Demographic, Experiential, and Temporal Variation in Ableism

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Abstract

Data from Project Implicit were analyzed to explore trends in ableism. Over 300,000 U.S. residents with and without disabilities completed the Disability IAT and two measures of explicit prejudice. The most consistent predictors of bias across types of prejudice were gender and contact with individuals with disabilities: Women and those who had contact were less prejudiced. Temporal analyses indicated that mean implicit prejudice increased over time (2004-2017), yet explicit bias showed a decline over the same period. Among people with disabilities, implicit and explicit prejudice were related to lower contact with others who shared one's disability, as well as to perceptions that one's disorder affects few activities and/or is primarily mental or emotional. Theoretical and practical implications are discussed.

Keywords: disability, prejudice, disablism, ableism, bias, implicit association task, IAT, explicit bias, people with disabilities, demographic, temporal

Demographic, Experiential, and Temporal Variation in Ableism

Ableism has been understudied, particularly as compared to other forms of bias and prejudice. This oversight may be partially attributable to the dearth of basic descriptive information regarding how ableism varies across groups and over time. While some studies have attempted to tackle these questions, they have often relied on small sample sizes. Further, few studies have examined views toward people with disabilities *among people with disabilities themselves*. The current study examined demographic and temporal differences in ableism in a sample of over 300,000 individuals (15% of whom have a disability) from the United States.

Ableism and Prejudice toward People with Disabilities

The term “ableism,” as defined in this special issue, encompasses “stereotyping, prejudice, discrimination, and social oppression” directed at people with disabilities (PWD; Bogart & Dunn, in press); and it can have a range of harmful effects. Targets of ableism may experience the negative psychological consequences of being patronized, avoided, ignored, or stared at, or may feel pressured to conceal their disability to avoid being the targets of such behavior (Reeve, 2006). Persons with disabilities are also more likely to experience a number of more serious forms of mistreatment, including housing discrimination (Turner, 2005) and abuse (Reeve, 2006). Gaining a better understanding of the cognitive and affective processes behind ableist behavior is therefore an important goal, as it is a necessary step for the development of policies and interventions that could prevent such mistreatment.

The present paper focuses on the second component of ableism, prejudice; below we use the term “disability prejudice” to specifically refer to prejudice against PWD. Past prejudice research (e.g. Lai, Hoffman, & Nosek, 2013) has differentiated between “implicit” prejudice and “explicit” prejudice. Explicit attitudes, typically measured using self-report questionnaires, are attitudes of which the person is aware and whose expression the person can control. Implicit attitudes, on the other hand, are associations that operate outside an individual's control and do not require awareness. Implicit attitudes are often measured with tasks such as the Implicit Association Test (IAT), which measures response latencies to pair target stimuli—for example, images representing disabilities—with evaluative stimuli ("good" or "bad" words).

Implicit attitudes are most likely to influence behaviors when evaluative judgments are made under conditions of ambiguity or when a person does not have the motivation or attentional resources to control them (Fazio & Olson, 2003). When people pay sufficient attention and are motivated to control the application of their implicit attitudes, however, their behavior is more likely to reflect their explicit attitudes. In other words, both types of attitudes toward PWD can lead to discriminatory behaviors, but they may do so differentially for different people (depending on motivation) or under different circumstances (depending on attentional resources).

Variation in Disability Prejudice: Demographic, Temporal, and Experiential

An important step toward a better understanding of both types of disability prejudice and the processes by which they operate is to understand how explicit and implicit attitudes toward this group are distributed across the population. We raise several possibilities about how these attitudes vary based on demographic characteristics, temporal trends, and personal experiences.

Demographics. Attitudes toward PWD may be related to certain demographic characteristics. In a large study examining prejudice against PWD, Nosek and colleagues (2007) found variation in both implicit and explicit prejudice across participant demographic characteristics. Implicit disability prejudice against PWD was strongest among Black and male participants and increased linearly with age; explicit disability prejudice was strongest among Asian and male participants. Age had a U-shaped relationship with explicit prejudice—it was highest among children, lowest around age 40, and at an intermediate level among older adults.

Other studies have also explored the relationship between certain demographic variables and disability prejudice. A review by Livneh (1982) concludes that (explicit) disability prejudice has a W-shaped relationship with age, such that prejudice decreases from early to late childhood, increases again during adolescence, decreases during adulthood, and increases once more with old age. Findler, Vilchinsky, and Werner (2007), on the other hand, find that age is negatively associated with explicit disability prejudice, though it is unclear whether they tested for non-linear relationships. Livneh (1982) also summarizes a few studies finding that level of education is negatively associated with disability prejudice (but see Findler et al., 2007). With respect to gender differences, some studies find that women hold more favorable attitudes toward PWD than do men (Livneh, 1982), although others find that women may have equal or greater prejudice, depending on how its operationalized (Findler et al., 2007). On balance, however, these studies suggest that women may be less prejudiced against PWD than are men.

Time. Attitudes toward many groups change considerably over time, as the population's perceptions of these groups also change (Westgate, Riskind, & Nosek, 2015). Some historical reviews suggest that such change may have occurred in perceptions toward PWD (Munyi, 2012), perhaps suggesting the influence of changes like increased intergroup contact (see Lai et al., 2013; Pettigrew & Tropp, 2008). One study examining disability prejudice with Project Implicit data from 2007 to 2016 (Charlesworth & Banaji, 2019) found that explicit prejudice toward PWD declined, but implicit prejudice toward PWD did not change. However, the study has some limitations: the study did not include the feeling thermometer measures of prejudice available in the data, so no information is available as to how these forms of prejudice change over time; moreover, it cannot be ruled out that the study's ten-year period may have been too short to detect a change in implicit prejudice.

One explanation for these declines in prejudice is that historical changes—e.g., the influence of politicians, media, or major events—may affect the population's level of prejudice. Likewise, as the visibility of PWD increases, individuals may have more encounters with PWD and, if these encounters are typically positive, may develop more positive attitudes. On the other hand, several studies have found that concrete efforts to change implicit bias via interventions rarely lead to sustained change (e.g., Forscher et al., 2017; Lai et al., 2016; Lai et al., 2013), making it unclear if prejudice will change over time.

Experiences. Certain personal experiences may also be related to disability prejudice. For example, people who have disabilities themselves may have greater sympathy for others with disabilities and exhibit less prejudice. Characteristics of a disability (e.g., how much it interferes with daily life or whether it is a more "invisible" disability) likely affect how individuals with disabilities view themselves, their disabilities, and the larger community of PWD (e.g., Bedini, 2000; Uppal, 2006). In particular, people who *identify* as having a disability—a subset forming only 28% of people who could be classified as having disabilities (Chalk, 2016)—may have more positive attitudes toward PWD (Dirth & Branscombe, 2018). This implies that experiences that make an individual more likely to identify as a person with a disability may be associated with lower prejudice against PWD. Research by Bogart, Rottenstein, Lund, and Bouchard (2017) has uncovered some experiential factors related to identification as a person with a disability, such as severity and duration of the disability. These variables, and others describing the precise nature and intensity of a disability, may therefore predict disability prejudice among people who themselves have disabilities.

Even among people without disabilities, the personal experience of knowing someone with a disability may be related to lower prejudice. Fichten, Schipper, and Cutler (2005) report that adults who volunteered with children with disabilities felt decreased social distance and increased comfort with adults with disabilities. Likewise, Amsel and Fichten (1988) found that college students who had previously had contact with a person with a disability had a higher ratio of positive to negative thoughts about interactions with students with disabilities, and are more comfortable with such interactions. The case for the prejudice-reducing effects of contact with PWD is further strengthened by its consistency with work on prejudice against other groups. As reviewed by Lai et al. (2013), intergroup contact reduces both explicit and implicit prejudice against a variety of groups. It is therefore very likely that, like personal experiences with disability, contact with PWD may be related to lower explicit disability prejudice (although there is some evidence that this may be less true for implicit prejudice; see Wilson & Scior, 2014).

The Present Study

In short, disability prejudice may be related to demographic characteristics, time, and personal experiences. However, much previous research has been limited by small sample sizes, has focused on explicit prejudice, and has focused on specific populations (e.g. college students) of uncertain generalizability. Moreover, although there has been some work on implicit disability prejudice, these studies may be even more limited than those focusing on explicit prejudice when it comes to understanding the demographic correlates of disability prejudice; Wilson and Scior note in their 2014 meta-analysis of disability IAT studies that most studies have used student samples and do not even examine basic demographic differences.

In the present study, we assessed whether each of these factors influenced explicit and/or implicit prejudice using a large internet data set of over 300,000 respondents (15% of whom had disabilities). These data were gathered from the Disability IAT on the Project Implicit website over a period of 13 years after the last publication of demographic data from this task (Nosek et al., 2007; our data partially overlap with Nosek et al.'s data, as we included all Disability IAT data publically available from Project Implicit). We provide a more in-depth analysis of these data than do Nosek and colleagues (2007), who present findings from a broad range of Project Implicit studies, with little attention paid to specifically discussing disability prejudice.

Specifically, we examined (a) how disability prejudice varies according to demographic (e.g., age) and social (e.g., intergroup contact) characteristics and (b) whether disability prejudice has increased or decreased in recent years (i.e., from 2004 to 2017). We also examined how characteristics of a disability (e.g., its permanence, severity, and concealability) were associated with prejudice in a large sample of individuals with disabilities.

The research reviewed above allowed us to tender hypotheses regarding most of our predictors, although there was generally not sufficient evidence to form separate hypotheses for each measure of prejudice. In the analyses presented below, we expected (1) that women would be less prejudiced than men; (2) that education would be negatively related to prejudice; (3) that age would have a U-shaped relationship with explicit prejudice; (4) that prejudice would decrease with time; (5) that participants who had contact with PWD would show lower disability prejudice; and (6) that PWD would hold lower prejudice than people without disabilities.

Method

Participants

Participants were 728,134 individuals who visited the "Disability IAT" page on the Harvard *Project Implicit* website between April 30th, 2004 and December 31st, 2017. Of these participants, 2,091 were excluded for making errors on more than 30% of trials on the IAT, 9 were excluded for having missing data on all variables, and 5,742 were excluded for having a pattern of fast and inaccurate responding, operationalized as having an error rate above 40% on at least one block and responding faster than 400 ms on over 10% of all trials. In addition, 159 people were excluded for reporting an age less than 10 or greater than 99. These exclusions were consistent with data exclusion criteria in previous IAT studies (Greenwald, Nosek, & Banaji, 2003; Nosek et al., 2007; Westgate et al., 2015). To obtain a culturally homogenous sample, and because the survey was conducted in English, we restricted our sample to respondents in the United States, excluding 401,129 people. Other than these exclusions, we used all available data, with a final sample size of 319,004 participants. The data and syntax for this project are publicly available at the Open Science Framework site for this project (https://osf.io/nv75h/?view_only=333757d1f76b4030bd13ae9fdcb671c2).

Most participants (71%) identified as female, with 28% identifying as male and 0.5% as some other gender. A majority of participants (79%) identified as White; 7% as Black, 5% as Asian, Pacific Islander, or Native Hawaiian, and 1% as Native American or Alaskan Native. Additionally, 1% identified as Black/White Biracial, 4% identified as a different Multiracial identity, and 4% identified as a different Monoracial identity. The modal educational attainment was "some college" (31% of respondents), and the mean age was 28.46 (*SD* = 12.41). Fifteen percent of respondents reported having a disability themselves.

Sensitivity Analysis

In order to find out the smallest possible effect we could reliably estimate with our sample size, we ran a sensitivity analysis under a few varying conditions. For the broader sample, nearly 300,000 participants completed the survey. With 99% power and an alpha of .05, the smallest possible effect size we could detect is a Cohen's f^2 value of .00006. For subgroup analyses among PWD, our effective sample size was approximately 45,000, although this number varied across analyses (down to approximately 24,000 participants). With 99% power and an alpha of .05, the smallest possible effect size we could detect is a Cohen's f^2 value of .0004. With approximately 24,000 participants, this effect size grows to.0008 (for 99% power).

Measures

Independent variables. The variables included in the present analyses were selected for analysis prior to exploration of the data. Participants reported race, gender, age, and education. For the primary analyses below, gender is coded as a binary variable (Woman vs. Man), because Project Implicit included only two gender response options during most of study period. Education is measured on a scale from 1 to 8 of increasing educational attainment.

Participants also indicated whether they knew anyone with a disability and whether they themselves had a disability. Participants who indicated that they had a disability were asked a number of follow-up questions: what type of disability they had (primarily physical vs. primarily mental or emotional vs. both), how long they had had this disability (in years), how severe it was, how pervasive it was, how easily they were able to hide it, whether they were involved in a support group for people with the disability (yes vs. no), how often they had contact with another person with the same disability, and how long they expected to have it (short-term vs. long-term). Disability severity was entered into regressions as standardized values ranging from -2 to 2.3 indicating increasing severity (see Supplemental Materials). Disability pervasiveness referred to the extent to which the disability affected daily activities and was measured on a 6-point scale (1 = "Affects nothing I do"; 6 = "Affects everything I do"). Ability to hide the disorder was measured on a 4-point scale (1 = "Impossible to Hide"; 4 = "Very able to hide"). Frequency of contact with others with the disability was measured on a 7-point scale (1 = "No Contact"; 7 = "Constant Contact").

The questionnaire was updated multiple times during the data collection period, and many questions changed in wording or response options. Details on these changes and how we dealt with them are presented in the Supplemental Materials (SM).

One notable problem arose in coding the variable for how long participants expected to be disabled. During most of the data collection period, this question asked participants to either indicate that they expected to be disabled "permanently," or to indicate the number of years they expected to have the disability, in integers between 1 and 90. However, due to an error in the survey, the response "permanently" was coded as 1, and was therefore not distinguishable from participants who responded that they expected to be disabled for only one year. To differentiate among participants with the value 1 for this version of the future-expectancy question, we relied on the assumption that participants who had lived with their disability for a long time were likely to expect it to continue for a long time. Therefore, participants who had the value of 1 were coded as "long-term" if they had reported having had their disorder for at least 10 years. Participants who expected their disability to continue for at least ten years were also coded as "long-term," and all other participants were coded as "short-term." We expect a considerable amount of measurement error in this variable, and its relationships with other variables should be interpreted with some caution.

Finally, date of participation was also recorded. Time since study onset was included as a covariate, measured in years since the beginning of the study. Since visual inspection of scatterplots (see Figure 1) suggested that time might have a linear relationship with some measures of prejudice, we tested for linear relationships between prejudice measures and time.

Dependent variables.

IAT D scores. In the Disability IAT, participants viewed images representing *ability* or *disability*—for example, a person skiing or a person in a wheelchair, respectively—and words representing the concepts *good* and *bad*—for example, “Beautiful” or “Hate”—and are instructed to sort them to one side of the screen or the other (a complete list of stimuli can be viewed in the Appendix). Participants first completed two practice blocks to gain experience at sorting both of these categories of stimuli (that is, the ability/disability category and the good/bad category), then completed two test blocks sorting intermingled stimuli from both categories. They then completed another practice block sorting the disability/ability stimuli to the opposite sides of the screen as before. Following this, participants completed two more test blocks with the sorting instructions changed, so that if they had sorted in a stereotype-congruent manner (i.e., abled to the same side as good) for the first set of blocks, they sort in a stereotype-incongruent manner (i.e., abled to the same side as bad) for the second set, and vice versa. Participants were instructed to respond as quickly and accurately as possible.

Implicit prejudice was measured using the *D* score (Greenwald et al., 2003)—the difference between a participant’s mean response latencies on “incongruent” trials (in which negative evaluative stimuli were paired with ability-related stimuli, or positive evaluation stimuli were paired with disability-related stimuli) and “congruent” trials (in which negative evaluative stimuli were paired with disability-related stimuli, or vice versa), divided by the standard deviation of the participant’s response latencies. *D* scores can range from -2 to 2; positive *D* scores represent pro-ability prejudice, and negative *D* scores represent pro-disability prejudice.

Explicit prejudice. Explicit prejudice against PWD were measured by asking participants to choose an option from 1 (*I strongly prefer disabled people to abled people*) to 5 (*I strongly prefer abled people to disabled people*), with the midpoint labeled *I like Disabled people and Abled people equally*. “Abled” and “Disabled” were not defined for participants.

Feeling thermometers. In two further questions, participants rated their feelings toward abled people and toward PWD, respectively, on a scale from 0 (*very cold*) to 10 (*very warm*), with the midpoint labeled *neutral*. The thermometer scales measured feelings toward those with and without disabilities separately, allowing us to determine the extent to which demographic and experience variables independently predict feelings toward individuals with and without disabilities; these two variables were modeled in separate regressions.

Results

Because questions were added and removed over the course of the data collection and participants were allowed to skip questions, sample sizes—and therefore degrees of freedom—differ by analysis. Further, the sample size for all the below analyses were very large: depending on the analysis in question and the size of the relative sample or sub-sample, *N*s ranged from 24,163 to 291,936. Because these sample sizes were large enough that even negligible effects were often statistically significant, we discuss effects below that were both statistically significant *and* had a standardized effect size $\beta \leq 0.01$ (this decision was made prior to conducting analyses). For this reason, *p*-values are not reported in the text below, although they can be viewed in the tables. The selection of this effect size cutoff was relatively arbitrary, given the lack of consensus in the attitudes field about what constitutes a practically significant effect size (Bosco, Aguinis, Singh, Field, & Pierce, 2015). It is worth mentioning an illustrative example to provide a concrete picture of the variance explained by a standardized coefficient of this size. In the regression predicting feelings of warmth toward PWD among people who themselves have disabilities (Table 2), the duration of the participant's disability had a β of 0.0107, and removing this variable decreased the adjusted R^2 by 0.00008. However, we acknowledge that even effects at and above this size may not be practical from the perspectives of researchers and practitioners.

Primary Analyses

Linear regressions (see Table 1) were conducted to predict implicit prejudice, explicit prejudice, warmth toward PWD, and warmth toward people without disabilities from a set of variables including participants' age, gender, race, education, contact with PWD, own disability status, and date of participation from 2004 to 2017. The regression for IAT scores also controlled for the order in which blocks of stimuli were presented, the side of the screen on which stimuli were presented (following Westgate et al., 2015), and the number of IATs the participant reported having previously taken. Finally, the squared value of the participant's age was included to test for U-shaped relationships between prejudice and age (see SM for plots of age differences and analyses including interactions of disability status with demographic variables).

Implicit Prejudice

Results indicated that participants showed greater implicit disability prejudice if they were male, had no disability themselves, or had no contact with any PWD. Implicit disability prejudice was negatively related to education, and positively related to age and time: that is, participants who completed the task later in the study period (e.g., 2017) showed *more* implicit prejudice than participants who completed the task earlier in the study period (e.g., 2004), suggesting that implicit prejudice has increased in recent years (see the first panel of Figure 1).

Full results for participant race effects can be viewed in Table 1. Implicit prejudice was highest among Black participants and lowest among Multiracial participants.

Explicit Prejudice

Explicit disability prejudice was greater among men, participants who reported having no disability themselves, and those who reported not knowing anyone with a disability. Explicit prejudice was also highest among participants of Asian ancestry and lowest in the “Other Races” category. Finally, explicit prejudice had a U-shaped relationship with age, was negatively related to education, and has decreased in recent years (see the second panel of Figure 1).

Feelings of Warmth toward PWD

Women reported warmer feelings toward those with disabilities, as did participants with disabilities and those who had contact with PWD. Warmth toward PWD was positively related to education and showed an inverted-U-shaped relationship with age. Feelings of warmth toward PWD were highest among Black participants and lowest among Asian participants. Finally, feelings of warmth toward individuals with disabilities appear to have been increasing in recent history (see the third panel of Figure 1).

Feelings of Warmth toward People without Disabilities

Results for this analysis diverged somewhat from the previous regression (i.e. variables were usually less predictive and/or in the other direction), suggesting that the relationships between most predictor variables and feelings of warmth toward those with disabilities are not due to general feelings of warmth toward people in general. Women, individuals without disabilities, and those who had contact with individuals with disabilities reported warmer feelings toward people without disabilities. Warmth toward people without disabilities was also positively related to education, showed a U-shaped relationship with age, and did not change over time (see the fourth panel of Figure 1).

Feelings of warmth toward people without disabilities were similar to feelings of warmth toward PWD in terms of the pattern across races, being highest among Black participants and lowest among Asian participants. However, it is worth noting that, of groups that felt more warmly toward PWD than toward people without disabilities, the greatest difference in means between these measures was found in the “Other Races” category, whereas of groups that felt more warmly toward people without disabilities than toward PWD, the greatest difference was found among White participants.

Prejudice among People with Disabilities

Separate analyses were conducted to model prejudice among participants who themselves had disabilities (Table 2). The results reported in this section focus on experiences specific to PWD. Race was treated here as a binary variable (White vs. Person of Color); this decision was in part due to the large number of parameters of these analyses (see SM for further discussion).

Implicit prejudice. Implicit disability prejudice among PWD was higher among those perceiving their disability as short-term, who were not involved in a support group for people with their disability, who had no contact with other PWD, and who identified as a man or a White person. Participants who identified their disabilities as primarily mental or emotional had higher disability prejudice than those who identified their disabilities as primarily physical or both physical and mental/emotional.

Implicit prejudice was also negatively related to the perceived pervasiveness of the disability (i.e., the extent to which it affected activities), the length of time the participant had had the disability, and the frequency of contact with others who shared the disability, and positively related to ease of hiding the disability. Implicit prejudice was lower among more educated people, decreased over time, and had an inverted U-shaped relationship with age.

Explicit prejudice. Explicit disability prejudice among PWD decreased over time. It was positively related to ease of hiding the disability and negatively related to education, perceived disability pervasiveness, perceived disability severity, length of time the participant had had the disability, and frequency of contact with others who had the same disability.

Prejudice was also greater among men, people of color, those not involved in a support group for people of their own disability, and those who had no contact with others with any disability.

The type of disability the participant had also made a difference. People who indicated that their disabilities were primarily mental or emotional had higher levels of disability prejudice than people who identified their disabilities as primarily physical or both. Finally, explicit prejudice had a U-shaped relationship with age.

Feelings of warmth toward PWD. Feelings of warmth toward persons with disabilities within this population increased over time. Warmth was positively associated with perceptions of one's own disability as more severe and frequency of contact with other people who shared their disability, and negatively associated with education and with perceptions of one's own disability as easier to hide. Greater warmth toward PWD was also reported by women, people of color, participants who reported having any contact with others who had disabilities, and participants who were involved in a support group for their disability. Finally, participants whose disabilities were primarily mental or emotional, or both mental/emotional and physical, felt less warmly toward PWD than did participants with primarily physical disabilities. Warmth toward PWD showed an inverted U-shaped relationship with age.

Feelings of warmth toward people without disabilities. Feelings of warmth toward persons *without* disabilities were greater for women and people of color; warmth was also positively related to contact with others who shared the participant's disability and negatively related to perceived pervasiveness. Participants also reported colder feelings if their disability was both mental and physical, and feelings of warmth had a U-shaped relationship with age.

Discussion

Demographic and Experiential Trends

On the whole, our predictions were supported regarding demographic and experiential variation in disability prejudice. For example, more highly educated people had less implicit prejudice and felt more warmly toward PWD; explicit prejudice and feelings of warmth displayed a U-shaped relationship with age; and having a disability oneself was related to lower disability prejudice across measures. Two of the most striking findings, however, were the relationships involving contact with PWD and the relationships involving gender.

Contact with PWD was the strongest predictor of both explicit prejudice and feelings of warmth toward PWD, such that greater contact was associated with lower explicit prejudice and greater warmth. Implicit prejudice was also negatively associated with contact. As discussed above, intergroup contact is one of the most commonly studied mechanisms for reducing prejudice. Past research (Lai et al., 2013) has found a negative relationship between contact and prejudice for a wide variety of stigmatized groups, including groups defined by various disabilities (for a meta-analysis, see Pettigrew & Tropp, 2006). Experimental research has indicated that this relationship is causal; i.e., increased contact decreases prejudice (Pettigrew & Tropp, 2006). While the present work did not manipulate contact, it did confirm that the negative correlation between intergroup contact and prejudice extends to disability prejudice; this finding suggests that contact with PWD may have a prejudice-reducing effect.

In addition, women in our sample showed lower implicit and explicit prejudice and greater warmth toward PWD. Similar gender differences have also been found for prejudice against other groups, and researchers have attributed these differences to various factors such as greater internal motivation to control prejudice (Ratcliff, Lassiter, Markman, & Snyder, 2006) and lower social dominance orientation (Pratto, Sidanius, Stallworth, Malle, 1994). Our research adds to the extensive literature on sex differences in prejudice, confirming with a large sample that these sex differences extend to the domain of disability prejudice.

Temporal Variation in Disability Prejudice

Interestingly, implicit and explicit prejudice followed *opposite* patterns over time. Although explicit prejudice decreased and self-reported feelings toward PWD became warmer over time, implicit prejudice increased during the same period. One possible explanation for the temporal difference between the two measures is tied to the fact that "implicit prejudice" and "explicit prejudice" may be somewhat unrelated concepts. If IAT scores partially result from environmental associations, as argued by Karpinski and Hilton (2001), these associations may not completely reflect evaluations of the target group. There is evidence that IAT scores at least partially measure knowledge of negative experiences the target group faces, such as disability-related hardship or prejudice (Arkes & Tetlock, 2004). In other words, the negative associations people hold regarding PWD may not reflect increased prejudice *per se*, but rather enhanced knowledge of the negative experiences they face. Explicit prejudice, however, might instead be lessened by growing awareness of disability prejudice—explaining the temporal divergence of these measures—because it represents attitudes personally endorsed by the individual as well as, for at least some people, the motivation to be or appear unprejudiced (Dunton & Fazio, 1997). Both of these effects may therefore arise from increases in the visibility of PWD and knowledge of issues such as ableism and accessibility. This awareness might take the form of increased activism and political participation by PWD, increased exposure to the voices of PWD through social media, or increased representation of PWD in media.

Trends among People with Disabilities

Among participants who themselves had disabilities, some of the most important predictors of prejudice were type of disability (mental/emotional vs. physical or both), severity, concealability, and frequency of contact with others who shared the disability. Participants whose disabilities were primarily mental or emotional had greater explicit and implicit prejudice, and lower warmth toward PWD. Greater disability severity was associated with lower explicit prejudice and higher warmth toward PWD, whereas greater concealability was associated with higher implicit and explicit prejudice and lower warmth toward PWD. Finally, level of contact with others who shared the disability was related to lower implicit and explicit prejudice and to greater warmth toward PWD.

One reason why these variables may be related to lower prejudice is that they may lead to greater identification with the group “PWD,” leading to lower prejudice. Unfortunately, we did not have a measure of identification per se: For most of the study period, disability status was measured with a question, “Do you yourself have a disability?” However, Bogart and colleagues (2017) demonstrated that experiential variables are related to identifying with the category of “PWD.” For example, identification will be stronger if the person’s disability is more noticeable, more severe, causes more pain, or if they have had the disability for longer. The similarities between Bogart’s measures and ours suggest that participants with disabilities that are difficult to hide, severe, and involve physical impairment may identify more strongly as a person with a disability. The same may be true for participants who have more frequent contact with others who share their disability. In that case, our results may indicate that people who identify more strongly as persons with disabilities are less likely to hold negative feelings toward that group. This interpretation is consistent with the Dirth and Branscombe’s (2018), argument that disability identification is a mechanism for coping with stigma and is related to behaviors such as emphasizing positive characteristics associated with the disability community and rejecting the idea that disability status is inferior to able-bodied status.

Our finding that prejudice is higher among people who described their disabilities as easier to hide adds to the literature on people with concealable stigmatized identities (e.g. Quinn & Earnshaw, 2011; Weisz, Quinn, & Williams, 2016), particularly concealable disabilities (e.g. Santuzzi, Waltz, Finkelstein, & Rupp, 2015; Santuzzi, Keating, Martinez, & Finkelstein, in press; Werner, Kurz, Rosenne, & Halpern, in press). Much of the research on this subject has focused on costs and benefits of disclosing identities; our research speaks to whether concealability affects prejudice toward others with disabilities. Future research might investigate whether the decision to disclose a concealable disability is related to lower disability prejudice.

Limitations and Future Directions

The design of the study was correlational, so we cannot draw definitive conclusions about the causes of the patterns of associations observed here. Moreover, many of the demographic questions changed various times during the data collection period. Some of these changes were minor; other changes were more dramatic. These methodological changes, and the decisions about how to address them (see SM), likely introduced some noise into the data. These changes could also have confounded results somewhat if these specific sample characteristics changed over time, although any chance variation in sample characteristics over time is likely to be relatively minor given our large sample size. However, *systematic* changes in characteristics over time could still have occurred, potentially altering the observed effect of time.

The present study may also be limited by the fact that the sample was self-selected, and may differ somewhat from the population to which we wish to generalize; for example, only 28% of participants identified as male. The proportion of the sample who reported having a disability was more representative: at 15%, this proportion was identical to the global population proportion (World Health Organization, 2011) and similar to the U.S. population (12.6%; U.S.

Census Bureau, 2015). However, it is likely that our sample of PWD was not fully representative, as certain groups (e.g., those with severe cognitive or visual impairments) may have found it more difficult to participate may therefore be underrepresented. This could have affected results if these groups differ from other PWD on any variables; for example, some people with disabilities that create difficulty using a computer may feel resentment toward people without disabilities because of the social exclusion this can create in present-day society; such factors could influence feelings toward people without disabilities relative to PWD.

Another potential limitation of this work comes from the fact that participants were not provided with definitions for the words “abled” and “disabled” used in the prejudice measures. The generalizability of results may be limited if participants systematically ignored certain types of disabilities (e.g., cognitive disabilities or psychological disorders) when responding. In particular, participants completing the IAT may have interpreted the explicit items as referring purely to physical disability, as the category “Disabled” on the IAT was represented with images relating to mobility and vision impairment. To the extent that “disability” was interpreted to mean physical impairment, our results may not capture attitudes toward other groups of PWD.

A final limitation to the present study is that, although we discuss changes in prejudice over time, the study’s design was cross-sectional rather than longitudinal, so it is possible that the observed temporal trends in prejudice were due not to real population change but to some change in the makeup of the study’s sample over time. Our temporal analyses controlled for a number of factors: age, race, gender, education, disability status, and contact with PWD, ruling out these factors as potential alternative explanations; however, it is still possible that our sample may have changed over time in terms of some other, unmeasured characteristic that could explain the apparent temporal trend. Moreover, the cross-sectional design also limits our ability to explain exactly how disability status influences disability prejudice. PWD are somewhat unique among marginalized groups because group membership is often not lifelong. A person with no disability may develop a disability later in life; a person's disability may be eliminated after they have lived with it for many years; or a person's disability may change in severity. The effects of acquiring or recovering from a disability on prejudice toward PWD are unknown. Our data, however, suggest that one or both of these life events may influence prejudice, as participants with and without disabilities differed in their prejudice. Among participants with disabilities, a number of factors related to the nature, duration, and type of disability were associated with disability prejudice. Future research should pursue these questions, as their answers may shed light on the mechanisms by which disability prejudice functions.

Practical Implications

The present study is primarily descriptive, and did not speak directly to causes and solutions of ableism. That said, however, of the variables we measured, contact with PWD stands out as the variable that is most relevant for policy and intervention: not only because it can be deliberately cultivated, but also because there is experimental evidence from studies of bias against other groups to support its causal importance (as reviewed by Lai et al., 2013). A few studies (e.g. Amsel & Fichten, 1988; Fichten et al., 2005) have found correlations between contact and disability prejudice; the present study provides strong evidence in support of this correlation. This finding is especially noteworthy given that contact was a binary variable: participants simply indicated whether any friend or family member had a disability, so these effects may underestimate the true impact of meaningful contact.

This prejudice/contact correlation has practical significance for efforts to reduce ableism. Although our data suggest that 15% of Americans have disabilities, contact between PWD and people without disabilities is reduced by accessibility issues that may block PWD from certain activities or places. In addition to the costs it imposes on PWD, this situation decreases contact between those with disabilities and those without, diminishing opportunities for the reduction of prejudice. This provides yet another reason why policymakers should consider ways to improve accommodations and access to resources across contexts so that PWD can fully participate in activities without being segregated from those who do not have disabilities. Moreover, the present results have encouraging implications for the success of contact-based interventions, such as that proposed in this issue by Young, Goldberg, Struthers, McCann, and Phills (in press).

Conclusion

It is our hope that the results reported here will be a guide to both future research and policy. Though this study did not directly examine the processes behind disability prejudice, its results are suggestive that attempts to reduce ableism could be targeted based on individuals' demographics (e.g. gender) and experiences, including both experiences with disabilities of their own and experiences with PWD. Future investigations into why these factors matter may reveal more about the mechanisms behind disability prejudice, leading one day to concrete solutions to this understudied social issue.

References

Amsel, R., & Fichten, C. S. (1988). Effects of contact on thoughts about interaction with students who have a physical disability. *Journal of Rehabilitation*, *54*(1), 61-65.

Arkes, H. R., & Tetlock, P. E. (2004). Attributions of implicit prejudice, or "would Jesse Jackson 'fail' the Implicit Association Test?". *Psychological Inquiry, 15*(4), 257-278.

Bedini, L. A. (2000). "Just sit down so we can talk:" Perceived stigma and community recreation pursuits of people with disabilities. *Therapeutic Recreation Journal, 34*(1), 55.

Bogart, K. R. & Dunn, D. S. (in press). Ableism special issue introduction. *Journal of Social Issues.*

Bogart, K. R., Rottenstein, A., Lund, E. M., & Bouchard, L. (2017). Who self-identifies as disabled? An examination of impairment and contextual predictors. *Rehabilitation Psychology, 62*(4), 553-562. doi: 10.1037/rep0000132

Bosco, F. A., Aguinis, H., Singh, K., Field, J. G., & Pierce, C. A. (2015). Correlational effect size benchmarks. *Journal of Applied Psychology*, *100*(2), 431-449.

Chalk, H. M. (2016). Disability self-categorization in emerging adults: Relationship with self-esteem, perceived esteem, mindfulness, and markers of adulthood. *Emerging Adulthood*, *4*(3), 200-206. doi: 10.1177/2167696815584540

Charlesworth, T. E., & Banaji, M. R. (2019). Patterns of implicit and explicit attitudes: Long-term change and stability from 2007 to 2016. *Psychological Science*, *30*(2), 174-192. doi: 10.1177/0956797618813087

Dirth, T. P., & Branscombe, N. R. (2018). The social identity approach to disability: Bridging disability studies and psychological science. *Psychological Bulletin*. Advance online publication. doi: 10.1037/bul0000156

Dunton, B. C., & Fazio, R. H. (1997). An individual difference measure of motivation to control prejudiced reactions. *Personality and Social Psychology Bulletin*, *23*(3), 316-326.

Fazio, R. H., & Olson, M. A. (2003). Implicit measures in social cognition research: Their meaning and use. *Annual Review of Psychology*, *54*(1), 297-327.

Fichten, C. S., Schipper, F., & Cutler, N. (2005). Does volunteering with children affect attitudes toward adults with disabilities? A prospective study of unequal contact. *Rehabilitation Psychology, 50*(2), 164-173.

Findler, L., Vilchinsky, N., & Werner, S. (2007). The multidimensional attitudes scale toward persons with disabilities (MAS) construction and validation. *Rehabilitation Counseling Bulletin*, *50*(3), 166-176.

Forscher, P. S., Lai, C., Axt, J., Ebersole, C. R., Herman, M., Devine, P. G., & Nosek, B. A. (under review). A meta-analysis of change in implicit bias. doi: 10.31234/osf.io/dv8tu

Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology*, *85*(2), 197.

Karpinski, A., & Hilton, J. L. (2001). Attitudes and the implicit association test. *Journal of Personality and Social Psychology*, *81*(5), 774-788.

Lai, C. K., Hoffman, K. M., & Nosek, B. A. (2013). Reducing implicit prejudice. *Social and Personality Psychology Compass*, *7*(5), 315-330. doi: 10.1111/spc3.12023

Lai, C. K., Skinner, A. L., Cooley, E., Murrar, S., Brauer, M., Devos, T., ... & Simon, S. (2016). Reducing implicit racial preferences: II. Intervention effectiveness across time. *Journal of Experimental Psychology: General*, *145*(8), 1001. doi: 10.1037/xge0000179

Livneh, H. (1982). On the origins of negative attitudes towards people with disabilities.

Rehabilitation Literature, 43, 338-347.

Munyi, C. W. (2012). Past and present perceptions towards disability: A historical perspective. *Disability Studies Quarterly, 32*(2). doi: 10.18061/dsq.v32i2

Nosek, B. A., Smyth, F. L., Hansen, J. J., Devos, T., Lindner, N. M., Ranganath, K. A., ... & Banaji, M. R. (2007). Pervasiveness and correlates of implicit attitudes and stereotypes. *European Review of Social Psychology*, *18*(1), 36-88.

Pettigrew, T. F., & Tropp, L. R. (2008). How does intergroup contact reduce prejudice? Meta-analytic tests of three mediators. *European Journal of Social Psychology*, *38*(6), 922-934.

Pratto, F., Sidanius, J., Stallworth, L. M., & Malle, B. F. (1994). Social dominance orientation: A personality variable predicting social and political attitudes. *Journal of Personality and Social Psychology*, *67*(4), 741.

Quinn, D. M., & Earnshaw, V. A. (2011). Understanding concealable stigmatized identities: The role of identity in psychological, physical, and behavioral outcomes. *Social Issues and Policy Review*, *5*(1), 160-190. doi: 10.1111/j.1751-2409.2011.01029.x

Ratcliff, J. J., Lassiter, G. D., Markman, K. D., & Snyder, C. J. (2006). Gender differences in attitudes toward gay men and lesbians: The role of motivation to respond without prejudice. *Personality and Social Psychology Bulletin*, *32*(10), 1325-1338.

Reeve, D. (2006). Towards a psychology of disability: The emotional effects of living in a disabling society. In D. Goodley and R. Lawthom (Eds.), *Disability and Psychology: Critical Introductions and Reflections* (pp. 94-107). London: Palgrave.

Santuzzi A. M, Keating, R. T., Martinez, J., & Finkelstein, L. (in press). Identity management strategies for workers with concealable disabilities: Antecedents and consequences. *Journal of Social Issues.*

Santuzzi, A. M., Waltz, P. R., Finkelstein, L. M., & Rupp, D. E. (2014). Invisible disabilities: Unique challenges for employees and organizations. *Industrial and Organizational Psychology*, *7*(2), 204-219. doi: 10.1111/iops.12134

Turner, M. A. (2005). *Discrimination against persons with disabilities: Barriers at every step*. DIANE Publishing.

U.S. Census Bureau (2015). *American FactFinder.* Retrieved from https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_1YR_S1810&prodType=table

Uppal, S. (2006). Impact of the timing, type and severity of disability on the subjective well-being of individuals with disabilities. *Social Science & Medicine*, *63*(2), 525-539.

Weisz, B. M., Quinn, D. M., & Williams, M. K. (2016). Out and healthy: Being more "out" about a concealable stigmatized identity may boost the health benefits of social support. *Journal of Health Psychology*, *21*(12), 2934-2943. doi: 10.1177/1359105315589392

Werner, S., Kurz, S., Rosenne, H., & Halpern, A. (in press). Disclosure in Cystic Fibrosis: A qualitative study. *Journal of Social Issues.*

Westgate, E., Riskind, R., & Nosek, B. (2015). Implicit preferences for straight people over lesbian women and gay men weakened from 2006 to 2013. *Collabra: Psychology*, *1*(1). doi: 10.1525/collabra.18

Wilson, M. C., & Scior, K. (2014). Attitudes towards individuals with disabilities as measured by the Implicit Association Test: A literature review. *Research in Developmental Disabilities*, *35*(2), 294-321. doi: 10.1016/j.ridd.2013.11.003

World Health Organization (WHO). (2011). *World report on disability.* Retrieved from http://www.who.int/disabilities/world_report/2011/en/

Young, R. E., Goldberg, J. O., Struthers, C. W., McCann, D., & Phills, C. E. (in press). The subtle side of stigma: Understanding and reducing mental illness stigma from a contemporary prejudice perspective. *Journal of Social Issues.*

Table 1. Linear Regressions Predicting IAT Scores, Explicit Prejudice, and Feeling Thermometer Scales

IAT Scores

	b	*SE*	*β*	*t*	*p*	95%UB	95%LB
Intercept	0.550	.002		229.83	< .001		
Date	< 0.001	< .001	.023	12.25	< .001	.023	.023
Order of Initial Pairing	-0.078	.001	-.183	-98.52	< .001	-.181	-.184
Side (of Stimuli)	.007	.001	.016	8.67	< .001	.018	.015
Age	.005	< .001	.137	37.90	< .001	.137	.137
Age^2	> -0.001	< .001	-.006	-1.91	.056	-.006	-.006
Gender	-0.059	.001	-.119	-64.68	< .001	-.117	-.121
Education	-0.006	.001	-.024	-9.93	< .001	-.023	-.025
Disability Status	-0.045	.001	-.074	-39.78	< .001	-.072	-.077
Contact with People with Disabilities	-0.029	.001	-.067	-35.95	< .001	-.066	-.069
Number of IATs taken	-0.039	< .001	-.147	-79.89	< .001	-.146	-.148
Native American	-0.029	.008	-.029	-3.64	< .001	-.013	-.044
Asian	0.021	.004	.026	5.74	< .001	.034	.019
Black	0.082	.003	.110	25.05	< .001	.116	.104
Black/White Biracial	-0.011	.007	-.011	-1.58	.114	.002	-.025
Multiracial	-0.044	.004	-.053	-11.24	< .001	-.045	-.060
Other Races	-0.026	.004	-.030	-6.41	< .001	-.023	-.038

Explicit Prejudice

	b	*SE*	*β*	*t*	*p*	95%UB	95%LB
Intercept	3.308	.003		959.65	< .001		
Date	> -0.001	< .001	-.054	-29.53	< .001	-.054	-.054
Age	-0.004	< .001	-.085	-23.41	< .001	-.084	-.085
Age^2	< 0.001	< .001	.081	26.07	< .001	.081	.081
Gender	-0.072	.001	-.098	-53.28	< .001	-.095	-.101
Education	0.010	.001	.026	10.54	< .001	.027	.024
Disability Status	-0.073	.002	-.080	-42.96	< .001	-.077	-.084
Contact with People with Disabilities	-0.090	.001	-.138	-74.21	< .001	-.136	-.141
Native American	-0.032	.012	-.022	-2.77	.006	.001	-.044
Asian	0.090	.006	.075	16.25	< .001	.085	.064
Black	0.017	.005	.015	3.47	.001	.025	.006
Black/White Biracial	0.021	.010	.014	2.00	.046	.034	-.006
Multiracial	-0.023	.006	-.019	-4.01	< .001	-.007	-.030
Other Races	-0.061	.006	-.049	-10.26	< .001	-.037	-.060

Warmth toward People with Disabilities

	b	*SE*	*β*	*t*	*p*	95%UB	95%LB
Intercept	0.024	.011		0.21	.835		
Date	< 0.001	< .001	.072	39.77	< .001	.072	.072
Age	0.001	.001	.008	2.27	.023	.009	.007
Age^2	> -0.001	< .001	-.036	-11.81	< .001	-.036	-.036
Gender	0.313	.004	.128	70.71	< .001	.137	.120
Education	0.011	.003	.009	3.63	< .001	.015	.003
Disability Status	0.084	.006	.028	15.12	< .001	.039	.017
Contact with People with Disabilities	0.346	.004	.158	85.91	< .001	.166	.150

Native American	0.038	.038	.008	0.98	.327	.083	-.067
Asian	-0.214	.018	-.053	-11.75	< .001	-.017	-.089
Black	0.330	.016	.090	20.83	< .001	.121	.059
Black/White Biracial	-0.091	.034	-.019	-2.68	.007	.048	-.085
Multiracial	-0.072	.019	-.017	-3.78	< .001	.020	-.055
Other Races	0.024	.020	.006	1.24	.215	.044	-.033
			Warmth toward People without Disabilities				
	b	*SE*	*β*	*t*	*p*	95%UB	95%LB
Intercept	-0.238	.011		-21.81	< .001		
Date	< 0.001	< .001	.001	0.61	.540	.001	.001
Age	-0.023	.001	-.141	-38.66	< .001	-.139	-.142
Age^2	0.001	< .001	.068	21.61	< .001	.068	.068
Gender	0. 153	.003	.066	35.83	< .001	.075	.058
Education	0.013	.003	.011	4.65	< .001	.017	.006
Disability Status	-0.110	.005	-.039	-20.48	< .001	-.028	-.049
Contact with People with Disabilities	0.086	.004	.042	22.27	< .001	.049	.034
Native American	0.018	.037	.004	0.48	.629	.076	-.068
Asian	-0.242	.018	-.064	-13.79	< .001	-.029	-.098
Black	0.381	.015	.110	24.99	< .001	.140	.080
Black/White Biracial	0.002	.033	.001	0.08	.939	.065	-.063
Multiracial	-0.101	.018	-.028	-5.92	< .001	.008	-.064
Other Races	-0.167	.019	-.042	-8.73	< .001	-.005	-.078

Note. Date: Date of survey taken from 2004 to 2017. Order: 1 = non-Disability+Good first, 2 = Disability+Good first; Side: 1 = Disability stimuli presented on right first, 2 = Disability stimuli presented on left first. Gender: -1 = men, 1 = women; Education: 8 progressive milestones of education (e.g., some high school, bachelor's degree); Disability Status: -1 = no, 1 = yes; Contact with People with Disabilities: -1 = no, 1 = yes. Date, Age, Education, and Number of IATs taken were mean-centered. Race variables were effects-coded such that White = -1. Thus, effective values of β for White participants would be -.013 (Implicit), -.014 (Explicit), -0.015 (Warmth, PWD), and 0.019 (Warmth, people without). Implicit Prejudice: N = 268,349. *F*(16, 268,332) = 1871.76, *p* < .001. Explicit Prejudice: N = 283,638. F(13, 283,624) = 1156.30, *p* < .001. Warmth (People with Disabilities): N = 289,438. F(13, 289,424) = 1337.73, *p* < .001. Warmth (People without Disabilities): N = 289,454. F(13, 289,440) = 449.80, *p* < .001.

Table 2. Linear Regressions Predicting IAT Scores, Explicit Prejudice, and Feeling Thermometers among People with Disabilities

			IAT Scores				
	b	*SE*	*β*	*t*	*p*	95%UB	95%LB
Intercept	.463	.006		75.45	< .001		
Mental Disability Indicator	.036	.005	.070	7.96	< .001	.078	.061
Mental and Physical Indicator	-.020	.005	-.033	-3.95	< .001	-.023	-.043
Ability to Hide Disability	.026	.003	.057	8.28	< .001	.063	.051
Pervasiveness	-.026	.003	-.068	-8.63	< .001	-.062	-.074
Severity	.002	.004	-.004	-0.53	.598	.003	.012
Contact frequency (own disability)	-.010	.002	-.036	-5.22	< .001	-.032	-.040
Involved in Support Group	-.017	.004	-.027	-4.07	< .001	-.019	-.035
Duration	.002	< .001	-.041	-5.15	< .001	.040	.041
Long-term	-.010	.004	-.020	-2.55	.011	-.012	-.028
Date	>-.001	< .001	-.029	-4.38	< .001	.029	.029
Order of Initial Pairing	-.072	.003	-.155	-24.82	< .001	-.149	-.161
Side (of Stimuli)	< .001	.003	.001	.24	.811	.007	-.004
Previous IATs	-.027	.002	-.090	-14.34	< .001	-.086	-.093
Age	.007	< .001	.214	16.98	< .001	.215	.213
Age^2	>-.001	< .001	-.024	-2.08	.037	-.024	-.024
Gender	-.060	.003	-.117	-18.67	< .001	-.111	-.124
Race	-.008	.003	-.015	-2.38	< .001	-.008	.022
Education	-.014	.002	-.046	-6.23	< .001	-.041	-.050
Contact (yes/no; any disability)	-.021	.004	-.038	-5.82	< .001	-.032	-.069
			Explicit Prejudice				
	b	*SE*	*β*	*t*	*p*	95%UB	95%LB
Intercept	3.150	.009		365.97	< .001		
Mental Disability Indicator	.061	.007	.079	9.08	< .001	.017	.066
Mental and Physical Indicator	-.058	.007	-.030	-7.76	< .001	.092	-.079
Ability to Hide Disability	.014	.005	.021	2.99	.003	-.050	.012
Pervasiveness	-.017	.004	-.030	-3.83	< .001	.030	-.039
Severity	-.046	.006	-.066	-8.30	< .001	-.055	-.077
Contact frequency (own disability)	-.025	.003	-.063	-9.03	< .001	-.057	-.068
Involved in Support Group	-.037	.006	-.041	-6.12	< .001	-.029	-.052
Duration	-.002	<.001	-.029	-3.68	< .001	.028	.030
Long-term	.002	.006	.003	- .41	.685	.015	-.009
Date	<.001	<.001	-.050	-7.55	< .001	-.050	-.050
Age	-.002	<.001	-.039	-3.06	.002	-.037	-.040
Age^2	<.001	<.001	.081	7.22	< .001	.081	.081
Gender	-.059	.005	-.077	-12.29	< .001	-.068	-.087
Race	.013	.005	.016	2.53	.011	.026	.006
Education	.021	.003	.048	6.48	< .001	.054	.041
Contact (yes/no; any disability)	-.035	.005	-.043	-6.58	< .001	-.033	-.054
			Warmth toward People with Disabilities				
						95% CI for *β*	
	b	*SE*	*β*	*t*	*p*	95%UB	95%LB

Intercept	7.556	.027		282.30	< .001		
Mental Disability Indicator	-1.589	.021	-.066	-7.64	< .001	-.025	-.107
Mental and Physical Indicator	-.061	.023	-.022	2.64	.008	.067	-.024
Ability to Hide Disability	-.065	.014	-.031	-4.52	< .001	-.003	-.059
Pervasiveness	-.013	.014	-.007	-0.96	.338	.019	-.034
Severity	.114	.017	.052	6.65	< .001	.085	.018
Contact frequency (own disability)	.101	.009	.081	11.81	< .001	.098	.064
Involved in Support Group	.118	.019	.042	6.65	< .001	.078	.006
Duration	.002	.001	.011	1.38	.167	.013	.008
Long-term	-.041	.019	-.016	-2.17	.030	.020	-.053
Date	< .001	.027	.029	4.52	< .001	.029	.029
Age	.005	.021	.034	2.70	.007	.038	.030
Age^2	>-.001	.023	-.054	-4.84	< .001	-.054	-.054
Gender	.026	.043	.107	17.24	< .001	.136	.078
Race	.008	.014	.033	5.37	< .001	.064	.003
Education	-.053	.017	-.038	-5.23	< .001	-.018	-.058
Contact (yes/no; any disability)	.089	.009	.035	5.33	< .001	.067	.002

Warmth toward People without Disabilities

	b	*SE*	*β*	*t*	*p*	95%UB	95%LB
Intercept	7.257	.027		270.92	< .001		
Mental Disability Indicator	-.040	.021	-.017	-1.91	.056	.024	-.057
Mental and Physical Indicator	-.087	.023	-.031	-3.76	< .001	.014	-.077
Ability to Hide Disability	-.027	.014	-.013	-1.87	.061	.015	-.041
Pervasiveness	-.082	.014	-.047	-5.97	< .001	-.020	-.074
Severity	.025	.017	.011	1.45	.148	.045	-.022
Contact frequency (own disability)	.062	.009	.050	7.19	< .001	.067	.033
Involved in Support Group	.011	.019	.005	0.62	.537	.040	-.032
Duration	-.003	.001	-.016	-2.03	.042	-.013	-.019
Long-term	-.040	.019	-.016	-2.11	.035	.021	-.053
Date	< .001	< .001	-.017	-2.56	.010	-.017	-.017
Age	-.007	.002	-.047	-3.69	< .001	-.043	-.050
Age^2	< .001	< .001	.029	2.53	.011	.029	.028
Gender	.138	.015	.058	9.27	< .001	.087	.029
Race	.043	.016	.017	2.78	.006	.048	-.013
Education	.009	.010	.006	.84	.401	.026	-.014
Contact (yes/no; any disability)	.003	.017	.001	.20	.839	.034	-.031

Note. Continuous and ordinal variables were mean-centered. Mental Disability Indicator: 1 = Disability is mental/emotional, -1 = Disability is physical; Mental and Physical Disability Indicator: 1 = Disability both mental and physical, -1 = Disability is physical; Ability to Hide rated on a 4-point scale; Pervasiveness: Degree to which disorder affects daily activities, rated on a 6-point scale; Severity of disorder rated on a 4- or 5-point scale and standardized; Contact: Frequency of contact with others who have same disability, rated on a 7-point scale; Involved in Support Group: 1 = yes, -1 = no; Duration: Number of years since onset of disability; Long-term: 1 = Disability is expected to continue over the long term, -1 = Disability is short-term. IAT Scores: N = 23,310. F(19, 23,290) = 127.00, $p < .001$. Explicit Prejudice: N = 24,620. F(16, 24,603) = 65.05, $p < .001$. Warmth toward People with Disabilities: N = 25,428. F(16, 25,411) = 60.86, $p < .001$. Warmth toward People without Disabilities: N = 25,416. F(16, 25,399) = 18.22, $p < .001$.

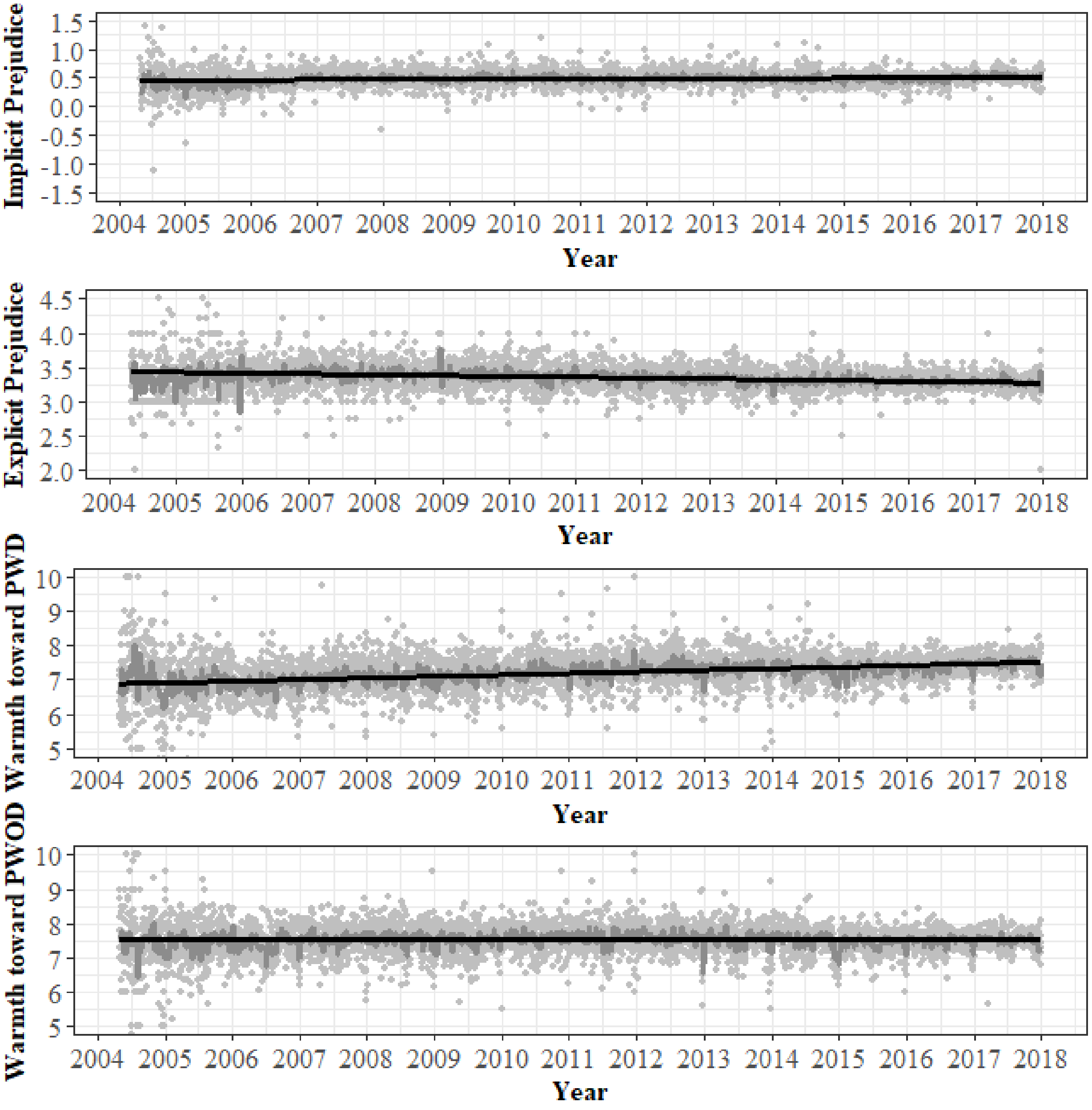


Figure 1. Trends overtime in (from top to bottom) IAT scores, explicit prejudice, feelings of warmth toward people with disabilities, and feelings of warmth toward people without disabilities. Dark black trend line represents overall trend; dark gray line represents weekly averages; gray points represent daily averages. PWD = people with disabilities. PWOD = people without disabilities.

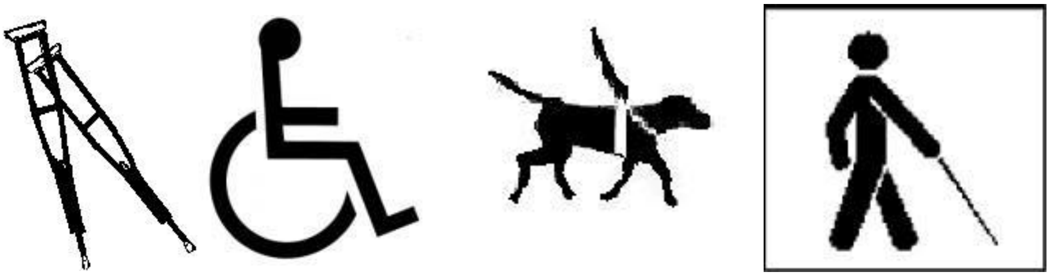
Appendix

***Good* Stimuli:** Beautiful, Happy, Cheerful, Pleasure, Joyful, Laughing, Terrific, Adore

***Bad* Stimuli:** Nasty, Yucky, Grief, Annoy, Sickening, Hate, Failure, Sadness

***Abled Persons* Stimuli:**

***Disabled Persons* Stimuli:**



Author Biographies

Jenna A. Harder is a graduate student in social/personality psychology in the Department of Psychology at Michigan State University. She received her master's degree from the same program in 2017. She is interested in the cognitive processes underlying prejudice and stereotyping, and in improving methodological and analytic practices in this area. Much of her work has focused on how race bias and social class bias influence police officers' decisions to use lethal force.

Victor N. Keller is a graduate student of social/personality psychology in the Department of Psychology at Michigan State University. He is interested in the evolution of intergroup processes and his research focuses on the social cognition of shared reality and coordination.

William J. Chopik is an assistant professor of social/personality psychology in the Department of Psychology at Michigan State University. He received his Ph.D. in Personality and Social Contexts Psychology from the University of Michigan in 2015. He is interested in how relationships—and the people in them—change over time and across situations. Dr. Chopik's research focuses on how factors both inside (biological, hormonal) and outside (social roles, geography) of people influence their approach to social relationships. His work examines phenomena as broad as how relationships and social institutions shape development and as focused as the hormonal mechanisms that underlie love and intimacy.