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journal homepage: www.elsevier.com/locate/jespPerceiving others as responsive lessens prejudice: The mediating roles of intellectual humility and attitude ambivalence[☆]Guy Itzchakov^{a,*}, Harry T. Reis^b, Kimberly Rios^c^a Department of Human Services, University of Haifa, 199 Aba Khoushy Ave. Mount Carmel, Haifa, Israel.^b Arts, Sciences and Engineering Department of Psychology, University of Rochester, P.O. Box 270266, 355 Meliora Hall, Rochester, NY 14627, United States of America^c Department of Psychology, College of Liberal Arts & Sciences, University of Illinois Urbana-Champaign, 308 Psychology Bldg, MC-716603 East Daniel St., Champaign, IL 61820, United States of America

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ABSTRACT

Can perceived responsiveness, the extent to which an individual feels understood, validated, and cared for by close others, reduce prejudiced attitudes? We hypothesized that perceived responsiveness by meaningful other people would increase recipients' intellectual humility and attitude ambivalence and that these changes would reduce prejudice. Five studies (total $N = 3362$), four of which were preregistered, manipulated perceived responsiveness by a specific person (Studies 1–3, 5) or measured the effects of perceived responsiveness by the closest social network of the recipient (Study 4). All studies supported the hypotheses. Specifically, Studies 1 and 2 found that perceived responsiveness increased intellectual humility and attitude ambivalence and reduced prejudice toward a group from a pre-determined list. Study 3 replicated these findings when participants freely chose the social group. In Study 4, perceived responsiveness from individuals' closest social networks predicted the dependent variables a few days afterward, controlling for positive and negative affect and social desirability. Finally, in Study 5, we added a condition of positive social interaction to rule out the possibility that the prior findings were due to recalling an affectively positive experience. The effect of perceived responsiveness on prejudice reduction (i.e., increased attitude favorability toward the social group) was not moderated by attitude certainty (Study 2), anxious or avoidant attachment style (Study 2), or attitude morality (Study 3). This work suggests that fostering perceived responsiveness can serve as a strategy for mitigating prejudice and promoting more open-minded attitudes.

Prejudice and discrimination are longstanding social problems in many countries. As of 2021, reported incidents of anti-Semitism in the US have been at an all-time high since 1979, when the Anti-Defamation League began collecting data on the topic (ABC news, 2022). Furthermore, the Council on American-Islamic Relations reported a 9% increase in civil rights complaints from Muslim Americans between 2020 and 2021 (VOA News, 2022). Beyond religious discrimination, in the United States, people of color are disproportionately more likely than Whites to be fatally shot by police officers (Lett, Asabor, Corbin, & Boatright, 2021). Despite these statistics, White Americans – particularly politically conservative Americans – perceive more anti-White than anti-Black discrimination (Peacock & Biernat, 2021), a trend that has been exacerbated over time (Norton & Sommers, 2011). These trends are not

unique to the United States. In a 2018 survey, 42% of Britons reported having experienced some form of prejudice in the past 12 months (Abrams, Swift, & Houston, 2018). Furthermore, news reports describe racism and discrimination, particularly toward immigrants (Esses, 2021), as “prevalent” throughout Europe (Bieling, 2021).

Prejudice refers to an unjustified negative attitude toward others due to their belonging to a particular social group (Rios, Sosa, & Osborn, 2018). According to Realistic Group Conflict Theory (Sherif, 1966) and Social Identity Theory (Tajfel & Turner, 1982), hostility toward a social group can result from competition over limited resources or from a desire to bolster one's self-image through favoring the ingroup over outgroups, respectively. Such competition for limited resources need not be real; the mere perception of zero-sum relations between groups (i.e.,

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that more for outgroups means less for the ingroup) is enough to elicit feelings of realistic threat to a group's power, status, or material resources (Gordils, Sommet, Elliot, & Jamieson, 2020; Rios et al., 2018). Another approach, Intergroup Threat Theory, suggests that in addition to realistic threats to the ingroup's power and resources, symbolic threats to the worldview and values of one's ingroup may foster prejudice (Stephan, Ybarra, & Rios, 2009). In their review of the literature, Brandt and Crawford (2020) found that perceived threats to the ingroup's worldview are a consistent predictor of prejudice, regardless of political ideology and religious beliefs (see also Brandt & Van Tongeren, 2017). Moreover, perceptions of realistic and symbolic threats mediate the association between prejudice and opposition to immigration (Pereira, Vala, & Costa-Lopes, 2010).

In the present work, we seek to test a novel method to reduce prejudice that does not involve persuasion attempts. Specifically, we posit that perceiving significant others – even those who do not belong to the target group – as responsive to oneself can increase open-mindedness, which may then be reflected in perceiving other social groups in a more positive light. The following sections provide a theoretical rationale for why perceived responsiveness could help reduce prejudice and how this approach introduces a novel perspective to the prejudice literature.

Our analysis builds on the idea that perceived responsiveness can increase open-mindedness. Individuals who are low on open-mindedness tend to be more prejudiced than open-minded individuals (Hodson & Dhont, 2015), presumably because low open-mindedness makes people resistant to evidence that their prejudice may be misguided. Two meta-analyses have demonstrated that lower openness is associated with more prejudice toward various social groups (Crawford & Brandt, 2019; Sibley & Duckitt, 2008). A common strategy to reduce prejudice involves increasing people's openness toward other viewpoints regarding the target group (e.g., Amodio & Devine, 2005). However, these types of interventions are directly aimed at addressing prejudice and involve either overt attempts at persuasion or reevaluation of one's attitudes. For people who lack the motivation to change their attitudes or do not believe prejudice is a societal problem, it is crucial to consider other, less explicit means of curbing biases. Indeed, prior research suggests that prejudice reduction interventions can backfire among those not intrinsically motivated to be unbiased (Legault, Gutsell, & Inzlicht, 2011) and that intergroup contact does not always succeed in mitigating prejudice (Hodson, 2008).

1. Perceived responsiveness and prejudice

Perceived responsiveness is the belief that another person understands and validates oneself and is willing to support one's needs (Reis, Clark, & Holmes, 2004). Perceived responsiveness includes three components. First, individuals must feel understood by others. Second, they should feel their partner's value and appreciate their attributes, accomplishments, and worldview. Finally, they must feel cared for, helped, and supported (Reis et al., 2004).

People may become more open-minded when they feel that meaningful others – romantic partners, close friends, valued relatives – are responsive to them. Perceived responsiveness creates a psychologically safe context where individuals feel emotionally validated and understood by others. This sense of affirmation enhances their sense of psychological safety and self-worth and reduces defensiveness (Itzhakov & Reis, 2023), as elaborated below. Consequently, recipients of responsiveness might become more receptive to new information and perspectives as they no longer need to be defensive about their existing beliefs (Livingstone, 2023). This psychological safety encourages the exploration of different viewpoints, leading to increased open-mindedness (Itzhakov & DeMarree, 2022). The positive experience of being genuinely heard and respected motivates individuals to engage in more thoughtful and unbiased processing of diverse ideas (Shelton, Trail, West, & Bergsieker, 2010). In this way, perceived responsiveness

may serve as a catalyst for cultivating open-mindedness and a willingness to consider alternative viewpoints.

For example, imagine that Morgan is feeling down and calls Emily to talk about a recent breakup. Emily responds attentively, showing concern for Morgan and asking how she feels. During their conversation, Emily truly listens and offers support, acceptance, and validation of Morgan's emotions, which helps Morgan feel understood and valued. Emily's responsiveness conveys acceptance, respect, and open-mindedness for Morgan's needs, which, we posit, may help Morgan feel more accepting and open-minded toward other people in turn. On the contrary, Morgan might become more defensive and less open-minded if she experiences a lack of responsiveness from Emily – for example, if Emily blames Morgan for the breakup by criticizing her behavior or if Emily trivializes Morgan's emotional upset. Responsiveness can be communicated by any members of an individual's social network but is most likely to come from close others (Clark & Aragón, 2013). For example, an individual who repeatedly experiences open-minded interactions with family members would likely be relatively more open-minded toward other people.

In the context of prejudice, open-mindedness refers to tolerance of divergent views and willingness to consider alternative viewpoints regarding the outgroup (Price, Ottati, Wilson, & Kim, 2015; Wohl, Stefaniak, & Smeekes, 2020). We theorize that perceived responsiveness may increase open-mindedness because the recipients of responsive behavior feel valued and accepted, lessening their need to defend or bolster their initial viewpoints (Reis, Itzhakov, Lee, & Ruan, 2022). For example, in interpersonal relationships, people who feel that a close other is attentive and understanding are less reactive to conflict (Gordon & Chen, 2016), have less defensive reactions to failure (Caprariello & Reis, 2011), display a lesser need for self-enhancement (Sedikides & Gregg, 2008), and behave less selfishly toward their roommates (Canavello & Crocker, 2010). In particular, Reis, Lee, O'Keefe, and Clark (2018) found that perceived responsiveness reduced several well-known self-enhancing defensive biases, such as the hindsight bias.

Recent work has shown that attitude-holders who perceive responsiveness from meaningful others became more open-minded (Itzhakov & Reis, 2021). In the context of intergroup relations, felt understanding, a core component of perceived responsiveness, predicts behaviors that reflect open-mindedness toward outgroups, such as more positive action tendencies, greater trust, political intentions for unity, and greater post-conflict forgiveness (Livingstone et al., 2020; Livingstone, Fernández Rodríguez, & Rothers, 2020). Supporting evidence also comes from research on high-quality listening, an antecedent of perceived responsiveness (Itzhakov, Reis, & Weinstein, 2022; Reis & Itzhakov, 2023), which has demonstrated that feeling heard increased speakers' open-mindedness (Itzhakov, DeMarree, Kluger, & Turjeman-Levi, 2018; Itzhakov, Kluger, & Castro, 2017).

When people do not feel responded to and valued by their social network, they can maintain their self-image by negatively and stereotypically evaluating members of a stigmatized group. Prejudice may play a role in maintaining a positive self-image when threatened because it gives the attitude holder a feeling of superiority over others (Stone, Whitehead, Schmader, & Focella, 2011). For example, Aydin, Krueger, Frey, Kastenmüller, and Fischer (2014) found that participants reported more prejudiced attitudes toward stigmatized individuals when their self-image had been threatened via social exclusion rather than bolstered via social inclusion.

The notion that perceived responsiveness would lessen its recipients' prejudice is also consistent with Significance Quest Theory (Kruglanski et al., 2022), which refers to the fundamental human need for social validation and worthiness. This need can be fulfilled when meaningful others support one's values and principles. The quest for significance is activated in response to experiences of significance loss or the potential for significance gain and plays an influential motivational role in predicting extreme attitudes and behaviors (Kruglanski et al., 2014). For example, in the context of prejudice, White people in New Zealand

expressed more prejudice and Ethnic Identity Nationalism when they felt disempowered (Leander et al., 2020). We propose that perceived responsiveness addresses the quest for significance by acknowledging and valuing an individual's viewpoints and contributions. In other words, when people feel heard, cared for, and respected, their sense of significance (i.e., social worth) is reinforced, inclining them to more openly embrace diverse perspectives and challenge prejudiced attitudes.

2. Mediating roles of intellectual humility and objective attitude ambivalence

We propose that the process through which perceived responsiveness reduces prejudice follows from two constructs operating in parallel that reflect open-mindedness: Intellectual humility and objective attitude ambivalence.

2.1. Intellectual humility

Intellectual humility describes a tendency to be open-minded when appraising the self and attitudes, notably including a willingness to acknowledge that one's beliefs might be wrong (Leary & Banker, 2019). Intellectual humility is reflected in an openness to new information, even if this information contradicts one's initial attitude, as well as lower defensiveness (Leary et al., 2017). The assertion that perceived responsiveness increases intellectual humility relies on theoretical and empirical bases. Theoretically, this hypothesis is consistent with the sociometer model, which posits that individuals' self-worth reflects their perceived interpersonal value, shaped and reflected by their social environment (Leary & Baumeister, 2000). Relatively high interpersonal value, in turn, should lessen the need to defend one's attitudes and allow individuals to recognize potential inaccuracies in their initial attitudes toward outgroups (Itzhakov et al., 2023). Therefore, intellectual humility might help correct misperceptions of social groups (Sgambati & Ayduk, 2022) that serve as antecedents of prejudice and extremism (Mernyk, Pink, Druckman, & Willer, 2022; Stanley, Whitehead, Sinnott-Armstrong, & Seli, 2020). This process is closely tied to reflective self-awareness, where individuals introspect in a non-defensive manner about their attitudes (Itzhakov et al., 2018), which can disrupt cognitive patterns contributing to prejudice (Itzhakov, Weinstein, Legate, & Amar, 2020).

Empirically, Reis et al. (2018) found that perceived responsiveness increased intellectual humility in two respects: openness to novel information and reduced self-serving biases. Based on this work, we seek to test whether the effect of perceived responsiveness on intellectual humility can be generalized to prejudiced attitudes, which are stronger, more interpersonal, and more resistant to change (Christ et al., 2010) than the phenomena that Reis et al. (2018) studied. Intellectual humility should help reduce prejudicial attitudes because open-mindedness allows individuals to recognize that their initial viewpoint toward an outgroup might be wrong or at least less than entirely correct. This, in turn, should increase the likelihood that the attitude holder will be willing to reconsider their attitude and mitigate their negativity. Supporting this hypothesis, intellectual humility has been found to reduce religious prejudice (Van Tongeren et al., 2016) and increase openness toward views that contradict initially held beliefs (Porter & Schumann, 2018). Moreover, intellectual humility has mediated the association between cognitive ability and freedom-of-speech support toward various social groups with diverse ideologies (De Keersmaecker, Bostyn, Van Hiel, & Roets, 2021).

Work from political psychology provides a further reason to believe that increasing intellectual humility would lead to less prejudiced attitudes. For example, intellectually humble individuals held more positive appraisals of political outgroup members and spent more time engaging with counter-attitudinal information and befriending political opponents (Bowes et al., 2022; Stanley, Sinclair, & Seli, 2020). Moreover, a manipulation of wise reasoning, which includes intellectual humility,

led to a higher likelihood of signing up for a bipartisan discussion group (Kross & Grossmann, 2012).

2.2. Objective attitude ambivalence

The second mediator we propose for the responsiveness-prejudice link is objective attitude ambivalence. Objective attitude ambivalence refers to the extent to which people hold positive and negative reactions toward attitude objects. Objective attitude ambivalence is often measured by separately assessing how positive and negative a person's attitude toward an object is (Kaplan, 1972). Given that perceived responsiveness helps people become more open-minded, it should also enable them to think about their attitudes more broadly, acknowledging both supportive and contradictory attributes. Itzhakov and Reis (2021) found that perceived responsiveness increased objective attitude ambivalence across various topics. Additional supporting evidence comes from research showing that high-quality listening increases speakers' objective attitude ambivalence (Itzhakov et al., 2017; Itzhakov & Kluger, 2017). However, these studies focused on topics such as genetically modified foods and work-related attitudes, which are usually less value-laden and more two-sided than prejudice toward outgroups.

When individuals perceive responsiveness from others, it triggers a subtle yet powerful shift in their self-awareness. This shift encourages a more holistic reflection on their attitudes. As individuals sense the validation and understanding offered by meaningful others, often in their in-group, it nudges them toward considering their viewpoints more expansively (Itzhakov & Reis, 2021). This reflective self-awareness fosters recognition of both positive and negative aspects of their attitudes. Rooted in the psychological impact of responsive interactions on self-perception (Pillaud, Cavazza, & Butera, 2013), this process broadens the scope of thinking and prompts individuals to examine opposite aspects within their attitudes (Itzhakov et al., 2017). Such introspection aligns with a more balanced and nuanced perspective, where self-awareness facilitates a shift from rigid negativity to a more encompassing viewpoint. This way, perceived responsiveness may catalyze attitudes driven by understanding the self and its intricacies (Livingstone, Fernández Rodríguez, & Rothers, 2020; Livingstone, Windéatt, et al., 2020).

We suggest that responsiveness-induced objective attitude ambivalence should predict lower levels of prejudice. For example, Maio, Bell, and Esses (1996) found that ambivalent attitude holders process information more deeply and systematically than univalent attitude holders, making them less prejudiced. Relatedly, Rothman, Vitriol, and Moskowitz (2022) found that emotional ambivalence made participants more aware and less defensive about their biases. Alternatively, one might suggest that objective attitude ambivalence could increase prejudice because attitude holders may reduce their discomfort by processing information in a biased manner that supports their initial attitude and avoids disconfirming information (e.g., Itzhakov, Amar, & Van Harreveld, 2020; Sawicki et al., 2013). However, we believe this argument does not apply to responsiveness-induced increases in objective ambivalence because prior studies demonstrated that when people perceived others to be responsive toward them, their attitude became broader (i.e., increased objective ambivalence; Itzhakov & Reis, 2021). However, this broadening of attitude is not associated with the psychological experience of conflict which is usually associated with objective ambivalence (Itzhakov & Van Harreveld, 2018; Van Harreveld, Van der Pligt, & de Liver, 2009), known as subjective attitude ambivalence (DeMarree, Wheeler, Brinol, & Petty, 2014; Priester & Petty, 1996). Rather, in these instances, individuals are more able to tolerate the existence of pros and cons within their attitude (Itzhakov & Reis, 2021).

Increased objective attitude ambivalence is not equivalent to reduced prejudice, as more attitude ambivalence can result in more prejudice, less prejudice, or no change. For example, higher attitudinal

ambivalence can result from increased positive and negative attributes toward the outgroup. Yet, if the increase in negative attributes is greater than positive ones, overall favorability will be lower, and prejudice will likely be higher.

We posit attitude ambivalence and intellectual humility as mediators of the association between perceived responsiveness and prejudice because prior research has indicated that prejudiced beliefs result from people's processing of information about their social world (Maio, Haddock, Manstead, & Spears, 2010). That is, prejudiced attitudes are the outcome of information processing rather than the reverse, as scores of studies have indicated (e.g., Maio et al., 1996; Maio, Greenland, Bernard, & Esses, 2001). Furthermore, the reverse causal ordering – that prejudice would be a mediator and ambivalence or intellectual humility would be outcomes – does not seem sensible, in that we see no good reason to expect that holding less negative beliefs about an outgroup would cause one to become less ambivalent and intellectually humble after the fact.

In sum, we hypothesize the following (see Fig. 1):

Hypothesis 1. Perceived responsiveness will reduce prejudiced attitudes.

Hypothesis 2. Perceived responsiveness will increase intellectual humility concerning the prejudiced group.

Hypothesis 3. Perceived responsiveness will increase objective attitude ambivalence toward the prejudiced group.

Hypothesis 4. The effect of perceived responsiveness on prejudice reduction will be mediated in parallel by increased intellectual humility and attitude ambivalence.

Serial mediation may also exist. However, past research does not allow us to specify which of these mediators comes first. Therefore, until research establishes that one of these is causally prior, we prefer the more cautious prediction of simultaneity. This preference also follows from the fact that we did not manipulate the mediators, and mediation experts advocate against making serial arguments regarding mediators that are assessed at the same time since, from an empirical standpoint, these could easily be switched (Fiedler, Harris, & Schott, 2018; MacKinnon, Fairchild, & Fritz, 2007). Nevertheless, for exploratory purposes, we report the results of serial mediation analysis in the supplementary materials.

3. Overview of the present studies

We conducted five studies to test our hypotheses. In Study 1 ($N = 269$), we randomly assigned participants to low-or-high perceived responsiveness conditions and measured prejudice toward four groups: individuals with same-sex sexual preferences, transgender people, Orthodox Jews, and illegal immigrants. In Study 2 (preregistered; $N = 722$), we added a control condition to test whether the effects of perceived responsiveness stem from the harmful effects of low responsiveness, the beneficial effects of high responsiveness, or both. In Study 3 (preregistered; $N = 597$), participants chose the social group they were most prejudiced toward before the responsiveness manipulation. In Study 4 (preregistered; $N = 388$), we aimed to increase ecological validity by examining the effects of perceived responsiveness originating from participants' closest social network on prejudice toward various social groups. In Study 5, to rule out the possibility that our effects were due to affective positivity, we replicated the previous results in a high-powered study (preregistered; $N = 1386$) that included an additional condition of positive social interaction. Data and codes are available at https://osf.io/wyvt6/?view_only. All studies received ethical approval (#474/20). We report all studies conducted on this topic and all measures, manipulations, and exclusions in all studies.

4. Study 1

4.1. Method

4.1.1. Participants

We recruited undergraduates from a university in Israel in exchange for course credit. We followed recent recommendations regarding feasibility analysis to recruit as many participants as possible (Lakens, 2022), which we did until the end of the fall 2021 term. This strategy yielded 272 participants. We excluded three participants because they did not write about their prejudiced attitudes, resulting in a final sample size of $N = 269$ ($M_{\text{age}} = 23.38$ $SD = 4.65$). Sensitivity analysis indicated that the smallest effect size that this sample size can detect with a power of 0.80 and $\alpha = 0.05$ is $d = 0.34$ in a two-group between-participant design (Faul, Erdfelder, Lang, & Buchner, 2007).

4.1.2. Procedure

After signing a consent form, participants reported their attitude favorability (i.e., initial prejudice) toward four groups: Gay and lesbian people, transgender people, Jewish Orthodox, and illegal immigrants to

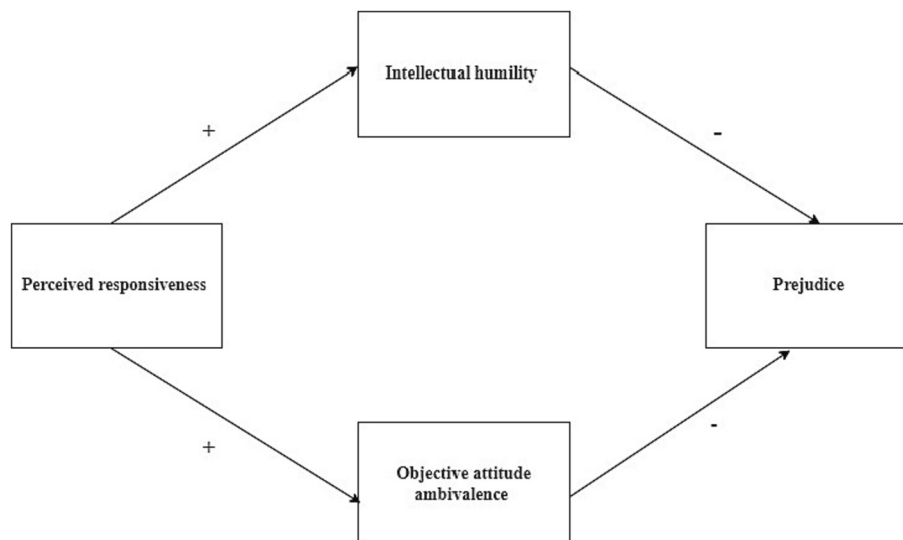


Fig. 1. A model of the effect of perceived responsiveness on prejudice reduction through increased intellectual humility and objective attitude ambivalence.

Israel. Then, we asked participants to select the group toward which they held the most *negative* attitude and write a brief essay about it. The essay could reflect the reason for their negative attitude or a personal example that reflects it. The choices were Jewish Orthodox- 45.6%, illegal immigrants- 27%, transgender individuals- 19.3%, and gay and lesbian individuals- 8.1% (see supplementary materials for auxiliary moderation analyses). These groups were selected based on prior research (Itzhakov, Weinstein, Legate & Amar, 2020)

After writing the essay (see Supplementary Materials for an example), participants were randomly assigned to a perceived responsiveness condition based on previous work (Caprariello & Reis, 2011). Specifically, participants in the high responsiveness condition ($n = 136$) were instructed to:

“Please describe someone who best fulfills the criteria of a responsive partner (e.g., “He or she knows the real you,” “He or she is interested in what you are thinking and feeling,” “He or she esteems you, shortcomings and all,” “He or she is non-judgmental toward you”).” Subsequently, they answered the following questions: a) “How does this relationship make you feel? If possible, use specific examples?” b) “Imagine this person sitting next to you at this very moment. What might you talk about? What’s the first thing you’d want to ask him or her?” and c) What does this relationship personally mean to you? How does this person fit into your life?”

Participants in the low responsiveness condition ($n = 133$) received the following instructions: “Please describe someone who best fulfills the criteria of an unresponsive person (e.g., “He or she knows you fairly well but often seems discouraging,” “He or she is often critical and seems judgmental toward you and unwilling to be helpful or supportive” “He or she doesn’t seem to like you much”).” Subsequently, they answered the following questions: a. How does this relationship make you feel? If possible, use specific examples b. “Imagine this person sitting next to you at this very moment. What might you talk about? What’s the first thing you’d want to ask him or her?” c. What does this relationship personally mean to you? How does this person fit into your life?”

Finally, participants completed questionnaires containing the study’s mediating and dependent variables and were debriefed.

4.1.3. Measures

All measures ranged on a scale from 1 (*completely disagree*) to 9 (*completely agree*) unless noted otherwise.

Perceived responsiveness (manipulation check). We used a validated perceived partner responsiveness questionnaire (Reis et al., 2018) adapted to the present setting. This questionnaire consisted of 10 items. Example items were: “The person I thought of a) makes me feel cared for,” b) understands me.” ($\alpha = 0.97$).

Intellectual humility. We measured intellectual humility with nine items from Hoyle, Davison, Diebels, and Leary (2016), which measures the extent to which a person is open to opposite points of view. Example items were: “Although I have a certain attitude toward the group, I do not know everything there is to know about them,” and “My current attitude regarding the social group I chose may turn out to be wrong in the future.” ($\alpha = 0.94$).

Objective attitude ambivalence. We measured objective attitude ambivalence with the split semantic differential scale, which includes two items, asking separately about positive and negative attributes of the attitude (Kaplan, 1972). Specifically, “Considering only your negative (positive) feelings and thoughts towards the group, how negative (positive) is your position?” Ambivalence was calculated by the most frequently used formula, which subtracts the absolute value of the difference between the positive (P) and negative (N) attributes $(P + N)/2 - |P - N|$ (Thompson, Zanna, & Griffin, 1995). Higher scores indicate greater ambivalence. The correlation between the positive and negative items was $r(267) = -0.17, p = .005$.

Attitude favorability (prejudice). Attitude favorability was measured before and after the manipulation. We used a feeling thermometer that asked about participants’ attitudes toward the group they

wrote about (Haddock & Zanna, 1999). The measure ranged from 0° (very unfavorable) to 100° (very favorable feelings). We calculated a measure of the *change* in attitude favorability by subtracting the pre-manipulation rating from the post-manipulation rating. Higher scores indicate an increase in attitude favorability, equal to a decrease in prejudice.

4.2. Results and brief discussion

Table 1 presents the means and standard deviations by experimental conditions. Table 2 presents the overall descriptive statistics and correlations between the variables in the study.

Perceived responsiveness. Participants in the high responsiveness condition reported significantly greater perceived responsiveness than participants in the low responsiveness condition, $t(267) = 26.52, p < .001, d = 3.27$, indicating the manipulation was effective.

Intellectual humility. Participants in the high responsiveness condition reported higher levels of intellectual humility than participants in the low responsiveness condition, $t(267) = 2.45, p = .015, d = 0.30$.

Objective attitude ambivalence. Participants in the high responsiveness condition had higher levels of objective attitude ambivalence regarding the social group they chose than participants in the low responsiveness condition, $t(267) = 2.33, p = .020, d = 0.28$.

Attitude favorability (prejudice). A mixed ANOVA indicated a significant change of attitude favorability as indicated by a significant Condition $\times$ Time interaction, $F(1,267) = 6.14, p = .014, \eta_p^2 = 0.02$, Cohen’s $f = 0.14$. Specifically, a significant increase emerged in the high responsiveness condition, $M_{\text{difference}} = 2.42, SE_{\text{difference}} = 1.01, p = .02$, but not in the low responsiveness condition, $M_{\text{difference}} = -1.13, SE_{\text{difference}} = 1.02, p = .27$.

4.2.1. Mediation analyses

We conducted parallel mediation analyses using Model 4 in PROCESS (Hayes, 2017). The dependent variable was post-manipulation attitude favorability. We submitted pre-manipulation attitude favorability as a control variable. The indirect effect of the responsiveness manipulation on post-manipulation attitude favorability through intellectual humility was significant, $b = 0.51, SE = 0.23, 95\%CI [0.10, 1.03]$. The indirect effect through objective attitude ambivalence was also significant $b = 0.68, SE = 0.34, 95\%CI [0.04, 1.43]$. The direct effect was not significant, $b = 0.90, SE = 0.65, t = 0.29, p = .771, 95\%CI [-1.09, 1.47]$ (Fig. 2). These results indicate that intellectual humility and attitude ambivalence served as parallel mediators of the responsiveness-prejudice relationship (Hypothesis 4). The results were similar when submitting post-manipulation attitude favorability as a change score from pre-manipulation attitude favorability. We report the results of a serial mediation analysis (for all experiments) in the supplemental materials.

4.2.2. Controlling for false positives

Because we conducted multiple significance tests, false-positive

Table 1
Study 1: Means and standard deviations for each experimental condition.

	Low responsiveness		High responsiveness	
	M	SD	M	SD
1. Perceived responsiveness	4.15	1.86	8.61	0.55
2. Intellectual Humility	5.50	2.04	6.07	1.81
3. Attitude ambivalence	2.16	2.68	2.99	2.84
4. Attitude favorability (prejudice) 1 ^a	31.19	26.90	35.48	27.88
5. Attitude favorability (prejudice) 2 ^b	30.06	27.09	37.94	30.07

Note. ^a pre-manipulation, ^b post manipulation; Perceived responsiveness and intellectual humility were measured on a 1-to-9 scale, and attitude favorability was measured on a 0-to-100 scale.

Table 2

Study 1: Descriptive statistics and correlations between the study's variables.

	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Experimental condition	NA	NA					
2. Perceived responsiveness	6.40	2.61	0.85**				
3. Intellectual humility	5.79	1.94	0.15*	0.15*			
4. Attitude ambivalence	2.58	2.93	0.14*	0.19*	0.56**		
5. Attitude favorability (prejudice) 1 ^a	33.38	27.33	0.08	0.11	0.49**	0.39**	
6. Attitude favorability (prejudice) 2 ^b	34.04	28.85	0.14*	0.13*	0.60**	0.55**	0.91**

Note. ^a pre-manipulation, ^b post manipulation; * $p < .05$, ** $p < .01$; Perceived responsiveness and intellectual humility were measured on a 1-to-9 scale, and attitude favorability was measured on a 0-to-100 scale. NA- not available

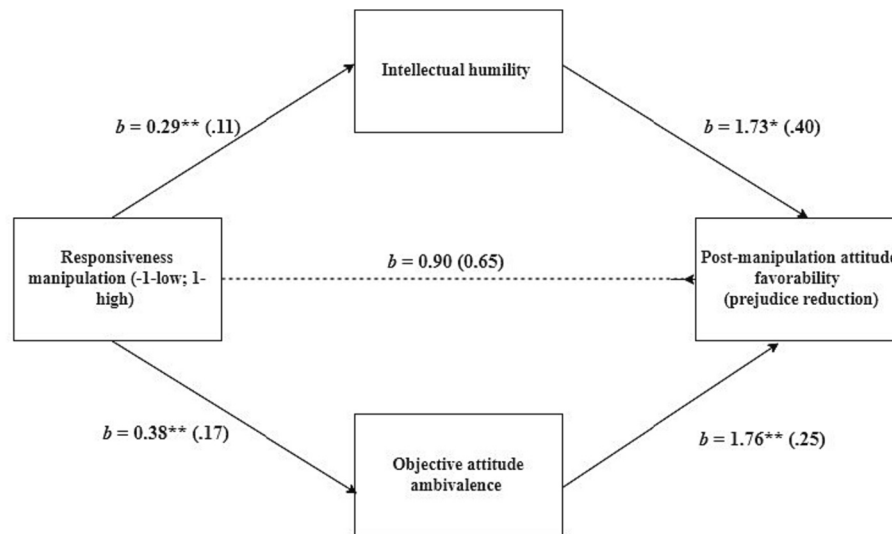


Fig. 2. Study 1: Mediation model for the effect of perceived responsiveness on prejudice reduction through intellectual humility and objective attitude ambivalence. ^apre-manipulation attitude favorability was used as a control variable.

results are possible. Therefore, we employed the Benjamini-Hochberg approach (Benjamini & Hochberg, 1995). This well-validated approach addresses the potential for false positives while maintaining statistical power, unlike other methods that involve substantial power loss (Narum, 2006; Thissen, Steinberg, & Kuang, 2002). We set a significance level of $\alpha = 0.05$ for a false discovery rate and computed p -values for the indirect effects ($ps = 0.027, 0.046$). A comparison of the original p -values to the Benjamini-Hochberg critical values indicated that the largest p -value (0.046) was smaller than its critical value (0.05). Thus, all the effects remained significant (Benjamini & Hochberg, 2000).

In sum, Study 1 provided support for all research hypotheses. Perceived responsiveness increased participants' intellectual humility, objective attitude ambivalence, and attitude favorability (reduced prejudice) toward the chosen social group.¹ Nevertheless, the lack of a control condition raises a key question: Do the responsiveness-induced effects stem from the positive consequences of high responsiveness, negative responsiveness, or both? Study 2 addressed this limitation.

5. Study 2

Study 2 had four goals. First, we wanted to test the source of perceived responsiveness on intellectual humility, attitude ambivalence, and prejudice reduction, namely, whether the effects obtained in Study

1 emerged because of the benefits of high perceived responsiveness, the harms of low perceived responsiveness, or both. Second, we wanted to provide a preregistered conceptual replication of Study 1. Third, we wanted to examine attitude certainty and attachment styles as possible moderators. We believed attachment styles might be relevant because prior research suggests that perceived non-responsiveness is strongly associated with both anxious and avoidant attachment (Reis & Clark, 2013). We tested attitude certainty as a potential moderator because attitudes held with greater certainty tend to be more resistant to change (Tormala & Petty, 2004; Tormala & Rucker, 2007). Finally, we also measured participants' intentions to behave open-mindedly toward the social group as an additional indicator of prejudice reduction.

5.1. Method

5.1.1. Participants

We recruited 748 participants from Prolific Academic in exchange for a monetary reward. We excluded 26 participants from the data analysis because, as described in the preregistration, they either failed to answer the instructional attention check item correctly or did not write the required essay in the manipulation. The final sample size was $N = 722$ ($M_{\text{age}} = 40.54$, $SD = 13.57$). Sensitivity analysis indicated that the smallest effect size that this sample size can detect with a power of 80% in a three-group between-participant design is Cohen's $f = 0.11$ (Faul et al., 2007).

5.1.2. Procedure

Participants first completed a consent form and measures of attachment style and attitude certainty. Afterward, they rated their attitude toward the following social groups. They chose the groups toward which

¹ For each study, we report moderation analysis of the most frequently selected stigmatized groups vs all the other groups combined in the supplementary materials. The supplementary materials also include moderation analyses of the most frequently chosen group with each dependent variable and an example essay.

they hold the most negative attitude: Gay and lesbian people (4.2%), transgender people (19.5%), illegal immigrants (61.8%), Muslims (12.2%), and Black people (2.4%), and wrote a brief essay about the group toward which they held the most *negative* attitude.

After writing the essay, we randomly assigned participants to high, control, or low perceived responsiveness conditions. Participants in the high ($n = 234$) and low ($n = 233$) responsiveness conditions received the same instructions as in Study 1. Participants in the non-informational control condition ($n = 255$) were instructed to list five characteristics of a person they are acquainted with but do not know well and do not have strong feelings about, positive or negative. This condition was used in prior research (Reis et al., 2018).

5.1.3. Measures

All measures ranged on a scale from 1 (*completely disagree*) to 9 (*completely agree*) unless noted otherwise.

Perceived responsiveness (manipulation check). We slightly modified a new perceived responsiveness measure (Crasta, Rogge, Maniaci, & Reis, 2021) to fit the experimental setting. The questionnaire consisted of ten items, for example: “the person I wrote about tries to see where I’m coming from ($\alpha = 0.98$).

Attachment style. We measured attachment style before the manipulation using the ECR-short form (Wei, Russell, Mallinckrodt, & Vogel, 2007). We computed scores for anxious ($\alpha = 0.76$) and avoidant ($\alpha = 0.82$) attachment styles.

Attitude certainty. We measured attitude certainty using a seven-item questionnaire (Petrocelli, Tormala, & Rucker, 2007). A sample item was: “How certain are you that you know what your true attitude toward the social group really is? ($\alpha = 0.95$).

Intellectual humility and attitude ambivalence. These measures were the same as in Study 1 ($\alpha_{\text{humility}} = 0.95$). Each item for the ambivalence measure ranged from 1 (*completely disagree*) to 9 (*completely agree*). The correlation between the positive and negative items was $r(719) = 0.57, p < .001$.

Attitude favorability (prejudice). We assessed attitude favorability (prejudice) with two measures. First, as in Study 1, participants rated their attitude favorability using the feeling thermometer before and after the manipulation. After the manipulation, we also included six pairs of items on a bipolar scale of attitude favorability toward the social group (e.g., Klein, Licata, Azzi, & Durala, 2003). This measure highlights the cognitive aspect of the attitude (hereafter, cognitive favorability). Sample pairs of items asked about the following item pairs: harmful-beneficial, negative-positive, and worst-best ($\alpha = 0.97$).

Open-minded behavior intentions. We measured open-minded behavior intentions for exploratory purposes and thus it was not pre-registered. This measure captures individuals’ intentions to behave open-mindedly with eight items (Itzhakov & Reis, 2021). For example: “To what extent are you willing to watch an interview with a person that advocates in favor of the opposite side of your attitude?” ($\alpha = 0.90$).

5.2. Results

Table 3 presents the descriptive statistics by experimental conditions. We used Least Significant Difference (hereafter: *LSD*) post-hoc tests for pairwise comparisons. Table 4 presents the overall descriptive statistics and correlations between the variables in the study.

Perceived responsiveness (manipulation check). An ANOVA indicated a main effect of the manipulation on perceived responsiveness, $F(2,719) = 663.96, p < .001, \eta_p^2 = 0.65$, Cohen’s $f = 1.53$. Specifically, perceived responsiveness in the high responsiveness condition was greater than in the control and low responsiveness conditions, $ps < 0.001$. Participants in the control condition reported greater perceived responsiveness than those in the low responsiveness condition. Thus, the manipulation was effective.

Intellectual humility. An ANOVA indicated a main effect of the responsiveness manipulation on intellectual humility, $F(2,719) = 14.06, p < .001, \eta_p^2 = 0.04$, Cohen’s $f = 0.20$. Intellectual humility was greater in the high responsiveness condition than in the control condition, $p = .008$, and low responsiveness condition, $p < .001$. Participants in the control condition reported greater intellectual humility than those in the low condition, $p = .006$.

Attitude ambivalence. An ANOVA indicated a main effect of the manipulation on attitude ambivalence, $F(2,717) = 10.95, p < .001, \eta_p^2 = 0.03$. Cohen’s $f = 0.17$. Attitude ambivalence was significantly greater in the high responsiveness condition than in the control condition, $p < .001$, and low responsiveness conditions, $p = .016$. Participants in the control condition showed significantly greater attitude ambivalence than those in the low condition, $p = .022$.

Attitude favorability (prejudice). A mixed ANOVA indicated a significant interaction between the groups and change in prejudice of attitude favorability by the experimental condition, $F(2,717) = 15.74, p < .001, \eta_p^2 = 0.04$, Cohen’s $f = 0.20$. There was a significant increase in attitude favorability in the high responsiveness condition, $M_{\text{difference}} = 3.52, SE_{\text{difference}} = 0.73, p < .001$. No change emerged in the control condition, $M_{\text{difference}} = -0.12, SE_{\text{difference}} = 0.70, p = .861$. Participants in the low responsiveness condition showed a significant reduction in attitude favorability, $M_{\text{difference}} = -2.22, SE_{\text{difference}} = 0.73, p = .002$.

An ANOVA indicated a main effect of the manipulation on cognitive favorability, $F(2,717) = 8.19, p < .001, \eta_p^2 = 0.02$, Cohen’s $f = 0.14$. Cognitive favorability was greater in the high responsiveness condition than in the control condition, $p = .040$, and in low responsiveness conditions, $p < .001$. Participants in the control condition reported greater cognitive favorability than those in the low condition, $p = .036$.

Open-minded behavior intentions. An ANOVA indicated a main effect of the manipulation of intentions to behave open-mindedly toward the social group, $F(2,714) = 7.75, p < .001, \eta_p^2 = 0.02$, Cohen’s $f = 0.14$. Open-minded behavior intentions were significantly greater in the high responsiveness condition than in the control condition, $p = .047$, and in the low responsiveness conditions, $p < .001$. A significant

Table 3
Study 2: Means and standard deviations by experimental conditions.

	Low responsiveness		Control condition		High responsiveness	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. Perceived responsiveness	3.06 ^a	1.47	5.62 ^b	1.73	7.99 ^c	1.09
2. Intellectual Humility	5.86 ^a	1.98	6.34 ^b	2.04	6.81 ^c	1.87
3. Attitude ambivalence	2.91 ^a	2.21	3.40 ^b	2.42	3.91 ^c	2.39
4. Attitude favorability (prejudice) 1 ^a	48.24 ^a	28.14	48.66 ^a	30.35	49.90 ^a	29.36
5. Attitude favorability (prejudice) 2 ^b	46.02 ^a	29.30	48.78 ^{ab}	30.73	53.11 ^b	30.73
6. Cognitive favorability (prejudice)	4.17 ^a	1.83	4.54 ^b	1.87	4.89 ^c	2.02
7. Open-minded behavior intentions	5.51 ^a	1.91	5.83 ^b	1.69	6.15	1.71 ^c

Notes. ^a pre-manipulation, ^b post manipulation; Different uppercase letter represents means significantly differing in rows (i.e., by experimental condition). All measures besides attitude favorability were measured on a 1-to-9 scale. Attitude favorability was measured on a 0-to-100 scale.

Table 4

Study 2: Descriptive statistics and correlation between the variables in the study.

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10
1. Experimental condition	NA	NA										
2. Perceived responsiveness	5.56	2.47	0.81**									
3. Intellectual humility	6.34	1.97	0.19**	0.15*								
4. Attitude ambivalence	3.41	2.37	0.17**	0.12**	0.25**							
5. Attitude favorability (prejudice) 1 ^a	48.93	29.30	0.02	0.05	0.34**	0.47**						
6. Attitude favorability (prejudice) 2 ^b	49.29	30.69	0.09*	0.11*	0.39**	0.49**	0.93**					
7. Cognitive favorability (prejudice)	4.53	1.93	0.15**	0.16**	0.28**	0.54**	0.67**	0.71**				
8. Anxious attachment	4.39	1.54	0.02	0.01	0.05	−0.02	0.04	0.04	0.05			
9. Avoidant attachment	3.13	1.44	−0.01	−0.11*	−0.04	−0.05	0.03	0.01	−0.01	0.20**		
10. Attitude certainty	5.32	2.10	−0.04	−0.04	−0.54**	−0.06	−0.19**	−0.24**	−0.14**	−0.07	−0.08	
11. Open-minded behavior intentions	5.83	1.78	0.15**	0.23**	0.35**	0.14**	0.20**	0.22**	0.18**	0.00	−0.12**	−0.16**

Notes. Groups were coded as 0- low responsiveness, 1- high responsiveness; ** $p < .01$, * $p < .05$; ^a pre-manipulation, ^b post-manipulation. All measures besides attitude favorability were measured on a 1-to-9 scale. Attitude favorability was measured on a 0-to-100 scale. NA- not available

difference also emerged between the control and low responsiveness conditions, $p = .043$.

5.2.1. Mediation analyses

We analyzed parallel mediation analyses with a categorical independent variable using Model 4 in PROCESS (Hayes, 2017) and a sequential coding system for the multicategorical independent variable.

Attitude favorability (prejudice). We controlled for pre-manipulation attitude favorability. When comparing the control condition and the low perceived responsiveness condition, the parallel indirect effect was significant through intellectual humility, $b = 0.47$, $SE = 0.22$, 95%CI [0.11, 0.96], and through objective attitude ambivalence, $b = 0.38$, $SE = 0.18$, 95%CI [0.07, 0.79]. The direct effect was not significant, $b = 1.51$, $SE = 0.99$, $p = .128$, 95%CI [−0.44, 3.45]. The total effect was significant, $b = 2.35$, $SE = 1.00$, $p = .019$, 95%CI [0.38, 4.33].

When comparing the high perceived responsiveness and control conditions, the parallel indirect effect was significant through intellectual humility, $b = 0.44$, $SE = 0.20$, 95%CI [0.10, 0.88], and through objective attitude ambivalence, $b = 0.40$, $SE = 0.19$, 95%CI [0.08, 0.84]. The direct effect was significant, $b = 2.59$, $SE = 0.99$, $p = .009$, 95%CI [0.65, 4.53]. The total effect was significant, $b = 3.43$, $SE = 1.00$, $p < .001$, 95%CI [1.45, 5.40] (see Fig. 3a).

Cognitive favorability (prejudice). When comparing the control and low perceived responsiveness conditions, the parallel indirect effect was significant through intellectual humility, $b = 0.07$, $SE = 0.03$, 95%CI [0.01, 0.14], and through objective attitude ambivalence, $b = 0.20$, $SE = 0.09$, 95%CI [0.04, 0.37]. The direct effect was not significant, $b = 0.10$, $SE = 0.15$, $p = .509$, 95%CI [−0.19, 0.38]. The total effect was significant, $b = 0.36$, $SE = 0.17$, $p = .035$, 95%CI [0.02, 0.70].

When comparing the high perceived responsiveness and control conditions, the parallel indirect effect was significant through intellectual humility, $b = 0.07$, $SE = 0.03$, 95%CI [0.02, 0.13], and through objective attitude ambivalence, $b = 0.21$, $SE = 0.09$, 95%CI [0.04, 0.40]. The direct effect was significant, $b = 0.07$, $SE = 0.15$, $p = .604$, 95%CI [−0.21, 0.31]. The total effect was significant, $b = 0.36$, $SE = 0.17$, $p = .040$, 95%CI [0.01, 0.70] (see Fig. 3b).

5.2.2. Discussion

The Supplementary Materials include moderation analyses of the most frequently chosen group with each dependent variable and pre-registered moderation analyses of attitude certainty, avoidance, and anxious attachment on the dependent variables, which were not significant.

Study 2 makes several contributions. First, it indicated that the effects of perceived responsiveness on intellectual humility, objective attitude ambivalence, and prejudice reduction emerge from both the

benefits of high perceived responsiveness and the harm of poor perceived responsiveness. It also replicated the parallel mediation of intellectual humility and attitude ambivalence on the relationship between responsiveness and prejudice. We also obtained evidence for convergent validity by observing supporting main effects with two measures of prejudice and a related measure of behavioral intentions. Contrary to our predictions, neither attitude certainty nor attachment styles moderated the responsiveness-prejudice relationships, suggesting that responsiveness reduces prejudice for individuals regardless of their certainty about their initial attitudes and regardless of their attachment insecurity. However, thus far, we measured prejudice toward pre-selected social groups, which may or may not be groups about which participants had strong or fixed feelings, thus limiting generalizability. It remains to be tested whether the effects will also emerge when participants are free to select the social group toward which they hold prejudiced attitudes. This was the goal of Study 3.

6. Study 3

The main goal of Study 3 was to replicate the effects obtained in the previous studies when allowing participants to choose freely the social group toward which they are most prejudiced. We also sought to evaluate another potential moderator- the moral basis of the attitude. Previous work has found that a moral basis—the extent to which an attitude is moralized (i.e., attitudes based on core moral beliefs and convictions; Skitka, 2010)—can influence susceptibility to attitude change (Luttrell, Petty, Briñol, & Wagner, 2016). Thus, perceived responsiveness might have a stronger effect on attitudes with a strong moral basis because it includes validating core values. Therefore, we examined attitude morality as a potential amplifier of the responsiveness-induced change in prejudice. The hypothesis, sample size, experimental conditions, and analysis plan were preregistered.

6.1. Participants

We recruited 619 participants via Prolific. Participants from Studies 1 or 2 were not eligible to participate. Of the 619 participants, 22 did not meet the inclusion criteria specified in the preregistration because they did not follow the instructions for the essay on their prejudiced attitude (e.g., they left the space blank or did not write about a specific group). Hence, they were excluded from the data analyses. The final sample size was $N = 597$ ($M_{age} = 31.9$ $SD = 11.22$). Sensitivity analysis indicated that the smallest effect size that this sample size can detect with a power of 80% in a three-group between-participant design is Cohen's $f = 0.11$ (Faul et al., 2007).

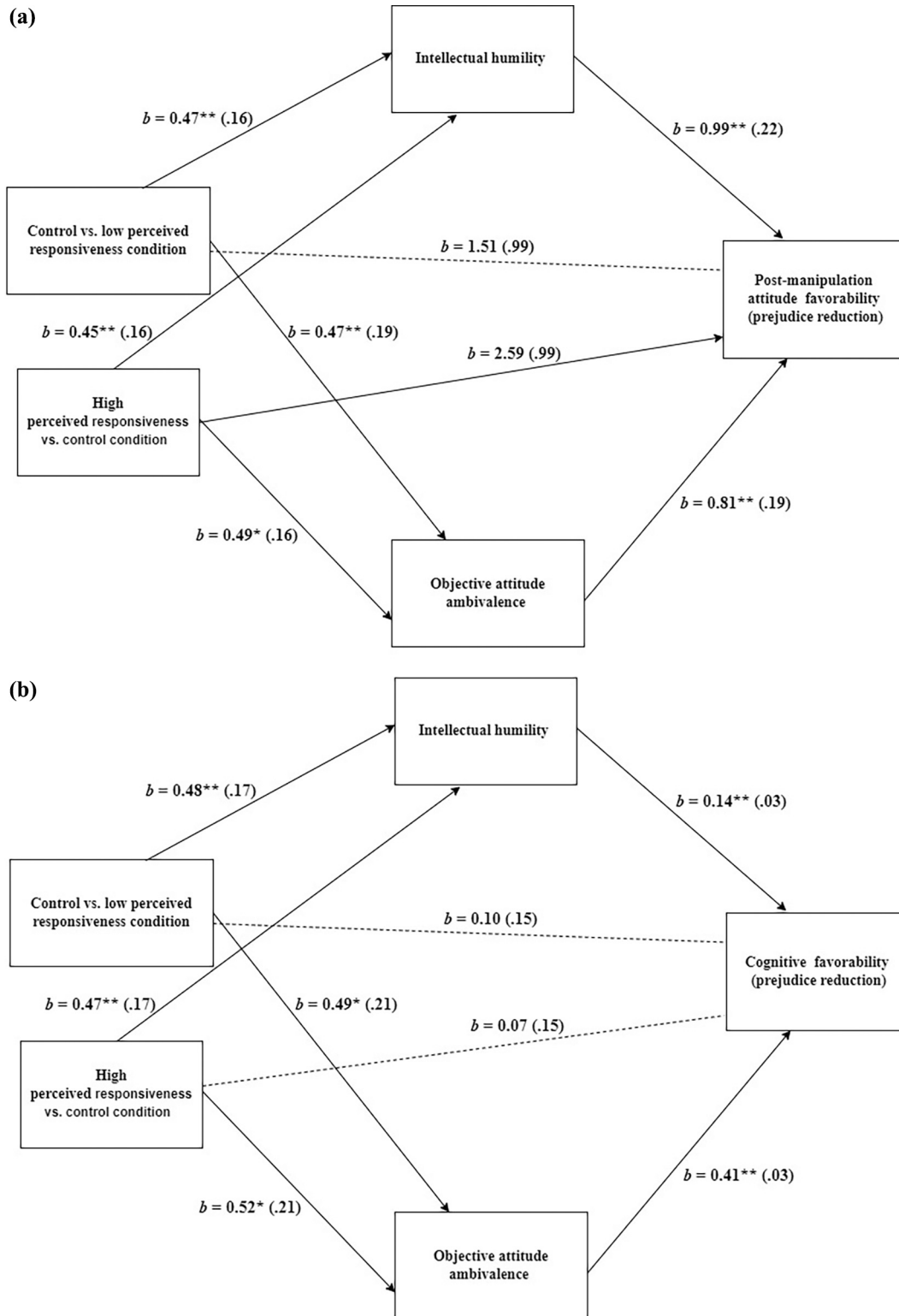


Fig. 3. a. Study 2: Categorical mediation model for the effect of perceived responsiveness on attitude favorability (prejudice reduction) through intellectual humility and objective attitude ambivalence. ^apre-manipulation attitude favorability was used as a control variable.
b. Study 2: Categorical mediation model for the effect of perceived responsiveness on cognitive favorability (prejudice reduction) through intellectual humility and objective attitude ambivalence.

6.1.1. Procedure

After completing a consent form, participants wrote an essay about a social group toward which they hold a negative attitude. The preface read:

“Everyone has different feelings toward individuals from different backgrounds or who have grown up in difficult circumstances – people who are different from them in some way. These feelings can change over time or remain the same.

Please write a brief essay about a social group toward which you have a negative attitude (for example, people of color, people from a specific ethnic group or nation, the elderly, homeless people, people with a different sexual or political orientation, etc.). The essay can describe your general attitude toward this specific group or your experience with a person from this social group.” Participants selected various social groups; more common examples were people on social welfare, the elderly, LGBT, vegans, Muslims, Gypsies, conservatives, and anti-vaxxers.

Afterward, the participants wrote the name of the social group and completed a measure of attitude morality. Subsequently, we randomly assigned them to a high perceived responsiveness ($n = 189$), control ($n = 223$), or low perceived responsiveness ($n = 185$) condition, using the same manipulation as in Study 2. Afterward, participants completed the mediators and dependent measures, were debriefed, and compensated.

6.1.2. Measures

All measures used scales ranging from 1 (*completely disagree*) to 9 (*completely agree*) unless noted otherwise.

Attitude morality. We measured attitude morality before the manipulation with the four-item Moral Conviction Scale (Skitka & Morgan, 2014). An example item was: “To what extent is your position on the social group you wrote about a reflection of your core moral beliefs and convictions?” ($\alpha = 0.93$).

Perceived responsiveness (manipulation check). We used the same perceived responsiveness measure as in Study 2 (Crasta et al., 2021) ($\alpha = 0.98$).

Intellectual humility and attitude ambivalence. These variables were measured as in the previous studies ($\alpha_{\text{intellectual humility}} = 0.94$). The correlation between the positive and negative items was $r(610) = 0.20$, $p < .001$.

Prejudice. We assessed prejudice with the same two measures as in Study 2 ($\alpha_{\text{cognitive attitude}} = 0.94$).

6.2. Results

Table 5 presents the descriptive statistics by the experimental conditions. We used *LSD* tests for pairwise post-hoc analyses. Table 6 presents the overall descriptive statistics and correlations between the variables in the study.

Perceived responsiveness (manipulation check). An ANOVA indicated a main effect of the manipulation on perceived responsiveness, $F(2,594) = 456.53$, $p < .001$, $\eta_p^2 = 0.61$, Cohen's $f = 1.45$. Specifically,

the mean of perceived responsiveness in the high responsiveness condition was greater than in the control and low responsiveness conditions, $ps < 0.001$. In addition, participants in the control condition reported greater perceived responsiveness than those in the low responsiveness condition, $p < .001$.

Intellectual humility. An ANOVA indicated a main effect of the responsiveness manipulation on intellectual humility, $F(2,594) = 14.67$, $p < .001$, $\eta_p^2 = 0.05$, Cohen's $f = 0.22$. IH was significantly greater in the high responsiveness condition than in the control condition, $p = .009$, and low responsiveness condition, $p < .001$. Participants in the control condition reported greater intellectual humility than those in the low responsiveness condition, $p = .003$.

Objective attitude ambivalence. An ANOVA indicated a main effect of the manipulation on objective attitude ambivalence, $F(2,594) = 11.41$, $p < .001$, $\eta_p^2 = 0.04$, Cohen's $f = 0.20$. Attitude ambivalence was greater in the high responsiveness condition than in the control condition, $p = .009$, and low responsiveness condition, $p < .001$. Participants in the control condition showed greater attitude ambivalence than those in the low condition, $p = .019$.

Attitude favorability (prejudice). A mixed ANOVA indicated a significant Condition $\times$ Time interaction on attitude favorability, $F(2,594) = 15.92$, $p < .001$, $\eta_p^2 = 0.05$, Cohen's $f = 0.22$. We observed a significant increase in attitude favorability in the high responsiveness condition, $M_{\text{difference}} = 4.99$, $SE_{\text{difference}} = 0.79$, $p < .001$. The differences in the control condition $M_{\text{difference}} = 1.417$, $SE_{\text{difference}} = 0.72$, $p = .051$, and low responsiveness condition, $M_{\text{difference}} = -1.29$, $SE = 0.79$, $p = .106$, were not significant.

Regarding the second prejudice measure, cognitive favorability, a significant main effect of the manipulation emerged, $F(2,594) = 7.90$, $p < .001$, $\eta_p^2 = 0.03$, Cohen's $f = 0.17$. Cognitive favorability was greater in the high responsiveness condition compared to the control condition, $p = .022$, and to the low responsiveness condition, $p < .001$. Participants in the control condition reported marginally greater attitude favorability than those in the low responsiveness condition, $p = .066$.

6.2.1. Mediation analyses

We conducted categorical mediation analyses as in Study 2.

Attitude favorability (prejudice). We controlled for pre-manipulation attitude favorability. When comparing the control and the low perceived responsiveness conditions, the parallel indirect effect was significant through intellectual humility, $b = 1.25$, $SE = 0.38$, 95% *CI* [0.54, 2.04], and through objective attitude ambivalence, $b = 1.20$, $SE = 0.44$, 95% *CI* [0.40, 2.10]. The direct effect was not significant, $b = -.012$, $SE = 0.90$, $p = .893$, 95% *CI* [-1.88, 1.64]. The total effect was significant, $b = 2.33$, $SE = 1.04$, $p = .026$, 95% *CI* [0.28, 4.38].

When comparing the high perceived responsiveness and the control conditions, the parallel indirect effect was significant through intellectual humility, $b = 0.77$, $SE = 0.33$, 95% *CI* [0.15, 1.45], and through objective attitude ambivalence, $b = 0.92$, $SE = 0.39$, 95% *CI* [0.21, 1.75]. The direct effect was significant, $b = 2.15$, $SE = 0.88$, $p = .015$, 95% *CI* [0.41, 3.88]. The total effect was significant, $b = 3.84$, $SE = 1.04$, $p < .001$.

Table 5

Study 3: Means and standard deviations by experimental conditions.

	High responsiveness		Control Condition		Low responsiveness	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Perceived responsiveness	8.12 ^a	0.96	5.51 ^b	1.91	3.25 ^c	1.59
Intellectual humility	5.27 ^a	2.08	4.74 ^b	2.06	4.14 ^c	1.93
Attitude ambivalence	2.23 ^a	1.86	1.75 ^b	1.73	1.32 ^c	1.96
Attitude favorability (prejudice) 1	19.80 ^a	17.42	18.16 ^a	16.23	20.48 ^a	18.16
Attitude favorability (prejudice) 2	24.79 ^a	19.72	19.47 ^{bc}	17.97	19.19 ^{bc}	15.95
Cognitive favorability (prejudice)	3.19 ^a	1.71	2.84 ^{bc}	1.62	2.55 ^{bc}	1.25

Notes. Higher values in the attitude favorability measures denote less prejudice toward the social group. The different uppercase letter represents means significantly differing in rows (i.e., by experimental condition). All measures besides attitude favorability were measured on a 1-to-9 scale. Attitude favorability was measured on a 0-to-100 scale.

Table 6

Study 3: Descriptive statistics and correlation between the variables in the study.

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Perceived responsiveness	5.64	2.48						
2. Attitude morality	5.40	2.48	−0.05					
3. Intellectual humility	4.72	2.07	0.22**	−0.09*				
4. Objective attitude ambivalence	1.77	1.88	0.25**	−0.08*	0.39**			
5. Attitude favorability (prejudice) 1	19.36	17.23	0.04	−0.07	0.37**	0.38**		
6. Attitude favorability (prejudice) 2	21.07	18.07	0.18**	−0.09*	0.54**	0.56**	0.80**	
7. Cognitive favorability (prejudice)	2.86	1.56	0.20**	−0.18**	0.53**	0.52**	0.59**	0.74**

Notes. ** $p < .01$, * $p < .05$. All measures besides attitude favorability were measured on a 1-to-9 scale. Attitude favorability was measured on a 0-to-100 scale.

.001, 95%CI [1.81, 5.88] (see Fig. 4a).

Cognitive favorability (prejudice). When comparing the control and low perceived responsiveness conditions, the parallel indirect effect was significant through intellectual humility, $b = 0.18$, $SE = 0.06$, 95% CI [0.07, 0.30], and through objective attitude ambivalence, $b = 0.13$, $SE = 0.06$, 95%CI [0.02, 0.25]. The direct effect was not significant, $b = -0.02$, $SE = 0.12$, $p = .835$, 95%CI [−0.27, 0.21]. The total effect was not significant, $b = 0.28$, $SE = 0.15$, $p = .066$, 95%CI [−0.02, 0.58].

When comparing the high perceived responsiveness and control conditions, the parallel indirect effect was significant through intellectual humility, $b = 0.15$, $SE = 0.06$, 95%CI [0.03, 0.28], and through objective attitude ambivalence, $b = 0.14$, $SE = 0.05$, 95%CI [0.04, 0.25]. The direct effect was not significant, $b = 0.05$, $SE = 0.12$, $p = .667$, 95% CI [−0.19, 0.29]. The total effect was significant, $b = 0.35$, $SE = 0.15$, $p = .021$, 95%CI [0.05, 0.65] (see Fig. 4b).

These results support the mediating roles of intellectual humility and attitude ambivalence in the effect of responses on prejudice reduction (hypothesis 4).

6.2.2. Brief discussion

Contrary to our prediction, Attitude morality did not moderate the effect of the perceived responsiveness manipulation on prejudice (see supplements). Moreover, as in Study 2, the large sample size resulted in small p -values that remained significant when conducting the Benjamini-Hochberg correction method for multiple comparisons.

In sum, Study 3 provided a preregistered conceptual replication of our findings in Studies 1 and 2. Notably, Study 3 increased the generalizability of our research by allowing participants to freely choose the social group toward which they feel prejudiced. In addition, the results of this study, in concert with the previous studies, suggest that the effect of perceived responsiveness on prejudice reduction is not limited to a specific attachment style (Study 1), levels of attitude certainty (Study 2), or attitude morality (Study 3).

Studies 1–3 were designed to establish a causal association between perceived responsiveness and prejudice reduction. However, the ecological validity of these findings and the underlying mediation model have yet to be examined. That is, are people who perceive higher levels of responsiveness by their meaningful others in their everyday lives less prejudiced toward social outgroups than people who perceive less responsiveness? We conducted Study 4 to address this question.

7. Study 4

The goals of Study 4 were twofold. First, we wanted to examine in a more naturalistic setting whether experiencing perceived responsiveness from members of one's closest social network would predict levels of prejudice. A positive answer to this question would provide ecological validity for the model, which was supported in Studies 1–3. Second, we wanted to conceptually replicate the finding of Study 2 that the responsiveness of one's social network predicts intentions to behave open-mindedly toward the prejudiced group. As in the previous studies, we preregistered all research hypotheses, required sample size, and measures.

7.1. Method

7.1.1. Participants

Undergraduates from a University in Israel took part in the study in exchange for course credit, $N = 429$.² Of these participants, 28 completed only the first-wave questionnaires, and 13 of the participants who completed the two waves of data collection did not follow the instructions regarding the description of their closest social network (e.g., they wrote a meaningless combination of letters or left the space blank). Thus, consistent with our preregistration, 41 participants were excluded from the data analyses. The final sample size was $N = 388$ ($M_{\text{age}} = 27.09$, $SD = 7.42$). Of these participants, 87.2% were Jewish, 1.8% were Christians, 7% were Muslims, 2.8% were Druze, and 1.3% had other religions. Sensitivity analysis indicated that the weakest explained variance that this sample size can detect, with a power of 80% in regression analyses with four predictors, is $R^2 = 0.02$.

7.1.2. Procedure

This study consisted of two phases spaced three days apart. In the first phase, participants indicated their closest social network, namely, the social group closest to them, and wrote a brief description of this group. Most participants (77.7%) chose their family as their closest social network, 19.5% chose their friends, 1.8% chose their colleagues, and 0.5% chose their community or another network that was not part of the options. Participants then responded to a perceived responsiveness questionnaire referring to this network. We conducted the study's second phase three days later so that the IV and DVs would not be collected on the same day. Participants indicated their attitude toward the following social groups and selected the group toward which they held the most negative attitude: Jewish Orthodox (20.1%), illegal immigrants (51.9%), transgender people (17.7%), gay and lesbian people (8.7%), and people of color (1.5%). Participants also indicated the extent to which they believed it was socially acceptable to hold a prejudiced attitude toward each group, as well as their current positive and negative affect. Afterward, participants were debriefed and received course credit.

7.2. Measures

The measures were administered in Hebrew. Unless otherwise noted, response options ranged on a scale from 1 (*not at all*) to 9 (*very much*) on Likert-type scales.

Perceived responsiveness (Time 1). We used the same measure as in Studies 2 and 3 (Crasta et al., 2021; $\alpha = 0.92$).

Prejudice (Time 2). We used the same measures as in Studies 2 and 3 ($\alpha_{\text{cognitive favorability}} = 0.88$).

Open-minded behavior intentions (Time 2). We used the same measure as in Study 2 in the second phase (Itzhakov & Reis, 2021; $\alpha = 0.89$).

² A higher number of participants signed up for the study than the sample size we preregistered. Our IRB requires that we allow each student who registered to participate.

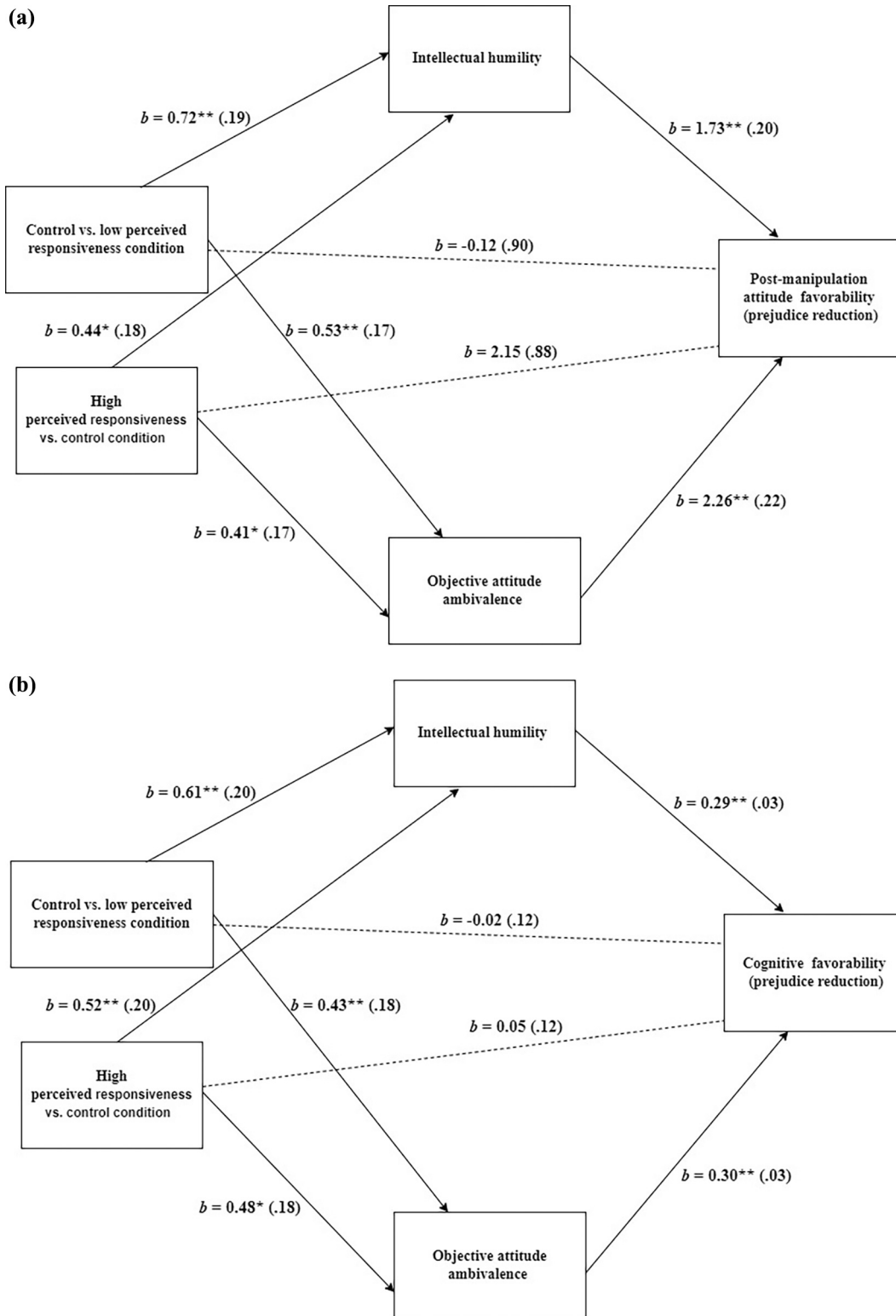


Fig. 4. a. Study 3: Categorical mediation model for the effect of perceived responsiveness on attitude favorability (prejudice reduction) through intellectual humility and objective attitude ambivalence. ^apre-manipulation attitude favorability was used as a control variable.
b. Study 3: Categorical mediation model for the effect of perceived responsiveness on cognitive favorability (prejudice reduction) through intellectual humility and objective attitude ambivalence.

Control variables (Time 2). We measured positive ($\alpha = 0.90$) and negative affect ($\alpha = 0.91$) as control variables in the study's second phase. We also assessed the perceived social desirability of holding prejudiced attitudes toward the group participants selected with the item: "The next question relates to the social group you reported having the most negative attitude. How much do you think it is acceptable in the company to hold a negative attitude toward this group."

7.3. Results

Table 7 presents the results of the multiple regression analyses. Table 8 presents the descriptive statistics and correlations between the variables in the study.

Attitude favorability (prejudice). Perceived responsiveness by the individual's closest social network at time 1 predicted higher attitude favorability (lower prejudice) regarding the selected social group at time 2, controlling for positive affect, negative affect, and social desirability, $\beta = 0.22$, $t = 4.19$, $p < .001$. Perceived partner responsiveness also predicted higher attitude favorability without the control variables, $\beta = 0.25$, $t = 4.98$, $p < .001$. A similar pattern emerged for cognitive favorability with the control variables, $\beta = 0.17$, $t = 3.20$, $p = .002$, and without them, $\beta = 0.16$, $t = 3.16$, $p = .002$ (Table 4).

Open-minded behavior intentions. Perceived responsiveness at time 1 predicted greater intentions to act open-mindedly toward the selected social group at time 2, controlling for positive affect, negative affect, and social desirability, $\beta = 0.15$, $t = 2.73$, $p = .007$. The results were similar without the control variables, $\beta = 0.17$, $t = 3.39$, $p < .007$.

7.3.1. Mediation analyses

Is the association between perceived responsiveness and open-minded behavior intentions mediated by attitude favorability toward the social outgroup? We evaluated two mediation models using Model 4 in PROCESS (Hayes, 2017). We submitted perceived responsiveness at

Time 1 as the predictor variable, attitude favorability at Time 2 as the mediator, positive affect (Time 1), negative affect (Time 1), and social desirability (Time 2) as covariates, and behavior intentions at Time 2 as the outcome variable. The indirect effect was significant, $b = 0.08$, $SE = 0.03$, 95%CI [0.06, 0.18], but the direct effect was not significant, $b = 0.08$, $SE = 0.07$, $p = .26$, 95%CI [-0.06, 0.21] (Fig. 5a). The mediation analyses did not change when the model did not include the control variables. In this instance, the indirect effect from perceived responsiveness to behavior intentions through attitude favorability was significant, $b = 0.13$, $SE = 0.03$, 95%CI [0.08, 0.17]. The direct effect was not significant, $b = 0.10$, $SE = 0.06$, $p = .12$, 95%CI [-0.03, 0.23].

Next, we considered cognitive favorability as the mediator. The indirect effect was significant, $b = 0.07$, $SE = 0.03$, 95%CI [0.03, 0.14], whereas the direct effect was not significant, $b = 0.11$, $SE = 0.07$, $p = .08$, 95%CI [-0.01, 0.26] (Fig. 5b). The results did not change when the control variables were not in the model. The indirect effect from perceived responsiveness to behavior intentions through cognitive favorability was significant, $b = 0.07$, $SE = 0.03$, 95%CI [0.02, 0.13]. The direct effect was significant, $b = 0.16$, $SE = 0.06$, $p = .01$, 95%CI [0.03, 0.29].

7.3.2. Discussion

As in Study 1, we conducted auxiliary analyses to test the interaction between perceived responsiveness and prejudice for participants who selected Jewish Orthodox (arguably liberals) vs. participants who selected the other groups (arguably conservative). Unlike Study 1, interaction effects on the two measures of prejudice were not significant, $ps \geq 0.34$. As in the previous studies, the adjusted p -values remained significant when conducting the Benjamini-Hochberg test to control for the family-wise error rate.

In sum, Study 4 supported Hypothesis 1; namely, higher levels of perceived responsiveness predicted lower levels of prejudice. In addition, lower prejudice (increased attitude favorability) was associated

Table 7

Study 4: Standardized regression coefficients and model summary.

Variable	General attitude Favorability (prejudice)				Cognitive favorability (prejudice)			Open-minded behavior intentions		
	B	t	p	β	t	p		β	t	p
Constant	NA	-0.77	0.44	NA	3.56	<0.001		NA	5.22	<0.001
Perceived responsiveness	0.22**	4.19	<0.001	0.17**	3.19	0.002		0.15**	2.73	0.007
Positive affect	0.07	1.30	0.19	0.06	1.23	0.22		0.15**	2.93	0.004
Negative affect	-0.04	-0.83	0.40	0.04	0.80	0.43		-0.01	-0.21	0.84
Social desirability	-0.05	-0.90	-0.37	-0.12*	-2.33	0.02		-0.09	-1.67	0.095
Model summary										
				F		p				R ²
Attitude favorability (prejudice)				6.53**		<0.001				0.07
Cognitive favorability (prejudice)				3.99**		0.004				0.04
Open-minded behavior intentions				5.25**		<0.001				0.05

Notes. ** $p < .01$, * $p < .05$. NA- not available

Table 8

Study 4: Descriptive statistics and correlations between the variables in the study.

	M	SD	1	2	3	4	5	6
1. Perceived responsiveness (Time 1)	7.71	1.23						
2. Positive affect (Time 2)	5.10	1.81	0.20**					
3. Negative affect (Time 2)	2.86	1.62	-0.27**	-0.07				
4. Social desirability (Time 2)	5.99	2.12	0.17**	0.18**	0.01			
5. General attitude favorability (Prejudice; Time 2)	27.97	25.51	0.25**	-0.03	-0.11*	0.002		
6. Cognitive favorability (Prejudice; Time 2)	3.69	1.56	0.16**	0.18**	-0.002	-0.08	0.53**	
7. Open-minded behavior intentions (Time 2)	5.27	1.71	0.17**	0.17**	0.01	-0.04	0.42**	0.37**

Notes. ** $p < .01$, * $p < .05$. All measures besides general attitude favorability were measured on a 1-to-9 scale. General attitude favorability was measured on a 0-to-100 scale.

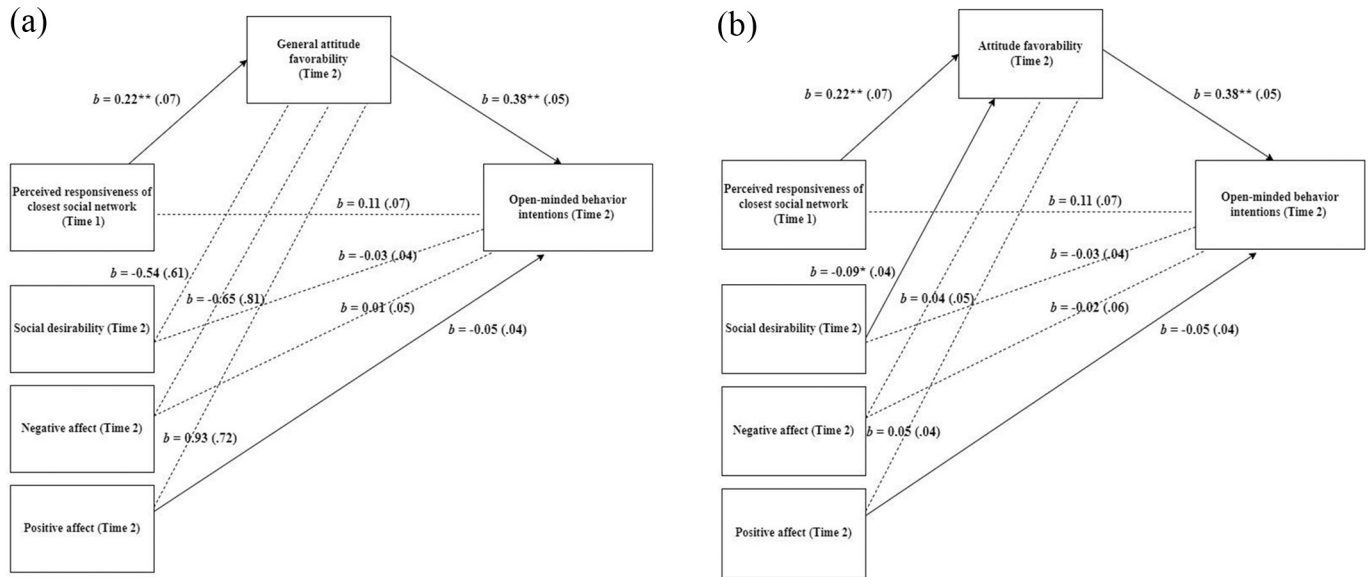


Fig. 5. a. Study 4: Mediation model for the effect of perceived responsiveness on open-minded behavior intentions through attitude favorability with social desirability, negative affect, and positive affect as covariates. ^apre-manipulation attitude favorability was used as a control variable.

b. Study 4: Mediation model for the effect of perceived responsiveness on open-minded behavior intentions through cognitive favorability with social desirability, negative affect, and positive affect as covariates.

with higher open-minded behavioral intentions. Thus, Study 4 contributed ecological validity to our model by focusing on existing social networks. A strength of the study is that perceived responsiveness and prejudice were assessed on different days. In future research, assessing both variables at multiple and perhaps lengthier intervals would be desirable to permit cross-lagged analyses, offering insights into whether responsiveness accurately forecasts changes in prejudice over an extended duration.

The supplemental materials report moderation analyses of the most frequently chosen group with each dependent variable – specifically, the interaction between the experimental condition and the most frequently chosen group on the attitudinal and behavioral intention measures. Contrary to Study 1, we did not find an interaction.

8. Study 5

Study 4 indicated that the effects of perceived responsiveness on prejudice hold when controlling for positive and negative affect. However, the three manipulations in Studies 1–3 might be viewed as simultaneously activating perceived responsiveness and positive interaction with a close other since responsive interactions are usually experienced as affectively positive. Thus, the effects reported to this point may be driven by recollections of positive interaction rather than perceiving a meaningful other as responsive. Prior research provides mixed evidence regarding the effect of positive mood on prejudice. For example, individuals in a positive mood exhibited lower prejudice when their goal involved establishing rapport with a conversational partner who outwardly embraced egalitarian beliefs (Lai, Hoffman, & Nosek, 2013). However, when they lacked the motivation to connect with their partner or failed to infer their partner's egalitarian stance, a positive mood did not reduce prejudice (Huntsinger, Sinclair, Dunn, & Clore, 2010). Therefore, we thought it best to determine whether the effects of perceived responsiveness on prejudice exist above and beyond positive affect and should be addressed with additional data. Accordingly, to rule out the possibility that our prior results were driven by recalling a positive social experience, we contrasted our perceived responsiveness manipulation with an affectively pleasant but non-responsive condition. As with the previous studies, this study was preregistered.

8.1. Method

8.1.1. Participants

We aimed to conduct a high-powered study and therefore recruited 1405 participants. An independent coder, who was blind to the research hypotheses, excluded 19 participants for failing to respond to the instructions of their condition or for writing irrelevant content in their essays. The final sample size was 1386 participants ($M_{age} = 34.02$, $SD_{age} = 12.31$; 48.2% male, 49.6% female, 2.2% non-binary/third gender). Sensitivity analysis indicated that the smallest effect size this sample can detect in a between-participant design with three groups is Cohen's $f = 0.08$ (Faul et al., 2007).

8.1.2. Procedure

Participants first signed a consent form, and then, as in Study 3, freely selected a social group toward whom they held a negative attitude, rated their attitude toward the group on the thermometer scale, and then wrote a brief essay describing their bias. As in Study 3, participants chose a wide range of social groups, such as homeless people, KKK, Republicans, Democrats, Transgender people, rich people, Muslims, immigrants, obese people, the elderly, and Native Americans. Examples of essays are provided in the supplementary materials.

Afterward, we randomly assigned participants to three experimental conditions: High perceived responsiveness ($n = 453$), control ($n = 443$), and positive social interaction ($n = 490$). The high responsiveness and control conditions were similar to those in the previous studies. The positive social interaction condition was new to this study. We used instructions that resembled previous work (Abeyta, Routledge, & Juhl, 2015; Mikulincer, Hirschberger, Nachmias, & Gillath, 2001). To distinguish perceived responsiveness (which is usually a positive affective experience) from positive affect, we asked participants to think about a time they had a pleasant interaction with someone they were acquainted with but did not know well. Specifically, participants were requested to: "Please describe a time you did something pleasant with someone you are acquainted with but do not know well and who neither likes nor dislikes you. This could be watching a movie, TV show, sports game, or any other activity, and you enjoyed the experience." We provided participants with five essay boxes to list their thoughts to equate this condition with the other control condition, where we asked

Table 9

Study 5: Means and standard deviations by experimental conditions.

	High perceived responsiveness		Positive social interaction		Control condition	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Perceived responsiveness	7.86 ^a	0.99	5.92 ^b	1.43	5.12 ^c	1.82
Intellectual humility	5.40 ^a	2.15	4.95 ^b	2.24	5.01 ^b	2.16
Attitude ambivalence	1.74 ^a	3.10	0.91 ^b	2.59	0.78 ^b	2.70
Positive affect	5.75 ^a	1.75	5.58 ^a	1.72	5.03 ^b	1.81
Negative affect	2.32 ^a	1.44	2.41 ^a	1.41	2.50 ^a	1.56
Attitude favorability (prejudice) 1	21.54 ^a	20.67	21.74 ^a	20.61	19.68 ^a	18.11
Attitude favorability (prejudice) 2	28.47 ^a	22.54	24.61 ^b	21.74	23.67 ^b	21.41
Cognitive favorability (prejudice)	3.73 ^a	1.99	3.34 ^b	1.75	3.21 ^b	1.68

Notes. Higher values in the attitude favorability measures denote less prejudice toward the social group. The different uppercase letter represents means significantly differing in rows (i.e., by experimental condition). All measures besides attitude favorability were measured on a 1-to-9 scale. Attitude favorability was measured on a 0-to-100 scale.

Table 10

Study 5: Descriptive statistics and correlation between the variables in the study.

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Perceived responsiveness	6.30	1.84							
2. Positive affect	5.46	1.78	0.22**						
3. Negative affect	2.41	1.47	−0.22**	−0.12**					
4. Intellectual humility	5.12	2.20	0.12**	0.03	0.03				
5. Attitude ambivalence	1.14	2.83	0.14**	0.09**	0.02	0.43**			
6. Attitude favorability (prejudice)1	21.03	19.87	0.02	0.07*	0.03	0.43**	0.31**		
7. Attitude favorability (prejudice)2	25.57	21.98	0.10**	0.10**	0.04	0.49**	0.47**	0.74**	
8. Cognitive favorability (prejudice)	3.43	1.82	0.12**	0.11**	0.06*	0.41**	0.44**	0.43**	0.61**

Notes. ** $p < .01$, * $p < .05$. All measures besides attitude favorability were measured on a 1-to-9 scale. Attitude favorability was measured on a 0-to-100 scale.

participants to describe five characteristics of the target person.³ Afterward, participants completed questionnaires containing the research variables and demographics and were debriefed and compensated.

8.1.3. Measures

All measures ranged from 1 (*completely disagree*) to 9 (*completely agree*) unless noted otherwise. We used the same measures as in the previous studies: perceived responsiveness ($\alpha = 0.96$), intellectual humility ($\alpha = 0.95$), objective attitude ambivalence (correlation between the positive and negative items, $r(1,384) = -0.50$, $p < .001$) and cognitive favorability ($\alpha = 0.94$). Attitude favorability (pre-and-post manipulation) was measured as in the previous studies with the feeling thermometer scale and ranged between 0 and 100. We also measured positive affect ($\alpha = 0.90$) and negative affect ($\alpha = 0.88$) using the PANAS scale (Watson, Clark, & Tellegen, 1988) as control variables.

8.2. Results

8.2.1. Main effects

Table 9 presents the descriptive statistics by the experimental conditions. We used *LSD* tests for pairwise post-hoc comparisons. Table 10 presents the overall descriptive statistics and correlations between the variables in the study.

Perceived responsiveness (manipulation check). An ANOVA indicated a main effect of the manipulation on perceived responsiveness, $F(2, 1383) = 423.79$, $p < .001$, $\eta_p^2 = 0.38$, Cohen's $f = 0.64$. Specifically, perceived responsiveness in the high responsiveness condition was higher than in the control condition, and the positive social interaction condition, $ps < 0.001$. Participants in the positive social interaction condition reported higher perceived responsiveness than those in the condition, $p < .001$.

Intellectual humility. An ANOVA indicated a main effect of the responsiveness manipulation on intellectual humility, $F(2, 1383) =$

5.92, $p = .003$, $\eta_p^2 = 0.01$, Cohen's $f = 0.10$. IH was higher in the high responsiveness condition than in the control condition, $p = .007$, and the positive social interaction condition, $p = .001$. IH did not differ between the group and the positive social interaction conditions, $p = .656$.

Attitude ambivalence. An ANOVA indicated a main effect of the manipulation on attitude ambivalence, $F(2, 1383) = 15.61$, $p < .001$, $\eta_p^2 = 0.02$, Cohen's $f = 0.14$. Attitude ambivalence was higher in the high responsiveness condition than in the control and positive social interaction conditions, $ps < 0.001$. Attitude ambivalence did not differ between participants in the control and positive social interaction conditions, $p = .467$.

Positive affect. An ANOVA indicated a main effect of the manipulation on attitude ambivalence, $F(2, 1383) = 20.31$, $p < .001$, $\eta_p^2 = 0.03$, Cohen's $f = 0.17$. There was no difference in positive affect between the high responsiveness and positive social interaction conditions, $p = .144$. However, the high responsiveness and positive social interaction conditions induced higher positive affect than the control condition, both $ps < 0.001$.

Negative affect. An ANOVA did not indicate a main effect on negative affect, $F(2, 1383) = 1.65$, $p = .191$, $\eta_p^2 = 0.002$, Cohen's $f = 0.04$. Specifically, the high perceived responsiveness did not induce different negative affect scores relative to the control and positive social interaction conditions, $ps = 0.325$ 0.069, respectively. There was also no difference between the control and positive social interaction conditions, $p = .382$.

Attitude favorability (Prejudice). A mixed ANOVA indicated a significant Condition $\times$ Time interaction on attitude favorability, $F(2, 1383) = 8.99$, $p < .001$, $\eta_p^2 = 0.01$, Cohen's $f = 0.10$. We observed a significant increase in attitude favorability in all the conditions. However, the increase in the high perceived responsiveness condition, $M_{\text{difference}} = 6.93$, $SE = 0.71$, was significantly higher than in the control, $M_{\text{difference}} = 3.99$, $SE = 0.72$, and positive social interaction conditions, $M_{\text{difference}} = 2.87$, $SE = 0.68$.

Cognitive favorability (prejudice). An ANOVA indicated a main effect on the second measure of attitude favorability (prejudice), $F(2, 1383) = 10.09$, $p < .001$, $\eta_p^2 = 0.01$, Cohen's $f = 0.10$. Participants in the

³ We did not require participants to complete fill-in boxes.

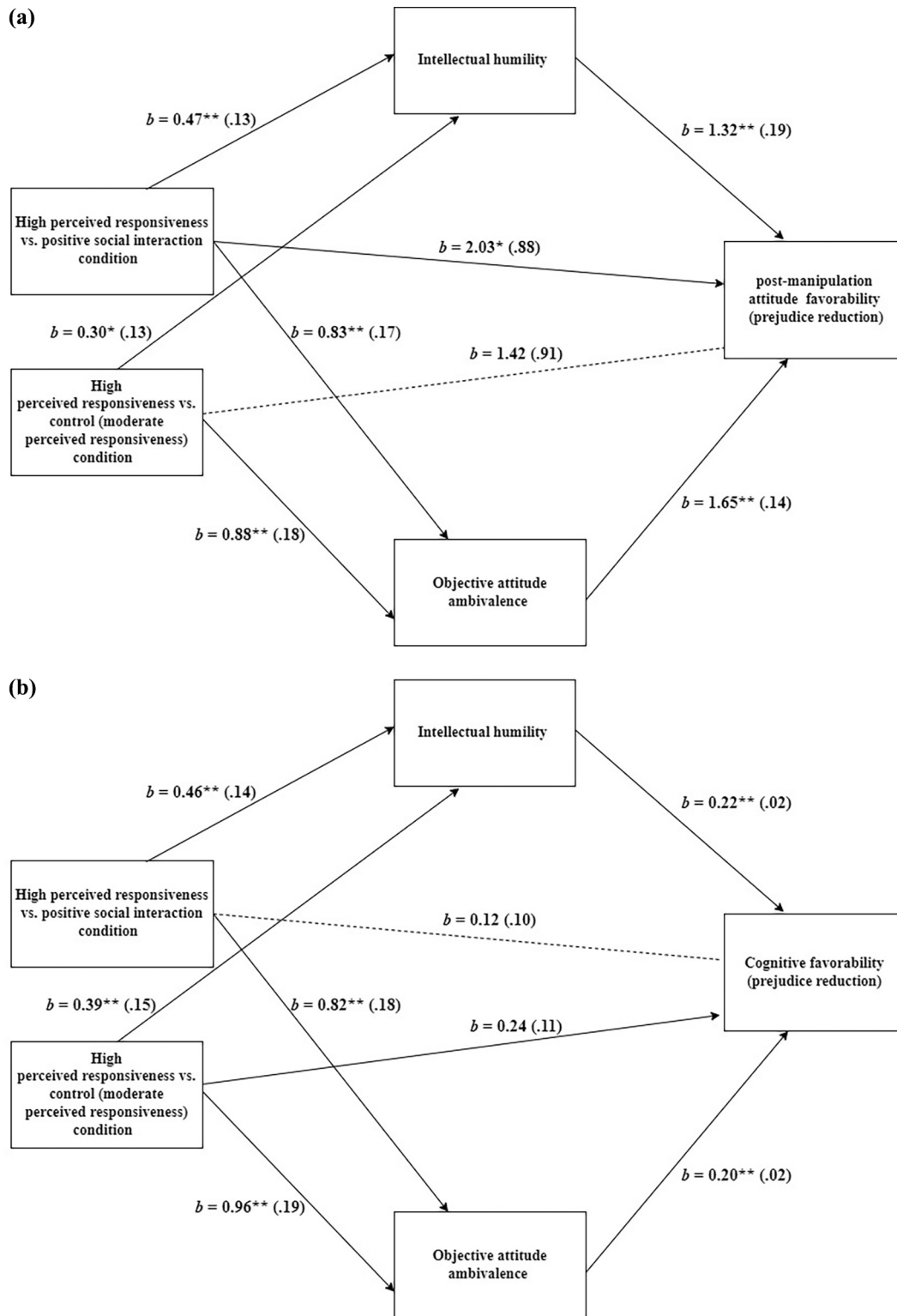


Fig. 6. a. Study 5: Categorical mediation model for the effect of perceived responsiveness on attitude favorability (prejudice reduction) through intellectual humility and objective attitude ambivalence. ^apre-manipulation attitude favorability was used as a control variable.

b. Study 5: Categorical mediation model for the effect of perceived responsiveness on cognitive favorability (prejudice reduction) through intellectual humility and objective attitude ambivalence.

high perceived responsiveness condition reported higher attitude favorability toward the social group they selected than participants in the control and positive social interaction conditions, $ps < 0.00$. There was no difference between the control and positive social interaction conditions, $p = .264$.

In the supplementary materials, we report results for all the main effects, controlling for positive and negative affect. As can be seen there, the main effects of the condition remained significant above and beyond positive and negative affect for all dependent variables.

8.2.2. Mediation analyses

As in Study 3, we conducted categorical parallel mediation analyses using Model 4 in PROCESS (Hayes, 2017). Different from Studies 2 and 3, Study 5 had two control conditions rather than lower levels of responsiveness. Therefore, we used an indicator coding system for the categorical independent variable (i.e. the experimental condition).

Attitude favorability (Prejudice). We controlled for pre-manipulation attitude favorability. When comparing the high perceived responsiveness and the positive social interaction conditions, the parallel indirect effects were significant through intellectual humility, $b = 0.62$, $SE = 0.21$, 95%CI [0.25, 1.07], and through objective attitude ambivalence, $b = 1.37$, $SE = 0.34$, 95%CI [0.76, 2.07]. The direct effect was significant, $b = 2.03$, $SE = 0.88$, $p = .022$, 95%CI [0.29, 3.76] as was the total effect, $b = 4.02$, $SE = 0.95$, $p = .026$, 95%CI [2.14, 5.89].

Similar results were observed when comparing the high perceived responsiveness and control (i.e. moderate perceived responsiveness) conditions. The parallel indirect effects were significant through intellectual humility, $b = 0.40$, $SE = 0.18$, 95%CI [0.06, 0.79], and objective attitude ambivalence, $b = 1.45$, $SE = 0.36$, 95%CI [0.80, 2.22]. The direct effect was not significant, $b = 1.42$, $SE = 0.91$, $p = .116$, 95%CI [-0.36, 3.20]. The total effect was significant, $b = 3.28$, $SE = 0.98$, $p < .001$, 95%CI [1.35, 5.20] (see Fig. 6a).

Cognitive favorability (prejudice). When comparing the high perceived responsiveness and positive social interaction conditions, the parallel indirect effect was significant through intellectual humility, $b = 0.10$, $SE = 0.03$, 95%CI [0.04, 0.17], and through objective attitude ambivalence, $b = 0.17$, $SE = 0.04$, 95%CI [0.09, 0.25]. The direct effect was not significant, $b = 0.12$, $SE = 0.10$, $p = .254$, 95%CI [-0.08, 0.32]. The total effect was significant, $b = 0.39$, $SE = 0.12$, $p = .001$, 95%CI [0.16, 0.62].

Similar results emerged when comparing the high perceived responsiveness and control (moderate perceived responsiveness) conditions. The parallel indirect effect was significant through intellectual humility, $b = 0.09$, $SE = 0.03$, 95%CI [0.02, 0.16], and through objective attitude ambivalence, $b = 0.19$, $SE = 0.04$, 95%CI [0.11, 0.29]. The direct effect was significant, $b = 0.24$, $SE = 0.11$, $p = .025$, 95%CI [0.03, 0.45]. The total effect was significant, $b = 0.52$, $SE = 0.12$, $p < .001$, 95%CI [0.28, 0.76] (see Fig. 6b).

As in the previous studies, all p -values remained significant when conducting the Benjamini-Hochberg correction method.

8.2.3. Discussion

The supplementary materials include a moderation analysis of pre-manipulation attitude favorability on the relationship between the experimental condition and post-manipulation attitude favorability. It also includes serial mediation analysis.

In sum, Study 5 provided evidence that the active ingredient in our manipulation relates to perceived responsiveness rather than a positive feeling that stems from social interaction. The positive social interaction condition did not differ from the high-perceived responsiveness condition in the level of positive affect it induced. However, both had significantly higher means of positive affect than the control condition. Because the perceived responsiveness manipulation check revealed a

significant difference between the high responsiveness and the two control conditions, we can conclude that perceived responsiveness rather than positive affect was responsible for the obtained reduction in prejudice. Together with the categorical mediation analyses, Study 5 establishes that the effects of responsiveness on the dependent variables hold beyond whatever incidental positive affect the responsiveness manipulation may have induced.

9. Mini-meta analysis

We conducted a random-effects mini-meta analysis to obtain insight into the average effect sizes and their heterogeneity (Goh, Hall, & Rosenthal, 2016). We used the R package “metaphor” (Viechtbauer, 2010). Because we are interested in the effects of high perceived responsiveness, in Studies 3 and 5, we calculated Cohen’s d , which compared the experimental and two control groups combined. In Study 4, we converted the correlations between perceived responsiveness attitudinal outcomes and open-minded behavior intentions into Cohen’s d . Table 11 presents the results. As can be seen in the table, the effect size of the perceived responsiveness manipulation on the dependent variables ranged between 0.29 and 0.34.

The average effect size on the dependent variables was $0.29 \leq d \leq 0.34$ and showed heterogeneity in the attitude favorability measure but not in cognitive favorability, intellectual humility, and attitude ambivalence. These effects fall between small and medium by the classic standard (Cohen, 1988); however, according to a more recent analysis, this range of effects is between the 35th and 40th percentile (Gignac & Szodorai, 2016). Moreover, Funder and Ozer (2019) note that an effect size of $r = 0.20$ indicates a medium effect of explanatory and practical use in the short run and, therefore, is meaningful.

10. General discussion

This research was designed to test whether perceived partner responsiveness has the potential to reduce prejudice. We supported this hypothesis in five studies (four of which were randomized experiments) and established mediating roles of intellectual humility and objective attitude ambivalence. These effects were observed when participants selected an outgroup from a list (Studies 1, 2, and 4) or freely chose the social group in question (Studies 3 and 5). Furthermore, perceived responsiveness increased intentions to act open-mindedly toward groups that are targets of prejudice (Studies 2 and 4). In this work, we measured prejudice (attitude favorability) with an affective measure (feeling thermometer; all studies) and a cognitive measure (Studies 2–5), documenting that the effect is not limited to either measure of prejudice. We also found no evidence to support moderation of these effects by attitude certainty (Study 2), anxious or avoidant attachment style (Study 2), or attitude morality (Study 3). In Study 4, we extended the generalizability of our laboratory experiments by showing that the experience of responsiveness from a person’s natural social network predicted lesser general prejudice. Finally, Study 5, a highly powered ($N = 1386$) and preregistered study, indicated that the effects of perceived responsiveness held above and beyond a recollected experience of positive social interaction.

Table 11

A meta-analysis of the variables ($N = 3362$).

Variable	k	d	LL	UL	SE	Z	p	τ	Q	df	$p(Q)$
Perceived responsiveness (manipulation check)	4	2.26	1.51	3.00	0.38	5.96	< 0.001	0.75	248.45	3	< 0.001
Intellectual humility	4	0.31	0.21	0.41	0.05	6.25	< 0.001	0.09	23.35	3	< 0.001
Objective attitude ambivalence	4	0.34	0.30	0.37	0.02	17.89	< 0.001	0.02	1.48	3	= 0.689
Attitude favorability (prejudice)	5	0.30	0.19	0.41	0.06	5.28	< 0.001	0.12	32.60	4	< 0.001
Cognitive favorability (prejudice)	4	0.29	0.26	0.33	0.02	15.89	< 0.001	0.00	1.75	3	= 0.626
Open-minded behavior intentions	2	0.30	0.22	0.38	0.04	7.71	< 0.001	0.03	1.52	1	= 0.216

Note. ^a The effect sizes were calculated based on only the post-manipulation results in the experiments.

This work contributes to the literature in at least three ways. First, regarding attitude change theories, our studies provide evidence that attitude change can occur without direct attempts at persuasion. When individuals perceive that others understand, care for them, and value them, they pass on these feelings of support in their evaluations of other social groups. That these effects reflect the impact of intellectual humility suggests a process of becoming more open to the possibility that one's initial, relatively more negative perception may have been wrong or at least incomplete. The parallel effect of objective attitude ambivalence indicates that people become aware of more complexity within their attitude; that is, they recognize positive sides to their thoughts and emotions regarding the other group that accompanies their initially more negative thoughts and emotions.

Second, our results have implications for the prejudice literature. Direct attempts at prejudice reduction can sometimes elicit reactance (Legault et al., 2011), and dominant group members often believe prejudice against their own group is more pervasive than prejudice against outgroups (Norton & Sommers, 2011). Thus, it is important to understand how prejudice might be reduced in more subtle ways that do not directly challenge one's attitudes toward the target group (see also Chow, Mak, & Auyeung, 2023). Prior research on prejudice focuses on antecedents of prejudice that are either directly related to the target group (e.g., intergroup threat; Pereira et al., 2010) or aimed at bolstering one's self-image (Fein & Spencer, 1997). In contrast, we addressed characteristics of relationships with others who do not belong to the target group – specifically, perceived partner responsiveness. Doing so is critical because people are not always able to interact directly with target group members and because people who exhibit the most prejudice are often the least motivated to try to become less prejudiced (Plant & Devine, 1998). An intervention that involves the responsiveness of close others might reach even those individuals who are not inherently driven to be unbiased.

Third, this research also offers a theoretical contribution to the responsiveness literature by showing that perceived responsiveness can affect perceptions about individuals other than those who are the source of that responsiveness. These studies suggest that responsiveness can spread to perceptions of unrelated persons. In particular, prior research has shown that perceived responsiveness lessens defensive self-enhancement (Reis et al., 2018) and increases openness to novel, potentially attitude-discrepant information (Itzhakov & Reis, 2021). Because prejudice is sometimes grounded in defensiveness and reluctance to acknowledge positive information about outgroups, prejudice reduction appears to be another downstream outcome of these responsive-induced processes.

Studies 2 and 3 included a control condition to determine whether high perceived responsiveness decreased prejudice, low perceived responsiveness increased prejudice, or both. Results supported both. Although this discussion thus far has focused on how high perceived, responsiveness lessens prejudice, it is also important to acknowledge that low perceived responsiveness may lead to greater prejudice. In other words, when participants felt misunderstood and non-valued, they became more negative toward the outgroup. This result is consistent with research showing that social exclusion can increase prejudice (Aydin et al., 2014), as well as work showing that when people's sense of their social value is threatened, they may take steps to re-establish their sense of worth (Leary, Tambor, Terdal, & Downs, 1995). One way to do so is to hold and express more negative attitudes toward outgroups (Crocker & Schwartz, 1985).

10.1. Interpersonal processes and prejudice reduction

This work joins previous research that found that interpersonal processes such as high-quality listening (Itzhakov, Weinstein, et al., 2020) can reduce prejudice. Perceived responsiveness shares similarities with listening but differs in that it does not necessarily involve conversations, as shown in Studies 1–3. Of course, responsiveness often does

follow supportive conversations (Itzhakov et al., 2022; Reis & Itzhakov, 2023), but the fact that it can be activated by asking people to recall instances in which others had been responsive suggests a novel, more easily accomplished method for application.

The responsiveness-induced mediators that reduced prejudice, namely intellectual humility and objective attitude ambivalence, might operate similarly in other intrapersonal processes that have been shown to reduce prejudice, such as perspective-taking (e.g., Galinsky & Ku, 2004) and self-affirmation (e.g., Lehmiller, Law, & Tormala, 2010). However, responsiveness is not isomorphic with these processes. Responsiveness does not entail taking another person's viewpoint as perspective-taking does; instead, it focuses on recalling positive meta-perceptions. Like self-affirmation, responsiveness increases feelings of self-worth, yet it is premised on feedback others have provided rather than reflecting on one's values and beliefs. Thus, although perceived responsiveness may tap certain elements relevant to perspective-taking and self-affirmation, it describes a distinct process. Of particular importance, the prejudice-reducing effect of perceived responsiveness was shown to be mediated by increases in objective ambivalence, whereas self-affirmation has been shown to decrease objective ambivalence (Reich & Wheeler, 2016). Thus, while we believe that perceived responsiveness and self-affirmation are complementary processes, they involve distinct mediating mechanisms.

Furthermore, although self-affirmation and perceived responsiveness both can reduce self-threat and thereby ameliorate prejudice, these constructs have important differences. In the case of perceived responsiveness, self-image maintenance typically originates from external sources such as other people in one's social network, romantic partners, friends, and family (Reis et al., 2004; Sprecher, Treger, Wondra, Hilaire, & Wallpe, 2013). Social interactions can facilitate perceived responsiveness (Sprecher et al., 2013), for example, when a listener exhibits high-quality listening to the speaker (Itzhakov et al., 2022, in press). In contrast, self-image maintenance is generated internally, without the actual or implied presence of other people, in self-affirmation, by reflections on one's own values or abilities (e.g., Crocker, Niiya, & Mischkowski, 2008). In other words, self-affirmation does not require social interaction; it usually operates when a person is alone. The distinction is conceptually important: whereas self-affirmation depends solely on the individual's own thought processes, perceived responsiveness involves the internalization of acceptance received from others.

On a more practical level, the present work suggests that interventions promoting responsiveness might help reduce extremism. As societies become more polarized, developing strategies to help people connect above their differences is essential. We suggest that a first step in connecting is facilitating openness and intellectual humility, which, as suggested by our studies and the prior work cited earlier, can be facilitated by responsiveness. Furthermore, such difficult situations require the sort of constructive emotional expression that responsiveness has been found to facilitate (Ruan, Reis, Clark, Hirsch, & Bink, 2020). Hence, it will be useful in future research to examine responsiveness-increasing interventions as a potential strategy for creating an attitudinal climate that promotes integration between social groups.

10.2. Limitations and future directions

Several limitations of our work merit note. First, we only used explicit measures of prejudice. Individuals are sometimes unaware of or unwilling to disclose their prejudiced attitudes. It will be important in future work to examine prejudice with an implicit attitude measure such as the IAT (Greenwald, Nosek, & Banaji, 2003) to bolster the generalizability of our findings. Notably, several aspects of our results suggest that our effects emerge across multiple levels of prejudice. Participant's attitude favorability scores toward the target groups in our studies ranged from the low 20s to the high 40s, below the midpoint of a 0–100 scale on which 100 reflected the most favorable attitude. In addition, as

we report in the supplemental materials, neither initial attitude favorability nor certainty about one's attitude toward the target group (an indicator of attitude strength; Tormala & Petty, 2004) moderated the relationship between perceived responsiveness and prejudice at time 2. In other words, both relatively prejudiced and relatively nonprejudiced participants demonstrated more favorable outgroup attitudes after the experimental manipulation. That said, it will be critical in future research to determine if perceived responsiveness still makes a difference at higher levels of initial prejudice than we observed in our samples – for example, whether White nationalists will exhibit less racism following perceived partner responsiveness. It will also be important to determine whether responsiveness that is narrowly targeted at reinforcing one's prejudice—for example, by conveying an understanding of and valuing for a person's prejudiced beliefs—would increase rather than decrease prejudice, as research on the attitude justification effect would suggest (Wilson, Ottati, & Price, 2017).

Although not unique to the present research, an additional limitation concerns the question of lasting effects. Specifically, research increasingly suggests that measures of prejudice can be altered temporarily in a laboratory context but that creating enduring changes in prejudice typically requires considerable effort and time (Devine, Forscher, Austin, & Cox, 2012; Lai et al., 2016). Brief interventions can produce enduring changes but must be carefully timed, context-specific, and target specific psychological processes (Walton, 2014; Walton & Yeager, 2020). Because the current experiments examined intergroup attitudes at a single time point immediately following a manipulation, it is unclear whether the observed increases in attitude favorability (a decrease in prejudice) endure over time.

An additional limitation is that our data did not address questions about the temporal order of the mediators and outcomes (Fiedler et al., 2018). We assessed these variables simultaneously and assigned variables to the role of mediator or outcome based on theory. Future research might explicitly consider the temporal order of changes in these variables, either with a systematic set of experiments that manipulates each variable one at a time or perhaps with a daily diary study, conducting prospective cross-lagged analyses.

Furthermore, we did not collect sufficient demographic data to determine the distributions of dominant and non-dominant group members across studies (e.g., the number of non-LGBT participants or White Americans in the studies conducted within the United States). Thus, it remains to be seen whether perceived responsiveness would have the same effects on non-dominant groups' prejudicial beliefs as on dominant groups' beliefs. For example, future studies could test whether perceived responsiveness reduces Asian American individuals' prejudice toward Black or LGBTQ individuals (Cortland et al., 2017; Craig & Richeson, 2016). An interesting question for future research is whether induction of perceived partner responsiveness reduces the feeling that others are prejudiced against one's own social group'.

In Study 2, we did not find that avoidant or anxious attachment style moderated the effect of perceived responsiveness on attitude favorability/prejudice reduction. However, attachment processes may still contribute to our findings in that responsiveness could create a state-level increase in personal sense of security, whereas nonresponsiveness could create a state-level decrease in security (Murray, Holmes, & Collins, 2006). These changes, in turn, might lead to changes in prejudicial attitudes (Carnelley & Boag, 2019). Further research is needed to determine whether a personal sense of security mediates these effects above and beyond intellectual humility and attitude ambivalence.

An additional possible direction for future research is to consider the role of socio-ecological factors that may impact perceived responsiveness and their possible effects on prejudice. For example, Lun, Kesebir, and Oishi (2008) conducted a daily-diary study and found that among persons with highly interdependent self-construals, greater felt understanding (which is a component of perceived responsiveness; Reis & Clark, 2013) was linked to higher life satisfaction and reduced physical symptoms. A recent theoretical paper (Selcuk & Gunaydin, 2023)

suggests that in more interdependent cultures, perceived responsiveness may emphasize interpersonal factors, including intergroup relations. Further research is needed to determine whether socio-ecological factors would moderate these findings.

11. Conclusion

In five studies, we found that perceived responsiveness increases intellectual humility and objective attitude ambivalence toward outgroups for its recipients. This, in turn, reduced prejudiced attitudes. The present finding suggests that responsiveness from others can be positively contagious by making individuals more open-minded toward stigmatized social groups. We hope this work will open avenues for further exploration of positive interpersonal processes that can mitigate prejudice.

Open practices

The studies in this article earned Open Materials, Open Data, and preregistration badges for transparent practices. Materials and data for the studies are available at https://osf.io/wyvt6/?view_only

The preregistrations for Studies 2–4 can be found at each respective link: Study 2- <https://aspredicted.org/blind.php?x=em996e>, Study 3- https://aspredicted.org/KR2_QZG, Study 4- https://aspredicted.org/M68_3X4. Study 5- https://aspredicted.org/TXT_3RY

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data and codes are available at <https://osf.io/wyvt6/>

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jesp.2023.104554>.

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