Following the Science to Understand How to Reduce Prejudice and its Harmful Consequences in Post-Pandemic Times

Stewart I. Donaldson, Jennifer Villalobos, & Minji Cho

Prejudice Eradication and Education (PEEL) Lab

Claremont Graduate University

Abstract

"Follow the Science" was the cry heard around the world during the global pandemic. This approach was used to develop evidence-based prevention measures (e.g., social distancing, hand washing, and mask-wearing), covid treatments, and vaccines, and to prevent major declines in well-being (Donaldson, Cabrera, & Gaffaney, 2022). The Prejudice Eradication and Education Lab (PEEL LAB) at Claremont Graduate University has adopted the "follow the science" approach to understand how to reduce prejudice and its harmful consequences in post-pandemic times. Our systematic review of 2,515 published peer-reviewed studies on the effectiveness of gender and race/ethnicity prejudice reduction interventions has identified four exemplary evidence-based approaches for reducing prejudice:

1. Contact Interventions
2. Perspective Taking Approaches
3. Interactive and Narrative Modalities
4. Multi-faceted Interventions

These four approaches were by far the most successful (had the largest effect sizes) and should be considered carefully when planning new prejudice reduction and eradication interventions in post-pandemic times. Phase II of this study identified six specific exemplary prejudice reduction interventions that demonstrated effective approaches for reducing prejudice and its harmful effects. The implications of these findings and future directions for research and intervention design are discussed.

Following the Science to Understand How to Reduce Prejudice and its Harmful Consequences in Post-Pandemic Times

The Claremont Graduate University Prejudice Eradication and Education (PEEL) Lab was established in 2022 to eradicate racial and gender-based prejudice and subsequent stereotyping by understanding and targeting their historical and scientific antecedents. It is recognized that the goal of eradication is bold, given the history of prejudice and its centrality to the human condition. Nonetheless, the lab aims to use science to explore the issues, feelings, and systems that undergird prejudice and its associated harmful behaviors. In addition, lab members aim to understand individuals and groups commonly associated with prejudice ideology to further the development of inoculations and eradication training.

PEEL Lab Members

The PEEL LAB is made up of an interdisciplinary group of social scientists, scholars, and field practitioners who aim to explore the root of individual and group prejudice, including what groups experience prejudice most, and how to eradicate such thoughts and attitudes before they manifest into discrimination, hate, inequity, and violence. Our projects incorporate research and scholarship spanning many interconnecting disciplines, such as evaluation, positive psychology, education, public health, economics, policy studies, and leadership and management. The project described below is focused on learning about the most successful evidence-based prejudice reduction interventions and programs to date.

Phase I

A systematic analysis of 13 peer-reviewed meta-analyses and review papers (Table 1) reporting on the findings from over 2,515 published peer-reviewed studies of gender and

race/ethnicity prejudice reduction interventions was conducted. These intervention studies were carried out across experimental/lab, field, and educational settings. In terms of size, breadth, and vitality, the prejudice reduction literature has few rivals. Paluck and Green (2009; 2021) argue that methods, interventions, and dependent variables associated with prejudice reduction research are diverse, and research designs vary drastically. However, our analysis shows that several prejudice reduction intervention approaches seem to perform best across designs and have robust theoretical foundations and significant effects on prejudice reduction and attitudinal changes towards race and gender. The following is a summary of findings from our analysis, described in more detail in Table 1 below:

I. **Contact Interventions:** Direct and indirect contact interventions are the most successful evidence-based prejudice intervention approaches. Allport (1954) is often credited with the development of the contact hypothesis, also known as Intergroup Contact Theory. The theory states that under appropriate conditions (equal group status within the situation, common goals, intergroup cooperation, and authority support), interpersonal contact is one of the most effective ways to reduce prejudice between majority and minority group members. Effect sizes from meta-analyses of various forms of contact interventions (e.g., intergroup, face-to-face, peer influence, etc.) range from ***d*=.23** and ***d*=.46**, demonstrating a significant inverse relationship between contact and prejudice. Some additional notes about contact interventions:

    1. Contact intervention effects persist over time.
    2. Indirect contact interventions are successful, but the effect of virtual contact interventions has not been definitively confirmed.

3. Cross-cultural research: higher cultural egalitarianism in a country predicted stronger inverse associations between intergroup contact and prejudice. Cultural equality values predicted stronger contact–prejudice relationships over and above equal status. Significantly weaker contact–prejudice associations were found in more hierarchical cultural contexts.

II. **Perspective-Taking Approaches:** Also known as a form of cognitive intervention, perspective-taking approaches are well-supported strategies for reducing prejudice. Perspective-taking is the ability to understand how a situation appears to another person and how that person is reacting cognitively and emotionally to the context. Interventions based on perspective-taking include social awareness training, social categorization, cognitive and emotional training, and knowledge acquisition, among others. Their effect sizes range from ***d*=.30** and ***d*=.50**, demonstrating both a significant inverse relationship between perspective-taking intervention and prejudice and a significant positive relationship between perspective-taking and attitudinal changes toward outgroup members.

III. **Interactive and Narratives Modalities:** Interactive and narrative intervention is a form of digital interactive experience in which users create or influence a dramatic storyline through their actions or literary narratives. These types of interventions can be instructional, or education based. One meta-analysis reported an effect size of interactive narrative interventions at ***d*=.43**. Other reviews of these types of interventions report significant positive effects on the reduction of prejudice towards race and sexuality and significant effect on attitudinal changes.

IV. **Multi-faceted Interventions:** Prejudice reduction intervention research is a heavily applied science, and therefore, much of the research on strategies to minimize prejudice has been done on interventions that use a multi-faceted approach. As such, there are a plethora of studies and meta-analyses on multifaceted interventions (e.g., direct contact experiences along with social-cognitive training programs designed to promote empathy and perspective-taking) and are among those with the most potent effects on reducing individual and group prejudice. Effect sizes of the relationship between multifaceted interventions and prejudice reduction average around ***d*=.43**, whereas those that target improving group attitudes range between ***d*=.3**9 and ***d*=.49**. Some additional notes about multifaceted interventions:

1. Higher effects are observed with majority versus minority (underrepresented) groups.
2. Interventions based on multiple theoretical frameworks are most effective at tackling prejudice in children and adolescents.

Table 1. Effective Prejudice Reduction Intervention

PI Category	Specific PI	Article	RCT effect	Non-RCT effect	Observational/other study effects
Contact Interventions	Contact (Intergroup Contact)	Pettigrew et al., 2006	515 studies Fixed Effect Size: r = -.225, p < .0001	None	From 696 samples, the meta-analysis reveals that greater intergroup contact is generally associated with lower levels of prejudice (mean r = .215). Mean effect rises sharply for experiments and other rigorously conducted studies. 94% of the samples in their analysis show an inverse relationship between intergroup contact and prejudice.
	Direct Contact Interventions: 1. Contact meetings, 2. Cooperative learning programs	Lemmer & Wagner, 2015	63 studies Overall effect size: μ_0 = 0.29, p<.001 – Contact meeting effect size: 0.31, p<.001 24 studies – Cooperative Learning program effect size: 0.25, p<.001	37 studies Overall effect size: μ_0 = 0.41 – Contact meeting effect size: 0.41, p<.001	
	Indirect Contact Interventions: 1. Extended, 2, Virtual Effects on	Lemmer & Wagner, 2015	16 studies Overall effect size: μ_0 = 0.23, p<.001 8 studies – Extended effect size: 0.42, p<.001 – Virtual effect size:	5 studies Overall effect size: μ_0 = 0.33, p<.05 – Virtual effect size: 0.33, p<.05	

PI Category	Specific PI	Article	RCT effect	Non-RCT effect	Observational/other study effects
	ethnic attitudes		0.08		
	Face-to-Face contact	Paluck et al., 2021*	28 studies Effect size: *d* =0.28	None	None
	Extended and imaginary contact	Paluck et al., 2021*	137 studies Effect size: *d* = 0.37	None	None
	Peer influence, discussion, and dialogue	Paluck et al., 2021*	40 studies Effect size: *d* = 0.27	None	None
	Contact	Hsieh et al., 2022	None	20 studies Effect size: *d* = 0.612, *p*<.*01*	None
	Direct contact structure programs	Beelmann, A., & Heinemann, K. S., 2014*	22 studies Effect size: *d* =.43	None	Intervention programs designed to prevent and reduce prejudice or otherwise improve intergroup attitudes in children and adolescents.
	Contact	Kende et al., 2018	459 studies Effect size: *r* = - .2091, *p* < .0001	None	higher cultural egalitarianism in a country predicted stronger negative associations between intergroup contact and prejudice (*r* = -.3)
	Intergroup	Ulger et al,	19 studies	None	Studied improving outgroup

PI Category	Specific PI	Article	RCT effect	Non-RCT effect	Observational/other study effects
	Contact	2018	Effect size: $d = 0.46$, $p < .0001$		attitudes
Perspective Taking	1. Intentional strategies to overcome biases 2. Exposure to counter stereotypical exemplars 3. Identifying the self with the outgroup	Fitzgerald et al., 2019	47 studies Controlled intentional process in an experimental setting – Effect size not reported – These three intervention types are the most effective ones	Comparison to a control group with similar characteristics – Effect size not reported	None
	Cognitive and emotional training (e.g., perspective taking)	Paluck et al., 2021*	107 studies Effect size: $d = 0.35$	None	None
	Value consistency and self-worth	Paluck et al., 2021*	35 studies Overall Effect size: $d = 0.41$ – Lab: $d = 0.50$ – Online: $d = 0.30$	None	None
	Social categorization	Paluck et al., 2021*	59 studies Effect size: $d = 0.37$ – Lab: $d = 0.44$	None	None

PI Category	Specific PI	Article	RCT effect	Non-RCT effect	Observational/other study effects
			– Online: *d* = 0.07		
	Awareness	Hsieh et al., 2022	None	28 studies Effect size: *d* = 0.442, *p<.01*	None
	Categorization	Hsieh et al., 2022	None	6 studies Effect size: *d* = 0.264	None
	Social norms	Hsieh et al., 2022	None	3 studies Effect size: *d* = 0.154	None
	Perspective-taking	Hsieh et al., 2022	None	4 studies Effect size: *d* = 0.236	None
	Perceived variability	Hsieh et al., 2022	None	1 study Effect size: *d* = 0.908	None
	Social Cognitive Training Programs	Beelmann, A., & Heinemann, K. S., 2014*	45 studies, weighted effect size: d_w=.33	None	None
	Perspective Taking/ Empathy	Beelmann, A., & Heinemann, K. S., 2014*	24 studies, weighted effect size: d_w=.44	None	None
	Knowledge acquisition	Beelmann, A., & Heinemann, K. S., 2014*	93 studies, weighted effect size: d_w=.32	None	None
Interactive & Narrative Modalities	Entertainment	Paluck et al., 2021*	12 studies Effect size: *d* = 0.43	None	None
	Reading	Paluck et al,	Statistics not reported.	Positive effect on attitudes	Theories of narrative

PI Category	Specific PI	Article	RCT effect	Non-RCT effect	Observational/other study effects
	(literature/ storytelling). Narratives that encourage perspective taking.	2009			persuasion suggest additional processes that could explain prejudice reduction findings from reading field experiments.
	Instruction	Paluck et al, 2009	Statistics not reported.	Significant positive effects on reduction of prejudice towards race and sexuality	None
Multi-faceted interventions	Contact + Media/ Instructional, (e.g., anti-bullying training)	Aboud et al., 2012	32 studies Effect sizes not reported. Interventions were related to 34 positive effects on attitudes and 15 positive effects on peer relations.	Non RCT group showed no positive effect on either attitude or peer relations/behavior effect.	
	Direct + Indirect Interventions	Lemmer & Wagner, 2015	8 studies Meeting & Virtual effect size: $\mu_0 = -0.43$, *p<.001*	2 studies Overall effect size: $\mu_0 = 0.24$ Meeting & Virtual effect size: - 0.24	None
	Contact & Perspective-taking	Hsieh et al., 2022	None	2 studies Effect size: $d = 0.71$, $p < .05$	None
	Multifaceted interventions (consisting of different strategies)	Ulger et al., 2018	10 studies Weighted effect size: $d+ = 0.49$, $p < .05$	None	Studied improving outgroup attitudes

PI Category	Specific PI	Article	RCT effect	Non-RCT effect	Observational/other study effects
	Anti-racism workshops in workplace	Hassen et al., 2021	None	None	Continuous, ongoing training was considered better than one-time training. Training should avoid a "one size fits all" approach for staff. Anti-racism training needs to be ongoing, with the support of a skilled facilitator adept in this subject area.
	Anti-racism workshops in workplace	Hassen et al., 2021	None	None	Mixed-methods study of a 6-hour workshop on cultural competency with White, female occupational therapists found that study participants held significantly negative attitudes towards African Americans which were not ameliorated by the intervention. Offer shorter sessions one week apart
Others (e.g., Virtual Reality)	Majority perspective: participants belonging to a majority group interact in VR with avatars or virtual agents representing a stigmatized outgroup	Tassinari et al., 2022	2 studies Statistics not reported. – Mixed but potential to decrease prejudice towards stigmatized minority groups – Some found a decrease in prejudice towards minority groups, but some fail to obtain significant results	16 studies Statistics not reported.	10 studies are observational. Statistics not reported.

PI Category	Specific PI	Article	RCT effect	Non-RCT effect	Observational/other study effects
	Minority perspective: participants belonging to the majority group lives the virtual experience from a minority outgroup member's perspective	Tassinari et al., 2022	1 study Statistics not reported. – Mixed results: some RCT studies showed improved attitudes towards outgroup, but some didn't have effect on intergroup attitudes or even worsen attitudes.	33 studies Statistics not reported.	None
	Social skills	Beelmann, A., & Heinemann, K. S., 2014*	7 studies weighted effect size: d_w=.39	None	None

**did not report significance levels*

Phase II

The goal of Phase II was to identify exemplary prejudice reduction interventions that demonstrate what has worked well in terms of reducing prejudice and its harmful effects. To obtain this goal, we conducted a second multi-stage systematic review of the 13 publications included in Phase I. The first stage of this study consisted of assessing meta-analysis and review articles reviewed in Phase I for the following criteria:

I. Publication was included in one of the selected meta-analyses or reviews during Phase I
II. The meta-analysis or systematic review of articles utilized some form of quality assessment (e.g., Cochrane)
III. Article reported on RCT's that used individual random assignment.
IV. Article included key terms of: "prejudice reduction intervention" "prejudice intervention" "discrimination reduction intervention" "racism intervention" "sexism intervention."
V. Article was published in a peer-reviewed journal in English language or with an English translation available.

A total of seven of the 13 meta-analyses and systematic review articles included in Phase I met the above criteria for inclusion. However, not all papers provided the list of studies/manuscripts included in their reviews. Among these, only five published a list of studies included in their reviews, including three meta-analyses and two systematic review papers. We then reviewed a total of $n = 421$ published empirical studies using the following criteria:

I. Study used an RCT or quasi-experimental design in either a university, laboratory, or field setting.

II. Intervention targeted prejudice based on gender (excluding sexuality) and/or race/ethnicity.

III. Study specifically measured prejudice reduction outcomes (i.e., decrease in implicit or explicit bias)

IV. Study reported significant outcomes associated with the intervention.

V. Study conducted during the last decade: 2013-2023

Of 421 articles reviewed, 38 articles met the criteria and were extracted for further review. Upon closer evaluation, an additional 20 articles were excluded based on several confounding factors, including

- Target groups included immigrants or members of ostracized religious groups: the reasons individuals discriminate against immigrants and/or members of certain religious groups varies across different countries with different historical contexts (e.g., Romani people in Europe) and were therefore excluded to maintain our focus on interventions for race/ethnicity and gender prejudice.
- Poor or missing study design, measurement, and/or effect size estimates

A total of 18 articles met the criteria for being an exemplar, including 10 studies based on Contact Theory, 5 studies based on Perspective Taking Theory, and 3 studies based on Cognitive/Social Psychology Theories. We narrowed this list further by selecting a representative sample from all theory types, effect sizes, and diverse representation based on: 1) country, 2) research setting, 3) population, and 4) intervention type. Based on this analysis, six exemplars emerged and are presented below:

1. ***Extended Class Exchange Program*** (Berger et al., 2016). The study was conducted in 2016 in Israel to target prejudice between Israeli-Jewish, Israeli-Palestinian, and Israeli-Ethiopian populations. The study included n6 3rd grade and n=226 4th grade students at an elementary school. The intervention was based on Contact Theory, where during 12x 4-hour bi-monthly sessions, students were tasked with interacting with each other through creative activities, socializing and team building activities, and reflective (e.g., mindfulness) activities. Students in the control group received an SEL intervention in a non-mixed classroom. Results demonstrated large effects throughout all measures of readiness for social contact toward the other: $\eta^2 = 0.38$; negative feelings toward the other: $\eta^2 = 0.48$; discriminatory tendencies toward the other: $\eta^2 = 0.26$; negative stereotyping toward the other: $\eta^2 = 0.38$; negative feelings toward Ethiopians: $\eta^2 = 0.36$; discriminatory tendencies toward Ethiopians: $\eta^2 = 0.17$. Study effects were demonstrated to a varying degree 15 months following the intervention.
2. ***Enacting Cultural Interests Project*** (Brannon and Walton, 2013). The study was conducted in 2013 in the United States to target prejudice against Latino Americans. The study included $n = 58$ undergraduate students at a college university. The intervention was based on Contact Theory, where non-Latino American college students were paired with Latino-American confederates, posing as another participant. Across conditions, the confederates expressed the same types of interests; but what was manipulated was whether one interest did (intervention) or did not (control) match one of the participant's interests. A second control group paired participants with Portuguese confederates. Shared interests created social connections. Participants displayed less anti-Latino prejudice in the social-connection/Mexican condition than in the social-

connection/Portuguese condition with a moderate effect, d = 0.56, or in the no-social-connection/Mexican condition with a large effect, *d* = 0.75. Positive intergroup attitudes were measured six months later.

3. ***Narrative Fictions*** (Johnson et al., 2013). The study was conducted in 2013 in the United States to target prejudice against Arab Muslims. The Study included *n* = 89 undergraduate students at a college university. The intervention was based on Perspective Taking Theory, where participants in the experimental condition were assigned to read a full narrative that included counter stereotypical exemplars and exposure to Muslim culture filled with a richness of descriptive language, dialogue, and monologue. Participants in the control groups were assigned either a one-page summary of the narrative without the richness of detail or a brief history of the automobile. Narrative fiction allows one to engage in a form of perspective-taking. Participants in the full narrative condition reported significantly lower implicit bias than in the condensed and control groups, $\eta^2 = .092$, indicating a moderate/medium to large effect. Participants in the full narrative condition reported significantly lower explicit racial attitudes than in the control group, but not in the condensed group, with a medium effect size of $\eta^2 = 0.076$. These results indicate that reading narrative fiction can reduce both implicit and explicit prejudice.
4. ***Immersive Virtual Reality*** (Salmanowitz, 2018). The study was conducted in 2018 in the United States to target prejudice against black individuals using an intervention based on Perspective Taking. The study included *n* = 94 non-black adult and college student participants in a university lab setting. Using a virtual reality (VR) set-up, participants in the intervention group were assigned a black avatar in their VR spaces, and within their

environment, were allowed to see their movements in a mirror reflecting their virtual selves. They were instructed to do creative tasks, including tasks that required them to touch themselves to provoke the body ownership illusion. Control groups were either assigned a black avatar but without a mirrored image of themselves or assigned a white avatar. By weakening distinctions between oneself and someone of a different race, the negative associations that are often ascribed to that race can become less potent. Following their VR experience, participants were asked to do a Mock Crime Scenario. Results in Mock Crime Scenario revealed a significant main effect of VR Type on evaluations of evidence and comprehensive verdicts, revealing a large effect $\eta^2 = .16$. 11% of the intervention group rendered Guilty verdicts, versus 30% of the control group. Implicit bias was significantly lower among participants in the intervention group, $\eta^2 = 0.07$ = moderate effect.

5. ***Prejudice Reduction through Music*** (Neto et al., 2016). The study was conducted in 2016 in Portugal to target prejudice against dark-skinned people (African). The study included $n = 229$ 6th-grade students from predominantly white schools in Portugal. Students received 5 x 90-minute sessions of a cross-cultural music program, including both Portuguese (e.g., Fado) and Cape Verdean (e.g., Morna) songs. The intervention was based on Social Identity Theory. The study employed a quasi-experimental design in which control classrooms were not given the cross-cultural music program. Pupils who were exposed to African songs (out-group songs) in addition to national songs during regular music classes showed less anti-dark-skin prejudice than pupils who only studied and learned national songs (in-group songs). Results showed moderate effects: implicit anti-dark-skin prejudice was lower at the end of the program than at the beginning $\eta^2 =$

.43, and it was still lower 3 months after its completion. In addition, the effect of the program was remarkably enduring: 2 years after its completion $\eta^2 = .21$, the level of prejudice was not different from the one registered 3 months after completion. Implicit bias measures were stronger when looking at the interaction between condition and time, immediately $\eta^2 = .34$ and at 3 months later $\eta^2 = .64$. Explicit anti-dark-skin attitudes were also lower at the end of the program than at the beginning, immediately $\eta^2 = .10$ after and 3 months later $\eta^2 = .02$.

6. ***Multiculturalism Education*** (Yogeeswaran & Dasgupta, 2014). The study was conducted in 2014 in the United States to target White Americans' prejudice against Hispanic Americans using an intervention based on Cognitive Theory. The study included $n = 126$ college students in a university lab. Participants were randomly assigned to either read about multiculturalism construed in an abstract manner, or a concrete manner or to read about something neutral and unrelated to multiculturalism (control condition). Based on social cognitive construal theories, results demonstrated that construing multiculturalism in abstract terms by highlighting its broad goals reduced White Americans' prejudice toward ethnic minorities relative to a control condition, large effect $\eta^2 = .19$, whereas construing multiculturalism in concrete terms by highlighting specific ways in which its goals can be achieved increased White Americans' prejudice relative to the same control. The abstract group perceived diversity less as a threat to national identity than the control group, large effect $\eta^2 = .16$. Perceivers' political orientation moderated the effects of multiculturalism construals on prejudicial attitudes.

Implications & Future Directions

Findings from Phase 1 illustrate the prejudice reduction approaches that seem to be the most promising for reducing prejudice in 2023 and beyond:

1. Contact Interventions
2. Perspective Taking Approaches
3. Interactive and Narratives Modalities
4. Multi-faceted Interventions

Furthermore, Phase 2 has identified 6 specific exemplary prejudice reduction interventions that can be emulated and serve as roadmaps for future prejudice reduction intervention designs. Using the rigorous empirical findings from Phase 1 and 2 to design new interventions and programs for post-Covid times, promises to successfully address one of the most challenging social, racial, and gender justice issues of our time – **prejudice and its harmful consequences of discrimination, inequity, hate, and violence.**

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