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# “But what do you really think?” Nurses' contrasting explicit and implicit attitudes towards people with disabilities using the implicit association test

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## Abstract

**Aims:** To investigate how nurses' implicit and explicit attitudes towards people with disabilities (PWD) compare to (1) other healthcare providers and (2) non-healthcare providers.

**Method:** We present an analysis of secondary data from the publicly available disability Implicit Association Test (IAT). We compare the explicit and implicit attitudes towards PWD for (1) nurses ( $n=24,545$ ), (2) other healthcare providers ( $n=57,818$ ) and (3) non-healthcare providers ( $n=547,966$ ) for a total of 630,238 respondents, between 2006 and 2021.

**Data Sources:** We use publicly available data for the Disability IAT from Open Science Framework repository of Project Implicit available at <https://osf.io/tx5fi/>.

**Reporting:** STROBE checklist.

**Results:** There is a distinct contrast between nurses' explicit and implicit attitudes. While nurses have more positive explicit attitudes towards PWD compared to other groups, they also have more negative implicit attitudes towards PWD. As such there is a contrast between nurses' stated (explicit) attitudes and their unconscious (implicit) attitudes towards PWD. Further, we find that implicit bias towards PWD—among all groups—has not improved over the 15 year period of our sample.

**Conclusions:** We present a contrast between nurses' explicit and implicit attitude towards PWD compared to non-healthcare providers. We posit that implicit bias is driven by a combination of workload and stress which drives nurses to unconscious modes of thinking more frequently.

**Implications:** We discuss three potential tools for improved educational praxis regarding treatment of PWD; (1) more PWD service user involvement, (2) the use of mindfulness techniques to reduce stress and (3) the use of patient contact simulation to promote education and understanding.

**Patient or Public Contribution:** There is no patient or public contribution.

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## KEYWORDS

disability, discrimination, medical education, nurses, unconscious bias

## 1 | INTRODUCTION

People with disabilities (PWD) face significant discrimination and bias in the several aspects of society (Oliver, 2013), including in healthcare settings (Bunbury, 2019). Previous research observed that a vast majority of healthcare professionals implicitly preferred people without disabilities (VanPuymbrouck et al., 2020). Cleary and Doody (2017) identified five major problems in relation to the implicit bias of nurses towards PWD. These were (1) a lack of cognitive skills and understanding for conducting proper health assessments for PWD, (2) a lack of capability to address the complex needs associated with disability, (3) an uneasiness working with PWD, (4) issues with communication and (5) negative attitudes and misconceptions about disability (Cleary & Doody, 2017). Groves et al. (2021) revealed that individual nurse bias and nursing care inconsistencies have been recognised in multiple countries and healthcare locations. They also identified that there needs to be a consistent focus on the role of nurses as representatives of the single largest professional component of the healthcare workforce. It is these negative attitudes towards disability/PWD, specifically in relation to nursing staff, that we focus on in this paper.

Stephenson (2018) identified that there is even significant bias shown to nurses with disabilities, who regularly face discrimination themselves within the UK healthcare system from their employers and colleagues despite ongoing and persistent efforts to boost equality. This suggests that there continues to be stigma around working in healthcare while having a health condition or disability, generating concerns about ability to carry out duties. Stephenson (2018) suggested that these assumptions are not necessarily founded, and presumptions are made based on medical knowledge rather than understanding the individual experience. If nursing staff are unable to diminish discrimination against their own colleagues, then nursing as a profession has a significant journey towards reducing intrinsic biases towards PWD. These attitudinal barriers may develop when PWD are considered to be sick, deficient or abnormal and in need of correction or adaptation (Kritsotakis et al., 2017). Such adverse attitudes can create major barriers in attempts by PWD to access healthcare services and lead to feelings of helplessness, frustration, oppression, and humiliation, leading to increased health disparities by driving health-avoiding behaviours (Peters & Cotton, 2015).

Further, implicit biases among healthcare professionals have been associated with several negative effects on health outcomes, including inadequate patient assessments; inappropriate diagnoses and/or treatment decisions; less time involved in patient care; and patients being discharged with insufficient follow-up (Oxtoby, 2020). These implicit biases are particularly targeted at minority and/or marginalised groups, including PWD (Vela et al., 2022).

### What does this paper contribute to the wider global community?

- This study shows how nurses' implicit and explicit attitudes towards people with disabilities (PWD) compare to other healthcare providers and to non-healthcare providers.
- This study will help to raise awareness among healthcare providers about the potential causes and effects of implicit bias towards PWD.
- This study will show how the dynamics of implicit bias towards PWD have not improved over the last 15 years and highlight the importance and benefits of reducing bias.

Further, there are important intersectional differences (based on race, age, gender identity or sexuality) within the broad category of 'PWD' (Craig, 2022). Consequently, to overcome these barriers and address the resulting health disparities, it is important that nurses, healthcare, and social welfare professionals develop unbiased attitudes towards PWD. Indeed, James et al. (2022) called for greater representation of PWD within healthcare curricula while Gleicher et al. (2022) provide a scoping review of current efforts to tackle implicit bias in healthcare curricula. In a systematic review of nurse attitudes to PWD, Satchidanand et al. (2012) identified that some studies revealed that some healthcare professionals demonstrate fear and anxiety about caring for a patient with physical disabilities. This could be potentially due to lack of specific education regarding the needs of PWD. Supporting this concept, common drivers for nurse bias (towards both PWD and other marginalised groups) are stereotypes and other personal beliefs, lack of awareness, lack of knowledge and unchanged/outdated institutionalised procedures or practices (Nyblade et al., 2019). Further research evidence recognises that nurses may develop unconscious bias during their initial education and practice placements, taking influence from their educators, supervisors and practice assessors. In a study by Weech-Maldonado et al. (2012) it was identified that PWD at hospitals with better cultural competency policies, educational programmes, practices and cultures reported overall better experiences with their care with regards to perceived discrimination to individuals.

The Implicit Association Test (IAT) (Greenwald et al., 1998) is the most commonly used measure of implicit bias, having been used for more than 20 years to collect data on implicit attitudes towards a wide range of characteristics, including gender, race, sexuality and, for our purpose, disability (Kurdi et al., 2019). It should be noted that the disability IAT focuses solely on physical (and visible) disabilities.

Wilson and Scior (2014) present a systematic review on the usage of the disability IAT among general populations that showed strong general negative attitudes towards PWD. Further, bias towards PWD is a difficult thing to shift; Charlesworth (2022) found that implicit bias towards PWD had only shifted by three percentage points over 14 years, across all respondents.

In terms of the specific manifestations of bias towards PWD, the HPOD (2021) explored how various forms of disability bias can affect clinical practice and has proposed three main sources of bias. Ineffectual bias is expressed when clinicians presume that patients with disabilities retain lower levels of activity and ability than non-PWD patients with the same conditions and therefore manage them paternalistically. Fragility bias occurs when clinicians perceive that patients with disabilities suffer more than non-PWD patients presenting with similar conditions, which may result in more conservative treatment. In contrast, catastrophe bias projects more suffering onto patients with disabilities than is experienced based on the assumption that their quality of life is diminished, provoking clinicians to 'give up' sooner than for non-PWD patients.

The most closely related studies to ours are VanPuymbrouck et al. (2020) and Feldner et al. (2022) who both use publicly available data from the disability IAT—the same data source that we use—to examine healthcare professionals and occupational therapists attitudes towards PWD, respectively. They revealed that despite a majority of professionals explicitly self-reporting not being biased against PWD, implicitly, the overwhelming majority showed implicit bias. We build on VanPuymbrouck et al. (2020) and Feldner et al. (2022) by providing a specific comparison between nurses, other healthcare professionals and non-healthcare professionals in terms of both explicit and implicit attitudes towards PWD. Further, we consider how these attitudes have changed over time since the disability IAT was introduced in 2006.

In this paper, we use publicly available data from the disability version of the IAT to present an analysis of the explicit and implicit attitudes towards PWD of healthcare professionals (distinguishing between nurses and other healthcare professionals) compared to non-healthcare professionals. As such, this paper adds to the body of knowledge on attitudes towards PWD especially among healthcare professionals. We also present a discussion on nurses' unconscious attitudes towards PWD and provide some recommendations for improved educational praxis.

## 2 | METHODS

We used publicly available data from Project Implicit for the disability IAT from 2006 to 2021 (Xu et al., 2022). Respondents first completed a pre-questionnaire that included basic demographics including occupation as well as explicit attitudes towards PWD. Respondents then completed the disability IAT procedure as a measure of their implicit attitudes towards PWD. The data is made publicly available on Project Implicit's Open Science Foundation repository on an annual basis.

In terms of the explicit measure of attitudes towards PWD, respondents were asked to indicate 'which of the following statements do you most agree with?' with a set of seven possible options ranging from 'I strongly/moderately/slightly prefer PWD to non-PWD' through to 'I slightly/moderately/strongly prefer non-PWD to PWD'.<sup>1</sup> There was also a middle option of 'I prefer neither PWD or non-PWD'. As such, respondents' explicit attitudes were measured along a 7 point scale from 1, strongest possible pro-disability attitudes to 7, strongest possible anti-disability attitudes.

The measure of implicit attitudes was the disability IAT as mentioned above. The IAT is a reaction-time based measure of implicit associations between particular concepts (i.e. PWD and non-PWD) and good/bad concepts (Pruett & Chan, 2006). Previous research has shown that the disability IAT is able to differentiate between positive and negative associations towards PWD (Pruett & Chan, 2006). Participants assigned stimuli (i.e. words or pictures) to pre-determined categories. The stimuli can be seen in Table 1 and Table A1 and an example screenshot can be seen in Figure 1. Participants performed tasks in which both the physically disabled and good and physically disabled and bad categories are together. The difference in reaction times assigning physically disabled-good and physically disabled-bad stimuli together gave a measure of the strength of implicit association between the concept of physical disability and good/bad value judgements. People with stronger negative associations towards disability or PWD experienced greater levels of incongruence or cognitive dissonance when assigning physically disabled-good stimuli together as this went against their implicit attitudes.

The corresponding result from the IAT is referred to as a D-score, with positive values representing implicit bias against PWD and negative values representing implicit bias towards non-PWD. Higher D-scores therefore represented higher levels of implicit bias towards PWD. IAT scores are commonly categorised into seven categories consistent with the explicit attitude measure outlined above. Threshold values are given as above .65 (below -.65) is strong bias, above .35 (below -.35) is moderate bias, above .15 (below -.15) is slight bias and values between -.15 and .15 are referred to as little to no bias.

We categorise respondents into one of three subgroups; (1) non-healthcare professionals (Non-HCP), (2) healthcare professionals excluding nurses (HCP-Non-Nurses) and (3) nurses (HCP-Nurses). In the results section that follows, we present respondents' explicit and implicit attitudes towards PWD broken down between these three subgroups. We also present Cohen's *d* effect sizes for difference in these explicit and implicit attitudes between subgroups (Sullivan & Feinn, 2012). Finally, we present a two-step Heckman selection regression (Heckman, 1979) for both explicit and implicit attitudes, in order to address potential issues of sample self-selection. To do this, we utilise incomplete IAT responses (respondents who started but did not finish the IAT) as a proxy for self-selecting out of the procedure. All analysis was conducted in Stata, including using the *esize* (Cohen's *d*) or *heckman* (Heckman selection model) commands.

<sup>1</sup>Whilst the procedure actually refers to 'physically abled people', we use the term non-PWD to be consistent throughout the paper.

Category	Items
Good	Love, excellent, enjoy, magnificent, spectacular, cheerful, smiling and fabulous
Bad	Rotten, grief, despise, humiliate, ugly, disaster, hurtful and pain
PWD	
Non-PWD	

Note: These are the stimuli as of 9 September 2022, though the stimuli have changed over time.

TABLE 1 Stimuli used for the disability Implicit Association Test (IAT).

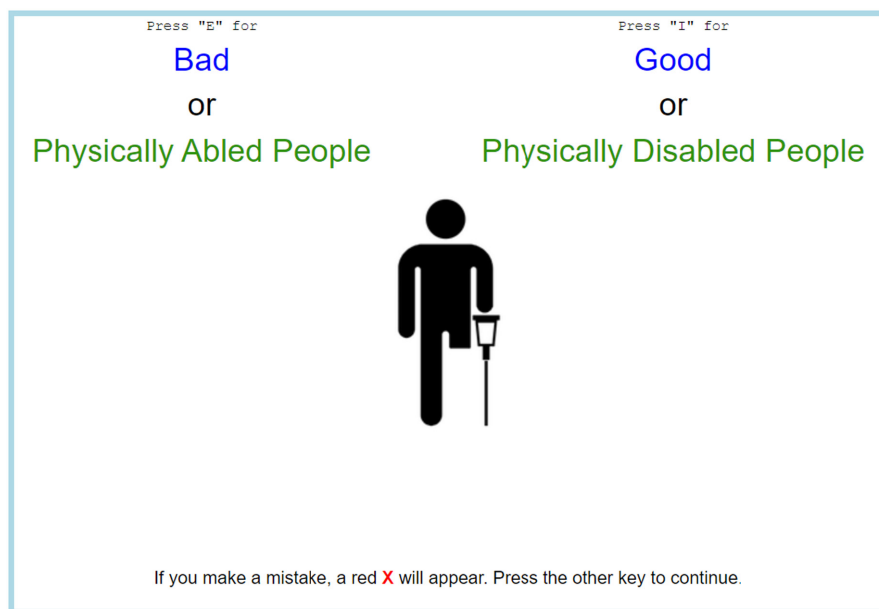


FIGURE 1 A screenshot of the disability IAT procedure.

A total of 1,457,112 records were obtained from publicly available data from Project Implicit for the disability IAT from 2004 to 2021. After removing respondents prior to 2006 (being the first full year the disability IAT was publicly available) and those who did not complete the IAT or did not state their occupation, 630,238 respondents remained for analysis. A further 60,733 incomplete responses were retained for use in the Heckman selection regression described above.

women and is also majority (77%) white. Approximately 60% reported that they had a friend or family member with a disability and a similar proportion reported having an (associate) degree or higher.

### 3 | RESULTS

#### 3.1 | Summary statistics

We now present demographic statistics relating to our 630,238 respondents, seen in Table 2. In terms of the demographic characteristics of our sample; approximately 87% are not healthcare professionals, 3.8% are nurses and the remaining 9.2% are other healthcare professionals. Around 17% reported having a disability—broadly in line with population level statistics. Our sample consists of majority (72%)

Table 3 presents differences between our subgroups in terms of important demographic characteristics. While there are some notable differences, these are not unexpected (in particular, nurses are more likely to be female and Non-Nurse healthcare professionals are more likely to have a degree) and we control for them when presenting a regression analysis.

#### 3.2 | Nurses' explicit bias

We now examine explicit attitudes towards PWD. Figure 2 shows the distribution of responses to the self-reported explicit attitude measure. As can be seen, a majority of respondents explicitly indicated that they had no bias. This is true for all three of our respondent subgroups. However, both HCP-Non-Nurses (66.4%) and HCP-nurses (69.6%) are more likely to indicate that they have explicitly unbiased attitudes towards PWD compared to non-HCPs (64.7%).

TABLE 2 Sample summary statistics.

Demographic variable	%	N
Healthcare professionals (n = 630,238)		
Non-healthcare professionals (non-HCP)	86.9%	547,966
Healthcare professionals—Non-Nurses (HCP-Non-Nurses)	9.2%	57,818
Healthcare professionals—nurses (HCP-nurses)	3.8%	24,454
Disability (n = 622,310)		
PWD	16.8%	104,525
Non-PWD	83.2%	517,785
Gender identity (n = 630,238)		
Male	26.4%	166,523
Female	72.1%	454,622
Non-binary	1.4%	9093
Race (n = 597,950)		
White	77%	460,101
Multiracial	4.7%	28,102
Black	6.9%	41,003
East Asian	3.1%	18,305
South Asian	2.5%	15,168
Native Hawaiian or other Pacific Islander	.6%	3308
Indigenous American	.8%	4517
Other	4.6%	27,446
Friend or family member who is a disabled person (n = 613,695)		
Yes	60.6%	371,842
No	49.4%	241,853
Has a degree (n = 630,238)		
Yes	52.5%	331,143
No	47.5%	299,095

TABLE 3 Subgroup summary statistics.

	Non-HCP (N = 547,966)	HCP-Non-Nurses (N = 57,818)	HCP-nurses (N = 24,454)
Age	32.46	33.62	34.30
PWD	17.2%	13.8%	14.2%
Female	73.8%	79.4%	92.7%
White	76.8%	77.0%	78.8%
Family	60.6%	58.6%	63.7%
Degree	58.3%	80.4%	64.1%

As above, the explicit measure operates along a 7-point scale, with values of 4 corresponding to no explicit bias. As such, values above 4 relate to negative explicit attitudes towards PWD, with higher values representing stronger bias. Table 4 gives a breakdown of the average explicit bias for each of our three subgroups. Consistent with Figure 2, non-HCPs have the most

negative explicit attitudes towards PWD. Indeed, non-HCPs have significantly more negative explicit attitudes compared to HCP-Non-Nurses ( $p < .001$ ), although the effect size is relatively small (Cohen's  $d = .05$ ). Further still, HCP-Non-Nurses have significantly more negative explicit attitudes compared to HCP-Nurses, though again the effect size is small (Cohen's  $d = .06$ ). HCP-Nurses have the most positive explicit attitudes towards PWD and while this effect size is small (Cohen's  $d = .10$  compared to non-HCP) it is significant.

### 3.3 | Implicit attitudes

We now turn to implicit attitudes as measured by the IAT D-score. We categorise respondents into one of seven categories depending on their D-score (exact details are outlined in the methods section above). Figure 3 gives the distribution of categorised D-scores, broken down for each of our subgroups. While there are strong levels of implicit bias (over 40%) among all subgroups, HCP-Nurses (45.2%) are more likely to show strong implicit bias against PWD than both HCP-Non-Nurses (43.1%) and Non-HCP (41.1%) respondents.

In terms of precise D-scores, Table 5 gives an overview for each subgroup. Consistent with Figure 3, HCP-nurses have the highest levels of implicit bias towards PWD, though as with explicit attitudes the effect size is small (Cohen's  $d = -.10$  compared to Non-HCP). Therefore, in contrast to explicit attitudes where HCP-Nurses showed the most positive explicit attitudes towards PWD, HCP-Nurses show the most negative implicit attitudes towards PWD compared to both Non-HCP but also HCP-Non-Nurses. While the effect sizes are relatively small, it is notable that there is a reversal between implicit and explicit attitudes.

### 3.4 | Bias over time

We now consider how the dynamics of implicit attitudes towards PWD have changed over time, shown in Figure 4. First, there are relatively small differences between our subgroups, consistent with the above analysis. More notably, implicit attitudes towards PWD have not improved over the course of the 15-year sample presented here, remaining at relatively high levels typically identified as 'moderately biased', on average, among all subgroups.

### 3.5 | Regression analysis

In order to investigate the robustness of our results, we conduct a Heckman selection regression analysis to enable us to control for self-selection (as proxied by IAT completion) and other important variation. The results of the second step regression equation can be seen in Table 6, while the first step selection equation is presented in an appendix. We first note that both regressions presented are consistent with VanPuymbrouck et al. (2020) in terms of the sign

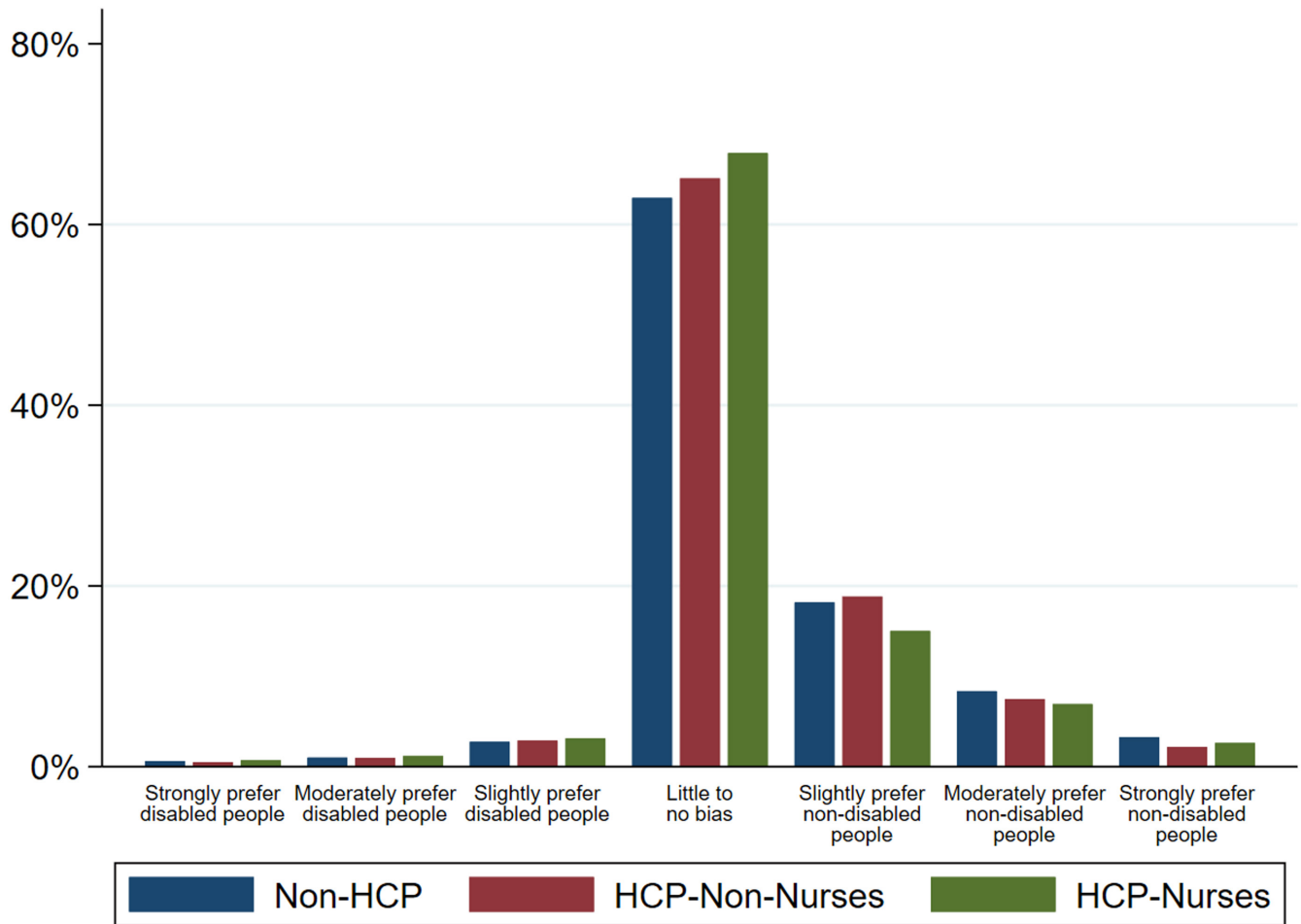


FIGURE 2 Explicit attitudes towards disability for nurses, other healthcare professionals and non-healthcare professionals.

TABLE 4 Pair-wise effect sizes for differences in explicit attitudes.

	Average [95% CI]	Cohen's <i>d</i> effect size	
Non-HCP, (N=532,329)	4.39, [4.39, 4.39]	.05, [.04, .06]	.10, [.09, .12]
HCP-Non-Nurses, (N=56,656)	4.35, [4.34, 4.35]	.06, [.04, .07]	
HCP-Nurses, (N=23,485)	4.30, [4.29, 4.31]		.10, [.09, .12]

and magnitude of coefficients. We see that being a non-PWD significantly increases negative explicit and implicit attitudes towards PWD. Conversely, women have significantly better implicit and explicit attitudes towards PWD compared to men. There is a small but significant effect of being white on better explicit and implicit attitudes towards PWD. Further, having a friend or family member who is disabled is associated with significantly better attitudes towards PWD, something which has consistently been shown to be a stronger moderator of unconscious bias. While the effect of age and education are different between implicit and explicit attitudes, the effect sizes are relatively small.

Importantly, the results are consistent with the analysis presented above with a significant but contradictory effect of being an HCP-nurse on having both better explicit and worse implicit

attitudes towards PWD compared to non-HCPs. This effect is robust to several important aspects of demographic variation within the sample. We therefore have a situation in which there is a contradiction between nurses' explicit and implicit attitudes—with better explicit attitudes belying worse implicit attitudes towards PWD.

#### 4 | DISCUSSION

We found that there are significant negative implicit and explicit attitudes towards PWD. Further, we presented evidence that while nurses showed significantly more positive explicit attitudes towards PWD than other professions (including other healthcare professionals), the reverse was true in terms of implicit attitudes. Nurses



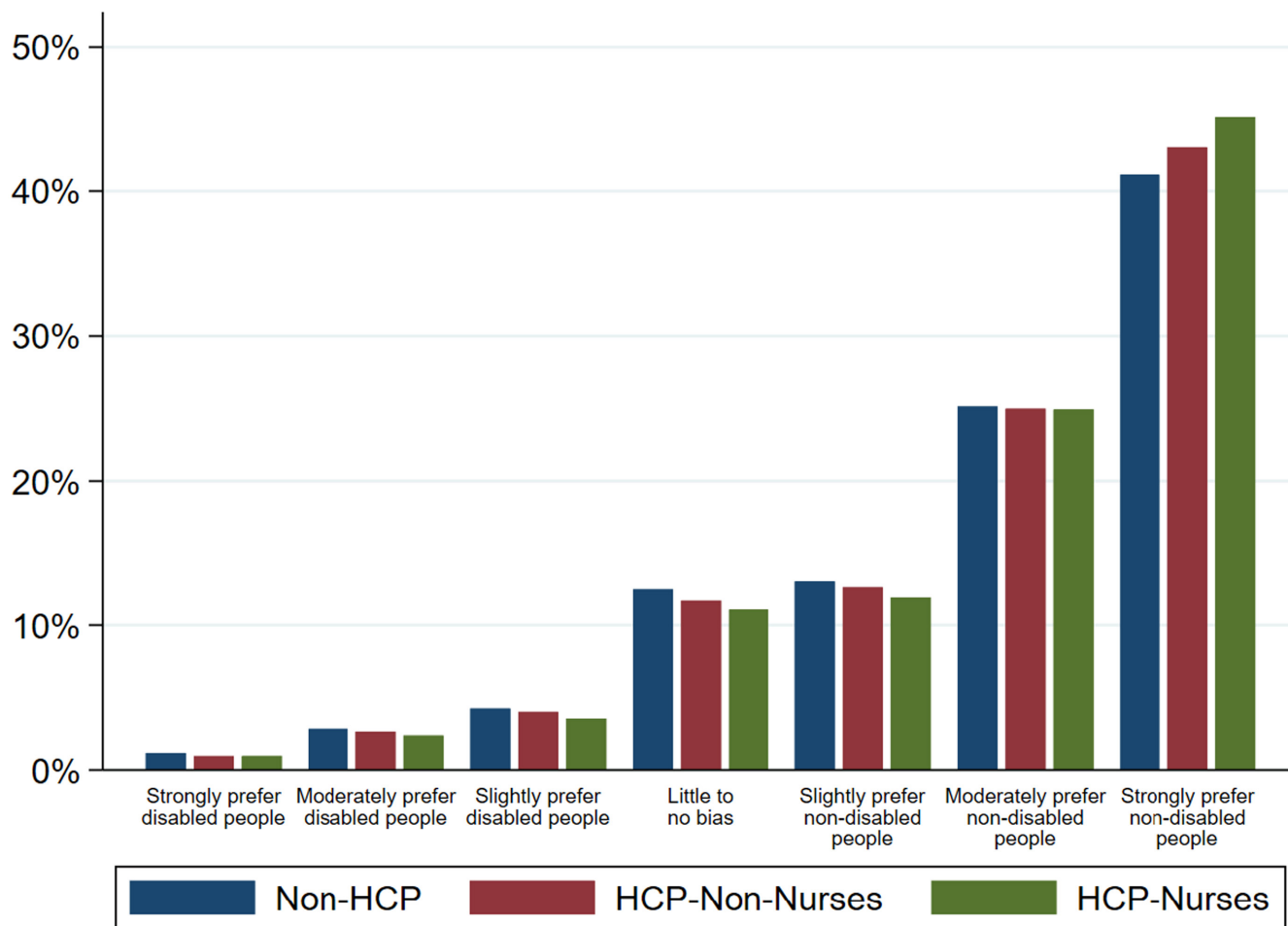


FIGURE 3 Implicit attitudes towards disability for nurses, other healthcare professionals and non-healthcare professionals.

TABLE 5 Pair-wise effect sizes for differences in implicit attitudes.

	Average [95% CI]	Cohen's <i>d</i> effect size	
Non-HCP, (N=532,329)	.51, [.51, .51]	-.05, [-.06, -.04]	-.10, [-.11, -.09]
HCP-Non-Nurses, (N=56,656)	.53, [.53, .53]	-.05, [-.07, -.04]	
HCP-Nurses, (N=23,485)	.55, [.55, .56]		-.10, [-.11, -.09]

within our sample had significantly more negative implicit attitudes towards PWD compared to other professions. Finally, our results suggested that attitudes towards PWD (among all groups) have been stagnant and if improving attitudes towards individuals with disabilities is a goal for improving healthcare accessibility and positive satisfaction and outcomes, then we have consistently failed over the last 15 years. A regression analysis showed our results to be robust to notable demographic variation within our sample.

Driving the differences of implicit bias between nurse and other groups could potentially be the issues that were identified by Cleary and Doody (2017), who identified that nurses possess misconceptions about disability, a lack of cognitive skills and understanding to conduct proper health assessments for PWD, a lack of capability to address the complex needs associated with disability,

an uneasiness with working with PWD, issues with communication and also negative attitudes. There is also evidence that increasing workload intensifies stress, which has been proven to increase intrinsic bias in nursing decision-making (Murphy et al., 2023). Gardner (2023) found that nursing workloads have increased exponentially over the last 15 years due to staff shortages and reduced healthcare funding. This may in part explain why bias towards PWD has not reduced significantly over this period. The NHS Staff Survey (NHS, 2022) demonstrates that nursing staff, working in an environment of constant and unrelenting pressure in the NHS, are physically and emotionally impacted and feel powerless to give adequate care to patients due to staff shortages. Oxtoby (2020) proclaims that it can be more difficult not to make assumptions about patients when operating in a busy healthcare environment since



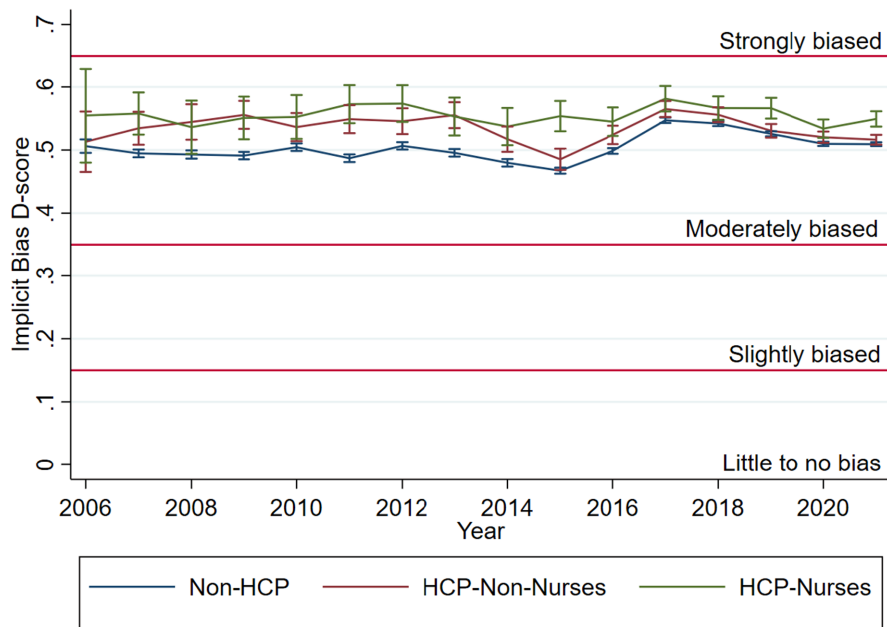


FIGURE 4 Implicit bias D-scores over time and by subgroup.

TABLE 6 Heckman two-step selection model—regression equation.

Dependent variable	Explicit attitudes	Implicit attitudes
HCP-Non-Nurses	-.047*** (.004)	.022*** (.002)
HCP-Nurses	-.055*** (.006)	.047*** (.003)
Age	-.002*** (<.001)	.006*** (<.001)
Non-PWD	.179*** (.003)	.078*** (.002)
Female	-.158*** (.002)	-.114*** (.001)
White	-.006** (.003)	-.021*** (.001)
PWD friend/family	-.210*** (.002)	-.054*** (.001)
Degree	.029*** (.003)	-.034*** (.001)
Constant	4.481*** (.005)	.459*** (.003)
N	580, 434	592, 023

Note: The first-step selection equation is reported in an appendix. \*\* and \*\*\* represent significance at the 5% and 1% level, respectively.

clinicians work in highly pressurised settings that require fast thinking. Further, there is a string of successive decisions for healthcare professionals to make—diagnosis, action plan, further investigation, or treatment—all of which present opportunities for unconscious bias to creep into decision-making processes. Bridges et al. (2019) identified a correlation between low staffing levels and low quality of carer or patient satisfaction. These findings are consistent with other studies which demonstrated higher patient-to-staff ratios are associated with lower quality of care and patient satisfaction and may result in poorer quality interactions between patients and staff (Griffiths et al., 2016). In addition to exacerbating well-known patient safety risks, these findings indicate a wider unconsciously generated negative effect from low staffing, with additional more

general adverse consequences for patient experience and quality of care, potentially leading to biased decision-making.

This implies that health professionals need to consider introducing specific training within their workplace for nursing employees to mitigate this unconscious bias. Moreover, Bridges et al. (2019) recognise that assistant nursing staff are particularly in need of further training as they are often used to mitigate the shortfall in registered nurses. Formal education on the assessment of the complex needs of PWD should also be integrated into pre-registration curricula throughout the course. Within the context of participation in clinical practice, placement education performs a significant function in preparation for health professions, consisting of 50% of undergraduate nursing programmes. Thompson et al. (2023) suggest that nurse educators must devise learning objectives for pre-registration nursing placements that emphasise identifying personal bias in their own practice and develop the courage and leadership for students to address the biased practice of colleagues to promote improved care, safety and patient outcomes.

In the context of addressing nursing practice and nurse education, Charlesworth (2022) noted that implicit biases are genuinely difficult to amend because they are subconscious; however, they are not insurmountable. Using mindfulness techniques, conscious reasoning, and a sincere motivation to adapt, implicit biases can be overcome, and a more inclusive patient experience can be delivered. This point notwithstanding, Thompson (2014) identifies that clinicians can be powerful change agents for promoting disability rights. To do so, they must address disability biases that are ubiquitous in clinical practice and focus upon transforming long-standing health care disparities experienced by PWD. Burgess et al. (2017) noted that unfortunately only minimal progress has been achieved in discovering and implementing efficient strategies to address these typically normal, but potentially harmful unconscious bias processes.

Creswell (2017) has proposed the use of mindfulness interventions to address implicit bias and these may be especially pertinent for nurses experiencing high stress and workload as highlighted above. One working definition of mindfulness is a process of openly attending, with awareness, to one's present moment experience. The specific goal of mindfulness, according to Craig (2022) is to empty the mind of distracting thoughts so that the individual can focus on the present moment, and the PWD, without assumptions or judgements. As such, this strategy is related to emotional regulation and perspective taking by encouraging slow thinking. This process of awareness of present moment experience contrasts with much of our daily life experience, in which we often find ourselves running on automatic pilot or suppressing unwanted experiences (Kang et al., 2013). Mindfulness would be an intended intervention when nurses would stop, think, and empathise with their patients, concentrating on their needs, considering effective communication, and listening skills and thus increasing compassion and understanding for their circumstances. Mindfulness meditation teachers have long emphasised that mindful awareness can foster insights into the nature of one's suffering and that this understanding naturally gives rise to feelings of compassion towards the self and others (Gunaratana, 2011). These skills are a favourable and justifiable method to address the issue of implicit bias. Mindfulness training may also have advantages over alternative approaches to addressing implicit bias because it focuses on the development of skills, reflectiveness and promotes a non-judgmental approach. It can also bypass the negative feelings when directly confronted with evidence of discrimination, and constitutes a rounded approach to promoting the well-being of healthcare professionals (Tang et al., 2015). Further, there is evidence that regular practice is a key component and that professionals experience benefits from group support (Carmody & Baer, 2009).

Alongside mindfulness interventions, the use of virtual reality simulation has been lauded as a successful method of address implicit bias. This works by giving the individual an immersive and realistic scenario where they can practice interactions with PWD patients in a controlled setting. This method of education could address issue of the nurse's uneasiness with working with PWD, issues with effective communication and negative attitudes. Previous research by Todd and Galinsky (2014) ascertained that exercises where participants are asked to imagine what it would be like to be someone else under specific circumstances, reduced prejudice and undermined negative stereotypes. However, it is important that simulation is only used to simulate nurse-patient interactions and not to provide in-vivo experiences of living with a disability, since this can have unintended consequences. Nario-Redmond et al. (2017) identified that while simulating other people's disabilities, these simulations can fail and reinforcing harmful stereotypes by decreasing the perceived adaptability of being disabled and thus reducing the considered capabilities of individuals who are disabled (Silverman et al., 2015).

Another potential avenue to consider to successfully mitigate bias towards PWD is service user involvement. Working closely with disability organisations and other partners to enable PWD to

enter the profession and to understand the needs for PWD through nursing support and nurse associate roles could be useful in this respect. Across much of the IAT literature, having experience interacting with a particular group of people is associated with lower bias (Aberson, 2021). Indeed, there is evidence that simply *imagining* interacting with a group of people can reduce bias towards them (Turner et al., 2007; Turner & Crisp, 2010). There is therefore strong evidence that the common best practice of service user involvement is likely to be particularly beneficial in the context of PWD patients.

#### 4.1 | Limitations

We note here some limitations of the current research. First, the sample is not random or representative—it is entirely self-selected in terms of who chooses to go to the Project Implicit website and take an IAT. Further, people choose which IAT to perform, so people choosing the disability IAT may have so particular interest or preconceived reason for taking the disability IAT. Despite this, it is likely the unconscious bias (for all groups) is underestimated since people with particularly strong negative attitudes will likely just avoid taking an IAT.

While a number of meta-analyses have confirmed the predictive validity of the IAT as a measure that can reliably predict explicit attitudes or actual behaviours (Greenwald et al., 2009; Hofmann et al., 2005; Kurdi et al., 2019). However, this has been widely discussed in the literature (Kurdi et al., 2021; Schimmack, 2021). Nonetheless, the IAT remains the most widely used measure of implicit bias, both within the specific disability context and in other contexts.

It should also be noted that while our effect sizes are significant, they tend to be small in magnitude. First, overall levels of disability bias are relatively high for all subgroups regardless of intergroup differences. Second, the Non-HCP subgroup are intended as a 'general population' baseline comparator, and thus despite effect sizes being small they are noteworthy. Since nurses show high levels of implicit bias towards PWD regardless of any general population comparison, our central findings regarding the need to improve nurses' implicit attitudes towards PWD remains.

#### 5 | CONCLUSION

In conclusion, we identified that nurses had relatively low levels of explicit bias towards PWD but in fact this belies their relatively high implicit bias that the IAT identifies. It has been argued that stress and poor knowledge of nursing PWD can be a crucial reason why this bias exists. We believe that using mindfulness techniques alongside a form of simulation teaching, related to experiential learning about PWD, such as virtual reality experiential based learning and hearing the voices of disabled service users may help to reduce the implicit bias inherent in both pre- and post- registration nurses and potentially other health care professionals.

**AUTHOR CONTRIBUTIONS**

DWD: Conceptualization, Writing—original draft, Writing—review & editing, Formal Analysis, Visualisation. TK: Conceptualization, Writing—original draft, Writing—review & editing.

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No funding was obtained to conduct this research.

**CONFLICT OF INTEREST STATEMENT**

We have no conflict of interest to declare.

**DATA AVAILABILITY STATEMENT**

The data that support the findings of this study are openly available in Project Implicit Demo Website Datasets at <https://osf.io/tx5fi/>.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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## APPENDIX A

Dependent variable	Explicit attitudes	Implicit attitudes
Age	<-.001, (<.001)	-.002*** (<.001)
Non-PWD	-.018*** (.007)	-.067*** (.006)
Female	.036*** (.006)	.106*** (.005)
White	.023*** (.006)	.030*** (.005)
PWD friend/family	-.011** (.005)	.075*** (.004)
Degree	.021*** (.005)	.025*** (.005)
Constant	1.522*** (.011)	1.520*** (.009)
N	580, 434	592, 023

Note: The first-step selection equation is reported in an appendix. \*\* and \*\*\* represent significance at the 5% and 1% level, respectively.

TABLE A1 Heckman two-step selection model—selection equation.