*Time 1:* Emotion recognition positive: 84.53 (1.71) Emotion recognition negative: 63.71 (1.82) *Time 2:* Emotion recognition positive: 88.86 (1.71) Emotion recognition negative: 69.01 (1.71)
Condition × valence × time interaction	$F(2,79) = 0.34$, $p = 0.72$	See Table 4a

General discussion

A cross-cultural online survey (Study 1), a laboratory study (Study 2), and an ecologically valid real-world manipulation (Study 3) examined whether changes in self-focus or changes other-focus can at times affect performance on standardized emotional competency tasks. Scholars have long speculated about whether self-focus could help to scaffold social cognitive skills, or whether other-focus could potentially impair such skills, including recognizing other people's internal states. We conceptually replicate the only other known experimental study on this topic (Kafetsios & Hess, 2013) by using two more direct operationalizations of self-focus and other-focus within two new cultural settings. Overall, our meta-analytic integration supports the idea that self-focus can affect emotional competencies, while other-focus does not consistently do so.

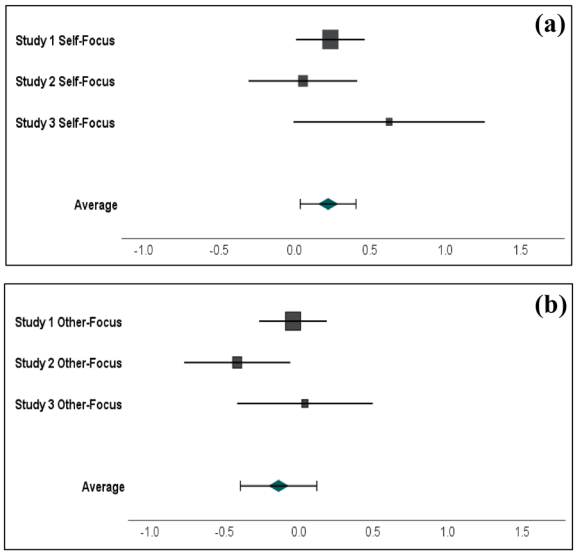

Fig. 2 Mini meta-analysis examining the effect of self-focus (**a**) and other-focus (**b**) on emotion recognition

There are several assets to this research. First, the experimental approach clarifies whether and how temporary self-focused and/or other-focused inductions can influence emotional recognition and verbalization. As reviewed in the introduction, there are open questions on the specific causal role of self and other-focus. By using different operationalizations of self-construal, our studies can more clearly isolate the specific role of self-focus and other-focus. In addition, this research also examined whether there were different outcomes on emotional verbalization versus emotion recognition, which was not the case.

Moreover, this research can contribute to discussions about the orthogonality of self-focus and other-focus. Previous research suggests that this orthogonality has implications for health and well-being (Fritz & Helgeson, 1998; Helgeson & Fritz, 1999). Thus, this paper can help clarify if there are distinct outcomes associated with unmitigated self-focus (high self-focus, low other-focus) and unmitigated other-focus (high other-focus, low self-focus) for emotional competencies (Studies 1 and 2; Fig. 1), which is a novel contribution. It is notable that in Studies 1 and 2 we find no interactions between self and other-focused primes, which suggests that the orthogonality of self-focus and other-focus may not be relevant with respect to emotional competencies.

Perfect replications across studies are unlikely, and we note that self-focused primes increased emotion recognition in Study 1, while other-focused primes impaired emotional recognition in Study 2. Study 3 was more complex, because it tracked emotion recognition over time. It found that self-focus led to an increase in emotion recognition over time, but so did the control group. However, in Study 3, other-focus did not change emotion recognition over time. These inconsistencies are difficult to explain or resolve, however, our meta-analysis suggests that on average self-focus may increase emotion recognition, while on average there may not be a consistent effect of other-focus. Future studies can help to confirm these findings.

One potential explanation for the inconsistencies may be due to characteristics of the samples. Study 1 used a general adult sample, while Studies 2 and 3 used college students, who have been shown to be more self-focused and less other-focused than other adults (Chopik & Grimm, 2019; Manstead, 2018; O'Brien et al., 2013). Thus, the extent to which self-focus and other-focus primes affect emotional skills may depend upon baseline levels of self- and other-focus. Another potential explanation is the use of different primes and different emotion recognition measures across the studies. Finally, the use of three different study settings (online, lab, field) could have also influenced the results. Future research should try to gain a better understanding of under which circumstances self-focus may increase emotional competencies or other-focus may impair them.

Yet, the present evidence collectively supports the idea that contrary to intuitive beliefs about how self-focus and other-focus might affect emotion recognition, in fact, our meta-analysis found that self-focus may at times improve it, but there are no overall effects of other-focus. With respect to emotional verbalization, only one study (Study 2) examined this question, and thus, a meta-analysis was not possible. It found that participants used fewer emotion words when primed with high other-focus. Yet this study needs replication in order to be more confident of the results. Future research should help to clarify under what contexts, and with which populations, one type of focus is more effective at changing emotion recognition performance or emotion verbalization.

Practically, these studies could prove useful in settings where it is desirable to temporarily increase

emotional competencies. For example, therapists working with clients with limited emotional vocabularies might attempt to increase these vocabularies by focusing their clients on their unique and separate selves, either within a clinical setting or via daily text messages (Study 3). People with alexithymia, who have difficulty identifying and describing emotions, might especially benefit from such approaches. Indeed, people scoring high in alexithymia have a relatively higher other-focus and a lower self-focus (Konrath et al., 2011). This research may also prove useful in other settings where emotional competencies are needed (e.g. law enforcement). Future research should test the practical relevance of this research in applied settings.

Potential explanations

Although beyond this research endeavor, we can speculate on why the current effects were obtained, and suggest directions for future research to test these potential mechanisms.

Differentiation between the self and others: Our main proposed explanation is that a high sense of oneself as separate and autonomous is necessary to develop an understanding that others may have needs, desires, thoughts, and emotions that are different from one's own. Similarly, a high sense of oneself as interconnected and psychologically overlapped can make it difficult to disentangle one's own internal states from those of other people (Mashek et al., 2003). Our results fit well with prior research on the role of self-focus in developing social cognitive skills (Asendorpf et al., 1996; Brownell & Carriger, 1990; Gallup & Platek, 2002; Johnson, 1982; Mitchell et al., 2005).

Some lay theorists may guess that more *other-oriented* people would be better at describing and identifying emotions because of the primacy they place on connecting with others. Similarly, one might guess that more *self-focused* people would exhibit poorer performance on emotional tasks because their primary focus on their unique self makes them less attuned to others' emotional worlds. Indeed, other research finds that people from collectivistic cultures are better at responding to others' desires and perspectives compared to those from individualistic cultures (Wu & Keysar, 2007; Yamagishi, 1988). Yet individualism/collectivism is a complex construct that includes cultural expectations, beliefs, and roles, and involves more than a simple focus on the self and others. Moreover, across three studies we found evidence for the opposite results.

Future research should directly examine whether self-focus and other-focus primes affect psychological differentiation or fusion of the self and others, respectively, and whether this helps to explain why they lead to changes in emotional competencies.

Motivation to achieve one's goals: Another reason why self-focus might help to improve emotion recognition (and other-focus might impair it) is because an increased focus on the self may make people extra attentive to how others' emotional states can help them to achieve their own goals and personal desires. Indeed, extreme forms of self-focus (i.e. narcissism) are associated with increased emotion recognition and emotional understanding (Konrath et al., 2014; Vonk et al., 2015). Future research should directly examine whether induced self-focus and other-focus affect individuals' relative focus on fulfilling their own versus others' goals, and whether this in turn is associated with emotion recognition performance.

Cognitive-perceptual styles: Finally, it is possible that the high self-focus priming also affected participants' cognitive-perceptual style, making them better at isolating specific facial features (e.g. a raised eyebrow, or downturned lips). Prior research has found that self-focus primes can indeed create more context-independent thinking compared to other-focus primes (Kühnen & Oyserman, 2002; Lin & Han, 2009). Thus, until researchers use other emotional stimuli that are more holistic and context-dependent, such as observing social interaction videos, we cannot say for certain whether high self-focus (low other-focus) leads to improved emotion recognition. However, even in more holistic tasks (i.e. videos, or real-time social interactions), participants from more individualistic cultural groups still have better emotion recognition performance compared to those from more collectivistic cultural groups (Ma-Kellams & Blascovich, 2012). Moreover, we found that the primes affected emotional verbalization (Study 2), and not just emotion recognition. So changes in cognitive style cannot fully explain our results.

Still, we recommend that future research directly test whether self-focus and other-focus primes actually lead to more analytic and holistic cognitive-perceptual styles, respectively, when viewing others' facial

expressions of emotion. Researchers could do this, for example, by use eye-tracking devices to determine which features of the photos participants focus on, and whether this is related to their emotion recognition performance.

Limitations and future directions

We see the current studies as important stepping stones to future research. A major strength of this research is our ability to draw causal inferences because participants were randomly assigned to experimental conditions. However, we do not intend to overstate the current findings.

First, we construe emotions in a classically individualistic way, as occurring "within individuals" (e.g. personal pride), whereas we may find different effects if we were to construe emotions in a more other-oriented manner, as occurring "between individuals" (e.g. group pride; Masuda et al., 2008; Mesquita, 2001; Uchida et al., 2009). Thus, although priming participants with other-focus led to impaired emotional recognition in *individual* targets, it might actually increase their skill at reading or inferring emotional states in *groups* of individuals. (See (Woltin et al., 2011), for findings consistent with the latter suggestion, although these authors used self-reported traits and not emotion recognition tasks). Priming other-focus might similarly increase people's verbalization of group-experienced emotions. Related to this, emotions naturally occur within social contexts, and in real life, the effect of self-focus and other-focus might depend upon the relationship between the observer and expresser (Fischer et al., 2019; Zaki et al., 2008). Thus, future research should examine these research questions within real social interactions.

In the current studies, we focus on only two types of emotional competencies (i.e. emotion recognition, emotion verbalization). In addition, like many other scholars, we rely on static images of facial expressions, typically of unknown actors (i.e. strangers), which leads to limited generalizability. Future research should examine to what extent these results apply to other actors and other types of stimuli.

In addition, like most emotion recognition studies, participants read the emotions of *strangers*, rather than known others. More other-focused people may have impaired emotion recognition performance when the targets are unfamiliar compared to when targets are known others. Indeed, one study found that participants with more interdependent self-construals were better than those with more independent self-construals at identifying the emotions of their friends, but were worse with strangers (Ma-Kellams & Blascovich, 2012). This is perhaps because interdependent people value close relationships more than distant relationships, and focus their efforts in line with these priorities. It would be interesting to examine whether the present findings extend to the decoding of emotions in familiar faces. But again, this does not explain why we would find that the primes affected emotion verbalization in Study 2.

Taken together, future research should examine how and why self and other-focus causally impacts other emotional competencies (e.g. emotion regulation), using different stimuli (e.g. live interactions), and considering different contexts (e.g. different relationship types, different salient goals).

One alternative explanation for our results is based on prior work finding that increased self-focus leads to higher attention to relevant standards, and the ways that the self may deviate from these. In general, this increased awareness of discrepancies between the self *as it is* versus *as it ought to be* leads to a corrective process, whereby individuals try to better meet the standard (Duval et al., 2012). So, it is possible in our studies that participants in the high self-focus conditions were more likely to take the task seriously and work harder to respond to the experimental demands. However, if this is the case, then we might expect to find that participants in the high self-focus conditions took longer to complete the emotion recognition tasks. Yet an analysis of the reaction time data in each of the studies found that condition did not significantly affect reaction time in any of the studies, nor did the results change when we controlled for reaction time. This suggests that participants may not have been more careful or reflective in the high self-focus (low other-focus) conditions, although this depends upon whether we accept that higher reaction times indicate more focus. Future research is needed to better understand explanations of our results.

Finally, in all studies, participants were directly told that the studies were examining emotional processes. In doing so, we may have inadvertently reminded participants of their personal standards or mental

models about emotions. Some research has found that high self-focus only leads to increased emotional intensity in the presence of such reminders (Chentsova-Dutton & Tsai, 2010; Silvia, 2002). In the absence of such reminders, at times, self-focus can actually *reduce* experienced emotional intensity. Although this prior research has only focused on how self-focus affects personally experienced emotions, it is possible that similar processes are at play when it comes to identifying emotions in others or verbalizing emotions.

Conclusion

We have isolated a potential causal influence on emotional abilities, with potential practical implications. Inducing people to be in a state of high self-focus may at times improve emotional skills, while inducing high other-focus does not consistently affect such skills. An increased tendency to recognize emotional states and use emotional language is associated with a number of psychological and physical health outcomes (De Gennaro et al., 2004; Honkalampi et al., 2000; Jula et al., 1999; Novin et al., 2013). Future work should help to unravel potential mechanisms and implications of these results.

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Declarations

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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