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Abstract

Research on flow, a positive emotional experience characterized by full absorption, involvement, and enjoyment during an activity, has primarily focused on the individual benefits of this mental state. In the present study, I investigate the mechanisms by which flow may produce changes in social orientation such that the boundaries between the self and other are diminished. In a 2x2 study, UNC undergraduates (N=106) were randomly assigned to a flow or no flow condition; half of the participants were also randomly assigned to have a mirror in the cubicle during the study to manipulate self-consciousness. I hypothesized that flow would alter social orientation such that people reported increased feelings of closeness with others, mediated by decreases on self-consciousness. Contrary to hypotheses, primary analyses demonstrated no significant effects of condition on average measures of social closeness, although participants in the flow and mirror conditions reported the highest feelings of closeness with others on individual items from two measures of interpersonal closeness. Further, participants in the flow and mirror condition also exhibited higher levels of state mindfulness. This work implies that the flow state should be conceptualized and researched in terms of the potential social benefits of decreasing boundaries between individuals.

The Effects of the Flow State on Social Orientation Within and Beyond Group Boundaries

Flow, a positive emotional state characterized by full absorption, involvement, and enjoyment during an activity, has been identified as a frequent experience for people who are "flourishing," or leading fulfilling lives (Csikszentmihalyi, 1997; Keyes, 2007). Flow is optimized when one's perceived degree of challenge during a task is met by an equally high skill level (Csikszentmihalyi, 1990) Experiencing flow during an activity yields not only positive emotions, but also a unique set of changes in perception. The state is characterized by several trademark features, including altered perceptions of time, intense concentration, and loss of self-consciousness (Csikszentmihalyi, 1990). Since its emergence in the field of psychological research, flow has predominantly been investigated as a personal experience with a host of individual benefits. However, the changes in perception that arise during flow may have direct social consequences. The current study focused on alterations in social orientation as a potential benefit of the flow state, highlighting the ways in which flow may decrease perceived barriers between individuals. Additionally, self-consciousness - defined in this context as low preoccupation with the self (Jackson & Marsh, 1996) - was tested as a mediator between flow and changes in social orientation, as this change in perception was hypothesized to play a key role in decreasing boundaries between the self and others.

Solo Activity, Solo Benefits

Flow, as defined by Mihaly Csikszentmihalyi, is "a state of concentration so focused that it amounts to absolute absorption in an activity" (Jackson et al., 2010, p. 130). The flow state arises during activities that are intrinsically motivating and high on the challenge-skill axis; this means that the activity presents a high level of challenge, but the participant has the abilities to match the task at hand (Csikszentmihalyi, 1991). Flow has been studied in the context of a

diverse array of activities, such as playing jazz music or chess, climbing a mountain or swing dancing, writing in a journal, or reading a novel (Csikszentmihalyi, 1991). People that experience flow during activities colloquially describe this experience as being "in the zone," referencing feelings of total immersion and enjoyment (Jackson & Csikszentmihalyi, 1999). A growing body of empirical evidence has contributed to a more complex understanding of flow and its connections to positive emotional states. One study assessed the flow state in individuals at work, demonstrating that flow increases positive affect during work and may consequently have the potential to increase overall quality of life (Csikszentmihalyi & LeFevre, 1989). Research on flow within the realm of sports and games also suggests a link between play and positive emotions; flow has been identified as a central component of intrinsically rewarding activities like chess or basketball, illuminating the intertwined nature of flow and positive emotions that motivate the pursuit of certain enjoyable activities (Csikszentmihalyi, 1975). Flow has also been linked to the experience of distinct positive emotions such as interest; interest in an activity – a fundamental aspect of flow related to the challenge-skill axis – encourages exploration that in turn leads to expansion of the self (Fredrickson, 2001). This expansion of the self demonstrates the potential social relevance of flow, as an individual's sense of self contributes to their experience of interactions with others.

The benefits that individuals experience during flow also may have implications for greater societal outcomes. Flow has been linked to the overall concept of flourishing, a characteristic of individuals who not only lack mental illness, but also possess a host of positive qualities that enables them to function at a high level (Keyes, 2007). A person who enters the flow state at work, for example, is more likely to experience positive emotions and a higher level of enjoyment in their career. This person, labeled as a flourisher, is less likely to experience

chronic physical and mental illness, and is consequently less likely to miss work due to poor health (Catalino & Fredrickson, 2011; Keyes, 2007). Flourishing that is linked to the flow state, in turn, could impact a person's functioning within a community and their overall contributions to society. However, the broader implications of these findings remain open-ended as Keyes's study defined a person's interactions with society by their personal contributions to their job rather than their direct interactions with other people. The present study will delve more deeply into specific aspects of the flow state that may produce changes in social orientation such that individuals are more open to interact with and demonstrate feelings of closeness to others.

Solo Activity, Social Benefits?

Several theoretical models suggest that the individual experience of flow during an activity may have direct social benefits. The broaden-and-build theory of positive emotions predicts that positive emotions broaden one's awareness and encourage novel experiences that, over time, build biological, psychological, and social skills and resources (Fredrickson, 2001) such as social connections (Kok et al., 2013) and social support (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008). For example, in one six-month longitudinal study, people who felt more positive emotions and successfully signaled these feelings to others through genuine expressions of emotion experienced enhanced social connectedness with others (Mauss et al., 2011). In another study, people who underwent a positive emotion induction expanded their circle of trust, suggesting the capacity of positive emotions to weaken the boundaries between the self and other (Dunn & Schweitzer, 2005). Individuals experiencing positive emotions are also more likely to form common in-group identities, demonstrating a willingness to see beyond differences in order to connect with others in more meaningful ways (Dovidio et al., 1998).

Recently, Stell and Farsides (2015) investigated the capacity of a brief positive emotion intervention to decrease implicit bias towards a racial outgroup. After a 7-minute guided loving-kindness meditation, a technique used to foster feelings of caring for the self and others (Salzberg, 1995), participants were asked to direct feelings of love towards gender-matched members of a racial outgroup. The participants in the loving-kindness meditation condition exhibited decreased implicit racial bias, mediated by increases in other-focused positive emotions (Stell & Farsides, 2015). This finding suggests that positive emotions, which are central to the flow state, may broaden perception in a way that decreases the boundaries between self and other, creating more opportunities for meaningful interactions with different others.

Loss of self-consciousness and decreased barriers

While flow fits the broaden-and-build framework as a positive emotional state, it also produces several unique effects on perception that distinguish it from other positive emotional experiences. Notably, individuals in the flow state experience a loss of "self-consciousness," defined as a decreased preoccupation with the self (Jackson & Marsh, 1996); this does not mean that individuals become unaware of what is happening in the mind and body, but "rather [are] not focusing on the information normally used to represent to oneself who one is" (Jackson & Marsh, 1996, p. 19). Loss of self-consciousness may amplify the expected effects of positive emotions on social orientation by decreasing the salience of the construct of the self, thereby promoting increased attention towards others. A multitude of social psychological research describes the structure of interpersonal closeness as greater overlap between one's sense of the self and another (Aron et al., 1991; Clark, 1983; Wegner, 1980); this conception of the construct of closeness suggests that a loss of sense of self may erode the barriers between the self and others. Research also suggests that the effects of self-awareness may extend beyond classic

group boundaries such that orientation towards out-group members is altered; the capacity to identify someone as an out-group member depends entirely on recognition of identity characteristics that form an "us" and a "them" (Dovidio et al., 1998). To the extent that flow entails a loss of self, the qualities that distinguish these identities and separate these groups should be less salient.

Flow During Reading

While positive emotion interventions have been previously demonstrated to decrease implicit bias, the present investigation of flow presents a challenge as few interventions have been developed to induce flow in a laboratory research setting (Moller, Meier, & Wall, 2007). Considering the delicate balance of skill and challenge required to produce flow, the state itself is highly dependent on the individual and not always easy to achieve. Nonetheless, certain activities are more likely to universally induce flow than others. While reading has never been used to induce flow in the laboratory, it is described as the activity that most commonly produces flow experiences for individuals in daily life (Massimini, Csikszentmihalyi, & Delle Fave, 1988). Although this study was the first to explore reading as an experimental induction of flow, the methods integrated research that highlights ways of manipulating a reading task to maximize the likelihood of achieving flow. For example, research on flow during reading demonstrates that flow is most likely to occur when texts are both fictional and selected by the reader (McQuillan & Conde, 1996). Fiction is also highly associated with pleasure during reading, suggesting that fictional texts will also maximize the positive-emotion yield from a reading task (Nell, 1988).

Existing literature also suggests that reading can induce the mental state of narrative transportation that elicits perceptional effects similar to the flow state, such as loss of self-consciousness and altered perceptions of time (Green et al., 2005). Mazzocco and colleagues

explored the impact of narrative transportation on implicit social bias. In one study, a narrative about acceptance of homosexuality persuaded participants to feel increased tolerance towards homosexual individuals on a self-report scale, but only to the extent that the narratives were high in measures of narrative transportation (2010). The present study used the framework of this research to design a brief yet transporting reading intervention to examine the effects of flow on social orientation and group boundaries.

The Present Study

The present study examined whether alterations in self-perception that occur during a transporting flow experience have direct implications for conceptualizations of social boundaries and propensity for social interaction. The study used a 2 (flow, no flow) x 2 (heightened self-awareness, control) design. Participants were randomly assigned to read a brief narrative selected to induce or inhibit flow; half of the participants in each condition were also randomly assigned to have a mirror placed in front of them during the study, which is a well-established manipulation of self-consciousness. Then, participants completed several measures of social orientation in order to determine if these changes in experience altered the way that individuals conceptualized their relationship to others. I hypothesized that participants in the flow/no mirror condition would demonstrate changes in social orientation, mediated by decreases in self-consciousness and increases in positive emotions, such that they reported increased feelings of closeness with others and increased propensity to interact with others compared to the other conditions. I did not expect that the flow/mirror condition would produce comparable increases in feelings of closeness, as the salience of the self introduced by the mirror would counteract the decreases in self-consciousness produced by flow. I expected the lowest ratings of closeness in the no flow/mirror condition due to heightened feelings of self-consciousness without the

addition of positive emotions from flow. Finally, I expected baseline ratings of closeness for the no flow/no mirror condition, as there were no manipulations that would impact social orientation.

Method

Participants

One hundred and six UNC undergraduate students enrolled in an Introductory Psychology course participated in a study advertised as "Reading and Cognition." Of these participants, 65.1% identified as female. The mean age of the sample was 19.08 (*SD* = 2.10) years old. The self-identified ethnic backgrounds of the participants were 94.3% not Hispanic/Latino and 5.7% Hispanic/Latino. The self-identified racial identities of the participants were 17.9% Asian, 5.7% Black, 71.7% White, and 4.7% other. Participants were rewarded with one credit towards their Introductory Psychology class for participation in the one-hour long lab session.

Measures

To induce flow, I chose two short stories – "A Sound of Thunder" by Ray Bradbury and "Rules of the Game" by Amy Tan – from a list of popular short stories included in school curricula. The stories were carefully selected such that they presented a challenging and transporting read for college students. For the no flow condition, participants chose between texts entitled "Before you read" and "After you finish reading," selected from a website containing instructions and advice on how to read different types of passages thoroughly and efficiently. These texts were intended to inhibit the participants' capacity to enter flow, so they were selected because they induce neutral emotions, or at most, a sense of boredom. Using the Linguistic Inquiry and Word Count (LIWC) program, linguistic analyses were implemented to

control for certain criteria and minimize the possibility of differences within conditions. All four passages were matched on word count (A Sound of Thunder = 4,381 words; Rules of the Game = 4,522 words; Before you read = 4,411 words; After you finish reading = 4,831 words), positive emotion words (A Sound of Thunder = 0.94% positive words; Rules of the Game = 2.26% positive words; Before you read = 2.54% positive words; After you finish reading = 1.78% positive emotion words), and social words (A Sound of Thunder = 9.79% social words; Rules of the Game = 9.93% social words; Before you read = 7.71% social words; After you finish reading = 5.29% social words).

Inclusion of Other in the Self Scale (IOS; Aron, Aron, & Smollan, 1992). Feelings of closeness with others were measured using the IOS. This measure instructed participants to think about their relationships with several individuals, including their best friend, roommate, sibling, parent, professor, and a stranger ($\alpha = 0.623$). Participants were asked to consider an array of seven pairs of increasingly overlapping circles (labeled "self" and "other") and choose the pair that best represented their feelings of closeness with that person; see Figure 1.

Overlap of Self, Ingroup, and Outgroup (OSIO; Schubert & Otten, 2002). Similar in structure to the IOS, this measure asked participants to choose a pair of overlapping circles that best represented their feelings of closeness with members of different groups as opposed to selected individuals. Groups targeted in the present study included White people, Black people, Asian people, men, women, transgender people, straight people, gay people, Christian people, Jewish people, Muslim people, UNC students, and Duke students ($\alpha = 0.779$); see Figure 2.

Waiting Room Task (Holland et al., 2004). The Waiting Room Task is a behavioral measure of willingness to connect and interact with others. Five chairs were set up in the hallway, and

the researchers placed a notebook and water bottle on the first chair to make it appear as if another person was sitting there and would return to their seat. The researcher told the participant that they needed to wait in the hallway while they set up the computer for the following section of the study. When they arrived in the hallway, the researcher then delivered a brief scripted comment, saying, "It looks like another participant is here already, but you can go ahead and have a seat and I'll return in a minute to bring you back to the lab." The researcher then recorded which chair the participant chose to sit in, indicating how close they were willing to sit to another person who could presumably return while they were there.

Modified Differential Emotions Scale (mDES; Fredrickson et al., 2003). Specific emotions were measured using a 21-item scale (α = 0.822). All items were anchored on a 5-point Likert-type scale of 0 (*Not at all*) to 4 (*Extremely*). Participants were asked to rate the extent to which they felt the given emotions while reading the passage they chose. Sample items include "*How **amused, fun-loving**, or **silly** did you feel while reading?"* and "*How **angry, irritated**, or **annoyed** did you feel while reading?*"

Flow Scale (Jackson & Marsh, 1996). Flow was measured using 13 items from a 36-item scale (α = 0.655); items that were not relevant to the selected reading task were eliminated (e.g., *"I was not worried about my performance during the event"*). All items were anchored on a 5-point Likert-type scale of 1 (*Strongly disagree*) to 5 (*Strongly agree*). Sample items include "*I was challenged, but I believed my skills would allow me to meet the challenge*" and "*I was completely focused on the task at hand.*"

Situational Self-Awareness Scale (Govern & Marsch, 2001). Self-consciousness was measured using a 9-item scale (α = 0.792). All items were anchored on a 7-point Likert-type

scale of 1 (*Strongly disagree*) to 7 (*Strongly agree*). Sample items include "*While reading, I was keenly aware of everything in my environment"* and "*While reading, I was self-conscious about the way I looked*." An average of all items was analyzed, as well as averages of the three subscales of this measure: public, private, and surroundings. They were each evaluated by condition to account for the possibility of the mirror producing a certain type of self-consciousness.

State Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003). Mindfulness was added as an exploratory measure, as flow and mindfulness have been demonstrated to exhibit an inverse relationship in previous research (Sheldon, Prentice, & Halusic, 2014). Mindfulness was measured using a 5-item scale ($\alpha = 0.504$). All items were anchored on a 7-point Likert-type scale of 0 (*Not at all*) to 6 (*Very much*). Sample items include "*While reading, I found it difficult to stay focused on what was happening"* and *"I read the passage automatically, without being aware of what I was doing*."

Procedure

In this 2x2 study, participants were randomly assigned to either the flow or no flow condition, which determined the type of story they would read during the manipulation. Half of the participants were also randomly assigned to complete the study with a mirror positioned next to the computer screen in the right-hand corner of the cubicle with the intention of manipulating the construct of self-consciousness (Beaman et al., 1979); the mirror was positioned such that participants would see themselves out of the corner of their eye. When the mirror was in the cubicle, the researcher acknowledged it by telling the participant not to mind it and that it was there for another study.

Upon arrival in the lab, each participant sat down in front of a computer and followed the instructions shown on the screen for the first portion of the session. For all conditions, participants were shown short descriptions of the texts described above: “A Sound of Thunder” and “Rules of the Game” for the flow condition, and “Before you read” and “After you finish reading” for the no flow condition.

After the participant finished reading their chosen passage, they completed the IOS and the OSIO as measures of social closeness. The participant was then instructed to alert the researcher that they were finished, at which point the researcher told them that the computer had to be set up for the next portion of the study. At this point, the participant was led into the waiting area in the hallway where the researcher had set up the Waiting Room Task as a behavioral measure of willingness to connect with others.

After approximately one minute, the researcher returned to the hallway to bring the participant back to the lab, and the remainder of the study continued on the computer. The participant filled out several measures, including the mDES, the Situational Self-Awareness Scale, the Flow Scale, the MAAS, and several demographics questions. The participant was then debriefed and given a chance to ask the researcher any remaining questions before leaving the session.

Results

Descriptive Statistics

See Table 1 for descriptive statistics and Table 2 for correlations among key variables.

Manipulation Check

To determine the effects of the reading intervention on participants’ flow experience, scores from the Flow State Scale (Jackson & Marsh, 1996) were submitted to a 2 (flow/no flow)

x 2 (mirror/no mirror) ANOVA. A significant main effect was found for flow condition, $F(1, 101) = 13.699$, $p = .000$; there was no significant main effect of mirror or interaction. To determine the effects of the mirror manipulation on participants' feelings of self-consciousness, scores from the Situational Self-Awareness Scale (Govern & Marsch, 2001) were submitted to a 2x2 ANOVA. A main effect for flow condition was not significant, but the means were in the expected direction, $F(1, 101) = 2.684$, $p = .104$. A main effect for mirror condition also was not significant, but the means were in the expected direction, $F(1, 101) = 2.684$, $p = .104$; there was no significant interaction effect. To determine if the mirror affected specific aspects of self-consciousness, scores from the subscales of the Situational Self-Awareness Scale were submitted to 2x2 ANOVAs. For the "private" and "surroundings" subscales, no main effects or interactions were significant. For the public subscale, there was a significant effect for mirror condition, $F(1, 102) = 9.792$, $p = .002$, such that participants in the mirror condition reported increases in public self-awareness.

Primary Analyses

Data from the Inclusion of Other in the Self Scale (IOS; Aron, Aron, & Smollan, 1992) were used to determine the effects of condition on social orientation. The data were compiled into an aggregated measure by averaging the participants' ratings for all six IOS items. No main effects or interactions were significant when the aggregated measure was used as the outcome variable in a 2x2 ANOVA. There were, however, significant findings for two scale items. A significant main effect was found for mirror condition for the IOS item asking participants to rate their closeness with their best friend, $F(1, 98) = 5.734$, $p = .019$, such that participants in the mirror condition reported higher closeness than the no mirror condition (see Figure 3). An interaction at the level of a trend was found for flow and mirror conditions for the IOS item

asking participants to rate their closeness with a stranger, $F(1, 102) = 3.090$, $p = .082$, such that participants in the flow/mirror and no flow/no mirror conditions reported higher closeness than the flow/no mirror and no flow/mirror conditions (see Figure 4). No other individual IOS items produced significant results.

Data from the Overlap of Self, Ingroup, and Outgroup scale (OSIO; Schubert & Otten, 2002) were submitted to a 2x2 ANOVA to analyze the effects of condition on feelings of closeness with members of various groups. No main effects or interactions were significant when the aggregated measure was used as the outcome variable. There were, however, significant findings for the individual OSIO measure related to feelings of closeness with members of different gender groups. A significant interaction effect was found for participants' ratings of closeness with people of a gender outgroup, $F(1, 101) = 7.110$, $p = .009$, such that participants in the flow/mirror and no flow/no mirror conditions reported higher closeness than the flow/no mirror and no flow/mirror conditions (see Figure 5). No other individual OSIO items produced significant results.

Data from the Waiting Room Task (Holland et al., 2004) were submitted to a 2x2 ANOVA to analyze the effects on social orientation; no main effects or interactions were significant.

Secondary Analyses

To explore the connections between the flow state and other attention-related orientations, the Mindful Attention Awareness Scale, state version (MAAS; Brown & Ryan, 2003), was included in the study. A 2x2 ANOVA demonstrated a marginal main effect of flow, $F(1, 101) = 3.823$, $p = .053$, such that participants in the flow conditions reported higher levels of mindfulness than the no flow conditions. There was also a significant interaction effect, $F(1,$

101) = 5.459, p = .021, such that participants in the flow/mirror condition reported higher levels of mindfulness than the other conditions.

Using data from the Modified Differential Emotions Scale (mDES; Fredrickson et al., 2003), the effects of flow on participants' reported emotional state were submitted to a 2x2 ANOVA. In keeping with the existing literature, there was a significant main effect of flow, F(1, 101) = 18.354, p = .000, such that participants in the flow condition experienced greater positive emotions than the control.

Discussion

The aim of this study was to evaluate the capacity of the flow state to effect changes in social orientation such that individuals would be more willing to interact and connect with others. I anticipated that the flow state would produce increases in ratings of closeness, specifically due to the positive emotions and loss of self-consciousness produced during flow. I also hypothesized that the addition of a mirror would induce feelings of self-awareness that would interfere with the loss of self-consciousness achieved during flow, thereby interrupting the flow state. The hypotheses of this study were not fully supported by the results; the average scores on measures of feelings of closeness demonstrated no significant effects of flow or the presence of the mirror. Furthermore, the significant effects that emerged on individual items were contrary to the hypotheses, such that ratings of closeness were highest in the flow/mirror and no flow/no mirror conditions.

With regards to the flow manipulation, the results of this study indicate that this novel intervention was effective in inducing flow in participants; the success of this intervention is meaningful in that it contributes to the sparse literature on laboratory flow inductions (Moller, Meier, & Wall, 2007). This study is the first to use reading to induce flow, and the results of both

the flow manipulation check, as well as the significant effect of reading on positive emotions, suggest that this activity should be considered for use as a flow induction in future research.

While the flow manipulation was successful, the mirror manipulation did not significantly influence the average score on the manipulation check of overall self-awareness, although it did elicit the specific aspect of public self-consciousness. Seeing as the mirror produced a main effect for several measures, its influence in this study may not have been effectively captured by the selected manipulation check as a whole. Interestingly, the significant effect of the mirror on the public self-consciousness subscale of self-awareness suggests that the mirror manipulation may have been successful in shifting a small aspect of self-awareness. The items on this subscale primarily relate to awareness about appearance and thoughts about others' perceptions of oneself; this suggests that perhaps the mirror manipulation evoked the classic notion of self-consciousness as a general concern about how one is seen in the eyes of others. This has the potential to explain why the mirror manipulation produced higher ratings of closeness on some items, as the mirror may have been a cue for the presence of others; however, since this effect was not apparent in the average scores, future research should be done to explore whether these findings may have been the result of chance.

With regards to effects on social orientation, the hypotheses of this study were partially supported by the data. Although the aggregate scores for the dependent measures did not demonstrate significant results, particular items from these scales did exhibit intriguing effects. Participants in the mirror condition reported the highest ratings of closeness with their best friend, while there was no significant main effect of flow. Contrary to hypotheses, it seems as though the mirror did not interrupt the flow state, but rather may have amplified feelings of closeness with certain already-close others. One possibility is that the mirror made the concept of

the self more salient, as well as the concepts of sociality and people in general, leading to increased ratings of closeness with others because participants conceptualized those others as a part of the self. In other words, the mirror did not interrupt the flow state, but rather broadened the scope of self-awareness such that others were incorporated into the concept of the self. Since this finding was unexpected and only apparent for one IOS item, though, future research should explore the relationship between self-consciousness and connectedness with already-close others to determine whether or not this finding was reliable and meaningful.

Furthermore, participants in the flow and mirror condition reported high ratings of closeness with a stranger and members of a gender outgroup. As hypothesized, the connection between flow and increases in ratings of closeness may be attributed to the boost of positive emotions that participants received during the flow state, creating an effect of broadened perception and incorporation of others into the concept of the self. However, as identified above, the effects of the mirror ran contrary to the hypotheses, such that the mirror produced increases in feelings of closeness. Interestingly, participants in the flow and no mirror condition reported significantly lower ratings of closeness, suggesting that there is a joint effect of flow and mirror. One possible explanation for the unexpected effects is that reading, while successful in inducing flow based on the manipulation check, is a unique kind of flow activity that may not necessarily simulate all aspects of other flow experiences such as the challenge at hand during sports or games. Consequently, reading may not be as effective in producing the loss of self-consciousness that I hypothesized to be central to this study. However, it seems possible that the other aspects of the flow state such as intense focus and positive emotions were still at work in influencing social connection. These effects, in tandem with the added construct of sociality made salient by

the mirror, may have produced a different cognitive state altogether. This may explain why the effects found in this study are not all in the expected directions.

The possibility that this study is tapping into a different mental state is supported by the finding that participants in the flow and mirror condition reported significantly higher levels of state mindfulness. One explanation for this finding lies in the present-moment focus that is central both to the flow state and the mindful state, and is particularly relevant to the chosen reading manipulation. Self-awareness is also a central aspect of mindfulness, and it was intended to be amplified in the mirror condition. It seems likely that participants adopted the present-moment orientation of the flow state, and potentially also benefited from the self-awareness component of the mirror manipulation, thereby producing heightened state mindfulness.

It is also important to explore why the ratings of closeness were similarly high for the flow/mirror and no flow/no mirror conditions on the IOS and OSIO items that produced significant results. One possibility is that, as originally hypothesized, the flow state and the mirror actually did produce opposite effects such that they canceled each other out, yielding ratings of closeness that were no higher than baseline levels expected in the no flow/no mirror control. However, due to the increases in positive emotions and public self-consciousness explored above, there may be additional ways of explaining this finding. One suggestion is that the no flow manipulation was not entirely neutral in that it may have induced boredom in some participants. When boredom is induced, it seems likely that participants might be more oriented towards others because they are more motivated and willing to engage in meaningful interactions to alleviate that sense of boredom (Barbalet, 1999). To have a clearer idea of the effects of flow on social orientation, it would be helpful to have a control condition that is entirely neutral rather than one that may have produced a confounding emotional state.

As addressed earlier, this study has several limitations primarily to do with the chosen manipulations. The flow state consists of a balance of challenges and skills that may be difficult to achieve in the laboratory setting. While the reading intervention was successful in inducing a state of flow that conformed to the chosen manipulation check, it is certainly not representative of the wide range of more immersive and intrinsically motivated flow activities experienced in the field. Future research should continue to explore creative flow inductions that more closely mirror the effects of flow as it occurs naturally during enjoyable activities. Furthermore, the mirror manipulation check may not have tapped into what I originally conceptualized as the construct of self-consciousness. In future studies, it would be helpful to reconsider how this classic manipulation alters consciousness in a way that seems to promote increased other-focus. Furthermore, this study had a limited sample size and may have consequently been underpowered; a larger sample may have served to clarify some of the unexpected findings or perhaps may have allowed the hypothesized findings to emerge. Consideration of these limitations would benefit future research, enabling a better understanding of the validity of these findings.

Although the hypotheses were not supported, this study provides groundwork for continued explorations of the flow state as a broadening experience that may expand the self and orient individuals towards others, but only when the concept of the self is made particularly salient. This research suggests that flow might be understood not only as a positive emotional state, but potentially also as a method of increasing feelings of interpersonal closeness under the right circumstances. Previous associations between the flow state and the overarching concept of flourishing would be strengthened by future research exploring the capacity of flow to produce not only individual benefits, but social outcomes as well.

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Table 1

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
IOS Average	106	1.00	6.00	3.6758	.85068
IOS Best Friend	102	1.00	7.00	5.2451	1.55707
IOS Stranger	106	1.00	3.00	1.2547	.49879
OSIO Average	106	1.54	6.92	3.9728	.88482
OSIO Gender Outgroup	106	1.00	7.00	3.6132	1.62317
Positive Emotions	105	1.00	3.50	1.8914	.57914
Flow State Scale	105	1.77	4.15	3.1786	.44416
SSAS	105	1.11	5.89	3.6807	1.00968
State MAAS	105	1.00	9.00	4.9067	1.71421
Waiting Room	104	1.00	4.00	1.8654	.69754

Table 2

Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) Flow	1.00					
(2) Mirror	.000	1.00				
(3) IOS	-.033	.088	1.00			
(4) OSIO	-.001	.022	.241*	1.00		
(5) Self-awareness	-.159	.161	-.019	.068	1.00	
(6) Positive emotions	.392**	.045	-.090	.048	-.031	1.00

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Figure 1

Inclusion of Other in the Self Scale:

Participants were asked to rate their closeness with their best friend, roommate, sibling, parent, favorite professor, and a stranger.

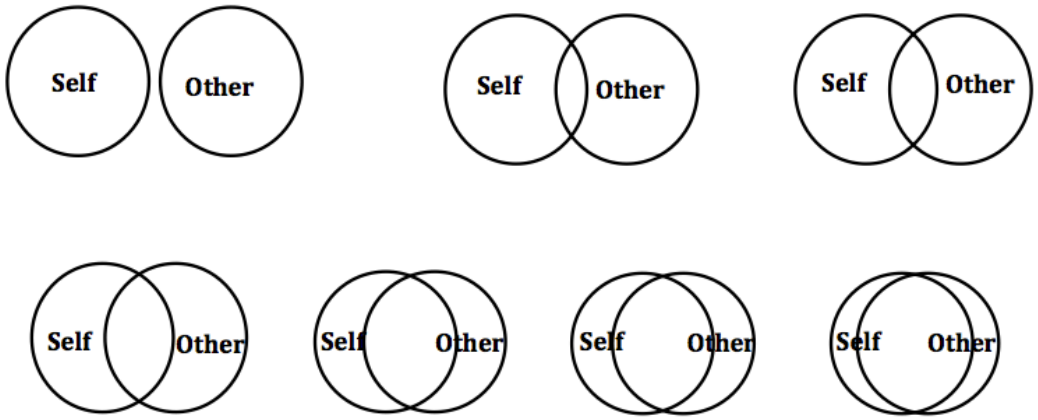

Figure 2

Overlap of Self, Ingroup, and Outgroup Scale:

Participants were asked to rate their closeness with White people, Black people, Asian people, men, women, transgender people, straight people, gay people, Christian people, Jewish people, Muslim people, UNC students, and Duke students.

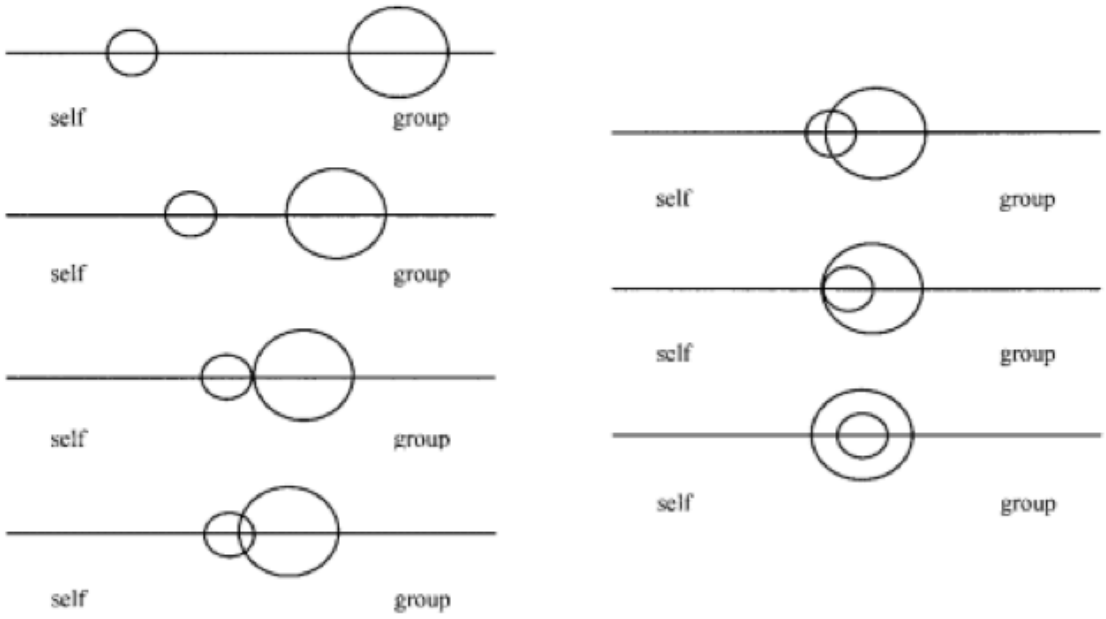

Figure 3
IOS: Best Friend

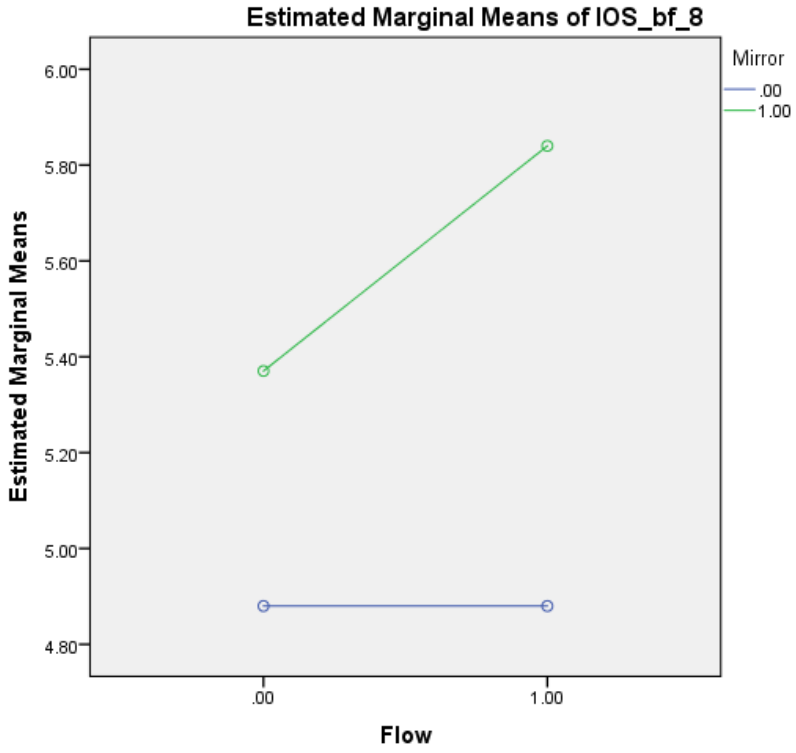

Figure 4
IOS: Stranger

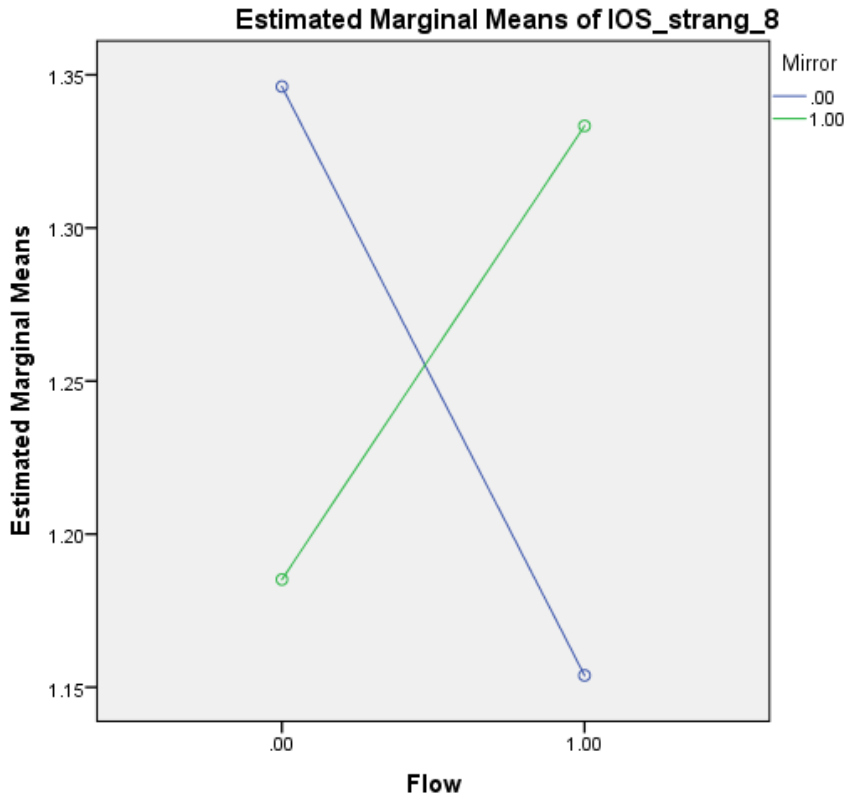

Figure 5
OSIO: Gender Outgroup