



Does trait interpersonal fairness moderate situational influence on fairness behavior?

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ABSTRACT

Although fairness is a key moral trait, limited research focuses on participants' observed fairness behavior because moral traits are generally measured through self-report. This experiment focused on day-to-day interpersonal fairness rather than impersonal justice, and fairness was assessed as observed behavior. The experiment investigated whether a self-reported fairness trait would moderate a situational influence on observed fairness behavior, such that individuals with a stronger fairness trait would be less affected by a situational influence than those with a weaker fairness trait. We used an iterated resource game in which participants could withdraw resources as they chose, and we manipulated the number of resources bogus players withdrew. The number of resources participants withdrew was the behavioral measure of fairness. Results confirmed the expected moderation of the unfairness manipulation by a fairness trait on observed behavior. Those reporting a stronger fairness trait were unaffected by the manipulation, whereas those reporting a weaker fairness trait were more strongly influenced.

1. Introduction

1.1. Problem statement

Fairness is a central concern for humans (Fowers, 2015). In this study, we focus on interpersonal fairness, defined as an equal division of benefits and burdens among relatively equal participants. Our focus is on whether the self-perceived degree of trait fairness toward others moderates a situational influence on behavior. Therefore, we use the term *fairness* in this article, unless the authors we cited used the term *justice*. More varied and complex definitions of fairness and justice are available, but the definition above encompasses this study well.

Fairness plays a crucial role in personal relationships, organizations, and societies (Stavrova & Schlösser, 2015; Stouten et al., 2006). The question of fairness has been studied most often in impersonal terms with a focus on formal categories of justice (e.g., distributive, procedural, and retributive justice; Duff et al., 2016; Thibaut & Walker, 1975), perceptions of an overall social climate (Hülle et al., 2018; Torres-Harding et al., 2012), and just world expectations (e.g., García-Sánchez

et al., 2022; Lerner, 1980). Fairness has also been studied as respondents' perceptions of other individuals' behavior (e.g., Feather et al., 2013; Thomson et al., 2021).

A prominent approach to assessing an agent's fairness trait is Justice Sensitivity (e.g., Schmitt et al., 2010), which focuses on a respondent's emotional reactions to perceived injustice in four circumstances: when others treat the respondent unfairly (Victim scale), when others act unjustly toward a third party (Observed scale), when the respondent benefits from injustice (Beneficiary scale), and when the respondent acts unfairly (Perpetrator scale). Only one of the scales addresses the respondent's reactions to their own fairness, but that scale does not assess the degree to which the respondents' behavior is just, only the person's emotional reaction to perceived injustice.

Although the research cited so far can help us understand how actors view impersonal, societal, and third-party justice, it cannot inform us about the actor's behavioral fairness or what influences it. That is, none of these approaches examine an actor's own fairness behavior. A focus on the actor's fairness behavior will allow researchers, policy makers, and educators to assess what prompts justice behavior and on how to

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improve individuals' ability to act justly.

We chose interpersonal fairness because it is an everyday concern that consequentially shapes personal and work relationships and it can be studied in research participants' observed behavior rather than relying solely on research participants' perceptions of others (Fowers et al., 2021; Gollwitzer et al., 2009; Thomson et al., 2021). This study was designed to examine the influence of an interpersonal fairness trait and a situational influence on observable behavior.

1.2. Fairness behavior and its importance

We focused on respondents' own fairness because it is an important but neglected factor in interpersonal relationships (Thomson et al., 2021). We assessed fairness behavior both through self-report and observed behavior, to avoid relying entirely on self-reported fairness. Behavioral assessment is important because some scholars worry about social desirability bias in self-reports (Hart et al., 2015; Nofle et al., 2011).

The influences of a fairness trait and situational factors on fairness behavior can be assessed with an economic game in which respondents behave more or less fairly as they obtain resources in different conditions (Lotz et al., 2013). We selected a public goods game called a resource game, wherein players decide how much of a replenishable common resource to take in each iteration in view of the other players' past moves. Public goods games directly assess the respondents' own resource sharing behavior toward other participants who are playing with equal opportunities. Such games have a replenishment rate (e.g., 10% per turn), which means that if players take more of the resource than their share of the replenishment rate, the available resource pool will be depleted. In addition, Gollwitzer et al. (2009) suggested that "the implicit norm in such symmetrical public goods games is to follow the 'equal division rule'" (p. 1001). Consistently taking an outside share means the player takes a much larger portion of the resource than players who take resources in line with the replenishment rate and will eventually deplete the resource pool by reducing the resources available for all the players. Therefore, we defined unfairness behavior as taking more than a sustainable share. A sustainable share is defined as a share than can be taken without depleting an available resource. (See the Procedures section for a precise definition of a sustainable share.)

1.3. Fairness as a virtue trait

Because interpersonal fairness is a matter of balancing one's own and others' resources and welfare, it is moral behavior. When that moral behavior is stable and properly motivated, it can be termed a virtue (Authors, 2021; Kristjánsson, 2015). Therefore, we approached this as research on a virtue trait, guided by virtue theory. Psychological studies on aspects of morality have expanded dramatically in the past 10 years (Ellemers et al., 2019), and research on virtues is also growing rapidly (Authors, 2021).

Virtue theory is increasingly guiding research on morally relevant traits such as fairness (Cokelet & Fowers, 2019; Fowers et al., 2021; Kristjánsson, 2015). Virtues are defined by having a behavioral component because thoughts, feelings, or intentions alone would not qualify as a virtue trait (Authors, 2021; Kristjánsson, 2015). Having a virtue trait means that one consistently engages in virtuous behaviors across situations. This does not mean that a person with a stronger fairness virtue trait will always act fairly or that fairness will always be on display. No one is perfectly fair. Moreover, situations tend to call for some virtues but not others, meaning that fairness is not always relevant to the circumstances.

1.4. The present study

From a virtue perspective, participants are likely to respond to situations differently, depending on the strength of their virtues. We

expected situational influence on fairness to be moderated by the strength of respondents' inclination toward fairness. Therefore, we predicted a trait (fairness) by condition (number of unfair players) interaction on observed fairness behavior. Following Gollwitzer et al. (2009), we manipulated the number of unfair players in our experimental conditions. We predicted that participants high in trait fairness would be more weakly affected by our manipulation, whereas those with lower in trait fairness would be more strongly affected by the manipulation. This interaction of traits and situational factors is an important prediction of virtue theorists (Fowers et al., 2021), and this is possibly the first study to assess the interaction between trait fairness and a situational influence.

Fairness behavior could be understood as the expression of a fairness trait, as an outcome of emotional reactivity to unfairness (i.e., Justice Sensitivity; Gollwitzer et al., 2009; Lotz et al., 2013), as the result of the personality dimensions of Agreeableness or Conscientiousness (John & Srivastava, 1999; Nofle et al., 2011), or as an outcome of social desirability (i.e., impression management or self-deception; Hart et al., 2015; Nofle et al., 2011). We included these three alternative explanations of fairness behavior to control for them while assessing whether the fairness trait moderates situational influence, as hypothesized. Concerns about social desirability bias is especially acute when studying moral behavior, given the widespread interest in perceiving oneself morally (Pagliaro et al., 2011; Van Nunspeet et al., 2015).

Given the paucity of research examining interactions between virtue traits and situational factors, there was no available empirical guidance for power requirements. We planned to test two parameters that represent the interaction effects of trait fairness and a conditional manipulation in a regression format. We anticipated up to 11 predictor variables. Using G*Power 3 (Faul et al., 2009), we estimated effect sizes of 0.09 (midway between small and medium conventional effect sizes) for the two effects of interest. With a power of 80% and an alpha level of 0.05, this suggested a sample size of 111.¹

2. Methods

2.1. Participants

Participants ($N = 127$) were undergraduate students at a university in the southeastern United States, with an age range of 18 to 34 years ($M = 20.5$, $SD = 2.3$), with 70.6% female. Most participants identified as White, but individuals also identified as Latinx (33.3%), Black (9.9%), South Asian (4.0%), East Asian (5.0%), and multiracial (6.9%).

2.2. Measures

We assessed the respondents' perceived fairness, justice sensitivity, personality traits, and social desirability with self-report measures.

2.2.1. Fairness

In an earlier study, we created the Interpersonal Fairness Scale (IFS), a 6-item self-report measure that includes statements such as "When interacting with other people, fairness is usually more important than getting something for myself" (Fowers et al., 2020). It is scored on a five-point scale, ranging from "1 = Strongly disagree" to "5 = Strongly agree." The construct validity was assessed with exploratory and confirmatory factor analyses, which confirmed the scale's unidimensionality. It correlated as expected with the four scales assessing Justice Sensitivity (Schmitt et al., 2010), and Perspective Taking, and Empathy scales (Davis, 1983). Correlations between the IFS and social desirability ranged from 0.25 to 0.37. The IFS had an alpha coefficient of 0.78 in the earlier study and an internal reliability of 0.85 in this study.

¹ This study was not pre-registered.

2.2.2. Justice sensitivity

We used the Justice Sensitivity Scales (Schmitt et al., 2010) to assess emotions about third party injustice as explanations for participants' fairness behavior. Justice Sensitivity measures how much an individual reacts emotionally to acts of injustice in four areas. Following the practice of other investigators (Gollwitzer et al., 2009; Lotz et al., 2013), we used a combination of two of the four scales in this study: (1) when the participant observes someone treating another person unfairly (Observer) and (2) when the participant is a beneficiary of unfair treatment (Beneficiary). Each scale has ten items with five-point responses ranging from "1 = Not at all" to "5 = Exactly." In this study, the Observer and Beneficiary scales had alpha coefficients of 0.85 and 0.91, respectively.

2.2.3. Personality

We employed the Agreeableness and Conscientiousness scales from the Big Five Inventory (John & Srivastava, 1999) as control variables. These scales have nine items each and a five-point response scale ("1 = Disagree strongly" to "5 = Agree strongly"). These scales have been used extensively to assess broad personality dimensions. In this study, the alpha coefficient for the two scales (Agreeableness and Conscientiousness) were 0.83 and 0.81, respectively.

2.2.4. Social desirability

We included the Balanced Inventory of Desirable Responding Short Form (BIDR-16; Hart et al., 2015) to assess socially desirable response sets. The BIDR-16 contains two eight-item scales: Self-Deception and Impression Management. The scales have a seven-point response scale ranging from "1 = not true" to "7 = very true." The BIDR-16 scales are strongly correlated with the same two scales in the full BIDR-40, the most widely used measure of social desirability. The alpha coefficients in this study were 0.72 for Self-Deception and 0.74 for Impression Management.

2.3. Procedure

Following Ethics Board approval, participants completed informed consent and played a computer game in our lab. They were told that they would play online with three other players in remote locations, through a university intranet. We randomly assigned participants to the three conditions in this experimental study.

The behavioral data were collected through a turn-based resource sharing game. The game's premise involved a lake in which the four players made a living by fishing. The lake begins with 20,000 fish and replenishes by 10% each turn. Each player was allowed to take between 0 and 1200 fish per turn. Players were told that if they each took 450 fish, they would be able to both make a sufficient living and sustain the fish population of the lake. Thus, taking more than 450 fish per turn would be unsustainable because it would deplete the fish population and result in participants taking more than their fair share. The goal of the game was to accumulate as many fish as possible without depleting all the fish in the lake. The players were incentivized by telling them that the total number of fish a player accumulates would correspond to the number of chances the player would later have to win a \$100 gift card in a raffle.

While participants were told that they were competing against three other human players, they were, in reality, playing against one of three randomly assigned pre-set protocols. In condition 1, no computer players behaved selfishly: all took 450 fish per turn. In condition 2, one of the three computer players behaved selfishly and took the maximum number of fish each turn. In condition 3, two out of three computer players took the maximum number per turn.

Once the participant read the instructions and clicked to begin the game, the computer generated a message indicating that each of the other players were connecting. After a pause, the game displayed a message that all players had connected and started.

Participants were required to submit their turn before the other players' moves became visible. After the participant submitted their turn, all four players' turns became visible. Participants played six rounds, after which the computer ended the game and generated a message saying that enough data had been collected.

Once the game was complete, the participants completed the self-report scales on a lab computer. The scales were presented in a randomized order to prevent questionnaire order effects.

Finally, participants were debriefed using the funnel debriefing model, to detect whether they had guessed the deception and to inform them of the true nature of the study. If a participant indicated suspicion about the bogus players, we excluded their data from analyses. We asked this question: "Was there anything suspect about the study you participated in?" If the participant answered yes, and said they had doubts about whether the bogus participants were real people, their data were removed from the experiment. Following this procedure, 102 participants were included, as 25 indicated suspicion. Although this reduced our achieved power to 76%, we deemed this decrease acceptable. We then distributed five \$100 gift cards randomly to the 127 participants.

3. Results

We first examined whether to include demographic variables as covariates in our analyses, but none were significantly associated with the participants' unfair behavior. Therefore, we did not include demographic covariates in the regression model. Because participants completed the economic game prior to the self-report questionnaires, it is possible that game performance could have influenced participants' self-reports, most crucially, the IFS. We conducted a oneway ANOVA to assess the effects of game conditions on the IFS, and the conditions do not appear to have affected IFS scores ($F(2, 99) = 0.92, p = .40$).

The direct associations among the fairness measures and unfair behavior were of interest, so we computed zero order correlations among these variables. Contrary to our expectations, Justice Sensitivity scores were not significantly correlated with unfair behavior. The IFS was associated with unfair behavior, as was Agreeableness, as expected. We retained the Justice Sensitivity and social desirability measures in subsequent analyses because they are theoretically relevant. No other measures were significantly correlated with unfairness behavior. Table 1 contains the correlation matrix.

We conducted a regression analysis to examine main and interaction effects on unfairness behavior. We selected the "no selfish players" condition as the reference group. To determine condition effects and create interaction terms, two dummy codes for conditions were used for the "one selfish player" and "two selfish players" conditions. Because Conscientiousness was one of two personality dimension covariates and it was not significantly correlated with unfairness behavior, it was not included in the regression analysis. In contrast, we saw Social Desirability and Justice Sensitivity as more directly and theoretically positioned as alternative explanations for unfair behavior, so we included these measures in our regression model.²

The model was found to be significant overall $F(11, 90) = 5.76, p < .001, adj R^2 = 0.34$. The results included the following statistically significant predictors of the amount of fish taken: Self-Deception ($p = .024$), the dummy variable for condition 2 "one selfish player" ($p = .042$), the dummy variable for condition 3 "two selfish players" ($p < .001$), and the interaction of the IFS and the dummy variable for condition 3 ($p = .002$).

This indicated that within the "two selfish players" condition, each decrease of one point in the IFS was associated with the participant

² Of course, decisions about which variables to include are debatable, so we examined various regression models including and excluding all combinations of the variables included in this study. The results were entirely robust to the various combinations of variables.

Table 1
Pearson correlations for study variables.

Variable	2	3	4	5	6	7	8	9
1. Age	-0.02	0.05	-0.07	0.13	0.10	0.15	0.10	-0.08
2. Gender		0.13	0.03	0.19	0.17	-0.18	0.12	-0.10
3. Interpersonal fairness scale			0.34**	0.63**	0.04	-0.11	0.19	-0.38**
4. Justice sensitivity (observer + beneficiary)				0.22*	-0.04	-0.39**	-0.25*	-0.14
5. Agreeableness					0.25*	-0.03	0.23*	-0.28**
6. Conscientiousness						0.27**	0.41**	-0.10
7. Self-deception							0.39**	0.18
8. Impression management								-0.04
9. Number of fish taken								

N = 102.

Note: for gender, 1 = male, 2 = female.

* p < .05.

** p < .01.

taking, on average, 170.45 more fish compared to the “no selfish players” condition (holding all other variables constant). Although the interaction between the IFS and the “one selfish player” condition was in the predicted direction, it did not reach statistical significance ($t(90) = -1.98, p = .051$). Detailed regression results are in Table 2. Fig. 1 provides a graphic representation of the interaction.

4. Discussion

The purpose of this study was to test the virtue theory prediction that self-reported trait fairness would interact with a situational factor to explain observed unfairness behavior. The primary test was the trait by condition interaction in the resource game. Virtue theory predicts that individuals high in a fairness trait would be less affected by the situational factor of other players taking an unsustainable portion of the resource. We found the predicted interaction of experimental condition with the IFS but not with Justice Sensitivity.

The nonsignificant interaction between condition and Justice Sensitivity was surprising because it is inconsistent with Gollwitzer et al.'s (2009) results using a similar public goods game. This lack of a significant association may be due to using a different economic game, but it is not apparent why this should be so, given the results we obtained with the IFS, and the research indicating that Justice Sensitivity

Table 2
Full regression model for total fish taken.

Variable	b	SE	95% CI	t	p
Intercept	2614.34	1405.68	[-178.29-5406.96]	1.86	0.066
Self-deception	40.14	17.54	[5.31-74.98]	2.29	0.024
Impression management	-19.37	17.35	[-53.84-15.1]	-1.12	0.267
Agreeableness	-5.15	20.69	[-46.26-35.97]	-0.25	0.804
Condition 2	3682.63	1787.21	[132.04-7233.23]	2.06	0.042
Condition 3	6134.19	1729.79	[2697.67-9570.71]	3.55	0.001
Justice Sensitivity	-3.18	12.65	[-28.31-21.94]	-0.25	0.802
Interpersonal Fairness Scale	21.01	44.88	[-68.16-110.18]	0.47	0.641
justice sensitivity × condition 2	10.46	16.62	[-22.56-43.48]	0.63	0.531
justice sensitivity × condition 3	11.12	17.16	[-22.97-45.2]	0.65	0.519
IFS × condition 2	-103.62	52.42	[-207.77-0.53]	-1.98	0.051
IFS × condition 3	-170.45	53.51	[-276.75 - -64.15]	-3.19	0.002

Note. For the full regression model, condition 1 “no selfish players” was the reference group. Condition 2 refers to “one selfish player” and Condition 3 refers to “two selfish players”.

correlates with several behavioral indicators of fairness.

We found an interaction between the IFS and one fairness condition while controlling for two measures of social desirability, Agreeableness, and Justice Sensitivity. Although Agreeableness was associated with unfair behavior in a zero-order correlation, it was not a predictor of unfair behavior in the overall model. Agreeableness is made up of the facets of trust, straightforwardness, altruism, compliance, modesty, and tender mindedness (John & Srivastava, 1999). Although each of these facets is likely to be associated with unfair behavior, none of them point specifically to fairness behavior. In contrast, the IFS was designed to capture the self-report aspect of trait-related fairness behavior. The moderate degree of shared variance ($r = 0.63$) and a moderate degree of distinctiveness between virtue fairness and agreeableness is consistent with the literature (e.g., McGrath et al., 2017; Nofle et al., 2011). We interpret these results to mean that although there is some content overlap between fairness and Agreeableness, the fairness construct is more specifically related to fairness behavior than the more general Agreeableness construct.

We found that the IFS interacts with a condition that is conducive to unfair behavior. Consistent with this prediction, there were no differences across conditions when trait fairness is high (see Fig. 1.) In contrast, individuals low in trait fairness were expected to be swayed more by situational factors. There were significant differences between the no selfish player condition and the three selfish players condition among participants who reported higher and lower trait fairness. Individuals lower in trait fairness were apparently more swayed by the behavior of the bogus participants, in that those lower in the trait took a sustainable amount of the resource when others did but took an unsustainable amount of the resource when most other participants did so. This is the precise interaction that virtue theory predicts (Cokelet & Fowers, 2019; Fowers et al., 2021).

These individual differences in responses to a situational influence is an important addition to the literature. Hundreds of studies demonstrate situational influences on behavior (Lefevor et al., 2017), but seldom assess relevant traits. It is vital that additional research investigate trait by condition interactions to further test virtue theory, but even more to assess the current consensus that behavior is partly predicated on the interaction of traits and situational factors (Webster, 2009). The emerging measurement of and evidence for virtue traits (e.g., Fowers et al., 2021) can provide important tools to incorporate virtue characteristics into studies involving situational influence. These results are consistent with research indicating that conditional factors interact with trait fairness (measured by Justice Sensitivity) in predicting (un)fair behavior (Gollwitzer et al., 2009; Lotz et al., 2013). This cumulating evidence clarifies that trait fairness is an important explanatory variable for (un)fair behavior.

The main effects for condition were also statistically significant, supporting the longstanding view that situational factors affect behavior. There were also differences between the conditions in which

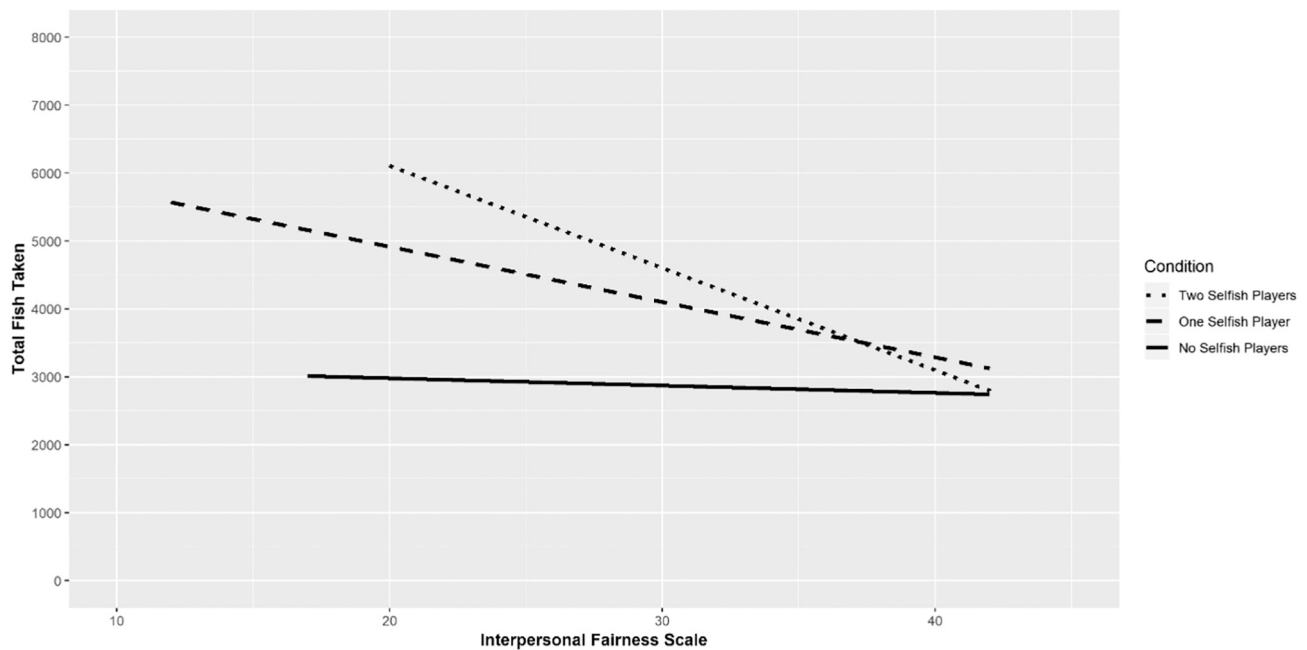


Fig. 1. Simple slopes for the interaction of the IFS and condition on unfairness behavior (total fish taken).

one or two bogus players took the maximum amount. These findings suggest that when a greater proportion of other participants act unfairly, people are more likely to act unfairly as well. Of course, this effect is conditioned by the degree to which a person views themselves as fair, with those indicating that they have a stronger fairness trait being relatively uninfluenced. Our conclusion is that it is vital to include both situational and trait influences on behavior and to examine their interaction.

4.1. Limitations

This study has some limitations. The study was conducted with undergraduate students, limiting the generalizability of the findings. It is likely that other populations will have differential motivations and capacities for fairness (e.g., children, older adults, relationship partners). This suggests that research on fairness could be deepened by attention to multiple populations.

Whereas the resource game is a reasonable paradigm for testing fairness behavior, it is a contrived arrangement in a laboratory setting with low stakes, raising ecological validity questions. Confidence in the interaction we found requires the demonstration of additional instances of the interaction. For example, behavioral fairness can be measured in many ways, such as the division of talk time in a conversation, sharing burdens equally, or providing extra resources to a disadvantaged person. Other situational factors may also influence fairness behavior, such as comparing participants' behavior when it is and is not made public.

The sample size was slightly below the target indicated by our power analysis, which may explain the lack of statistical significance of the interaction between the one selfish player condition and interpersonal fairness. Future studies should include larger, more representative samples.

Psychologists generally use a single timepoint self-report measure for trait measurement. No single timepoint assessment can assess the within-person consistency characteristic of durable traits. Recent experience sampling studies using Fleeson's (2007) density distribution approach to trait measurement provided stronger evidence for trait fairness by showing that self-reported fairness behavior was consistent within persons over time (e.g., Fowers et al., 2022; Meindl et al., 2015). Additional research with longitudinal designs could better assess the

fairness virtue trait.

4.2. Conclusion

This study suggested that a fairness trait can be identified, assessed, and used to predict behavior. In a resource game, this experimental study suggested that an interaction of a fairness trait and a situational factor partly explained unfairness behavior. This result added to existing experimental and experience sampling evidence by finding that self-reported behavioral fairness is associated with observed unfair behavior and differentially responsive to situational conditions. This evidence provides new knowledge about interpersonal fairness.

CRedit authorship contribution statement

Blaine Fowers – Conceptualization, funding acquisition, methodology; project administration, writing, reviewing, and editing.

Alexandra Lane - Data curation, methodology, project administration, research assistant supervision, writing.

John Abbamonte – Methodology, software creation, writing.

Samantha Lang – Conceptualization, data curation, writing, reviewing, and editing.

Bradford Cokelet – Conceptualization, writing, reviewing, and editing.

Austen Anderson – Conceptualization, writing, reviewing, and editing.

Kathryn Cioffi – Data curation, writing, reviewing, and editing.

Declaration of competing interest

None.

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