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Trait self-construal, inclusion of others in the self and self-control predict stay-at-home adherence during COVID-19

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ABSTRACT

To combat the global COVID-19 crisis, governments and health organizations rely on collective cooperation among every ordinary individual to adhere to non-pharmaceutical interventions (NPIs), such as physical distancing which includes, as examined in our study, staying at home. Thus, we ask the question: do individual differences in how individuals see themselves as connected to or separated from others (i.e., independent vs. interdependent self-construal) predict their stay-at-home adherence? In an online study ($N = 358$; 47.1% female, $M_{\text{age}} = 40.48$; 74.02% White), we measured trait self-construal, inclusion of others in the self (IOS), self-control and likelihood to stay-at-home in various scenarios. Results revealed a significant indirect, sequential effect of self-construal on stay-at-home adherence via IOS and self-control. Specifically, participants with a more accessible interdependent (vs. independent) self-construal reported higher stay-at-home adherence intentions as a consequence of greater IOS and self-control. Theoretical and practical implications are discussed.

1. Introduction

As of January 1, 2021, the COVID-19 global health emergency has resulted in more than 90 million confirmed cases, killing almost 2 million and affecting more than two hundred countries and territories (John Hopkins University, 2020). In addition, the pandemic is contributing to a major global economic downturn, initiating the largest global recession in history with a third of the world's population in lockdown (Kaplan et al., 2020), leading governments worldwide to allocate more than US\$13 trillion to stabilize the economy at the time of writing (Craven et al., 2020).

To curb the spread of COVID-19, governments and public health organizations have grappled with how best to engage citizens in non-pharmaceutical interventions (NPIs) such as physical distancing, which includes restricting gatherings and reducing outings (CDC, 2020). Or, as it's been commonly referred to in the public discourse, "stay-at-home" (Gao et al., 2020). While government authorities persistently promote the importance of NPIs, gaining citizen adherence to these recommendations poses a unique collective challenge, such that large-scale collaboration is required to achieve the goal of flattening the curve, and any individual's transgression may prolong the process. Therefore, it is important to understand how individual differences

impact people's propensity to respond to these government interventions. In particular, we argue that individual differences in self-construal—the extent to which individuals view the self as connected to or separate from others (Markus & Kitayama, 1991)—might affect their likelihood to cooperate (i.e., engage in NPIs) in the context of COVID-19. In the present study, we empirically examine the role of individual self-construal on stay-at-home adherence. We review the relevant literature and present evidence supporting our postulation in the next sections.

1.1. Self-construal

People vary in the extent to which the self is defined relative to social others (Markus & Kitayama, 1991). People with an independent self-view define the self as separate from others, valuing independence, autonomy, and uniqueness. In contrast, people with an interdependent self-view see the self as fundamentally connected to their social groups, emphasizing relationships and group memberships (Gardner et al., 1999; Markus & Kitayama, 1991). While the conceptualization of these two self-construals was initially rooted in cultural differences (cf. Greenwald & Pratkanis, 1984; Markus & Kitayama, 1991; Triandis, 1989), later studies have demonstrated that these two self-views co-exist within an individual, regardless of culture (Gardner et al., 1999; Hong

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et al., 2000; Singelis, 1994). Importantly, individuals vary in the extent to which an interdependent or independent self-construal is primarily accessible: individuals whose independent aspect of the self is more salient are more likely to exhibit an independent self-construal, while individuals whose interdependent aspect of the self is more salient are more likely to exhibit an interdependent self-construal (Gardner et al., 1999; Hong et al., 2000; Singelis, 1994).

Prior research suggests that people with an accessible interdependent self-construal tend to be more cooperative in a variety of social contexts. For example, Balcetus et al. (2008) found that Americans with a more accessible interdependent self-construal donated more to a food bank than those with a more accessible independent self-construal. The commonly adopted explanation for the positive effect of interdependent self-construal on social cooperation is that interdependent individuals attend to their social environment and embed the self into the social context. However, for individuals with a more accessible independent self-construal, decision making should be a personal matter that is disconnected from others and their social contexts (Kühnen et al., 2001; Markus & Kitayama, 1991). Therefore, individuals with a more accessible interdependent self-construal are more likely to construe a social situation as a collective matter, while individuals with a more accessible independent self-construal are more likely to process a social situation as an individual matter.

Interdependence has both affective (i.e., sense of emotional closeness with others) and cognitive (i.e., the perceptual map of self and others) components (Agnew et al., 2004; Ashmore et al., 2004). In particular, this sense of emotional involvement closely mirrors Agnew and colleagues' conceptualization of inclusion of others in self (IOS) as a form of psychological closeness (Agnew et al., 2004). Building on this prior research, it seems reasonable to expect that people with a more accessible interdependent (vs. independent) self-construal are more likely to feel closer to others and attend to mutual dependence in a social context (Aron et al., 1992). Thus, this idea of how much individuals feel themselves and their interests to be *overlapping* with others – that is, their IOS – should be predicted by accessibility of interdependent self-construal. As such, we propose that IOS is an important affective facet of self-construal, wherein more accessible interdependent self-construal should result in higher IOS.

Going one step further, we propose that the fact that interdependent (vs. independent) individuals who feel themselves to be closer with others should have important implications for their self-control resources and, in turn, adherence to NPIs. A few streams of research support this connection between IOS and trait self-control. First, according to the strength model of self-control (Muraven et al., 1999; Muraven & Baumeister, 2000), self-control is analogous to a muscle such that its capacity (i.e., the amount of self-control resources) can be augmented through practice (e.g., Muraven et al., 1999). Self-control training has been shown to improve self-control performance in a variety of domains, such as curbing impulse buying (Sultan et al., 2012), and improving academic performance and financial planning (Oaten & Cheng, 2006a; Oaten & Cheng, 2006b; Oaten & Cheng, 2007). Given that people with higher IOS are more concerned about social norms (Cross et al., 2011) and feel more responsible for others' welfare (van Dellen & Baker, 2011), they should develop stronger self-control over time as they are likely to practice self-control and inhibit their own impulses around others more often than people with lower IOS. Second, people with higher IOS are likely to see others as instrumental to their goal achievement (Fitzsimons & Bargh, 2003; Walton et al., 2012), which results in a greater tendency to include others' self-control resources into the self to use as one's own resources (Aron et al., 2004). This is consistent with the "cushion hypothesis," (Weber & Hsee, 1998) that suggests that people who are closer to others feel themselves as having more resources to lean on in the case of financial loss (Mandel, 2003). As such, the greater the IOS, the more resources individuals perceive themselves to have. Together, these prior studies suggest that greater IOS might be linked to chronically higher self-control.

In the context of COVID-19, we expect this higher level of self-control to be correlated with greater intentions to adhere to NPIs. This could be because voluntary NPI adherence, as opposed to mandated NPI laws, requires individuals to frequently exert effort to modify behavior and suppress impulses without the help of an external force. For example, physical distancing requires individuals to reduce their number of outings and, in many cases, change their normal routine (e.g., avoiding visiting restaurants, gyms, or beaches). As such, individuals need to engage in self-control behavior to resist the temptations of carrying out their habitual, pre-pandemic, behaviors (de Ridder et al., 2012).

Taken together, we predict that a two-mediator sequential mediation process such that higher accessible interdependent (independent) self-construal is associated with higher (lower) inclusion of others in the self, followed by higher (lower) self-control, which in turn increases (decreases) adherence to physical distancing NPIs. Our conceptual model is summarized in Fig. 1.

2. Methods

The full list of measurements and participants' responses are available at the following link: <https://osf.io/vjc7q/>.

2.1. Participants

The data was collected on March 24, 2020 during the early phase of the COVID-19 pandemic with an approximately 59,000 reported cases in the United States and NPI adherence was largely voluntary. We excluded participants from states where strict curfew was imposed at the time of data collection, including New York State, California, Oregon, and Washington State to test the effect of voluntary adherence.

Three-hundred-and-ninety-one participants recruited from Amazon's Mechanical Turk (MTurk) in exchange for compensation of \$0.5 USD completed our study. Twenty-two participants failed our attention check and were excluded¹ and another eleven participants did not complete our self-control measure. Therefore, the final sample consisted of 358 participants (47.1% female, one participant did not reveal his/her gender; $M_{age} = 40.48$, $SD = 12.69$, one participant did not reveal his/her age). A post-hoc power analysis based on the observed outcomes of this study shows that a sample size of 358 participants has a power of 0.97 to detect a two-tailed small-to-medium effect size ($r = 0.20$). Participants reported being 74.02% White, 10.89% Black, 4.75% Asian, 4.75% Hispanic/Latinx, 4.19% mixed race, and 0.56% other. Three participants did not report their ethnicity.

2.2. Procedure

Participants completed a set of questionnaires online. We only discuss the measures that are relevant to our research questions here. Following informed consent, participants first read information about COVID-19 (see Appendix A) and a series of four scenarios in which they

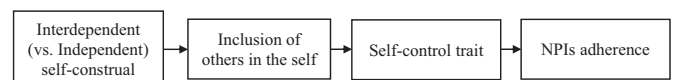


Fig. 1. Conceptual framework.

¹ Following prior practice (e.g., Huang et al., 2012; Meade & Craig, 2012; Ward & Pond III, 2015), participants were asked to select an instructed-response item ("Choose 'sometimes' for this line.") which was embedded in a scale with an obvious correct answer. Failing to do so indicates lack of attention. Hence, participants who failed this attention check were excluded from data analysis, though adding these participants to our data analysis does not change our effects.

imagined making a trade-off between engaging in a trade-off between outings versus stay-at-home. Then, participants completed a set of personality measures, including self-construal, IOS, and self-control. Finally, participants answered demographic questions, including their age, gender, and ethnicity, and were debriefed.

2.3. Measures

2.3.1. Stay-at-home scenarios

Participants read four scenarios: 1) going to a friend's party, 2) attending a business conference, 3) going on a family vacation, and 4) stick to one's normal routine (order randomized) and were asked to make a trade-off, on a binary scale, between social contact versus stay-at-home (see Appendix A for details).

2.3.2. Self-construal

To measure self-construal, participants completed the 24-item self-construal scale (Singelis, 1994). This scale has been shown to have good validity and reliability in the literature (e.g., Escalas & Bettman, 2005; Wang & Wang, 2016). Twelve items (e.g., I enjoy being unique and different from others in many ways) measured independent self-construal ($\alpha = 0.822$). The other 12 items measured interdependent self-construal (e.g., I usually sacrifice my self-interest for the benefit of my group; $\alpha = 0.823$). Participants answered all items on a 7-point scale (1 = strongly disagree, 7 = strongly agree). Both construals were indexed using the sum of their corresponding items. Following prior practice (e.g., Hannover, 2002; Hannover et al., 2006), we created an interdependence-independence difference index (IIDI) to assess the accessibility of self-construal by z-standardizing each of the two subscales and then subtracting each participant's independence score from his or her interdependence score. Thus, higher scores indicating a more accessible interdependent self-construal.

2.3.3. IOS

To measure IOS, we used the pictorial measure from Aron et al. (1992), which has been shown to have good validity (Zickfeld & Schubert, 2016). Participants were asked to indicate how close they feel to other people by selecting the diagram that best describes their relationship with others (Appendix A, Fig. 1).

2.3.4. Self-control

Individual difference in self-control was measured using the 13-item brief self-control scale (e.g., I am good at resisting temptation) on a 5-point scale (1 = "strongly disagree", 5 = "strongly agree"; Tangney et al., 2004). This scale has been commonly used by prior research and shown to have good validity and reliability (e.g., Ent et al., 2015). Participants' answers were averaged to create a self-control index ($\alpha = 0.884$).

2.4. Statistical analysis

No univariate nor multivariate outlier was detected using the standard deviation method (i.e., 3 SD from the mean, Bain & Engelhardt, 1992) and the Mahalanobis distance measure (Leys et al., 2018), respectively. To test the proposed sequential mediation framework, we used Model 6 in Hayes' PROCESS macro v3.4 (Hayes, 2018; number of bootstrap replications: 5000). The sequential mediation model controls for potential collinearity issues (Hayes, 2017). Additionally, bootstrapping does not require a normality assumption (Hayes, 2017), has been shown to perform better than normal regression methods (Taylor et al., 2008). Since our dependent variables are binary, we ran four separate process analyses with the level of standardized IIDI as the independent variable (X), participant's choice to stay at home or not as the dependent variable (Y), participants' IOS as the first mediator (M1), and self-control score as the second mediator (M2). All analyses were ran in SPSS version 25.

3. Results

Descriptive statistics and bivariate correlations between all measures are presented in Table 1. The results of the mediation analyses are displayed in Fig. 2. Consistent with our prediction, we found that IIDI was positively associated with IOS ($\beta = 0.14, p = .005$), wherein participants with a more accessible interdependent self-construal were associated with higher IOS than participants with a more accessible independent self-construal. Additionally, IOS was positively associated with trait self-control ($\beta = 0.14, p = .011$). Finally, trait self-control significantly predicted participants' stay-at-home adherence for the skip-party and skip-conference scenarios ($\beta_{\text{skip-party}} = 0.77, p < .001$; $\beta_{\text{skip-conference}} = 0.50, p = .015$). However, the impact of trait self-control on stay-at-home adherence for the skip-vacation and skip-routine scenarios were not significant ($\beta_{\text{skip-vacation}} = 0.45, p = .053$; $\beta_{\text{skip-routine}} = 0.21, p = .106$) (Table 2).

The same pattern of results was identified for the sequential mediation analyses. Specifically, the indirect effect of self-construal on stay-at-home adherence through the sequence of IOS and self-control was found to be significant in the skip-party and skip-conference scenarios ($\beta_{\text{skip-party}} = 0.0152, 95\%CI [0.0015, 0.0414]$; $\beta_{\text{skip-conference}} = 0.0099, 95\%CI [0.0005, 0.0295]$), but not significant in the skip-vacation ($\beta_{\text{skip-vacation}} = 0.0090, 95\%CI [-0.0002, 0.0278]$) and skip routine ($\beta_{\text{skip-routine}} = 0.0042, 95\%CI [-0.0011, 0.0143]$) scenarios. In the following section, we discuss the implications of these results.

4. Discussion

Mitigating the spread of COVID-19 represents a social dilemma in which any individual's uninhibited behavior towards a temptation (e.g., social gathering, nonessential traveling) may prolong the time needed to slow down the spread of the virus. In this study, we explore the role of accessible interdependent (vs. independent) self-construal in NPI adherence – specifically, whether individuals will stay-at-home. Results of our mediation analyses provide evidence suggesting a sequential path from chronically accessible interdependent self-construal to stay-at-home intentions via IOS and then trait self-control. That is, compared to people with a more accessible independent self-construal, people with a more accessible interdependent self-construal tend to perceive themselves as closer to others and in turn have more self-control resources, which lead them to adhere more to stay-at-home NPIs. Thus, findings from this research extend our understanding about who is more likely to adhere to NPIs voluntarily—those who define themselves by their social identities, those who feel themselves to be close with others, and those with high self-control. A practical implication of our findings is that interventions aimed at activating interdependent self-construal, building a sense of social interconnectedness and boosting self-control are likely to be effective in curbing the spread of the COVID-19.

Given that self-construal is the individual's perception about how connected or separate they are from others, the proposed sequential pathway is especially relevant when a social situation requires the exertion of self-control. For example, when the situation itself is tempting or offers a benefit. Specifically, we identify the strongest effect in the two scenarios where the benefit of participating is high (going to a friend's party brings joy and traveling to a conference for work could enhance one's career prospects).

Interestingly, it is worth noting that we did not find the predicted indirect effect of accessible interdependent self-construal in the skip family vacation scenario or skip one's routine scenario. Despite a clear benefit for going on a vacation, one possible explanation for the non-significance in the skip-vacation scenario is that we did not specify whether or not people would get their money back if they decided to forgo their vacation, and hence, participants may make different assumptions about the refund policy in this scenario. As for the skip-routine scenario, one possible explanation is that the risk of contracting COVID-19 close to one's home on March 24th was perceived to be

Table 1
Descriptive statistics and inter-correlations (n = 358).

	1	2	3	4	5	6	7
1. IIDI	–						
2. IOS	0.147**	–					
3. Self-control	–0.124*	0.114*	–				
4. Skip the party	–0.065	0.002	0.219**	–			
5. Skip the conference	–0.048	0.134*	0.153**	0.313**	–		
6. Skip the vacation	–0.063	0.031	0.113*	0.327**	0.335**	–	
7. Skip routine	–0.041	0.009	0.091	0.129*	0.201**	0.177**	–
Mean	–0.03	3.61	3.49	0.89	0.91	0.94	0.78
SD	1.38	1.70	0.76	0.31	0.28	0.24	0.41
Min	–4.45	1.00	1.46	–	–	–	–
Max	4.04	7.00	5.00	–	–	–	–
Skewness	–0.55	0.32	0.01	–	–	–	–
Kurtosis	0.89	–0.84	–0.59	–	–	–	–

Note. IIDI = Interdependence-Independence difference index, IOS = Inclusion of others in the self.

** p < .01.

* p < .05.

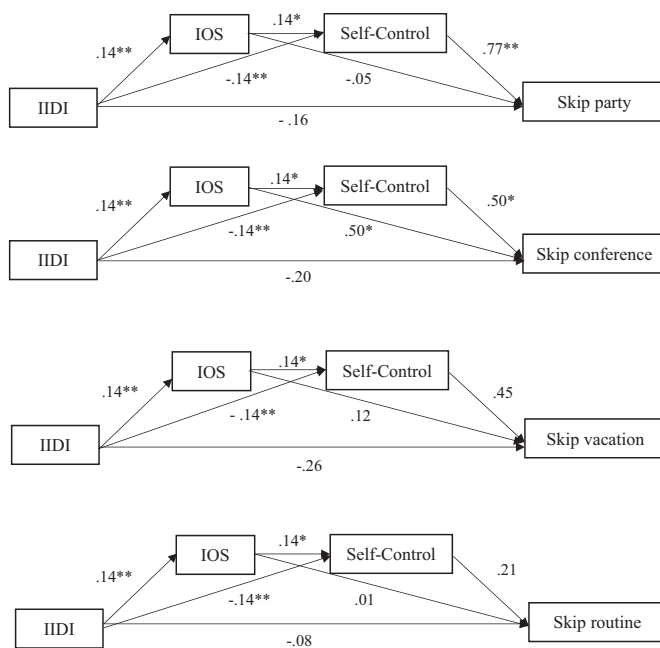


Fig. 2. Mediation analysis with two sequential mediators.

low, and as such few people may have thought to exercise self-control on this particular behavior. Similarly, given many states did not begin to roll out lockdowns and other more rigorous physical distancing policies until later in the pandemic (CDC, 2020), it may simply not have occurred to many individuals to change their daily routines. Another possible explanation is that participants perceived the routine scenario as involving essential activities, like grocery shopping, and chose to stick to it. Future research should investigate these possible explanations as well as how people perceive different forms and scenarios of NPIs.

This study is limited in several important ways. First, as our sample only included people living in the U.S., we are limited in our ability to generalize our findings to other countries and cultural contexts; while research in countries around the world has demonstrated consistency in the influence of self-construal on behavior (Cross et al., 2011), future research should replicate these effects in other countries. Additionally, our sample was drawn from Amazon’s MTurk which has been the subject of recent analysis (Aguinis et al., 2020; Smith et al., 2016) due to concerns about inattention, self-selection, and non-naivety among others. However, this method also provides a large and diverse

participant pool (Aguinis et al., 2020), which was readily accessible during the tumultuous period during which our data was collected, and attention checks were also incorporated as part of our data cleaning procedure. Further, we note that there is a low, but significant positive correlation between accessible self-construal and IOS, indicating that these two constructs are not wholly conceptually distinct (see Appendix A). However, as described in our theorizing, IOS is a subcomponent of accessible interdependence, rather than a wholly distinct construct, so this finding is consistent with theory. Finally, our research focused only on one type of NPI: stay-at-home. Future research should look at other NPIs, such as wearing masks, physical distancing and self-quarantine.

Taken together, our research suggests self-construal, inclusion of others in the self and self-control are important factors to understand individual differences in voluntary NPI adherence in the COVID-19 pandemic. Further research using longitudinal data and investigating different phases of the COVID-19 pandemic is required to shed further insights.

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Research involving human participants

The studies herein were developed from protocol #00057363, which was reviewed and approved by the Research Ethics Board (REB) at the University of Alberta, Canada. The University of Alberta’s REB utilizes the tri-council framework for research with human participants, which requires an informed consent process.

ORCID iD authorship contribution statement

Ke Tu: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Software, Visualization, Writing – original draft. **Shirley Chen:** Conceptualization, Data curation, Funding acquisition, Investigation, Methodology, Project administration, Resources, Visualization, Writing – review & editing. **Rhiannon MacDonnell Mesler:** Conceptualization, Investigation, Methodology, Project administration, Resources, Visualization, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no conflict of interest.

Appendix A. Study: information presented to participants about COVID-19

According to the World Health Organization, Coronavirus disease (COVID-19) is an infectious disease caused by a new virus that had not been previously identified in humans.

The most common symptoms of COVID-19 are fever, tiredness, and dry cough.

Some patients may have aches and pains, nasal congestion, runny nose, sore throat or diarrhea. These symptoms are usually mild and begin gradually. Some people become infected but don't develop any symptoms and don't feel unwell.

Most people (about 80%) recover from the disease without needing special treatment. Around 1 out of every 6 people who gets COVID-19 becomes seriously ill and develops difficulty breathing. Older people, and those with underlying medical problems like high blood pressure, heart problems or diabetes, are more likely to develop serious illness.

Study: Scenarios and Dependent Variables.

Scenario 1:

Now, imagine that you have made a pre-commitment to go to a friend's house for a party.

The party took your friend a long time to plan, and they have no intention of cancelling the event.

Given the current state of the pandemic, do you:

- Skip the party and stay home
- Go to the party

Scenario 2:

Now, imagine that you have an upcoming conference for work that you have already paid for out of your own pocket. Your company would only reimburse you if you actually attended the event.

The trip would involve multiple layovers at airports and some short-haul domestic flights.

Given the current state of the pandemic, do you:

- Cancel my work trip and stay home
- Go to the conference

Scenario 3:

Now, imagine that you have paid for an all-inclusive vacation that you've been waiting for the whole year.

The trip would involve multiple lay over at airports and some long-haul international flights.

Given the current state of the pandemic, do you:

- Cancel my vacation and stay home
- Go on my vacation

Scenario 4:

Now, imagine that you have a normal morning routine. You normally walk your dog to a local coffee shop and then stop at a bakery to pick up fresh baked goods before heading home.

Given the current state of the pandemic, do you:

- Change my normal routine and stay home
- Stick to my routine

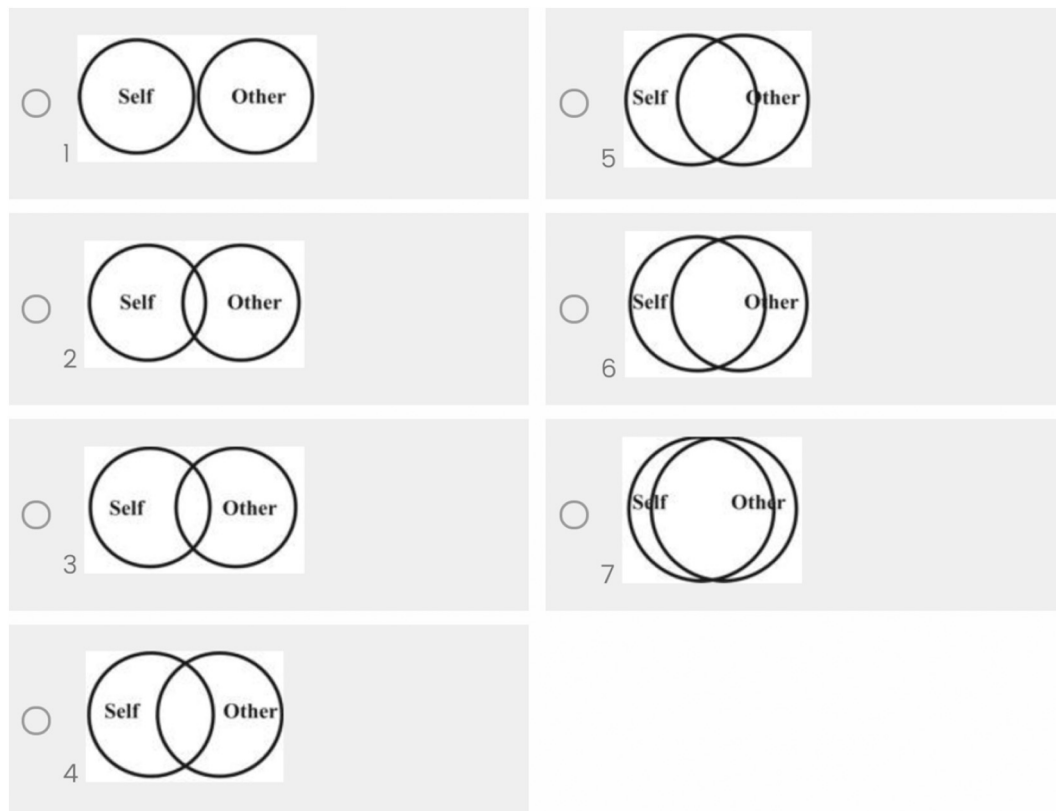


Fig. 1. The inclusion of others in the self scale.

Table 2

Construct validity analysis.

An assessment of discriminate validity between IIDI and IOS was conducted using factor analysis (Varimax rotation). Seven components emerged and the results indicate that although IOS did not emerge as a separate component on its own, it's closely related to subcomponents of the interdependence scale and thus consistent with our theorizing.

Constructs and items	Components						
	1	2	3	4	5	6	7
IOS	0.003	-0.465	-0.073	0.994	0.726	-0.372	0.525
Interdependence 1	0.164	0.199	0.177	0.876	-0.012	0.135	-0.022
Interdependence 2	0.531	0.227	0.076	0.873	-0.132	0.103	-0.028
Interdependence 3	1.161	-0.127	-0.221	0.361	0.167	-0.202	0.405
Interdependence 4	0.398	0.249	0.325	0.874	-0.152	-0.636	0.479
Interdependence 5	0.271	0.428	0.181	0.357	-0.353	-0.138	-0.148
Interdependence 6	1.131	0.032	0.068	0.315	-0.061	-0.003	0.092
Interdependence 7	1.275	-0.131	-0.011	0.112	0.136	-0.289	0.068
Interdependence 8	0.477	0.238	0.052	0.542	0.039	0.03	0.8
Interdependence 9	0.597	0.185	0.09	0.717	-0.014	0.207	0.078
Interdependence 10	1.353	-0.334	0.012	0.055	-0.086	0.285	0.179
Interdependence 11	0.816	-0.069	0.118	-0.187	0.087	0.279	1.559
Interdependence 12	0.818	-0.005	-0.167	0.464	-0.444	0.953	0.036
Interdependence 13	0.701	0.241	-0.205	0.244	0.352	-0.466	0.192
Interdependence 14	0.44	0.416	0.125	0.654	0.151	-0.083	-0.08
Interdependence 15	0.861	-0.043	-0.215	0.375	-0.076	0.446	0.256
Independence 1	-0.103	0.584	0.918	-0.042	0.002	-0.253	-0.072
Independence 2	0.116	0.344	0.873	-0.104	1.156	-0.254	-0.15
Independence 3	0.163	1.015	0.178	0.008	0.066	-0.115	0.294
Independence 4	0.136	0.402	0.252	0.048	1.624	0.216	0.028
Independence 5	-0.021	0.07	1.386	0.307	0.232	0.232	0.144
Independence 6	0.026	0.786	0.112	0.222	-0.002	-0.038	-0.195
Independence 7	-0.051	0.14	1.39	0.325	0.252	0.266	0.009
Independence 8	0.024	0.327	0.528	0.029	0.809	0.148	0.097
Independence 9	-0.164	0.556	0.887	0.052	0.335	-0.163	0.044
Independence 10	-0.013	1	-0.057	-0.003	0.307	0.021	0.266
Independence 11	-0.031	0.858	0.139	0.102	0.106	0.108	-0.042
Independence 12	-0.109	0.687	0.23	0.451	0.048	0.165	-0.027

(continued on next page)

Table 2 (continued)

Constructs and items	Components						
	1	2	3	4	5	6	7
Independence 13	-0.275	0.848	0.248	-0.068	0.264	0.421	0.106
Independence 14	-0.113	0.754	0.173	0.183	0.057	0.05	-0.095
Independence 15	-0.074	0.408	0.217	0.029	0.348	1.12	0.214
Total eigenvalues	14.119	12.243	5.177	4.306	3.87	2.845	2.717
% Variance	18.977	16.455	6.959	5.788	5.201	3.824	3.652

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