

IMPLICIT ATTITUDES AMONG TRAINEE AND QUALIFIED CLINICAL PSYCHOLOGISTS IN THE UK

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ABSTRACT

Implicit attitudes are thoughts and feelings that occur outside of conscious awareness and are therefore difficult to acknowledge and control. Implicit attitudes have been shown to predict socially sensitive intergroup behaviour not predicted by self-reported (explicit) attitudes. Consequently, negative attitudes towards certain demographic groups (e.g. women, older people, minority ethnic groups, gay people) may contribute to persistent disparities in employment, criminal justice, education and healthcare. The role of clinical psychologists (CPs) in the UK is very varied and CPs may be involved in direct or indirect clinical work and service development; and may be employed in leadership positions within the NHS. Therefore, implicit attitudes among CPs may have wide-ranging implications. However, very few studies have explored implicit attitudes among applied psychologists and none have considered trainee (TCP) and qualified clinical psychologists in the UK.

Eighty-one CPs, 143 TCPs and 86 members of the general population completed between 1 and 5 Implicit Associations Tests (IAT) and self-report measures of attitudes towards age, sexuality, skin-tone, weight and gender/career associations via an internet application. The results showed that negatively biased implicit attitudes towards non-dominant groups were present among CPs and TCPs to a similar degree to those observed in the general population. Conversely, all groups self-reported neutral or positive biases towards all non-dominant groups, except overweight people. All groups showed a similar degree of implicit and explicit pro-thin bias. These findings were not associated with participant age and did not vary by location or religion.

The results have implications for clinical psychology service provision and therapy outcomes (particularly for overweight clients), sex disparities in leadership within the profession and education and training. The findings require replication in a more diverse and representative sample and further research is required to determine whether implicit biases among clinical psychologists predict subtle, unconscious discriminatory behavior in this group.

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1. INTRODUCTION

1.1. History and Definitions

Brown (2011) defines prejudice as “an attitude, emotion or behaviour towards members of a group which directly or indirectly implies some negativity or antipathy towards that group” (p.7). In social psychology, an attitude is an association between a concept and the assessment or evaluation of whether it is good or bad, pleasant or unpleasant, positive or negative (Nosek & Banaji, 2009). At the heart of prejudice is stereotyping, or the allocation of group characteristics to an individual. Stereotypes underpin attitudes in that they shape our expectations of individual group members based on the relevant stereotypical characteristics attributed to that individual. This can lead to the person being evaluated in accordance with the stereotype rather than their individual qualities and abilities (Brown, 2011).

In academic research, the relationship between attitudes and behaviour has never been straightforward. In the second half of the 20th century, research demonstrating that measures of attitudes were not strongly related to behaviour contributed to a crisis of confidence in social psychology (Blair, Dasgupta & Glaser, 2015). For example, respondents in early research reported much more biased racial attitudes than was expressed in their behaviour (LaPiere, 1934). In contrast, several decades later self-reported racial attitudes were much more positive, yet large racial disparities in behavioural outcomes such as employment were still evident (Bertrand & Mullainathan, 2004). One explanation for these discrepancies was that individuals were more reluctant to self-report biased or prejudiced attitudes as it became increasingly socially unacceptable to do so. Others proposed that people were unaware of their biases (Devine, 1989). The notion of implicit versus explicit attitudes (and the idea that they may predict behaviour under different circumstances) emerged from this debate.

Explicit attitudes were said to result from deliberate, intentional introspection and be accessible through self-report. Conversely, implicit attitudes were thought to

be inaccessible through introspection as they existed outside of conscious awareness. At the same time, theories of automatic versus controlled processing and implicit and explicit memory were emerging in cognitive psychology. These converging lines of research set the stage for the development of a field of research in implicit social cognition and the methods designed to reveal its effects, which are essential to its investigation (Nosek, Hawkins & Frazier, 2011).

The theoretical roots of implicit social cognition have also contributed to the variety of terms used in the literature such as automatic/implicit/unconscious processing and controlled/explicit/conscious processing (Gawronski & Payne, 2010). For consistency and clarity in this thesis, I will follow De Houwer, Teige-Mocigemba, Spruyt and Moors' (2009) recommendations and use *direct* and *indirect* to describe features of measurement procedures and *implicit* and *explicit* to describe the psychological attributes that are assessed. With regards to *implicit* I will use this to describe the unconscious, efficient, unintentional, automatic or uncontrollable nature of the assessed constructs.

Greenwald and Banaji (1995) introduced the term 'implicit social cognition' to refer to thoughts and feelings which occur outside of conscious awareness or control in relation to social psychological concepts such as attitudes, stereotypes and self-concepts. Although implicit social cognition terms and measurement techniques have been applied in a variety of domains (within and outside of psychology), implicit intergroup attitudes and stereotypes and particularly 'racial' biases, have played an important role in the development of theory and methods. This is in part because some studies, such as those examining the role of implicit cognitions in police shootings of African American men, have received considerable media attention. Additionally, some indirect methods are well-suited to internet mediated research supporting the collection of "mega-samples" comprising of millions of participants.

Research in this area bears down on certain social/demographic groups (e.g. black and minority ethnic groups) and issues (e.g. women's rights). For clarity, the term 'minority ethnic' (ME) will be used to refer to people who identify themselves as part of cultural or ethnic group other than the majority group in a

society. In the UK, this predominantly refers to people of African, African Caribbean or South Asian origin (Williams, Turpin & Hardy, 2006). The term 'race' will always be placed in inverted commas or italics in acknowledgement of its illegitimacy as a concept referring to biological differences between humans. Following Archer and Lloyd (2002), sex will be used to refer to the binary categories of 'male' and 'female' whereas gender will refer to attributes often associated with the two sexes i.e. masculine and feminine. For conciseness, the term 'gay' will be used to refer to gay men and lesbian women.

1.2. Prediction of Behaviour

Research demonstrates that indirect measures capture something different to self-reported attitudes and judgements that uniquely predicts social behaviour (Nosek et al., 2011). Studies using "mega-samples" show that negative implicit attitudes and stereotypes regarding ethnic minorities, older people, gay and lesbian people, overweight people and women, amongst others are common although, as with explicit biases, there is considerable inter-individual variation (Nosek et al., 2007). Typically, the same biases are not revealed on corresponding explicit measures. Exceptions include weight and sexuality attitudes possibly because expressing negativity towards overweight and gay people is not as socially unacceptable as it is for other social groups.

Indirect measures predict behaviour across a broad range of domains. However, they are most predictive of socially sensitive interracial and intergroup behaviour. In contrast, direct measures are better predictors of behaviour in domains such as consumer behaviour and political preferences (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). This does not mean indirect measures provide a more accurate or 'truer' measure of one's thoughts and feelings than direct measures. Research indicates that they both provide valid assessments of unique aspects of social cognition.

1.2.1. Criminal Justice

The impact of implicit bias in law enforcement and criminal justice has received considerable attention, particularly in the USA where several police shootings of

unarmed African American men have been attributed to police peremptorily misidentifying innocuous objects (e.g. mobile phone) as weapons. A robust study using an indirect measure demonstrated that 72% of a very large sample (n=85742) implicitly associated African American people with weapons versus European American people with harmless objects (Nosek et al., 2007). Early studies examining the effect of racial primes on the identification of weapons showed that undergraduate students misidentified tools as guns more frequently when primed with an African American face than a European American face (Payne, 2001) even when explicitly told to avoid 'race' when making judgements (Payne, Lambert & Jacoby, 2002). Using a video game simulation, Correll, Park, Judd and Wittenbrink (2002) presented relatively small samples of students (n=40) and members of the community (European Americans n=21; African Americans n=25) with white and black male targets holding either a gun or a harmless object. Participants were instructed to identify whether the person was armed or unarmed then hit a button labelled "shoot" or "don't shoot". Both black and white participants were more likely to press "shoot" when the target was unarmed if the target was a black person. These findings were replicated in a more robust study which compared reasonably large samples of local and national police officers (n=124) to community members (n=135; Correll, et. al, 2007).

Implicit racial attitudes also predict bias in sentencing of African American defendants. For example, in the first study to use a sample of trial judges (n=133), Rachlinski, Johnson, Wistrich and Guthrie (2008) showed that judges with higher implicit pro-white bias gave African American defendants harsher sentences following a subliminal prime (than less pro-white judges) which replicated findings from studies using student samples.

1.2.2. Education and Occupation

A growing number of studies suggest that implicit attitudes may be among several factors contributing to the persistent sex gap in science, technology, mathematics and engineering (STEM) careers (Fiske, Dasgupta & Stout, 2014). Implicit bias may affect the sex gap by causing gatekeepers or influential adults (e.g. teachers) to unintentionally treat females differently to males. It may also

undermine women and girl's interest, willingness to persist and actual academic achievement in math and science related subjects. Research in support of these mechanisms is beginning to accumulate. For example, using a large, heterogenous sample of adults, Nosek and Smyth (2011) showed that implicit stereotypes associating males with maths and females with art predicted women's engagement with and academic achievement in maths. Additionally, in a study including 500,000 participants from 34 countries, Nosek et al. (2009) found that implicit gender stereotypes associating males more strongly with maths than females predicted national-level school achievement gaps in science and mathematics.

Teacher attitudes towards minority ethnic students have also been shown to influence educational outcomes, possibly contributing to the achievement gap in schools. In a study conducted in the Netherlands, Van den Bergh, Denessen, Hornstra, Voeten and Holland (2010) found that teachers with higher implicit bias against minority ethnic people (Turkish and Moroccan) had lower expectations of minority ethnic students relative to majority students and that this was associated with lower achievement among minority ethnic students. However, many of the children were immigrants and the study did not consider other factors that might affect school achievement such as proficiency in the Dutch language.

1.2.3. Employment

Several reasonably robust laboratory and field studies have demonstrated pronounced implicit sex and racial biases in hiring and promotion practices (e.g. Moss-Racusin, Dovidio, Brescoll, Graham & Handelsman, 2012; Rooth, 2010; Bertrand & Mullainathan, 2004). Rudman and Glick (2001) found that women who violated interviewers implicit (but not explicit) stereotypes associating women with niceness and communality were less likely to be promoted or receive performance rewards. This has been shown to be particularly true when women are being considered for leadership roles (Eagly & Karau, 2002). These findings are not dependent on the sex of the interviewer (Moss-Racusin et al., 2012).

Sex and racial disparities have received considerable attention in the literature, however weight-based discrimination remains under-researched (O'Brien, Latner,

Ebner & Hunter, 2013). Overweight individuals are subject to weight-based stigmatisation and discrimination in the workplace resulting in disadvantages in hiring, promotion and job termination (Puhl & Heuer, 2009). Anti-fat attitudes are underpinned by attributions regarding the causes of obesity (e.g. lack of personal control, laziness, gluttony); stereotyped characterisations (e.g. stupid, smelly; Puhl & Heuer, 2009); constructs such as disgust (Vartanian, 2010) and the importance placed on physical appearance (O'Brien et al., 2009; O'Brien, Hunter, Halberstadt & Anderson, 2007). Very few studies have examined the role of implicit anti-fat attitudes in employment practices, possibly because people are still openly discriminatory towards overweight people. Nonetheless, in a field experiment where fictitious job applications were submitted for real jobs, Agerstrom and Rooth (2011) found that human resources managers with higher levels of implicit anti-fat bias were less likely to call back obese job applicants than normal-weight applicants. This discriminatory behaviour was only weakly associated with their explicit anti-fat attitudes.

1.2.4. Health and Medicine

The potential role of implicit attitudes in health and well-being has been extensively investigated over the last decade. Behaviours such as drug and alcohol misuse, unsafe sex and unhealthy eating, which often conflict with health improvement messages, have received particular attention (Blair et al., 2015). For example, using a novel approach in a small sample of students, Wiers, van Woerden, Smulders and de Jong (2002) compared implicit and explicit attitudes towards alcohol and expectations of the effects of consuming alcohol (e.g. funny, cheerful, woozy, sleepy) among light and heavy drinkers. Interestingly, they found that both groups had negative implicit attitudes towards alcohol, but differed on their explicit global attitudes towards alcohol (heavy drinkers were more positive). The groups also differed on both indirect and direct measures of expectancies – heavy drinkers had stronger arousal expectancies whereas light drinkers had stronger sedation expectancies. However, implicit expectancies uniquely contributed to the prediction of actual alcohol use one month later.

Given that many psychological problems may have an object-evaluative component, the role of implicit attitudes in psychopathology has also been

investigated. Implicit attitudes have been found to covary as expected among people with certain conditions. For example, people with spider phobia show more negative implicit attitude towards spiders than non-phobic individuals. Implicit attitudes have been found to uniquely contribute to the prediction of relevant behavioural outcomes (e.g. approaching spiders, startle reflex; Huijding & de Jong, 2005, 2006). Studies have also shown that implicit attitudes may have longer-term predictive validity as well. For example, a series of studies found that implicit associations of self with death predicted self-harming 3 months later and suicidal ideation and attempted suicide 6 months later (Nock & Banaji, 2007; Nock et al., 2010; Randall, Rowe, Dong, Nock, & Colman, 2013). Implicit attitudes exceeded the predictive validity of other known risk factors in predicting future suicidality (Nock et al., 2010). All 3 studies employed prospective designs, however the small number of participants engaging in self-harm or attempting suicide during the follow-up periods limited the studies' ability to prospectively predict these behaviours.

Healthcare professionals' implicit attitudes, particularly towards racial and ethnic minorities and the role these may play in disparities in healthcare is also a growing area of research. As healthcare professionals are the focus of this study, the available literature will be considered in more detail later in this chapter.

1.3. Summary

An extensive body of research shows that implicit intergroup biases and negative stereotypes are pervasive. These have important implications for social justice and understanding the modern puzzle of why social inequalities persist when most people report holding egalitarian values (Payne & Cameron, 2010). Both implicitly and explicitly held attitudes contribute uniquely to the prediction of behaviour, however in intergroup domains indirect measures tend to predict more variance in behaviour than direct measures (Perugini, Richetin & Zogmaister, 2010). Studies of implicit attitudes and stereotypes in employment, healthcare, education and criminal justice show that associations between implicit biases and discriminatory behaviour have real-world effects. These findings have wide-

ranging implications for law, public policy and organisational practices. This thesis examines implicit intergroup attitudes towards several groups among healthcare professionals – specifically clinical psychologists. As implicit social cognition measurement and theory is inextricably intertwined, it is necessary beforehand to understand the dominant measurement techniques, what they measure and current thinking regarding the formation and malleability of implicit social cognitions.

1.4. The Recursive Relationship Between Measurement and Theory

Two lines of inquiry in cognitive psychology have been particularly influential in the evolution of experimental measurement of implicit social cognition:

- automatic versus controlled processing in attention
- unconscious versus conscious processing in implicit memory.

1.4.1. Automatic and Controlled Processing in Attention Research

Some of the seminal work included under the umbrella of implicit social cognition emphasises the theoretical difference between automatic and controlled processing. These studies built on work of Shiffrin and Schneider (1977) and Posner and Snyder (1975) which developed from research on selective attention and short-term stores by Broadbent (1971) and others. For example, Shiffrin and Schneider observed that participants who were trained to pay attention to a target stimulus would perform more poorly if that stimulus was displayed in the corner of the screen during another task. However, the same performance decrement was not found for stimuli the participant was not trained to pay attention to. The central idea that emerged from this research was that information processing could operate in automatic or controlled modes. Controlled processing was defined as demanding attentional resources, limited in capacity and voluntarily initiated. Whereas automatic processing needed little attention, had unlimited capacity and was difficult to suppress voluntarily. Additionally, a degree of learning was deemed important for automaticity. Well-learned items are retrieved automatically from memory whereas searching for poorly learned items required mental effort.

The seminal work of Fazio and colleagues built on these ideas of automatic and controlled processing to show that attitudes can be automatically activated (Fazio, Sanbonmatsu, Powell & Kardes, 1986). They also distinguished between well-learned (i.e. strong) attitudes that should be activated automatically and poorly learned (i.e. weak) attitudes which would not. This set the stage for the use of sequential evaluative priming (EP) techniques in the measurement of attitudes without requiring self-report.

In EP, participants are required to rate target words presented on a computer screen (e.g. “wonderful” or “terrible”), as pleasant or unpleasant, as quickly as they can. Immediately before the target word is presented, a prime – such as an image or word – is presented very briefly. If the prime is negative it might speed up the time taken to rate negative target words and slow down ratings of positive words. The direct response is the time taken to provide a rating of the target word (response latency). The evaluation of the influence of the prime is inferred by comparing average response latencies for categorizing positive words after a positive prime and negative words after a negative prime.

Although EP has been widely used in implicit social cognition research, the reliability of EP paradigms is often low and they tend to produce small effect sizes (Payne & Gawronski, 2010).

1.4.2. Unconscious and Conscious Processing in Memory

Greenwald and Banaji's (1995), influential review developed from a different area of cognitive psychology: implicit memory. Implicit memory is generally defined as the influence of past experiences on later performance, in the absence of conscious memory or verbal report potential for the earlier experience. It refers to any form of memory that can potentially operate without the person being aware that they are using their memory (Radvansky, 2008).

Of particular relevance for the field of implicit social cognition was Meyer and Schvaneveldts' (1971) discovery that presenting a person with a word facilitates access to other conceptually related words. For example, people were faster at

recognising a word like BUTTER if it followed the related word BREAD than when it followed the unrelated word NURSE (Meyer & Schvaneveldt, 1976). This and other work using similar research paradigms led to the proposition that memory comprises of a network of related entities. When one entity is activated, this tends to activate associated entities facilitating their retrieval and use (Meyer & Schvaneveldt, 1976). This idea forms the theoretical foundation for measures such as the Implicit Associations Test (IAT; Greenwald, McGhee, & Schwartz, 1998).

The IAT is thought to assess the strength of associations between target categories (e.g. African American people VS European American people) and attribute categories (e.g. good or bad), both arranged on bipolar dimensions (Teige-Mocigemba, Klauer, & Sherman, 2010). This is done by comparing response latencies for two differently combined categorisation tasks. Participants are required to categorise stimuli representing the four categories (e.g. pictures of faces and negative or positive words). The basic assumption of the IAT is that participants will find it easier, and will therefore be quicker, to categorise stimuli when the target and attribute categories are closely associated than when they are not. The IAT has been shown to have good internal consistency (split-half correlations or Cronbach's alpha ranging from .70 to .90) across multiple studies (Lane, Banaji, Nosek & Greenwald, 2007) and it has been shown to capture construct-related variance at the group and individual level (Teige-Mocigemba, Klauer & Sherman, 2010). Test-retest reliability is variable across studies, ranging from .25 to .69, however it is superior to other indirect measures in this regard (Lane et al., 2007). The IAT's improved psychometric properties and very large effects have contributed to its enormous popularity (Payne & Gawronski, 2010).

1.5. Direct Versus Indirect Measurement

Evaluative priming (Fazio, Jackson, Dunton, & Williams, 1995) and the IAT (Greenwald et al., 1998) allowed for an explosion in research in implicit social cognition. This in turn prompted substantial growth in the diversity of measurement methods all describing themselves as "implicit". Implicit measures

can be defined as the outcome of a measurement procedure that is caused in an automatic way by a psychological attribute (De Houwer, Teige-Mocigemba, Spruyt & Moors, 2009). The key feature of implicit measures is that their assessment of social cognition is indirect. For an explicit measure, the response directly reflects the content (Nosek, Hawkins & Frazier, 2012). For example, answering “yes” or “no” to the question “Do you like Donald Trump?” is a direct assessment of liking of Donald Trump. However, the same question could also be an indirect assessment of attitudes towards male leaders or Americans. A range of self-report measures, such as the Modern Racism Scale (McConahay, 1986) use self-report where the content of interest is not apparent to the respondent. However, these measures are subject to considerable extraneous variation (e.g. the respondent’s attitude towards Donald Trump as an individual may add unwanted variation to their assessment of Americans) and their indirectness is not always guaranteed.

Methods such as evaluative priming allow for greater confidence in the indirectness of their measurement because of their procedural features. While such methods increase the likelihood that an assessment is indirect, they cannot guarantee it. Furthermore, participants may not perform the tasks according to instructions and in some cases (e.g. where participants are told to ignore a prime but don’t) this can turn an indirect measure into a direct measure. Relative to direct measures, indirect measures often lack face validity, have weaker internal consistency and are more vulnerable to extraneous factors. This has implications for the power and validity of indirect measurement. Nonetheless, when task instructions are followed, implicit measures overcome issues of ability and willingness to report the content of interest.

1.6. Validity of the Distinction Between Implicit and Explicit Social Cognitions

Implicit social cognition has become almost synonymous with research using indirect measurement procedures (Payne & Gawronski, 2010). Consequently, these methods have been central to validating the idea that social cognitions - attitudes, stereotypes, beliefs and self-concepts - are usefully divided into two

components: implicit and explicit.

1.6.1. Construct Validity

Validating the distinction between implicit and explicit social cognitions requires evidence for convergent and divergent validity, that is evidence that implicit and explicit measures can be interpreted as measuring the same type of thing, but not exactly the same thing (Greenwald & Nosek, 2008).

The known group-approach to construct validity compares groups for which there is strong theoretical evidence that they will differ on the construct of interest. The strength of this approach depends on the certainty with which the groups can be assumed to be different on a priori grounds (Teige-Mocigemba et al., 2010).

Implicit measures have been used to distinguish between a number of groups for example gay and heterosexual men (Snowden, Wichter & Gray, 2008) and women (Banse, Seise & Zerbes, 2001), African Americans and European Americans (Nosek, Banaji, & Greenwald, 2002) and socially anxious people from non-anxious people (Lange, Keijsers, Becker & Rinck, 2008). In some instances, findings using implicit measures corresponded with self-report but in others implicit measures were more sensitive to detecting group differences than self-report (Nosek, Hawkins & Frazier, 2012). For example, paedophiles (people who are primarily or exclusively sexually attracted to prepubescent children) are strongly motivated to hide their sexual attraction towards children. In the first study to examine implicit associations among sex offenders, a novel *child-sex association* IAT distinguished between paedophiles and other sexual or violent offenders (Gray, Brown, MacCulloch, Smith & Snowden, 2005). However the paedophile sample was quite small (n=18).

Further evidence for divergent validity can be obtained if the discrepancies between indirect and direct measures follow theoretical expectations. For example, System Justification Theory posits that people are motivated to view the existing social system as just, including status and hierarchy differences (Jost, 2001). Consequently, members of disadvantaged groups may show no or weak in-group preferences (preference for others similar to them; Tajfel, 1974).

Consistent with this prediction, several studies have demonstrated that some

lower-status groups may express an explicit preference for their in-group, but demonstrate an out-group preference on implicit measures. For example, African Americans showed a strong ingroup preference explicitly but not implicitly whereas European Americans demonstrated both an explicit and implicit in-group preference (Jost, Banaji & Nosek, 2004). A similar pattern of findings was observed in the same robust study among gay and heterosexual people and old and young people.

Early evidence from studies of the relationship between implicit and explicit measures suggested they were assessing two distinct concepts (e.g. Fazio et al., 1995; Greenwald & Banaji, 1995; Greenwald et al., 1998). However, as the reliability of implicit measures improved, so did the strength of the relationship between implicit and explicit measures (Nosek, Hawkins & Frazier, 2012). In their meta-analysis of 126 studies across multiple domains e.g. attitudes, stereotypes and self-concepts, (Hofmann, Gawronski, Gschwendner, Le & Schmitt, 2005) found that the mean effect size for the correlation between IAT scores and explicit measures was .24. However, the large-scale analysis conducted by (Nosek, Greenwald & Banaji, 2005) revealed an explicit-implicit correlation of .37. The difference across these studies may be due in part to greater than expected implicit-explicit correspondence for the attitude domains included in Nosek, et. als' (2005) study. To determine whether variability in correlations is evidence of convergent or divergent validity, the source of the variability must be explained (Nosek, Hawkins & Frazier, 2012). For example, Payne, Burkley and Stokes (2008) showed that implicit and explicit measures were more strongly correlated when the structure of the two measures was similar, suggesting extraneous factors may influence the strength of implicit-explicit correlations.

All measurement is imperfect and subject to error. This may be random or systematic resulting from features of the measurement procedure or other influences that are irrelevant to the construct such as faking. On the IAT for example, participants can deliberately slow down their responding in one condition affecting their score. However, this may be statistically detectable (Cvencek, Greenwald, Brown, Gray & Snowden, 2010) and evidence suggests

that successful faking requires prior experience of the measure (Fiedler & Bluemke, 2005) and rarely occurs without instruction (Kim, 2003).

Most of the research on extraneous influences focuses on measures like the IAT which compare response latencies across performance conditions (Nosek, Hawkins & Frazier, 2012). Studies showing longer average response latencies for older participants indicate that processing speed, is an important confounding factor (Hummert, Garstka, O'Brien, Greenwald, & Mellott, 2002; McFarland & Crouch, 2002). Individual differences in task-switching ability have also been found to influence IAT performance (Mierke & Klauer, 2003). A scoring algorithm, called the D-algorithm, minimises these influences by creating an individual effect size (Cai, Sriram, Greenwald & McFarland, 2004). The order in which performance conditions are presented can also influence IAT score as the condition presented first interferes with performance on the second condition. However, simply including additional practice trials before presenting the second performance condition was found to reduce this extraneous influence (Greenwald, Nosek & Banaji, 2003).

Although such procedural changes can significantly reduce the influence of extraneous factors, they cannot be entirely eliminated. Nosek and Smyth (2007) used latent-variable structural models to distinguish between systematic method variance and attitude variance across seven attitude domains. They determined that the distinction between implicit and explicit measures was not explained by methodological influences. Rather, they concluded that implicit and explicit measures assess distinct but related constructs.

1.6.2. Predictive Validity

Arguably the most compelling evidence for the existence of implicit social cognitions is the ability of implicit measures to predict behaviour, particularly in socially sensitive domains such as attitudes towards racial groups (Greenwald et al., 2009).

Implicit measures predict behaviour across various domains and often, but not always, predict behaviour that is not accounted for by explicit measures (Frieese,

Hofmann & Schmitt, 2009; Greenwald et al., 2009; Perugini, Richetin & Zogmaister, 2010). Thus, the central issue is not whether implicit attitudes are related to behaviour, but when they are more or less likely to influence behaviour (Blair et al., 2015). Potential moderators include: motivation, opportunity, ability and awareness (Nosek et al., 2011).

1.6.2.1. *Motivation*: Perugini, Richetin & Zogmaister (2010) propose that the type of behaviour being investigated may moderate the predictive validity of implicit and explicit measures. Consistent with Greenwald et al's (2009) findings (that implicit measures predict greater variance in racial and intergroup domains than explicit measures), they argue that the social sensitivity of the behaviour under investigation is important. People may have an implicit reaction to a topic, but choose not to report it either because they disagree with the reaction or they agree but prefer not to say due to self-presentation concerns (Fazio, 1990; Nosek, 2005). Furthermore, implicit measures are more likely to predict behaviour for individuals who are motivated to change their behaviour than for those who are not (Devine, Plant, Amodio, Harmon-Jones & Vance, 2002; Dunton & Fazio, 1997).

1.6.2.2. *Opportunity*: Dual-process models account for the distinction between implicit and explicit social cognition in terms of the influence of different processing modes e.g. automatic versus controlled, spontaneous versus deliberate or impulsive versus reflective (Strack & Deutsch, 2015). Consequently, Perugini, Richetin & Zogmaister (2010) posit that implicit measures should be better at predicting non-verbal behaviours than verbal behaviours as they tend to be more spontaneous and difficult to control. Studies using non-verbal behaviours such as increased eye-blinking and seating distance during actual or hypothesised interactions with black or overweight people (Bessenoff & Sherman, 2000; Dovidio, Kawakami, & Gaertner, 2002) support this idea. However, behaviour likely exists on a continuum between, for example, spontaneous and deliberate therefore attempting to classify it as a dichotomy may be an oversimplification (Friesse et al., 2009). Furthermore, opportunity to control behaviour may be reduced if an individual has reduced cognitive capacity either due to cognitive overload (Friesse, Hofmann & Wänke, 2008) or cognitive

impairment e.g. following alcohol consumption (Hofmann & Friese, 2008). Increased time constraints may also influence opportunity to control responses as it can lead people to consider less information, rely more on categorical thinking and stereotypes and make more use of easily available cues when making decisions (Dijker & Koomen, 1996). For example, in a reasonably large (n=92), predominantly female sample Friese, Wänke and Plessner (2006) found that participants always followed their explicitly measured attitudes in making a product choice if given sufficient time. However, 60% followed their implicit preferences when time pressured.

1.6.2.3. *Ability*: Even if the motivation and opportunity are present, people may not have the ability to alter their implicit responses. This may be due to individual differences such as lower working memory (Hofmann, Gschwendner, Friese, Wiers & Schmitt, 2008), impulse control (Thush & Wiers, 2007) and executive function (Hofmann, Friese & Roefs, 2009). People also may simply not know how to alter their behaviour to undo the implicit influence (Nosek et al., 2011).

1.6.2.4. *Awareness*: Motivation, opportunity and ability may not matter if the person is unaware of their implicit attitudes or stereotypes, how they might affect behaviour or the link between the two. Without awareness, a person is unlikely to be able to prevent implicit content from influencing behaviour as they will not know they need to initiate control or corrective behaviour (Nosek et al., 2011)

1.7. What Do Implicit Measures Measure?

Cumulative evidence supporting the validity and utility of the distinction between implicit and explicit social cognitions has promoted substantial research in the field. However, research on what implicit measures actually measure is less mature (Nosek et al., 2011). Progress has been made in dual-process theories which attempt to explain the independent and interactive influence of implicit and explicit processes. Earlier research focussed on domain-specific dual-process theories which divided social cognitive processes into effortless, automatic

processes versus effortful, controlled processes (Payne & Gawronski, 2010).

1.7.1. Domain-specific Models

The Motivation and Opportunity as Determinants (MODE; Fazio, 1990) model has been particularly influential in attitudes research. This model aims to describe the multiple processes by which attitudes can affect judgement and behaviour. It distinguishes between two attitude-to-behaviour processes – spontaneous versus deliberate. Opportunity and motivation moderate which process will occur. Attitudes themselves are viewed as an association in memory between an object and the individual's evaluation of that object (Fazio, 1990).

The spontaneous process highlights the mechanism by which attitudes can guide behaviour without any conscious reflection by the individual (Fazio & Olson, 2014). Instead, the automatic activation of an attitude in memory upon encountering an attitude object influences how that object is construed in the immediate situation. The automatically-activated attitude acts as a filter which determines what a person attends to, perceives and interprets from all or part of a situation (e.g. Deutsch & Fazio, 2008) and therefore what behaviour follows. Attitudes may also influence outcome-based decision-making processes by, for example, defining what is a desirable or undesirable outcome of behaviour (Strack & Deutsch, 2015) and deciding on a behavioural plan. This deliberation requires effort; therefore, the individual must be motivated to deliberate and have the opportunity (e.g. time and resources) to do so (Sherman et al., 2014). These influences may also involve a combination of automatic and controlled processes however the controlled element will always depend on the motivation and opportunity to apply the necessary cognitive effort. The model is consistent with the premise that, although no measure is process pure (Conrey, Sherman, Gawronski, Hugenberg & Groom, 2005), indirect measures assess relatively automatic processes and direct measures assess relatively controlled, propositional processes (Gawronski & Bodenhausen, 2011).

1.7.2. Process Models

More generalised process models have emerged which emphasize the principles by which processes operate (e.g. associative vs rule-based) rather than the

conditions under which they operate (e.g. unconscious, efficient, unintentional, uncontrollable). One of the most influential of these is Strack & Deutsch's (2004) reflective-impulsive model. This model posits that behaviour is controlled by two different but interacting systems. The impulsive system is conceived as a simple associative network which, like most other associative network models, assumes that links between elements in the network are relatively stable and only change gradually through learning. How accessible content in this network is will depend on how frequently and recently it (or related content) has been activated. The impulsive system is relatively inflexible, but is fast and requires no attentional resources.

The reflective system however, employs propositional processes which can be conceptualised as the validation of the information implied by activated associations. It is driven by the principle of consistency as it strives to avoid or remedy inconsistencies between its elements. However, it is slower than the impulsive system and requires attentional resources. The impulsive system can be thought of as long-term memory whereas the reflective system is like short-term stores in that it can be flexibly generated and changed. The key difference between the two systems is that the activation of associations is assumed to occur independently of whether these associations are regarded as accurate or inaccurate whereas propositional processes are concerned with the validation of the information activated. Consequently, explicit measures, particularly those that require direct self-report assess the subjective validity of propositional statements (e.g. "how much do you agree with..."). Indirect measures assess the momentary accessibility of associations in memory irrespective of their truth value (Payne & Gawronski, 2010).

1.7.3. Multinomial Models

There are a multitude of dual-process models which attempt to explain a broad range of social psychology phenomena including attitudes and stereotypes. They have had a significant impact on the field however they have been criticized for being both too broad and too narrow in their focus. For example, Sherman (2006) argued that more than two processes are often needed to describe the interaction between automatic and controlled processes. Thus, more recently, the focus has

shifted to attempting to describe and quantify the contributions of multiple processes to performance on indirect measures. These multinomial models offer a way to quantify and test theories about the processes underlying indirect measures. One of the earliest insights from the application of formal process models is that experimentally induced changes in indirect measurement scores can result from different underlying mechanisms (Gawronski & Sritharan, 2010) e.g. genuine changes in mental representations or temporary impairments in executive control. As changes in indirect measurement scores are often interpreted as changes in the underlying mental representations, process models may help avoid misinterpretations of data and errors in theorising (Payne & Gawronski, 2010).

Although considerable progress has been made in theorising about implicit social cognition, several important questions remain. For example, it remains unclear whether indirect measures tell us something about the person or something about their environment. This debate has taken many forms. For example, it is reflected in the controversy surrounding whether IAT effects reflect cultural knowledge or personal knowledge (e.g. Nosek & Hansen, 2008). Continuing innovation in understanding the components of implicit processes will help clarify this question of what implicit measures measure as well as how they form, change and influence behaviour (Nosek et al., 2011).

1.8. Formation, Malleability and Change

Early research relied upon a view that implicit attitudes formed gradually over the course of development as patterns in the social world are detected and internalised (Dunham, Baron & Banaji, 2008). Consequently, they were also thought to be harder to change than explicit attitudes (Blair et al., 2015). Contrary to this view, evidence suggests that implicit intergroup preferences emerge early in life and are remarkably stable over the lifespan. Using an adapted version of the IAT called the Child IAT, Baron and Banaji (2006) compared IAT scores among 6-year-olds, 10-year-olds and adults. They found no difference in the degree of implicit pro-white attitudes among the three age groups suggesting that implicit biases emerge early and remain stable. However, like this study, the bulk

of the research into the development of social cognition across the lifespan is cross-sectional and longitudinal studies are virtually non-existent (Nosek et al., 2011). Conversely, there is considerable research on implicit attitudes and stereotype formation and malleability. The literature is too vast to summarise here, however the key points and some illustrative examples are discussed below.

1.8.1. Formation

While the notion that implicit intergroup attitudes form through long-term socialisation experiences has been challenged, there is also some supporting empirical evidence. For example, Sinclair, Dunn and Lowery (2005) found a stronger correspondence between child implicit and parent explicit racial attitudes among children who strongly identified with their parents. However, the findings from this study are limited by the low reliability of the novel measure of parental identification used ($\alpha = .58$) and the use of the standard version rather than the child version of the IAT. There is also evidence that implicit intergroup preferences can form very rapidly. Using a novel paradigm which measures arm movement as an assessment of approach-avoidance behaviour, Paladino and Castelli (2008) demonstrated implicit ingroup preferences for newly created social groups (RED and YELLOW) after a single experimental session. In their study Ranganath and Nosek (2008) showed that evaluative information about a group exemplar quickly generalised to the exemplar's social group at an implicit but not explicit level. Participants learned about positive and negative behaviours performed by an individual from each of two groups and were then briefly introduced to new individuals from these groups. Implicit evaluations of the original individual generalised to the new members of their group however participants did not report these generalisations explicitly. These learning sessions lasted as little as five minutes, however the evaluations formed about the novel groups persisted for at least a week. However, this study used a computerised task and it is not clear whether these findings would generalise to a real-world context.

1.8.2. Malleability and change

Empirical data suggests that, much like explicit attitudes, implicit attitudes may

change through two types of processing pathways: (1) in response to passive information processing that requires minimal deliberation and awareness and (2) in response to more active information processing requiring deliberation and awareness (Blair et al., 2015). As an example of the first process, Dasgupta and Greenwald (2001) weakened implicit attitudes by exposing participants to counter-stereotype cues in the form of biographies and photos of admired African Americans and disliked White Americans, however they did not control for practice or history effects. Hearing that one's attitudes are different to those of peers (Sechrist & Stangor, 2001), being placed in a subordinate role relative to a minority group member (Richeson & Ambady, 2003) and even just interacting with a member of an out-group (Lowery, Hardin, & Sinclair, 2001) have all been shown to reduce negative implicit attitudes. Conversely, perceived threats to one's identity (Gonsalkorale, 2007) and increasing the salience of group membership (Sassenberg & Wieber, 2005) can strengthen pre-existing implicit attitudes.

Some forms of deliberate information processing can change implicit attitudes, however other forms have no or the opposite effect. Although the research on persuasion is limited, the available evidence suggests that strong arguments can change implicit attitudes (Briñol, Petty & McCaslin 2012). For example, participants in one study were given one of two persuasive messages in favour of increasing the number of African American professors among the university faculty. One message contained a strong argument (that the quality of teaching would improve and the number of students per class would reduce) and the other contained a weak argument (current professors would have more free time). Following reading the strong message, participants showed less implicit bias on the *Race* IAT (however explicit attitudes were unchanged).

Being provided with counter-stereotype information can also change implicit attitudes, however only if the in-group member is like oneself. For example, Rudman and Phelan (2010) found that presenting women with biographies of other women in more traditionally masculine job roles (e.g. surgeon, CEO) decreased their self-leader associations and reduced their enthusiasm for more traditionally masculine occupations. The authors argued that the counter-

stereotype primes provoked upward comparison threat and increased self-stereotyping. However, in a similar study, Asgari, Dasgupta and Stout (2012) found that introducing similarity between participants and the prime (e.g. similar educational background) reduced stereotypic self-beliefs regarding women as leaders.

The studies above provide evidence for the malleability of implicit attitudes and stereotypes. However, with the exception of Ranganath and Nosek (2008), these studies were all confined to a single session. The evidence for real changes that persist in the longer term is limited. The research that is available indicates that real change only occurs after intensive intervention. Examples include changes in implicit racial biases following a semester-long diversity education programme (Rudman, Ashmore & Gary, 2001) or having an African American roommate (Shook & Fazio, 2008). Plant and Peruche (2005) reduced police officers' association of African Americans with weapons using a computerised training programme in which 'race' was unrelated to the presence of a weapon but only after extensive, repeated exposure to the programme.

Although there is considerable evidence that implicit attitudes and stereotypes can be experimentally manipulated, it is less clear whether these manipulations will affect behaviour and whether and under what circumstances these manipulations will persist in the longer-term. This is a particularly important area of research given the relationship between implicit intergroup attitudes and the prediction of behaviours which may contribute to persistent social inequalities.

1.9. Implicit Attitudes Among Healthcare Professionals

Social inequality, such as being part of one or more marginalised or discriminated against social groups (e.g. gay, minority ethnic, low socio-economic status) have been linked to a range of disadvantages in health outcomes including shorter life expectancy (Adler & Stewart, 2010). The causes for such disparities have been linked to biological and genetic factors, socioeconomic factors and psychological processes (e.g. Adler & Rehkopf, 2008). Psychological biases, such as implicit prejudice and stereotypes held by health care providers, are considered an

important mechanism through which health care inequalities are maintained (e.g. Chapman, Kaatz & Carnes, 2013). A growing body of evidence indicates that health care providers hold negative implicit attitudes towards certain groups e.g. minority ethnic groups (Haider et al., 2015; Hausmann et al., 2015; Sabin, Nosek, Greenwald & Rivara, 2009; Stepanikova, 2012), very overweight people (Phelan et al., 2014; Sabin & Greenwald, 2012) and gay people (Burke et al., 2015; Sabin, Riskind & Nosek, 2015) that are similar in magnitude to the general population (Hall et al., 2015).

A much smaller number of studies have examined the specific stereotypes or associations that healthcare providers hold towards some of these groups. For example, Green et al. (2007) and Sabin and Greenwald (2012) found that health care providers implicitly associated African American patients with being less cooperative and compliant in medical settings than European American patients. In a study focussing on obesity specialists, Schwartz, Chambliss, Brownell, Blair and Billington (2003) found very overweight people to be implicitly stereotyped as lazier, less intelligent and more worthless than normal weight people. As with other groups, clinician explicit bias towards marginalised groups is generally low (Blair et al., 2013). However, some exceptions have been reported where clinicians have, for example, explicitly stereotyped African American patients as less cooperative (Cooper et al., 2012) and very overweight patients as worse at taking care of themselves and having less self-discipline (Hebl & Xu, 2001). However, it is important to note that although clinicians demonstrate bias towards marginalised groups at a group-level, there is considerable individual variance and a minority demonstrate no negative bias or positive bias (e.g. Sabin et al., 2009).

Healthcare providers' implicit bias may contribute to healthcare disparities by influencing judgements and medical decisions regarding patients or they may impact on the quality of communication and interaction with patients (Zestcott, Blair & Stone, 2016). Research focussing on judgements and decision making suggests a complex picture where healthcare providers' implicit attitudes seem to influence some, but not all medical judgements. For example, Green et al. (2007) found that clinicians with greater negative implicit attitudes were less likely to

recommend the gold standard treatment for acute chest pain to African American patients relative to European American patients. Whereas, Sabin and Greenwald (2012) found that implicit racial bias predicted that African American patients would be prescribed less postsurgical pain relief than European American patient but did not predict differences in other treatment decisions such as treatment of asthma or urinary tract infections. However, both studies used vignettes to assess clinical decision-making which may not represent actual care delivery. Several other studies have failed to find any association between implicit bias and medical judgements (e.g. Haider et al., 2015) even when physician's also express explicit biases (Oliver, Wells, Joy-Gaba, Hawkins & Nosek, 2014). Thus, the evidence suggests that implicit attitudes may have a limited role in explaining disparities in medical outcomes and provision. Nonetheless, they may be more likely to affect care under time pressure, in the absence of practice guidance and when the clinician has no prior relationship with or limited information about the patient (Burgess, van Ryn, Dovidio & Saha, 2007; Stepanikova, 2012).

The effect of implicit bias on interpersonal communication in medical settings may impact on patient's perception, judgment and trust towards clinicians which could increase health disparities by influencing patients' engagement and adherence with treatment (Zestcott et al., 2016). Several studies found that African American patients report or are observed to have less positive interactions with clinicians who have higher levels of implicit pro-white attitudes (e.g. Hagiwara et al., 2013; Penner et al., 2010). Blair et al. (2013) found that African American patients rated clinicians higher in pro-white bias lower on interpersonal treatment, communication, trustworthiness and patient knowledge. However, the same association was not found for Latino participants suggesting that implicit bias may not be expressed or perceived in the same way with all groups. Using recordings of actual patient/provider interactions, Cooper et al. (2012) found that clinician implicit racial bias was associated with greater verbal dominance, slower speech and less patient-centeredness among both African American and European American patients, however bias was only associated with patient-reported worse interactions for African American patients. This suggests that clinician implicit bias may be more detrimental to patient perceptions for African Americans. Subtle and perceived discrimination may also

directly affect health by acting as a social stressor (Pascoe & Smart Richman, 2009).

1.10. Implicit Attitudes Among Applied and Clinical Psychologists

Studies among medical professionals and the general population indicate that implicit bias predicts a range of subtle, non-verbal discriminatory behaviours. For example, implicit bias among European Americans predicts increased eye-blinking, verbal errors, seating distance, poorer eye contact and reduced perceived friendliness in interactions with African American conversation partners (Dovidio, Kawakami, & Gaertner, 2002; Fazio, Jackson, Dunton, & Williams, 1995; McConnell & Leibold, 2001). These “micro-behaviours” may affect the quality of interactions and how trustworthy the European American conversation partner is perceived to be (Payne & Cameron, 2010). Furthermore, implicit bias towards minority ethnic groups has been shown to affect perceptions of emotion. Most of the research has focussed on European Americans’ readiness to perceive hostility or anger in African Americans (e.g. Devine, 1989; Hugenberg & Bodenhausen, 2003). However, consistent with this research, a small study conducted in China showed that Chinese people with higher implicit pro-Chinese bias perceived anger, fear and sadness more readily in White European faces than in Chinese faces (Wang et al., 2014). Although this finding requires replication, it suggests that implicit bias may influence emotion perception in in-group/out-group interactions more broadly. Accurate judgement of others’ emotional states can influence empathy for that person as well as basic approach/avoidance behaviour (Adams, Ambady, Macrae, & Kleck, 2006).

These subtle discriminatory behaviours have implications for the therapeutic relationship in psychotherapy. The helping alliance between client and therapist has been shown to be one of the most important factors in developing a successful therapeutic relationship (Roth, 2004). Central to developing a helping alliance is the therapist’s ability to present as caring, sensitive and sympathetic (Horvath & Luborsky, 1993) and for clients to perceive therapists as expert, attractive and trustworthy (Heppner & Dixon, 1981). Rogers (1951) considered the therapist’s ability to be empathetic, genuine and unconditionally accepting of

clients to be sufficient for therapeutic success. Psychotherapy research does not support the idea that a good therapeutic relationship is the only ingredient required for successful therapeutic outcomes. However, there is consistent evidence that, alongside therapeutic technique, the therapeutic alliance contributes significantly to successful outcomes (Roth, 2004).

Despite the potential impact of the “micro-behaviours” on the therapeutic relationship and therapy outcomes, very little research has focussed specifically on implicit attitudes and stereotypes among applied psychologists. A search of the existing literature was conducted to address the question of whether negative implicit attitudes towards marginalised groups were present among clinical psychologists specifically.

1.10.1. Search Strategy

The psychology librarian was consulted to help identify relevant bibliographic databases to search. The following search string was used to search all databases for studies published before the 17th of April 2017:

("implicit bias" OR "implicit attitude" OR "implicit prejudice" OR "implicit stereotype" OR "conscious bias" OR "conscious prejudice" OR "conscious stereotype")

AND ("psychologist" OR "therapist" OR "counselor" OR "counsellor")

The term ‘conscious’ was used as implicit bias is sometimes referred to as unconscious or non-conscious bias. The American spelling of ‘counselor’ was included as most of the research on implicit bias has been conducted in the USA. Searches were performed in the following databases, with terms searched within the title, abstract and keywords or all fields depending on the search options available: Academic Search Complete, CINAHL Plus, PsycINFO, ScienceDirect, SCOPUS and PubMed. See Table 1 below for further details.

Table 1: Literature Search Terms and Databases

Databases	Search strategy	No. Refs Found	Date Conducted
Academic Search Complete (1887 – present) CINAHL Plus (1982 – Present) PsycINFO (1800s - present)	ALL TEXT: ("implicit bias" OR "implicit attitude" OR "implicit prejudice" OR "implicit stereotype" OR "conscious bias" OR "conscious prejudice" OR "conscious stereotype") AND ALL TEXT: ("psychologist" OR "therapist" OR "counselor" OR "counsellor")	711	17/04/2017
Provider: EBSCO			
ScienceDirect	TITLE, ABSTRACT & KEYWORD: ("implicit bias" OR "implicit attitude" OR "implicit prejudice" OR "implicit stereotype" OR "conscious bias" OR "conscious prejudice" OR "conscious stereotype") AND TITLE, ABSTRACT & KEYWORD: ("psychologist" OR "therapist" OR "counselor" OR "counsellor")	3	17/04/2017
SCOPUS	TITLE, ABSTRACT & KEYWORD: ("implicit bias" OR "implicit attitude" OR "implicit prejudice" OR "implicit stereotype" OR "conscious bias" OR "conscious prejudice" OR "conscious stereotype") AND TITLE, ABSTRACT & KEYWORD: ("psychologist" OR "therapist" OR "counselor" OR "counsellor")	37	17/04/2017

PubMed (mid 1950's – present)	ALL FIELDS: ("implicit bias" OR "implicit attitude" OR "implicit prejudice" OR "implicit stereotype" OR "conscious bias" OR "conscious prejudice" OR "conscious stereotype") AND ALL FIELDS: ("psychologist" OR "therapist" OR "counselor" OR "counsellor")	2	21/04/2017
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A total of 753 studies were identified and titles and abstracts screened. Studies were included if they assessed implicit intergroup attitudes or stereotypes among trainee or qualified educational, forensic, counselling or clinical psychologists using an indirect measure (e.g. IAT, EP). Full-text documents for 29 studies were reviewed to determine eligibility. Five relevant studies were identified from database searches and two more were added from reference harvesting.

A total of 7 studies were identified as relevant: 4 research studies, 1 literature review and 3 dissertations. However, one unpublished dissertation (Schaffer, 2009) was inaccessible and therefore could not be evaluated. The review article (Boysen, 2009) included all three of the studies conducted prior to 2009 and is therefore not discussed separately. Additionally, another dissertation (Boysen, 2006) was published as Boysen and Vogel (2008), therefore it is also not discussed separately. A total of 5 studies were included for narrative synthesis.

1.10.2. A Narrative Synthesis

The earliest study (Abreu, 1999) used an adapted version of the priming procedure used in Devine's (1989) seminal study. Sixty qualified and trainee therapists, counselling psychologists and clinical psychologists were randomly assigned to either high-prime or low prime-conditions. All participants were very briefly presented with 100 words on a computer screen. For those in the high-prime condition, 80% of the words related to African American stereotypes (e.g. Negroes, Blacks, blues, ghetto, welfare, rhythm, basketball), in the low-prime condition 80% of the words were neutral (e.g. water, people, experience).

Participants then read a patient description and therapy excerpt for a hypothetical

client (ethnicity undisclosed) before completing ratings of general impressions of the client and psychopathology. Consistent with Devine's (1989) findings, but in a clinician sample, Abreu (1999) found that participants in the high-prime condition rated a hypothetical African American client as more hostile than those in the low-prime condition. In the second phase of the study, the hypothetical client's 'race' as an African American was made explicit to participants. Consistent with the study hypotheses that doing so would elicit socially desirable responding, clinician's ratings of the same client were much more positive than before. This small study was the first study to demonstrate that applied psychologists are vulnerable to implicit racial bias and that this may influence clinical judgement. It also highlighted a possible dissociation between clinician's implicit and explicit attitudes towards African Americans.

Castillo, Brossart, Reyes, Conoley and Phoummarath (2007) and Boyesen and Vogel (2008) both examined the influence of multicultural training on implicit bias among counselling students in post-graduate programmes. Castillo et al. (2007) administered a self-report measure of multicultural counselling competence and a computerised *Race* IAT to 84 masters-level students in counsellor education programmes. The measures were completed at the beginning and end of the semester. Over the semester, 40 participants completed a 45-hour multicultural counselling training course and the other 44 participants completed a similar-length counselling foundation course. Implicit anti-African American bias was present in both groups at pre-test, however a statistically significant reduction was only observed in the multicultural training group. Nonetheless, the magnitude of the bias remained in the moderate range. This study's pre-test, post-test quasi-experimental design limited the extent to which the findings could be attributed to the experimental manipulations. Furthermore, the foundation course also included a multicultural component which likely influenced the small post-test differences in multicultural competence observed between groups.

Similarly, Boyesen and Vogel (2008) administered counselling trainees a measure of multicultural competence and a *Race* IAT. They additionally administered the *Sexuality* IAT. One-hundred and five masters and doctoral level counselling students were divided into three groups: no multicultural training course,

multicultural training course just completed and multicultural training course completed in the previous semester. Consistent with the study hypothesis, implicit anti-African American and anti-gay bias was observed in all three groups and that the level of multicultural training did not affect implicit bias. This study was limited by its cross-sectional, quasi-experimental design therefore the results cannot be confidently attributed to training level. Furthermore, the researchers used pen-and-paper versions of the *Race* and *Sexuality* IATs. While there is limited research on the reliability of pen-and-paper versions of the IAT they have been shown to have similar test-retest correlations and reliability estimates to the computerised version (Lemm, Lane, Sattler, Khan & Nosek, 2008). However, Lemm, et. al (2008) noted that versions that combined words with images, as used in this study, performed more poorly than versions using word-only stimuli. Furthermore, pen-and-paper IATs are more prone to errors and large numbers of participants were removed from the analysis of the *Race* and *Sexuality* IATs (9.5% and 18% respectively) for making more than 30% errors.

More recent studies have returned to focussing on the influence of implicit bias on clinical judgements among applied psychologists. Katz and Hoyt (2014) recruited 173 qualified and pre-qualified clinical and counselling psychologists, nurses and social workers. Participants read two case studies of either a European American or African American client with features of anxiety or depression. They then completed a computerised version of the *Race* IAT as well as measures of multicultural competence, therapeutic bond expectancies, anticipated outcome and explicit 'race' bias. Anti-African American implicit bias was the strongest predictor of racial bias in bond expectations. As therapist expectations are predictive of therapeutic outcomes, the authors argue that such implicit biases could have a particularly deleterious effect on psychotherapy. However, the authors developed their own self-report measure to assess explicit bias in this sample. Although it demonstrated good internal consistency ($\alpha = .84$) and acceptable test-retest reliability ($r = .72$), it was not compared to any existing accepted measure of prejudice and was not associated with IAT scores. Therefore, their conclusion is questionable as another self-report measure may have been a better predictor than this novel measure or the *Race* IAT.

Jackson (2015) explored the extent to which implicit and explicit anti-African American and anti-fat attitudes among 263 trainee school psychologists influenced their judgements and attributions of symptoms of Attention Deficit Hyperactivity Disorder (ADHD). Participants were randomly assigned to one of four groups: average weight white, average weight black, overweight white, overweight black. They were all then provided with the same case vignette of a child showing ADHD symptoms but with photographs of boys demonstrating the characteristics associated to the relevant group attached. In addition to completing ratings of their general impressions, hypotheses for the behaviour, motivation to control prejudice and explicit attitudes; they completed an Affect Misattribution Procedure (AMP) as an indirect measure of attitudes. This entailed being asked to rate the pleasantness or unpleasantness of a series of rapidly presented abstract paintings. Participants were told they would be shown photographs of children as a warning that the next painting would be displayed and instructed not to let the photographs influence their judgements. The frequency of 'pleasant' or 'unpleasant' evaluations following positive or negative primes is measured, rather than reaction time. AMPs tend to demonstrate large effect sizes and improved reliability relative to traditional sequential priming procedures (Payne, Cheng, Govorun, & Stewart, 2005) however, some argue that participants tend to follow a demand strategy (Wentura & Degner, 2010). Interestingly, participants did not demonstrate an implicit anti-African American bias but did demonstrate implicit anti-fat bias. However, those individuals that were more biased tended to attribute overweight and African American student's difficulties to laziness. Unfortunately, the photographs used were of four different children and were not assessed for potentially confounding factors such as perceived attractiveness. Therefore, it is difficult to be certain that the results represent participants attitudes towards 'race' and weight rather than another variable.

Overall, the literature suggests that implicit biases towards African American people are present among applied psychologists. This finding was consistent across all studies, regardless of the indirect measure used, with the exception of Jackson (2015). There is some evidence that negative implicit sexuality and weight biases may be present as these were found in reasonably large samples

within the studies that assessed these variables (Boysen & Vogel, 2008, Jackson, 2015). However, these findings require replication. There was little consistency with regards to the self-report measures used and these tended to be novel measures or measures of perceived multi-cultural competence. The latter assess an individual's perception of their multi-cultural knowledge and do not ask about personal attitudes, therefore their use as a measure of explicit attitudes towards African Americans is questionable. Given this inconsistency and the doubtful validity and reliability of the measures used, it is difficult to draw any firm conclusions regarding explicit biases among applied psychologists from the available literature. However, it appears negative explicit attitudes towards African Americans are uncommon. The two intervention studies conducted (Castillo, Brossart, Reyes, Conoley & Phoummarath, 2007; Boysen and Vogel, 2008) produced inconsistent results regarding the effectiveness of multi-cultural training courses in reducing negative implicit biases towards African Americans. However, both studies lacked the methodological rigour needed to confidently attribute the results to the intervention and require replication with an improved study design.

The studies included in this review were all conducted in the USA using samples that were heterogenous in terms of professional background and level of training, therefore they cannot be generalised to specific groups of applied psychologists (e.g. qualified clinical psychologists). Further studies are needed to attempt to replicate the findings using more homogenous samples of applied psychologists (by professional background and stage of training) and employing more widely used measures of implicit and explicit attitudes.

1.11. Justification and Aims

The limited research on implicit intergroup attitudes among applied psychologists and healthcare professionals more generally has predominantly been conducted in the US. Although there is an ongoing debate regarding the development of implicit attitudes, there is some consensus that the stereotypes which underpin them are culturally and contextually bound. Therefore, the available research may not be generalizable to other nationalities. Additionally, no studies were

found focussing on clinical psychologists and only two included clinical psychologists in their samples (Abreu, 1999; Katz & Hoyt, 2014). The role of clinical psychologists in the UK is varied and, in addition to clinical practice, many also work in leadership role within the NHS and are involved in the recruitment of qualified and pre-qualified colleagues. The British Psychological Society Code Ethics and Conduct for psychologists (BPS, 2009) asserts that psychologists should “Respect individual, cultural and role differences, including (but not exclusively) those involving age, disability, education, ethnicity, gender, language, national origin, *race*, religion, sexual orientation, marital or family status and socio-economic status ... avoid practices that are unfair or prejudiced” (p. 10). Therefore, it is important to explore the prevalence of relevant implicit attitudes amongst this professional group as a starting point for further research. Attitudes regarding weight, age, sexuality and skin colour and gender-career stereotypes were selected as the focus for this study as:

- The IATs for these domains are well-established and widely used.
- There is evidence of inequalities in health care outcomes for older people, gay people, black and minority ethnic groups and people who are overweight that may in part be explained by clinician attitudes.
- The gender-career implicit stereotype has been associated with inequalities in recruitment and promotion practices.

Therefore, this study aims:

- To evaluate the implicit attitudes of trainee and qualified clinical psychologists in the UK.
- To compare the implicit attitudes of trainee and clinical psychologists to a group of non-psychologists.
- To explore whether implicit attitudes among psychologists are associated with the clinician’s own demographic statuses: age, sex, years of clinical experience, ethnicity or geographic location.

2. METHOD

2.1. Epistemological Position

Epistemology is a branch of philosophy interested in the study of the nature and forms of knowledge. Epistemological assumptions are concerned with how knowledge can be created, acquired and communicated (Scotland, 2012). Consequently, the epistemology underpinning research also guides the methodology employed (Guba, 1990).

Historically, quantitative research has been closely linked with positivism. As with all epistemologies, positivism is not a unitary school of thought but a group of theories which share some but not all assertions (Robson, 2011). Typically, positivist epistemology is grounded in realist ontology– the belief that reality exists independently of our representations of it and can be objectively observed. Positivism posits that knowledge or facts can only be gained through direct experience or observation (empiricism). From a positivist viewpoint, science is objective and value-free and its goal is to develop universal causal laws (Barker, Pistrang, & Elliott, 2002). However, positivism has been criticised from a range of philosophical standpoints. Crucially, its view of reality as only what can be perceived by our senses is argued to reduce ontology to epistemology limiting our understanding of the world (Danermark, 2002).

In contrast to positivism, postmodernism often adopts a relativist ontology which, in its most extreme forms, denies the existence of an objective reality (Robson, 2011). Instead, reality consists of multiple mental constructions which are socially, culturally or experientially based (Guba, 1990). Language is seen as the material for research and findings are the product of the interaction between the researcher and participant (Barker et al., 2002).

In this study, I adopt a post-positivist, critical realist stance particularly informed by the writings of Bhaskar (2008). Critical realism posits that there is an external world independent of human consciousness but that all knowledge is socially

determined conceptual constructions. Our understanding of empirical data is always informed by every day or scientific conceptualisations and is therefore theory-laden. As such, all knowledge is fallible (Danermark, 2002) and all measurement is an act of translation (Bhaskar, 2008).

From a critical realist viewpoint, the world is structured, differentiated, stratified and changing. Reality consists of several domains, including mechanisms which may generate events. To understand causation, we must also investigate these mechanisms, not only the observable event. Carter (2003) argues that critical realism is particularly useful when investigating social concepts (such as 'race') because its emphasis on theory-driven knowledge leads to the view of research as the identification of mechanisms and the social contexts responsible for regularities. He posits that this enables questions of 'how' and 'why' to be addressed in a way that an empirical focus on observable events and a postmodern focus on discursive exploration cannot.

This research explores implicit attitudes which are theorised to be one mechanism through which structural inequalities may emerge. The critical realist stance adopted by this research acknowledges that social events and processes can be studied, however all measures and observations are theory-laden and subject to individual, systemic, cultural and historical biases and are therefore fallible and open to revision (Archer, Bhaskar, Collier, Lawson, & Norrie, 2013).

2.2. Design

The study uses a quantitative, quasi-experimental between groups design. Static groups were used as random allocation was not practical. Participants' scores for each measure of implicit and explicit attitudes towards skin-tone, weight, age, sexuality and gender-career are the dependent variables. Participant type (trainee, qualified and control) is the independent variable. A between groups design was selected as it supports planned comparisons of performance on a specific measure among multiple groups. This design is appropriate for addressing the aim to explore whether there are differences in implicit attitudes among trainee and qualified clinical psychologists and non-psychologists.

Additionally, a correlational design is used to explore the relationship between implicit and explicit measures of attitudes.

2.3. Sample Size

The sample size for the planned univariate analysis of covariance was informed by power calculations using G*Power V3.1.9.2 which indicated that a sample size of 107 participants was needed to detect a moderate effect size. Furthermore, G*Power V3.1.9.2 indicated that a sample size of 63 was needed for the planned bivariate correlation among the implicit and explicit variables. Overall these power calculations indicated that a minimum of 107 participants who completed all 5 IATs were needed.

2.4. Ethics

2.4.1. Ethical Approval

Ethical approval was obtained from the University of East London School of Psychology Research Ethics Committee (see Appendix A). Explicit permission was obtained to recruit via social media (e.g. Facebook).

2.4.2. Informed Consent

Participants were provided with an online information sheet on the first page of the study website (see Appendix B). The purpose of the study was explained and information regarding the right to withdraw without providing a reason was provided. Participants were informed that the website uses cookies, what information would be stored in the cookie and how it would be used. Additionally, participants were informed they would receive feedback on their scores and that they might find this challenging. Participants were directed to an online consent form (see Appendix C) and required to click a button and submit to indicate their consent and proceed to the next page. As part of the consent form, participants were required to confirm they were 18 or older. The value entered for age on the demographics form was checked and participants were unable to proceed further

with the study if the value was below 18.

2.4.3. Confidentiality

To ensure confidentiality, participants were assigned an autogenerated unique identifying number. No identifying information was collected as part of the research data and the cookie only contained the participant's unique identifying number. Participants were given the option to provide an email address to enter a prize draw which was not linked to their study data in any way.

2.4.4. Protection from Harm

Data collected via the internet is sometimes considered less secure than offline methods (BPS, 2013). Every effort was made in the development of the website to ensure data security by preventing the use of common website exploits. Furthermore, data was transmitted between the internet server and the researcher's personal computer using a channel secured using a Secure Shell (SSH) cryptographic network protocol. The research database was then stored on an encrypted removeable hard drive.

Participants were informed that they may find the interpretations provided of their IAT scores challenging before consenting to take part. In addition, information regarding sources of support was displayed alongside the results.

2.5. Participants

2.5.1. Inclusion and Exclusion Criteria

Explicit inclusion and criteria were broad to maximise the potential sample size. Participants were required to be over the age of 18, resident in the United Kingdom and sufficiently fluent in English to understand the task instructions.

One limitation of using the internet to collect data is that doing so excludes individuals who do not have access to a computer or the internet. This may mean that certain age and socio-economic groups are less represented affecting the overall representativeness of the sample (Birnbaum, 2004).

2.6. Materials

2.6.1. Demographics Questionnaire

Participants were asked to complete a demographics questionnaire to determine their age, location in the United Kingdom, sex, sexuality, marital status, ethnicity and religion. For participants who self-identified as trainees or qualified clinical psychologists, years of clinical experience was also collected.

2.6.2. The Implicit Associations Test (Greenwald, McGhee, & Schwartz, 1998)

The IAT measures the relative strength of associations between pairs within category (e.g. *Old* vs. *Young*) and attribute concepts. Categories and attribute concepts can vary in many ways, but if an attitude or preference is of interest the attitude dimensions can be represented by the labels *good/bad*, *pleasant/unpleasant* or *positive/negative*.

Participants are required to rapidly classify stimuli (in the form of words, symbols or images) that represent a category and attribute into one of four distinct categories with only two responses. The underlying assumption is that it will be easier and therefore quicker to respond when categories that are closely associated share a response. For example, participants who closely associate the category *Old People* with the attribute concept *Bad* will be quicker at responding when *Old People* and *Bad* share a response (e.g. pressing the 'E' key on a keyboard) than when *Old People* and *Good* share a response.

The structure of the seven-block computerised IAT used in this study is described in Table 2.

Table 2: The seven block IAT (example from the Age IAT)

Block	No Trails	Function	Left Key (Order 1)	Right Key (Order 1)	Left Key (Order 2)	Right Key (Order 2)
1	20	Practice	Bad	Good	Good	Bad
2	20	Practice	Old People	Young People	Old People	Young People
3	41	Trial 1 Practice Trials 2-41 Test	Bad + Old People	Good + Young People	Good + Old People	Bad + Young People
4	41	Trial 1 – Practice Trials 2-41 Test	Bad + Old People	Good + Young People	Good + Old People	Bad + Young People
5	20	Practice	Good	Bad	Bad	God
6	41	Trial 1 Practice Trials 2-41 Test	Good + Old People	Bad + Young People	Bad + Old People	Good + Young People
7	41	Trial 1 Practice Trials 2-41 Test	Good + Old People	Bad + Young People	Bad + Old People	Good + Young People

The Age, Sexuality, Weight, Skin-Tone and Gender-Career IAT formats were used. Stimuli were obtained from the Open Science Framework repository maintained by the Project Implicit team at Harvard University (see Appendix D) and administration procedures were matched to those used by this team as closely as possible (see sections 2.7.2 and 2.7.3 for further details). The Skin-Tone IAT was selected instead of the more widely researched *Race* IAT as the *Race* IAT uses images of African American and Caucasian faces and was therefore not considered meaningful for examining racial biases in the UK context.

Internal consistency was assessed by calculating Cronbach's α for the d-scores for blocks 3 and 6 and blocks 4 and 7 for each of the 5 IATs. Scores for Age ($\alpha = .71$), Sexuality ($\alpha = .77$) and Skin-Tone ($\alpha = .80$) suggested good internal consistency for these IATs. Internal consistency was lower for the Gender-Career

($\alpha = .64$) and Weight IATs ($\alpha = .69$) however these values were similar to other studies e.g. Nosek, et. al (2007).

2.6.3. Semantic Differential (Thermometer) Questionnaires

Explicit attitudes towards each of the target concepts were measured using two 10-point semantic differentials consistent with those used by the team at Project Implicit. The anchors for these differentials were cold-warm except for the differential used for to measure gender-career attitudes. For gender-career, a 7-point differential was used with male-female as the anchor. The questionnaires used are provided in Appendix E.

To assesses internal consistency, Cronbach's α was calculated the two items completed for each questionnaire. Scores for Age ($\alpha = .76$), Sexuality ($\alpha = .86$), Skin-Tone ($\alpha = .95$) and Weight ($\alpha = .83$) suggested good internal consistency for the thermometer questionnaires.

2.7. **Website Development**

2.7.1. Apparatus

2.7.1.1. *Software*: The web application was developed using the following open source software to minimize project costs:

- Web Server: Apache HTTP Server V2.4.23 – Win32 Version for the development environment and Linux Version for the live environment. PHP V7.0.12 was installed as an Apache module to enable PHP programming.
- Database server: MySQL Server V5.7.

2.7.1.2. *Stimuli*: All the image stimuli used in the IATs web application were downloaded from the repository maintained by the Project Implicit repository on the Open Science Framework (<https://osf.io/kaqi5/>). Apart from the Weight IAT, none of the images were edited or modified. The images for the Weight IAT were edited to improve their quality.

Verbal stimuli were obtained from the first page of the relevant IAT on the Project

Implicit website. Again, no modifications were made.

2.7.2. Development Procedure

2.7.2.1. *Programming Procedure:* Server-side programming was conducted using PHP V7 and JavaScript 1.8.5 was used for client-side programming.

The source code for an existing IAT web application, *Open source, Web-based IAT* (Mason, Allon and Ozturk, 2015), was downloaded and reverse-engineered. This code was significantly modified to improve efficiency and security, enable data to be saved to a MySQL database and to support the required website procedure (e.g. administration of multiple IATs, randomising the order of IAT administration, passing the user to the next step in the procedure and modernising the scoring procedures). In accordance with good programming etiquette, all changes have been documented within the source code which will be made available at <https://github.com/winteram/IAT> as a branch of the original project. Effectively, only the core code for displaying the IAT stimuli and recording user responses was retained. Instruction pages were modified to match the layout and language used on the Project Implicit website.

New pages and functions were created to display the information sheet and consent form, record consent, display and save demographic information, display and save the relevant thermometer questionnaire, save progress (e.g. count of IATs completed) and save competition entries.

2.7.2.2. *Internal Testing Procedure:* Each new or modified section of code was tested in the development environment in isolation from the rest of the web application as far as was possible (e.g. demographics data validation) before the whole application was tested. This was an iterative process with changes being made following the discovery of errors, then sections retested. Once the web application was functioning satisfactorily in the development environment, it was published to the live environment and tested again. Several errors were found which predominantly related to the difference in operating systems between the development and live servers (Windows VS Linux). These were resolved and

final testing was completed.

2.7.2.3. *Piloting Procedure:* Several of the author's personal contacts living outside the UK were contacted and asked to test the web application. Pilot users were selected on the basis that they would not be eligible to participate based on their country of residence. The individuals contacted were a mix of programmers, graphic designers, usability testers and general users to obtain both expert and lay opinions on the website functionality. Ten individuals agreed to pilot the website. They were asked to provide feedback on the usability of the website, report any software errors and email the IAT D-scores that were displayed at the end of each test.

No significant software errors were reported, however pilot users fed back that they found the delay between completing the IAT and the thermometer questionnaire being displayed unacceptable. In response to this, the original code was changed significantly. In the original version, a record was written to the database for every item displayed (224 records per IAT). The altered code only stored the summary data for each IAT (e.g. average for each block and order in which the blocks were presented). This meant only 1 record was saved per IAT completed which significantly improved website performance.

D-scores were manually calculated for every IAT completed by the pilot users and compared to the value displayed to users. Some errors were discovered in the D-score calculation for the Skin-Tone and Sexuality IATs. These errors were identified, rectified and the scoring re-tested. Five pilot users agreed to complete some IATs again to support re-testing the scoring.

Additionally, some feedback was obtained regarding the instructions. Several users found them unclear and felt they learned how to complete the IAT from practice. To mimic the Project Implicit website as closely as possible, the instructions were not changed in response to this feedback although it would be useful to incorporate this feedback into any future versions of the web application.

At the end of the piloting procedure, all data obtained from pilot users was

backed up then removed from the study database.

2.8. Study Procedure

2.8.1. Recruitment Procedure

Participants were recruited via email and social media (e.g. the ClinPsyForum and the UK Clinical Psychology Facebook group). The researcher sent electronic invitations to personal and professional contacts inviting them to participate and share the invitation with their own social networks. In addition, 26 Clinical Psychology Doctorate courses were contacted and asked to distribute the study invitation to their current trainees and staff.

2.8.2. Website Procedure

On first entry to the website, participants were directed to the study information page. After reading this and consenting to participate, a cookie was saved to participant's personal computers containing their unique study identifiers. Cookies were used to minimize multiple submissions from the same participant and to enable participants to complete the study across multiple sessions. Multiple submissions cannot be entirely prevented; however, they are rare (Birnbbaum, 2004).

Participants were directed to the demographics questionnaire where self-reported age and location were checked to determine whether eligibility criteria were met.

Participants were then directed to their first IAT. The IAT procedure is discussed in more detail in section 2.6.2. The IATs were presented in balanced order using a 5X5 Latin-square design. Following the IAT, participants completed the explicit measure that corresponded with the target category for the current IAT.

Research using priming procedures (e.g. (Fazio, Jackson, Dunton, & Williams, 1995) suggests that presenting explicit measures first may activate the target concept and artificially inflate correlations between implicit and explicit measures. However, (Nosek, Greenwald, & Banaji, 2005) found no such effect when systematically varying the order in which implicit and explicit measures were presented.

Participants were then directed to a page displaying their result for that IAT and a possible interpretation. After being offered an opportunity to enter a prize draw, participants were invited to complete another IAT.

Participants who chose to continue immediately and those who returned to the website later were taken directly to the initial instruction page for the next IAT. This process was repeated until all five IATs were completed.

2.8.3. IAT Administration Procedure

The IAT procedure used in this study comprises a sequence of seven trial blocks (see Table 2). This is described below using the Age IAT as an example:

- Block 1: Twenty trials where participants are trained to press a left key when presented with faces of *Old People* and a right key for faces of *Young People*.
- Block 2: Twenty trials where participants are trained to press a left key when presented with “bad” words (e.g. yucky) and a right key for “good” words (e.g. attractive).
- Block 3 and 4: These comprise 41 trials each which combine the category and attribute discrimination procedures above such that participants press a left key when presented with an *Old* face and when presented with a *Bad* word.
- Block 5: Twenty trials where participants are trained to reverse target discrimination such that they press the left key when presented with “good” words.
- Block 5 and 6: Comprise 41 trials each where the earlier combined pairings are reversed such that participants press the left key when presented with “good” words and “old” faces.

The order of the combined pairings and relevant practice blocks was alternated between participants to minimize order effects (Lane et al., 2007) and trials were presented randomly. Consistent with current standard IAT procedures (Teige-

Mocigemba, Klauer, & Sherman, 2010), participants were provided with instructions to respond as quickly and accurately as possible; category labels assigned to the left or right key were displayed in the corresponding upper corners of the screen for every trial and errors were corrected. For incorrect responses, the response latency was recorded as the delay between stimulus presentation and the corrected response. This introduces a built-in error penalty as recommended by Greenwald, Nosek and Banaji (2003).

After completing each IAT and explicit measure, participants were provided with feedback on their performance and a possible interpretation of their IAT D-score (see section 2.7.4 for more details). Using the example above, participants who responded more quickly on Blocks 3 and 4 than Blocks 5 and 6 would have an automatic preference for *Young People over Old People*. An estimate of the magnitude of this preference was also provided (see section 2.8 for more details).

2.8.4. IAT Effect (D-Score) Scoring and Interpretation

The IAT effect was calculated using the following procedure as recommended by Greenwald et al. (2003):

- Trial blocks 1, 2 and 5 and the first trial in blocks 3, 4, 6 and 7 (see Table 2) are practice trials and were not included in the D-score calculation.
- Response latencies of 300 milliseconds or less were considered excessively fast. If the number of trials with a response latency of 300 milliseconds or less was greater than 10% of valid test trials, this score was excluded from the analysis.
- Trials with response latencies of 10,000 milliseconds or greater were excluded for being excessively slow and the total number of valid test trials was adjusted accordingly.
- The mean response latency was calculated for each of the test blocks (3, 4, 6 and 7).
- For administration order 1: The two mean differences were calculated as $(\text{Mean}^{\text{block6}} - \text{Mean}^{\text{block3}})$ and $(\text{Mean}^{\text{block7}} - \text{Mean}^{\text{block4}})$.
- For administration order 2: The two mean differences were calculated as $(\text{Mean}^{\text{block3}} - \text{Mean}^{\text{block6}})$ and $(\text{Mean}^{\text{block4}} - \text{Mean}^{\text{block7}})$.

- Each difference score was then divided by the standard deviation for both trial blocks used to calculate the difference score.
- The D-score was then calculated as the equal weight average of the two resulting ratios.

This scoring procedure results in D-scores with a possible range of -2.0 to 2.0 with zero representing no difference in response latency between conditions. D-scores are interpreted as demonstrating *slight*, *moderate* or *strong* associations using the conventional criteria for small, medium and large effect sizes of Cohen's (Cohen, 1977) *d* measure. If the number of errors made or the number of response latencies below 300 milliseconds exceeded 10% of valid test trials, participants were not provided an interpretation of their scores.

2.8.5. Semantic Differential Scoring

The scoring procedure described by (Nosek & Smyth, 2007) was used to calculate a difference score that is conceptually similar to the character of the IAT D-Score. A score ranging from +10 to -10 was calculated for each of the 10-point semantic differentials and from +7 to -7 for the gender-career semantic differential. Positive scores indicate greater liking or strength of association for the first category. For example, a participant who rates themselves as 7 in their warmth towards heterosexual people and 5 in their warmth towards gay people would have a difference score of +2, indicating a relative explicit preference for heterosexual people.

2.9. Study Sample Characteristics

2.9.1. Psychologist Sample

2.9.1.1. *Qualified Clinical Psychologists (CP)*: Eighty-one qualified clinical psychologists (CP) took part in the study: 74 females (91.3%) and 7 (8.6%) males. The mean age was 38.75 (SD = 7.75; range = 27 to 63). Seventy-seven (95.1%) participants identified themselves as White. The majority (91.4%) identified their sexual orientation as heterosexual. Fifty clinical psychologists (61.7%) reported they had no religious affiliation and 25 (30.9%) identified themselves as Christian. Thirty-seven (45.7%) were living in Greater London. The mean number of years of clinical experience reported was 11.01 (SD=7.45; range = 0 to 36).

Comparisons with demographic data from the Division of Clinical Psychology Workforce Project (Longwill, 2015) suggest that this sample of clinical psychologists is similar in age to other clinical psychologists in the UK. However, the sample was less diverse in terms of sex and ethnicity.

2.9.1.2. *Trainee Clinical Psychologists (TCP)*: One hundred and forty-three trainee clinical psychologists participated in the study. One hundred and twenty-two (85.3%) were female and 21 were male (14.6%). The mean age was 29.60 (SD = 3.78; range = 23 to 49). One hundred and seven (90.2%) trainees identified themselves as White. Trainees identifying as heterosexual comprised 83.2% of the sample whereas 14.7% identified their sexual orientation as lesbian, gay, bisexual (LGB) or other. The majority (69.2%) reported having no religion and 16.1% identified themselves as Christian. The majority (63.6%) lived outside of London.

The demographic characteristics of this sample of trainees was broadly similar to the equal opportunities data published by the Clearing House for Clinical Psychology for successful applicants in 2015. The only exceptions were sexual orientation and marital status. This sample was slightly more diverse in terms of sexuality (83.2% versus 88% heterosexual) and a larger percentage were in relationships (53.8% versus 39%).

2.9.2. General Population Sample (Control)

Eighty-six non-psychologists took part in this study: 47 females (54.7%) and 39 males (45.3%). The mean age was 31.67 (SD = 11.83; range = 18 to 76). Seventy-one (82.6%) were White and 81.4% identified as heterosexual. Like the psychologist samples, most non-psychologists reported no religion (66.3%). The majority (52.3%) reported living in London.

Compared to the latest census data, this sample was broadly similar to the wider population in England and Wales in terms of sex distribution and ethnic diversity (ONS, 2012). However, the sample deviated from the wider population markedly in terms of sexual orientation and religious affiliation. Sixteen percent of non-

psychologists identified themselves as LGB whereas census data suggests that only 1.7% of the UK population identify as LGB (ONS, 2016). Additionally, only 25% of the wider population report no religion and the majority (59%) identify as Christian.

2.9.3. Summary of Sample Characteristics

The three groups were similar in terms of the ethnic mix (White versus BAME $\chi^2=4.36$; d.f. =2; $p = 0.12$) and religious affiliation ($\chi^2= 2.24$; d.f. = 2; $p = 0.33$). However, females were over-represented among trainee and qualified clinical psychologists ($\chi^2 = 40.69$; d.f. = 2; $p < 0.001$) although the proportions of males and females in these groups was broadly similar to trainee and qualified clinical psychologists generally. Clinical psychologists were older and less diverse in terms of sexuality ($\chi^2 = 6.29$; d.f. = 2; $p = 0.05$) than the other two groups.

Additional demographic information is provided in Table 3.

Table 3: Demographics of participants within each sample group

	Clinical Psychologists (n=81)		Trainee Clinical Psychologists (n=143)		General Population (n=86)	
	M	SD	M	SD	M	SD
Age	38.75	7.75	29.60	3.78	31.67	11.83
Sex	n	%	n	%	n	%
Female	74	91.3	122	85.3	47	54.7
Male	7	8.6	21	14.6	39	45.3
Ethnicity	n	%	n	%	n	%
White British	77	95.1	129	90.2	71	82.5
Asian/British Asian	1	1.2	8	5.6	4	4.7
Black/Black British	0	-	2	1.4	3	3.5
Mixed Background	2	2.5	1	0.7	3	3.5
Other	1	1.2	2	1.4	2	2.3
Prefer not to say	-	-	1	0.7	3	3.5

Sexuality	n	%	n	%	n	%
Heterosexual/straight	74	91.4	119	83.2	70	81.4
Gay/Lesbian	2	2.5	8	5.6	8	9.3
Bisexual	2	2.5	11	7.7	6	7.0
Other	0	0.0	2	1.4	1	1.2
Prefer not to say	3	3.7	3	2.1	1	1.2
Marital Status	n	%	n	%	n	%
Married/civil partnership/ co-habiting	62	76.5	77	53.8	33	38.4
Divorced/separated/widowed	1	1.2	2	1.4	4	4.7
Single	17	21.0	60	42.0	46	53.5
Prefer not to say	1	1.2	4	2.8	3	3.5
Religion	n	%	n	%	n	%
No religion	50	61.7	99	69.2	57	66.3
Christian	25	30.9	23	16.1	75	20.9
Other religion	5	6.2	15	10.5	8	9.3
Prefer not to say	1	1.2	6	4.2	3	3.5
Location	n	%	n	%	n	%
Greater London	37	45.7	52	36.4	45	52.3
South East	11	13.6	15	10.5	6	7.0
South West	7	8.6	10	7.0	11	12.8
East	10	12.3	20	14.0	5	5.8
East Midlands	3	3.7	6	4.2	1	1.2
West Midlands	2	2.5	11	7.7	3	3.5
Yorkshire and the Humber	1	1.2	4	2.8	1	1.2
North East	1	1.2	1	0.7	10	11.6
North West	4	4.9	15	10.5	0	0.0
Scotland	4	4.9	9	6.3	2	2.3
Wales	1	1.2	0	0.0	1	1.2
Northern Ireland	0	-	0	-	1	1.2

3. RESULTS

3.1. Descriptive Statistics

Before commencing data analysis, data distributions were examined to determine whether parametric assumptions were met.

3.1.1. Participant Demographics

3.1.1.1. *Age:* To determine whether participant age was approximately normal, the z-scores for skewness and kurtosis were examined. The criterion for acceptable scores is dependent on sample size (Field, 2005). For smaller samples, a criterion value of 1.96 was used and for larger samples (TCP group) a criterion value of 2.58 was used. For all three groups, the z-scores of skewness and kurtosis was above the criterion value indicating that the data was significantly skewed and kurtotic (see Table 4). Furthermore, Shapiro-Wilk tests of normality indicated that the data was not normally distributed and visual examination of the histograms supported this.

Table 4: Participant age distribution properties and normality statistics

	M	SD	Skew.	Skew. z-score	Kurt.	Kurt. Z-Score	S.Wilk	Sig.
CP	38.75	7.75	1.27	4.77	1.92	3.64	0.90	0.00
TCP	29.60	3.78	1.61	7.96	4.66	11.57	0.88	0.00
Control	31.67	11.83	1.51	5.81	2.43	4.74	0.86	0.00

3.1.1.2. *Years of clinical experience:* Clinical psychologists' years of experience was not normally distributed. The data was skewed (z-score = 3.45) however the spread of the values was acceptable (kurtosis z-score = 1.7). Nonetheless, Shapiro-Wilk's test of normality was significant ($p < 0.01$) and visual examination of the histogram revealed a marked positive skew. The median

number of years of clinical experience was 10 (min = 0; max = 36).

3.1.2. Dependent Variables

3.1.2.1. *IAT Scores:* Participants completed a total of 937 IATs. The percentage of errors made was acceptable for all participants for all IATs therefore no data was excluded from the analysis.

Visual and statistical exploration of skewness, kurtosis and normality indicated that IAT scores were normally distributed for all tests and all participant groups. See Appendix F for details of the distribution properties.

Mean IAT scores indicate that all groups demonstrated some degree of implicit bias across all domains (see Table 5). That is, at group-level, participants demonstrated a slight pro-young bias, a moderate association between males and ‘career’ versus females and ‘family’, a slight pro-heterosexual bias, a moderate pro-light skin bias and a moderate pro-thin bias.

Table 5: Means and standard deviations for all IAT D-Scores

	Age		Gender-Career		Sexuality		Skin Tone		Weight	
	M	SD	M	SD	M	SD	M	SD	M	SD
CP	-0.27	0.40	-0.37	0.30	-0.15	0.41	-0.38	0.39	-0.33	0.38
TCP	-0.24	0.34	-0.39	0.33	-0.10	0.39	-0.27	0.42	-0.30	0.39
Control	-0.37	0.32	-0.44	0.32	-0.13	0.46	-0.44	0.43	-0.30	0.39
ALL	-0.28	0.5	-0.38	0.30	-0.09	0.45	-0.33	0.41	-0.28	0.37

Interpretation of D-Scores: > 0.1 = slight association, > 0.3 = moderate association, > 0.5 = strong association. Negative values indicate an implicit preference for the dominant group/stereotype.

3.1.2.2. *Thermometer scores:* Self-rated preferences scores for Sexuality, Skin Tone and Weight were all significantly skewed and kurtosed and Shapiro-Wilk’s test was significant ($p < 0.01$). For Age, the distribution and normality statistics all indicated that the data was not normally distributed for the CP and TCP groups. While skewness and kurtosis appeared satisfactory, the normality

statistic was significant ($p < 0.01$) for the control group. Examination of the histogram confirmed that the data for this group was also not normally-distributed. Similarly, the values for skewness and kurtosis for the CP and TCP groups on the Gender-Career thermometer were satisfactory but normality tests and examination of the histograms confirmed that this data was not-normally distributed. Consequently, parametric assumptions were not met for any of the thermometer scores (see Appendix F). Means and standard deviations for each thermometer score are provided in Table 6.

Table 6: Means and standard deviations for all thermometer (self-report) scores

	Age		Gender-Career		Sexuality		Skin Tone		Weight	
	M	SD	M	SD	M	SD	M	SD	M	SD
CP	0.14	1.35	-1.50	1.36	0.06	0.75	0.04	0.78	-0.17	1.09
TCP	0.54	1.36	-1.47	1.24	0.01	0.71	0.51	0.63	-0.67	1.68
Control	-0.16	1.77	-1.06	1.55	0.15	2.12	0.14	1.21	-0.56	1.43
ALL	0.23	1.42	-1.37	1.33	0.04	1.39	0.13	0.70	-0.56	1.47

Interpretation of thermometer scores: > 0.1 = slight association, > 0.3 = moderate association, > 0.5 = strong association. Negative values indicate an explicit preference for the dominant group, except for Gender-Career associations where a negative value indicates a stronger association between women/career and male/family.

Mean thermometer scores indicated that overall, the sample self-reported having no preference between homosexual versus heterosexual people. Direct measures also indicated that all groups held some degree of pro-dark skin bias. For the gender-career stereotypes, all groups self-reported strongly associating women with 'career' and men with 'family' which is the reverse of the traditional association between men and 'career' and women and 'family'. There was some variation among the groups with regards to age attitudes with the CP and TCP groups reporting a degree of pro-old preference whereas the control group self-reported a slight preference for young people over old people. For weight, all groups reported a degree of pro-thin explicit preference.

3.1.3. Inter-individual variability

There was substantial inter-individual variability in IAT D-scores, as determined by the magnitude of the associated standard deviations (see Table 5). This is

also illustrated by histograms for the 5 topics presented in Appendix G. If the IAT did not show meaningful inter-individual variability then it might not be appropriate to interpret it as an individual difference measure. One way to assess the meaningfulness of inter-individual variability in IAT D-scores is to assess correlations with self-report measures (thermometer scores). Consistent with other studies of intergroup attitudes and stereotypes, IAT D-scores are expected to be positively, but weakly, correlated with self-reported attitudes (thermometer scores) for the same topic. Correlation coefficients are reported in Table 7.

Consistent with expectations, direct and indirect measures for Age, Gender-Career and Sexuality were positively, but weakly correlated. The correlation for Skin Tone was statistically significant, however there was a negative relationship between the IAT D-score and thermometer score. This may reflect a marked difference in people's implicit attitudes towards dark-skinned people and their explicitly held egalitarian views. The correlation was not significant for implicit and explicit weight attitudes. Weight was also the only domain where implicit and explicit attitudes were in the same direction (i.e. pro-thin) which may represent the relative social acceptability of weight-based prejudice.

Table 7: Correlations (Spearman's rho) between direct and indirect measures

IAT D-Score	Thermometer Score	
	r_s	R^2
Age	**0.20	0.04
Gender-Career	*0.19	0.04
Sexuality	**0.33	0.11
Skin Tone	** -0.21	0.04
Weight	-0.01	-

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

3.2. Inferential Statistics

3.2.1. Implicit Attitudes and Stereotypes by Participant Group

Participant age was explored as a possible covariate with IAT D-score. However, participant age was not significantly related to implicit attitude for all IAT D-scores except for the Skin Tone IAT (see Table 8). Nonetheless, the Skin Tone IAT D-score and participant age were only weakly associated therefore controlling for participant age was unlikely to reduce the within-group error variance significantly (Tabachnick & Fidell, 2013).

Table 8: Correlations (Spearman's rho) between IAT D-scores and participant age

IAT D-Score	Thermometer Score	
	r_s	R^2
Age	-0.04	-
Gender-Career	0.05	-
Sexuality	-0.01	-
Skin Tone	*-0.19	0.04
Weight	0.04	-

* Correlation is significant at the 0.05 level (2-tailed)

A one-way analysis of variance (ANOVA) was performed for each IAT D-score (see Table 9). The Levene's test was not significant for any of the dependent variables, therefore the assumption of homogeneity of variance was met. This is particularly important given the unequal group sizes in the sample as homogeneity of variance can be affected when group sizes are discrepant (Tabachnick & Fidell, 2013).

Table 9: Between group comparisons (ANOVA) of IAT scores (all participants)

	CP	TCP	Control			
	n	n	n	F	p	eta
Age	49	80	45	2.12	0.12	0.16
Gender-Career	44	83	48	0.61	0.55	0.08
Sexuality	52	86	53	0.24	0.78	0.05
Skin Tone	50	77	50	2.79	0.06	0.18
Weight	52	87	52	0.92	0.91	0.03

All 5 ANOVAs were not significant. This suggests that there are no differences between CPs, TCPs and control group participants in their implicit attitudes towards age, sexuality, skin tone or weight or implicit male/career versus female/family stereotypes.

Given the predominance of female participants in the CP and TCP groups, a second series of one-way ANOVAs was performed excluding male participants (see Table 10). Again, the homogeneity of variance assumption was met. This series of one-way ANOVAs also yielded no significant group differences in implicit attitudes or stereotypes in the target domains (for females only).

Table 10: Between group comparisons (ANOVA) of IAT scores (females only)

	CP	TCP	Control			
	n	n	n	F	p	eta
Age	44	72	23	0.75	0.48	0.10
Gender-Career	41	74	30	0.14	0.87	0.05
Sexuality	48	75	34	0.24	0.79	0.06
Skin Tone	45	62	27	2.79	0.07	0.20
Weight	46	74	23	0.50	0.95	0.03

3.2.2. Explicit Attitudes and Stereotypes by Participant Group

As the data for all the thermometer scores was not normally distributed, a non-parametric Kruskal-Wallis test was performed for each of the target domains (see Table 11) to compare explicit attitudes and stereotypes among the three groups.

None of these analyses were significant indicating that the strength of explicit attitudes and stereotypes was similar among the three groups.

Table 11: Between group comparisons (Kruskal-Wallis) of thermometer scores (all participants)

	CP	TCP	Control			
	n	n	n	H	p	d
Age	49	80	45	4.28	0.12	0.23
Gender-Career	44	83	48	5.36	0.07	0.28
Sexuality	52	86	53	2.22	0.33	0.07
Skin Tone	50	77	50	1.84	0.40	0.00
Weight	53	87	52	2.09	0.35	0.04

As with the IAT D-scores, a second series of comparisons of thermometer scores between groups was performed with only female participants (see Table 12). These analyses yielded no differences for explicit attitudes towards age, skin tone, weight or gender-career associations. However, for sexuality there was a main effect of group ($H(2) = 8.40$; $p = 0.02$). Post-hoc comparisons between female TCPs and control group participants were significant ($U = 949$; $p = 0.01$; $r = -0.26$; $d = 0.42$). This suggests that female TCPs demonstrated less explicit pro-gay bias than female controls.

Table 12: Between group comparisons (Kruskal-Wallis) of thermometer scores (females only)

	CP	TCP	Control			
	n	n	n	H	p	d
Age	44	72	23	1.84	0.40	0.00
Gender-Career	41	74	30	2.87	0.24	0.15
Sexuality	48	75	34	8.40	*0.02	0.41
Skin Tone	45	62	27	0.17	0.92	0.00
Weight	47	74	23	0.97	0.62	0.00

* Significant at the 0.05 level

3.2.3. Implicit Attitudes and Stereotypes by Demographics

To explore whether there were differences in implicit attitudes and stereotypes by location, ethnicity or religious affiliation, participant data was collapsed within groups. Location data for all participants outside of Greater London was collapsed into a single category (“other areas”). Similarly, participants’ religious affiliation was collapsed into two groups: no religion and religion, where religious category comprised all participants who reported religious affiliation. Ethnicity was also collapsed into two groups (white and non-white), however the number of non-white participants was still too small for any meaningful comparisons to be made so it was not used.

3.2.3.1. *Location:* Normality and homogeneity of variance assumptions were met for all IAT D-scores within each location, except for Skin Tone IAT D-score. Therefore, comparisons by location were conducted using independent samples t-tests for age, gender-career, sexuality and weight IAT D-scores. There were no significant group differences on any of the dependent variables (see Table 13).

Skin Tone IAT D-scores were not normally distributed, therefore comparisons between locations were made using a non-parametric Mann-Whitney U test. This was also non-significant.

These findings suggest that implicit attitudes in the target domains do not differ between London and other areas. However, the locations collapsed into the ‘other areas’ category are very diverse and include, for example, major metropolitan areas as well predominantly rural areas. This heterogeneity may mask any other differences in implicit attitudes within the target domains e.g. urban versus rural.

Table 13: Comparisons by location (London versus “other areas”) for IAT D-scores

	London			Other			t	p	d
	n	M	SD	n	M	SD			
Age	75	-0.31	0.36	99	-0.26	0.36	-0.96	0.34	0.14
Gender-Career	74	-0.37	0.33	101	-0.41	0.32	0.87	0.38	0.12
Sexuality	78	-0.09	0.43	113	-0.15	0.40	0.95	0.35	0.14
Weight	82	-0.26	0.41	109	-0.34	0.36	1.39	0.17	0.21
							U	p	d
Skin Tone	80	-0.35	0.46	97	-0.36	0.38	3752.00	0.71	0.06

3.2.3.2. *Religion:* As assumptions of normality and homogeneity of variance were met, independent samples t-tests were performed to compare IAT D-scores for the target domains by religious affiliation (see Table 14). No significant differences were found between the religious and non-religious groups for implicit attitudes towards any of the target domains.

Table 14: Comparisons by religious affiliation (no religion versus Religion) for IAT D-scores

	No religion			Religion			t	p	d
	n	M	SD	n	M	SD			
Age	108	-0.28	0.38	63	-0.28	0.31	-0.02	0.98	0.35
Gender-Career	115	-0.39	0.32	57	-0.40	0.33	0.08	0.93	0.03
Sexuality	132	-0.10	0.43	54	-0.19	0.38	1.42	0.16	0.22
Skin Tone	124	-0.36	0.42	50	-0.33	0.43	-0.37	0.71	0.07
Weight	128	-0.29	0.40	59	-0.35	0.35	0.94	0.35	0.16

3.2.3.3. *Clinical Experience:* The association between the number of years of experience and IAT D-scores was explored to see whether the strength of implicit attitudes or stereotypes may be related to years of clinical experience. The data for number of years of experience was not normally distributed therefore Spearman's Rank Order correlations were performed (see Table 15). Surprisingly, none of the correlations were large suggesting that implicit attitudes and stereotypes among clinical psychologists are unaffected by clinical experience.

Table 15: Correlations (Spearman's rho) between years of clinical experience (clinical psychologists only) and IAT D-scores

IAT D-Score	Years of Experience (n=81)		
	n	r _s	p
Age	49	0.12	0.39
Gender-Career	44	-0.00	0.99
Sexuality	52	0.03	0.86
Skin Tone	50	-0.01	0.94
Weight	52	0.07	0.64

3.2.4. Comparisons to Data from Project Implicit

D-scores for UK residents completing IATs collected via the Project Implicit demonstration website over the last 5 years was obtained from the Open Science Framework repository maintained by this research team. The IAT D-score distributions for the control group were compared to the distributions from the Project Implicit sample to determine whether they were similar to each other. Given the large differences in sample sizes, a series of one-sample non-parametric Kolmogorov-Smirnov tests were conducted, which yielded no significant differences between the data distributions. See Table 16 for the results of these comparisons.

Table 16: Comparisons between D-Score distributions for the control group and data from Project Implicit for UK residents for the most recent 5 years.

	n (Project Implicit)	M	SD	p
Age	8056	0.46	0.40	0.89
Gender-Career	14193	0.40	0.39	0.93
Sexuality	11808	0.20	0.49	0.92
Skin-Tone	7597	0.32	0.42	0.85
Weight	3935	0.45	0.41	0.83

4. DISCUSSION

4.1. Summary of Results

This study explored implicit attitudes towards age, sexuality, skin tone and body-weight and gender/career associations among qualified and trainee clinical psychologists and non-psychologists. The main findings can be summarised as follows:

- All groups showed some degree of negative implicit bias towards non-dominant/marginalised groups. All groups showed an implicit association of men with 'career' and women with 'family'.
- All groups self-reported either no or positive explicit bias towards dark-skinned people, gay people and older people and an association of women with 'career' and men with 'family'.
- All groups self-reported holding negative attitudes towards overweight people.
- The degree of implicit and explicit attitudes was similar among qualified and trainee clinical psychologists and non-psychologists.
- Implicit attitudes were not associated with participant age or clinical psychologists' years of experience and did not vary by location or religious affiliation.

4.2. Relationship with Previous Research

4.2.1. Presence of Negative Implicit Bias Among Applied Psychologists

Consistent with the present findings, previous research reports that negative implicit bias, of similar magnitudes to that observed in the general population, is present among applied psychologists.

Moderate levels of pro-light skin implicit bias were observed among both trainee and clinical psychologists in this sample. Other studies of implicit attitudes

towards African American people among applied psychologists reported average IAT D-scores similar to those observed in this sample ($d = 0.36$; Katz & Hoyt, 2014, $d = 0.32$; Boysen & Vogel, 2008 and $d=0.44$; Castillo, Brossart, Reyes, Conoley, & Phoummarath, 2007). In these studies, positive D-scores represent negative bias towards the marginalised group (i.e. pro-white/anti-black).

Only one previous study considered implicit sexuality attitudes among applied psychologists. Boysen and Vogel (2008) reported a mean level of pro-heterosexual bias among counselling psychology students in the moderate range ($d=0.34$). In a large ($n=8995$), international sample of mental health providers (including counsellors and social workers), Sabin, Riskind and Nosek (2015) explored implicit attitudes towards gay men and lesbian women separately. Implicit pro-heterosexual bias was present, however negative implicit attitudes towards lesbian women were weaker than those towards gay men among female mental health providers. Male mental health providers had strong implicit preferences for heterosexual people over gay people. This suggests that the predominantly female sample of psychologists in this study may be broadly similar to other female mental health providers in terms of the degree their implicit pro-heterosexual bias.

Pro-thin bias was present in the only other study to examine implicit weight attitudes among applied psychologists (Jackson, 2015), however procedural issues limited the reliability of this finding (see section 1.10.2 for details). Similarly, implicit weight bias has also only been considered in a small number of studies among medical professionals. Overall, these studies have consistently shown strong implicit pro-thin biases among medical professionals, however most studies have been plagued by relatively small, heterogenous samples of medical professionals (Sabin, Moore, Noonan, Lallemand, & Buchwald, 2015; Schwartz, Chambliss, Brownell, Blair, & Billington, 2003; Teachman & Brownell, 2001). In a large group of medical doctors ($n = 2284$), Sabin, Marini and Nosek (2012) also found strong implicit pro-thin biases providing greater validity to the findings from these smaller studies. This suggests that the present sample of psychologists is similar in terms of implicit pro-thin implicit bias to other health professionals more broadly.

Overall, the present finding that negative implicit attitudes towards dark-skinned, gay and overweight people are present among trainee and qualified clinical psychologists is consistent with the very limited research among applied psychologists. However, this study was the first to employ an indirect measure to examine implicit attitudes towards age and gender-career stereotypes among applied psychologists. These topics also have not been examined among medical professionals using indirect measures. Nonetheless, as with the other topics explored psychologists did not differ from general population controls with regards to the strength or direction of their implicit age biases or gender-career stereotypes. Given the adequate sample size and broadly acceptable scale reliability for the IATs used in this study, this finding is unlikely to be due to measurement error.

Although none of the previous studies among applied psychologists made direct comparisons with non-psychologist groups, some of these authors considered their clinician samples to be broadly similar to the wider population in terms of the direction and strength of implicit biases (e.g. Boysen & Vogel, 2008). A handful of studies among medical professionals have included community or general population samples. Blair et al. (2013) compared implicit and explicit attitudes toward African American and Latino American people among 210 primary care providers and 190 community members in Denver, Colorado. They found both groups to be similar with respect to their implicit pro-European American preferences relative to African Americans and Latino Americans although these findings cannot be generalised to other areas. Sabin, Riskind, et al. (2015) included a 'non-provider' group in their study of attitudes towards gay men and lesbian women. Although they did not make statistical comparisons among groups, they commented on patterns of preferences between different groups of providers (e.g. nurses, medical doctors, mental health providers) and non-providers by participant sex and sexual orientation. They concluded that, overall, heterosexual providers and non-providers always showed an implicit pro-heterosexual preference. However, lesbian and gay providers tended to show the reverse preference indicating that participant demographics can be important moderators of implicit preferences.

The present finding that psychologists do not differ from non-psychologists in their implicit attitudes and stereotypes is consistent with this limited previous research. However, as with Sabin, Riskind, et al., (2015), this non-psychologist sample cannot be considered representative of any other known population only that they were recruited in the same way, at the same time and underwent the same procedures. Nonetheless, implicit biases among this sample of non-psychologists were no different to those detected in much larger samples of UK residents. Therefore, one can cautiously conclude that trainee and clinical psychologists do not differ from the wider UK population in their implicit negative biases towards older people, gay people, dark-skinned people and overweight people nor in their implicit gender-career stereotypes.

4.2.2. Explicit Attitudes and Stereotypes

In the present study, all participants self-reported no bias or a positive bias for each of the topics of interest, except for weight. This finding is broadly similar to the available research among applied psychologists with regards to ethnicity and sexuality attitudes. In his review of the literature on implicit and explicit bias among counsellors, Boysen (2009) found negative explicit bias towards minority ethnic people and gay people to be uncommon. However, 85% of the 261 comparisons made between groups on the relevant dependent variables (e.g. attributions of causes for causes of problems among African American and European American clients; Burkard & Knox, 2004) yielded null results. This suggests that, in most cases, no bias was present in either direction. Positive bias (i.e. pro-gay bias) was detected in some cases, particularly among those studies focussing on sexual orientation bias. Nonetheless, only one of these studies predicted positive bias toward gay clients (Gushue, 2004).

Contrary to the present findings, James and Haley (1995) found some degree of negative explicit age related bias among a large, national sample of practicing clinical psychologists in the US. Specifically, the authors found that older people showing symptoms of depression were viewed as less appropriate for therapy and having a poorer prognosis independently of their health status. Nonetheless, bias did not appear to affect diagnosis or treatment recommendations. Explicit

pro-young attitudes have also been found to be common in very large samples of non-psychologists (Nosek et al., 2007) suggesting that the overall pro-old explicit bias observed in this sample is somewhat unusual. Although there was no statistical difference between the groups, the psychologists in this sample reported a slight to strong pro-old explicit bias whereas non-psychologists reported a slight pro-young bias more consistent with previous research. It is possible that the psychologists were particularly affected by presentation concerns, however, this was not assessed in this study.

Only Jackson (2015) has previously considered explicit weight attitudes among applied psychologists and found an explicit pro-thin bias to be present overall. This finding is similar to studies of medical professionals where explicit pro-thin biases are frequently reported (Sabin et al., 2012; Sabin, Moore, et al., 2015; Schwartz et al., 2003). Similarly, robust studies in heterogeneous “mega” samples (n=199329) also report pro-thin bias to be common in the wider population (Nosek et al., 2007). The consistency of this finding across a wide range of samples suggests the present finding of explicit pro-thin bias among all groups is valid.

The finding of a strong explicit association of females with ‘career’ and males with ‘family’ across all groups is inconsistent with data reported by (Nosek et al., 2007) for 83084 participants. In this very large sample, participants explicitly associated males with ‘career’ and females with ‘family’. The striking contrast between this sample and Nosek, et. al.’ (2007) sample may reflect the nature of the present sample. CPs and TCPs may be more explicitly career-oriented given the commitment required to gain training places and ultimately qualify. Furthermore, some participants were recruited by snowballing so most of the non-psychologist participants will be CP’s and TCP’s social contacts which may have contributed to the similarity between the groups in this regard.

4.2.3. Correlations Between Implicit Attitudes and Participant Demographics

No relationship was found between participant age and the implicit attitudes or stereotypes assessed in this study. Using a large sample of participants, Nosek and Greenwald (2002) reported positive relationships between participant age

and the degree of implicit attitudes and stereotypes across all topics included, except implicit age attitudes. Older participants also tended to hold implicit pro-young attitudes, which contributed to the lack of relationship between age and age attitudes. Particularly strong relationships between age and gender-career implicit stereotypes were found. Older participants associated males with 'career' and females with 'family' more strongly than younger participants. A similarly strong relationship was observed between older participants and pro-white implicit bias but this was only on a version of the *Race IAT* which requires participants to categorise names associated with African Americans and European Americans rather than faces.

In their more recent study, which used the same website for data collection, (Nosek et al., 2007) did not find such a consistent linear relationship between age and implicit biases. However, like the previous study, they did find positive relationships between age and implicit gender-career stereotypes and age with implicit pro-light skin bias. The lack of consistency between the two studies may be explained by the different scoring methods employed. Nosek et al. (2002) used an older method which was later found to be sensitive to individual differences, such as differences in processing speed, which were likely more detrimental for older participants. The D-algorithm used by Nosek et al. (2007) results in an individual effect size which reduces such influences.

Based on these previous findings positive relationships between participant age and implicit gender-career stereotypes and implicit skin tone attitudes could reasonably have been expected. However, 46.1% of this sample were aged under 30 and 83.5% were 40 or younger. Only 7 participants were aged 60 or older. Therefore, there simply may not have been sufficient older participants for any relationships among age and implicit attitudes to emerge.

Only one study was found that considered clinicians' experience as a potential moderator of implicit attitudes. Rather, most previous studies have predominantly recruited trainee clinicians or grouped trainee and qualified clinicians together. Blair et al. (2013) specifically targeted experienced primary care practitioners, but still found no differences in negative implicit bias towards African Americans or

Native Americans between these experienced clinicians and their community sample. This may be at least in part because most participants (58%) had 10 or fewer years' experience and only 7 more than 20 years' experience. Additionally, the experience variable may have been too broad and a relationship may be more likely to emerge if the nature of the experience was better defined e.g. in terms of experience working with gay or minority ethnic clients.

4.3. Implications

The IAT results from this study may be disheartening given how much effort has been made over recent decades to challenge prejudice and discrimination against marginalised social groups. This may be particularly disheartening for clinical psychologists who are professionally obliged to be non-discriminatory but also, as suggested by their self-reported attitudes, likely believe themselves to hold non-biased attitudes. The dissociation between implicit and explicit attitudes and beliefs reported in this and other research, has led many to question how to interpret implicit measures. Are they a measure of personal beliefs and attitudes or cultural knowledge? Do they represent a 'real' form of prejudice?

4.3.1. Personal or Extra-Personal Associations

Although measures of implicit attitudes have been adopted by virtually all sub-disciplines of psychology, the nature of the constructs they assess remains controversial. Alongside theoretical developments in dual-process approaches, discussed earlier, whether indirect measures assess personal associations (links between concepts in memory) or extra-personal associations is an ongoing debate. Olson and Fazio (2004) define extra-personal associations as "associations that do not contribute to one's evaluation of an attitude object" (p. 653). Indirect measures, like the IAT, are thought to measure concept-evaluation associations that develop through experience via mechanisms such as classical conditioning (Olson & Fazio, 2001). Consequently, the crux of the interpersonal versus extra-personal debate is: do implicit measures reveal something about an individual's evaluations, even if they are not consciously aware of them; or do they reflect the cultural context a person is embedded in, and therefore say nothing about the individual's true propensities? This debate is arguably

particularly lively as it involves issues of free will and personal responsibility.

Attempts to define objectively what is interpersonal or extra-personal suffer from conceptual difficulties, leading Gawronski, Peters and LeBel (2008) to argue for a subjective definition whereby the individual determines if an association is part of their true self (personal) or not (extra-personal). However, Nosek and Hansen (2008) argue that endorsement is irrelevant for an indirect measure to assess an individual's attitude or predict behaviour. Mental associations reflect accumulated experience regardless of whether they are accepted or rejected as true (Gawronski & Bodenhausen, 2006). Furthermore, whether experience is culturally bound or culturally independent is irrelevant. What matters is that the experience happened and that associations formed.

While these theoretical and conceptual debates are important, especially for the development of successful interventions (Pennington, 2014), indirect measures do not directly probe behavioural propensity. They measure parameters (e.g. response latency) from which underlying mental processes may be inferred, as is true for many psychological measures. Therefore, in so far as indirect measures reliably predict discriminatory behaviours, they can be considered a measure of some real form of prejudice regardless of underlying mental processes.

4.3.2. Aversive Prejudice

Son Hing, Chung-Yan, Hamilton and Zanna (2008) propose that the pattern of dissociation between implicit and explicit attitudes (explicitly egalitarian, implicitly prejudiced) observed in this sample may be characteristic of aversive prejudice. Dovidio and Gaertner's (2004) theory of aversive 'racism' purports that many white people genuinely endorse egalitarian values, however this coexists with unconscious residual anxiety, stemming from culturally socialised negative images, in dealing with minority group members. It is this anxiety which is thought to colour interactions with minority ethnic and other outgroups and may betray itself through behavioural indicators of avoidance and coolness (Brown, 2011). However, aversive prejudice is only likely to affect behaviour when norms are ambiguous or the ability to control behaviour is reduced (e.g. because of time

pressure).

4.3.3. Implications for Equitable Service Provision

It is these sorts of subtle, unconscious and difficult-to-control behaviours that are best predicted by implicit intergroup attitudes and stereotypes (Greenwald, Poehlman, Uhlmann & Banaji, 2009). As discussed in section 1.10 discriminatory “micro-behaviours” may have implications for the therapeutic relationship and therapy outcomes. However, only one study to date has used an indirect measure to predict variables relevant to the therapeutic alliance (Katz & Hoyt, 2014). Boysen (2009) proposes that the difficulty in measuring implicit bias may have limited its inclusion in the psychotherapy literature. Another possibility is that there is simply no evidence of disparities in therapy outcomes or psychology, service provision minimising the need for this research.

However, this does not appear to be the case. A review of the literature on clinical psychology service provision in the UK confirmed that minority ethnic groups were generally excluded from and either unwilling or unable to access clinical psychology services (Williams, Turpin & Hardy, 2006). Furthermore, ethnic dissimilarity in therapy dyads is often (but not always) associated with reduced therapy uptake, increased premature dropout, shorter therapy duration and reduced post-therapy functioning (Farsimadan, Khan & Draghi-Lorenz, 2011). Among the many reasons for these disparities is that the profession is said to lack the ability to address, offer and provide an appropriate range of therapies that are sensitive to, attractive to, respectful of and relevant to the needs of a multi-cultural society (Williams et al., 2006). Studies of process and outcome also implicate negative effects of ethnic mismatching on therapy processes. However, qualitative studies suggest that ethnic differences do not affect therapy when they do not interfere with fundamental aspects of the therapeutic relationship such as perceived acceptance, empathy and genuineness (e.g. Chang & Berk, 2009). Ethnic mismatch may not be the problem however a range of factors including the therapists’ cultural competence and how this affects the therapeutic relationship are considered important (Farsimadan, Draghi-Lorenz, & Ellis, 2007).

Given the evidence for disparities in access to and outcomes from psychology services in the UK for minority ethnic groups in the UK, there is reason to consider the possible impact of implicit biases on the therapeutic alliance. While this remains an under-researched area, the American Psychological Society (APA) nonetheless specifically included recognising and challenging personal bias (implicit and explicit) in its *Guidelines on Multicultural Education, Training, Research, Practice and Organisational Change for Psychologists* (APA, 2002). This was followed with a detailed strategy for improving multicultural competence including content guidelines for personal development and educational institutions at all levels from secondary schools to universities offering doctoral level courses (APA, 2008). The BPS Division of Clinical Psychology Inclusivity Strategy (BPS, 2015) outlines the goals for the profession with regards to inclusivity, but it has little to say on how to achieve these. Similarly, one of the key outcomes for clinical psychology training programmes in the UK is to ensure trainees will have “the skills, knowledge and values to work with clients from a diverse range of backgrounds, understanding and respecting the impact of difference and diversity upon their lives” (BPS, 2016; p.20). However, course accreditation criteria do not prescribe how this outcome should be achieved or measured.

Anecdotal evidence suggests that this may contribute to considerable variation in the emphasis placed on equality and diversity issues between training courses. For example, the North Thames courses jointly offer an annual event intended to attract black and minority ethnic students to the profession. The finding in this study that trainee and qualified psychologists did not differ from each other or the general population in terms of implicit bias suggest that the profession may benefit from improved diversity education at all levels. Doctoral courses may offer a training opportunity with a lifetime impact on practice (Johnson & Federman, 2014). Consequently, greater input on the content for diversity education, including implicit bias awareness and intervention strategies, from the course accreditation body could have significant long-term benefits for service users.

4.3.4. Implications for Recruitment and Promotion

The role of a clinical psychologist is not confined to providing direct therapy and

many CPs may also be involved in workplace recruitment and selection for clinical psychology training programmes. Despite efforts to improve diversity in the clinical psychology workforce, men continue to be underrepresented (Cape et al., 2008). This disparity in the workforce has largely been attributed to clinical psychology being viewed as a low-prestige and feminine profession (Melia, 2016). However, while women are overrepresented overall, they are still underrepresented in leadership roles (Murphy, Bishop & Sigala, 2014). This profile of overrepresentation of male clinical psychologists in decision-making positions is consistent with the wider NHS (Newman, 2015) and other organisations globally (Mercer, 2014). Sex inequality in the workplace is a multi-faceted problem, however Islam and Schlösser (2016) highlighted three key challenges women face when striving for leadership positions: confidence; the double burden of having a career while also taking on most of the house-work and child-rearing responsibility; and implicit and explicit sex bias and stereotyping.

Research shows that women face negative gender biases when being evaluated for leadership positions (Patel, 2013), have to work harder to be perceived as equally competent as men (Lyness & Heilman, 2006) and may be seen as less ambitious and less committed to work due to family responsibilities. The presence of a significant implicit association of men with career and women with family in the present sample is consistent with the wider research on gender bias and stereotypes in the workplace. There is a lack of research examining how implicit biases may affect clinical psychology selection and recruitment specifically, however bias awareness training is recommended for recruiters more generally (Newman, 2015). Bias awareness training typically addresses interviewers' biases towards candidates whereas the presence of implicit gender bias among this predominantly female sample suggests that self-stereotypes may also be relevant in maintaining sex inequalities in leadership within clinical psychology. Evidence from studies of women in STEM (Stout, Dasgupta, Hunsinger & McManus, 2011) and law (Levinson & Young, 2010) and complexity theories of sex bias in leadership (Hogue & Lord, 2007) highlight both inter- and intra-personal biases in maintaining the status quo.

Thus, current models of bias awareness training in recruitment may be insufficient to address the impact of implicit self-stereotypes on women's self-concepts of themselves as potential leaders. Rather, Dasgupta (2011) promotes exposing women and girls to female experts and leaders to help reduce self-stereotypes. However, this requires there already be sufficient women in these positions to provide mentorship. Emerging research suggests that vignettes describing female leaders and experts may reduce implicit self-stereotypes, however this is dependent on perceived similarity between participants and the person described in the vignette (Asgari, Dasgupta & Stout, 2012). These findings require replication and further research to establish whether these changes affect self-stereotyping and decision-making in the longer-term. Nonetheless, strategies to reduce implicit self-stereotypes of gender roles may be important in motivating more women to aspire to leadership positions.

4.3.5. Weight Bias

Anti-fat attitudes are thought to be one of the few remaining socially acceptable forms of prejudice (Puhl & Heuer, 2009) and may therefore be less affected by presentation concerns. This may partly explain the correspondence between implicit and explicit pro-thin attitudes observed in this sample. Weight is not a protected characteristic under the Equality Act 2010 which may contribute to the prevalence of anti-fat attitudes and weight-based discrimination. However, the BPS Code of Conduct and Ethics for psychologists (BPS, 2009) is broader its assertion that psychologists should "avoid practices that are unfair or prejudiced" (p.10) and this can reasonably be considered to include weight-based prejudice. Much of the weight-based discrimination research is descriptive and very few consider the relationship between discrimination and either implicit or explicit anti-fat attitudes (O'Brien, Latner, Ebner, & Hunter, 2013). It is possible that, while psychologists may hold both implicit and explicit anti-fat biases, this does not negatively affect their behaviour with overweight clients or colleagues. With obesity rates continuing to rise (DoH, 2008) and the promotion of psychological approaches to weight-management (BPS, 2011), this is an important consideration for future research to ensure overweight individuals receive respectful and equitable treatment.

4.3.6. Skills That May Reduce the Effects of Implicit Biases

The finding that negative implicit biases towards dark-skinned people, overweight people, older people and gay people and implicit gender stereotypes were present among psychologists is disheartening. However, it should be noted there was considerable variation in scores and that a significant minority of participants did not demonstrate implicit biases. Future studies may wish to focus on understanding the characteristics of people who are aren't biased on indirect measures as well as those who are.

In the USA, self-reflection activities are commonly used as an education tool to help medical students become aware of their biases (Teal, Gill, Green, & Crandall, 2012). However, research suggests that awareness by itself may not be sufficient to produce change (Chapman, Kaatz, & Carnes, 2013). Nonetheless, being made aware of implicit biases through, for example, feedback from an IAT, may motivate people to address these – if the feedback and reflection activities do not induce defensiveness that can lead to denial of the bias (Zestcott et al., 2016).

Mindfulness meditation has been proposed to reduce the effect of implicit bias by increasing the ability to become aware when negative biases are activated, so that self-regulatory strategies can be employed to ensure actions are congruent with egalitarian values, and by reducing stress and internal sources of cognitive load (Burgess, Beach, & Saha, 2017). A promising study using a relatively small student sample showed a reduction in implicit bias on the Age and *Race* IATs following a 10 minute, non-bias specific mindfulness meditation (Lueke & Gibson, 2015). The reduction in implicit bias was largely accounted for by a reduction in the automatic activation of negative associations. However, the follow-up IAT was administered very shortly after the meditation so it is not clear whether the effects lasted in the longer-term.

Recently Lai et al. (2014) conducted a comparative analysis of 17 different interventions aimed at reducing implicit pro-European American bias in a large sample (n = 17021). The most effective interventions were those that employed counter-stereotype primes (e.g. a vignette where the participant is beaten by a

European American assailant and rescued by an African American passer-by) and those that bypass bias reduction and provide strategies to override or suppress the effects of bias. Among the least effective were those which aimed to activate egalitarian goals which may be considered broadly similar to self-reflection activities. This suggests that clinical psychologists existing self-reflection skills may not be sufficient to avoid the behavioural effects of implicit biases. However, as with other change studies, this study only focussed on short-term change in order to provide a basis to select interventions for long-term change studies.

Nonetheless, the positive or neutral bias demonstrated on explicit measures for all domains, except weight, suggests that participants explicitly hold egalitarian values and may therefore be highly motivated to control any biases they may possess.

4.4. Strengths and Limitations

4.4.1. Strengths

The current study was the first, to the author's knowledge, to explore implicit attitudes and stereotypes among trainee and qualified clinical psychologists. It is also the first to address implicit bias using the IAT in a UK sample of applied psychologists. Furthermore, no other study to date has explored implicit age biases or gender-career stereotypes using indirect measures in a psychologist sample. Additionally, the sample size within each group exceeded the minimum number needed to detect significant between group effects indicating that the main result is unlikely to be due to Type II error.

Finally, the finding that the results obtained from the general population sample were comparable to those obtained for UK residents completing the same IATs on the Project Implicit demonstration website provides initial validation for the web application developed for this study. This suggests that it could offer a viable alternative to low-budget researchers who cannot afford off-the-shelf solutions and do not have the technical skills to create their own IAT applications.

4.4.2. Limitations

4.4.2.1. *Construct and predictive validity of the IAT:* The IAT itself has been the subject of healthy scientific debate since its inception. This has resulted in improvements in the administration and scoring procedures to address important criticisms (Greenwald, Nosek, & Banaji, 2003). More recently, Oswald, Mitchell, Blanton, Jaccard and Tetlock (2015) have questioned the construct and predictive validity of the IAT. In their own meta-analytic study the authors directly challenged the size of the correlations between relevant IAT scores and criterion measures of racial or ethnic discrimination (e.g. “micro-behaviour”, person perception, brain activity), reported by Greenwald et al. (2009). Oswald and colleagues reported overall correlations of .15 and .12 versus .24 and .20 reported by Greenwald and colleagues. Oswald et. al (2015) argue that Greenwald et. als’ (2009) results were biased by particularly strong correlations between IAT scores and brain activity from neuroimaging studies. Their analysis of IAT-criterion correlations by the nature of the criterion measure revealed that the IAT was a poor predictor of the types of behaviour, judgements or decisions that are examined as instances of deliberate or spontaneous discrimination.

Oswald and colleagues proposed that the main reason for the weak correlations related to flaws in the instruments used to measure implicit and explicit attitudes. The dual-category format of the IAT itself was challenged. The authors found that the strength of correlations between IAT scores and criterion measures varied. If the *Race IAT*, for example, is a valid measure of the relative evaluations of African Americans compared to European Americans then the correlations should have been roughly equal in magnitude regardless of the criterion measure. This suggests that the IAT may not primarily measure attitudes. Furthermore, given evidence that the IAT in part measures abilities such as task switching and working memory, they argue that it may be contaminated by other sources of method-based variance or other processes or constructs other than evaluative processes that may account for higher IAT scores. A solution they propose to this problem is for sources of method-specific variance to be better established so that they can be measured and statistically controlled for. Furthermore, they argue for future research to employ latent variable modelling so that multiple measures of the same construct can be accommodated reducing

the dependence on a single measure.

While these are important weaknesses that should be considered in future research, Greenwald, Banaji and Nosek (2015) challenged the criteria used by Oswald and colleagues to select studies for inclusion in their meta-analysis. They argue that Oswald et. als' (2015) criteria were too broad and therefore included studies for which there was no theoretical basis for correspondence between attitudes and behaviour reducing the overall aggregate effect. Greenwald and colleagues also disagree with Oswald and colleagues' interpretation of their low average correlations as indicating that IATs are poor predictors of behaviour. Instead, they viewed both as demonstrating unequivocally significant average positive correlations between IAT scores and criterion measures.

4.4.2.2. Arbitrary Metrics: As with many psychological measure, the IAT uses *arbitrary metrics* to derive an individual's standing on the construct of interest. Metric refers to the numbering system used to describe an individuals' score (e.g. slight, moderate or strong). As psychological constructs often cannot be observed directly, such metrics are often arbitrary because it is not known where a given score places an individual on an underlying psychological dimension or how change on an observed score relates to change on the underlying construct (Blanton & Jaccard, 2006). While the use of arbitrary metrics does not necessarily limit psychology research, it does become problematic when an observed score is interpreted as reflecting a certain degree or amount of the construct. Blanton, Jaccard, Strauts, Mitchell and Tetlock (2015) note that IAT scores have yet to be systematically mapped onto true scores on the underlying construct of implicit attitudes. Therefore, the strength of an attitude or stereotyped association cannot be definitively linked to a specific IAT score or score range. Furthermore, Blanton and colleague's (2015) regression analyses of data from 5 previously published studies of implicit 'racial' bias confirmed their hypothesis that the zero point on the IAT does not correspond with behavioural neutrality. They argue that behavioural neutrality occurs at larger scores than zero and that the IAT metric is biased as individuals who are behaviourally neutral tend to obtain IAT scores indicative of pro-white bias. However, self-report measures were used to in the analysis to estimate the empirical zero point. As these are subject to

self-presentation concerns, assertions of behavioural neutrality cannot be wholly trusted.

Despite these criticisms, the IAT remains a popular measure, so, caution is warranted in its use and interpretation. It is proposed that individual scores should not be used for recruitment or selection but only for personal development and education. Furthermore, lower levels of implicit bias (e.g. scores in the 'slight' range) are said to be unlikely to reflect noticeable behavioural differences, whereas higher scores (moderate or above) most likely will. However, this requires empirical verification.

4.4.2.3. *Stimuli:* The IAT effects obtained in this study may be influenced by features of the stimuli used, especially for the Weight and Skin-Tone IATs. The stimuli for the Weight IAT *overweight* condition comprise of morphed versions of the same photographs of faces used in the *normal weight* condition (see Appendix D). However, some of the photographs have become so distorted they appear unnatural which may affect their perceived attractiveness. Consequently, the difference in response times between congruent and incongruent trials may be influenced by the perceived attractiveness of the face rather than weight. The current version of the Weight IAT on the Project Implicit website uses whole-body silhouettes instead of photographs to mitigate against this. However, these stimuli were not publicly available at the time of this study. Similarly, the Skin-Tone IAT uses a series of drawings of faces where only skin colour is manipulated across conditions (see Appendix D). As other features, such as hair type or style, are not changed along with Skin-Tone, these images appear very unnatural. Future studies should aim to employ more ecologically valid stimuli e.g. by using photographs. As the photographs used in the current main alternative, the *Race* IAT, do not represent the major minority ethnic groups in the UK, UK-specific alternatives may need to be developed.

4.4.2.4. *Sample:* One advantage of internet-based research is that it is easier to recruit larger and more diverse samples, however these samples may not be representative of any general population (Greenwald et al., 2003). This limits the generalisability of the present findings to other populations. Females

were over-represented in the sample as whole, but particularly among the trainee and clinical psychologist groups. While the sex-ratio within these groups was broadly consistent with trainee and clinical psychologists more generally, this may have resulted in an underestimate of the strength of implicit bias overall. In general population studies, males have consistently shown stronger negative implicit biases (Nosek et al., 2007). Furthermore, male medical professionals have demonstrated particularly strong pro-heterosexual biases relative to their female counterparts (Sabin, Riskind, et al., 2015). Therefore, these results may not say anything meaningful about male trainee and clinical psychologists. Similarly, most of the sample self-identified as white British and heterosexual. Other studies show that some (but not all) minority ethnic groups and gay people in general tend to show weaker implicit outgroup preferences and even implicit ingroup preferences (e.g. pro-gay; Nosek et al., 2007; Sabin, Riskind, et al., 2015). Therefore, these results may overestimate implicit bias in ethnic minority and gay psychologists. Additionally, non-religious people were over-represented in the sample. Comparisons between non-religious and religious people did not yield any significant results. However, previous studies have found differences in *Race* IAT scores between non-religious people and protestant Christian's (Kuppens & Spears, 2014). This suggests that the necessary grouping of all participants endorsing some religious affiliation may have masked some important differences among participants.

Unfortunately, the sample size was too small for meaningful geographic comparisons to be made. Comparisons by diversity of the local population or urban versus rural areas may have provided more of a theoretical basis to predict differences. For example, drawing on Allport's (1954) contact hypothesis, one might predict individuals from more ethnically diverse areas would show weaker implicit biases compared to ethnically homogenous areas. However, the data needed to reasonably accurately define such groups (e.g. post code) was not collected due to confidentiality concerns.

4.4.2.5. *Internet-based research:* Online research offers several benefits over laboratory research in that data can easily be collected from large, diverse groups over wide geographical areas (Nosek, Banaji, & Greenwald, 2002).

Computerised research more generally also offers greater speed and accuracy for data collection and scoring and the inclusion of built-in data validation can minimize missing data and entry errors (Naglieri et al., 2004). However, internet research presents some ethical issues, particularly pertaining to informed consent and underrepresentation of certain age and socio-economic groups who are less likely to have ready access to the internet. Furthermore, the absence of an experimenter increases the likelihood of misunderstandings which may result in participants discontinuing the study or completing the study incorrectly (Nosek et al., 2002). Participants are also less likely to ask questions via email making it difficult to detect when instructions aren't being interpreted similarly by all participants (Naglieri et al., 2004). Arguably most detrimental to studies using reaction time measures like the IAT over the internet is that consistency in the testing environment cannot be guaranteed. Reaction time studies may be particularly vulnerable to internal and external distractions, for example. The IAT is also affected by contextual factors such as participant's motivational and emotional states (Gawronski & Sritharan, 2010). Contextual cues in the immediate environment can also impact on implicit measures. For example, acoustic cues, such as violent and misogynistic rap music, have been shown to increase levels of implicit negative bias towards African Americans (Rudman & Lee, 2002). Ambient darkness can also increase implicit prejudice towards African Americans, but only among people who believe the world is dangerous (Schaller, Park & Mueller, 2003).

4.4.2.6. *Other methodological issues*

To maximise recruitment in a short period of time, several compromises were made to encourage participation by making the study as quick and easy to complete as possible. One was giving participants a choice in the number of tasks they needed to complete. This meant that the group sizes for qualified psychologist and control group participants was sometimes smaller than hoped for in the individual IAT by group comparisons. However, the average number of tasks completed was just under 3 suggesting that this may have overall been a beneficial strategy as fewer participants may have taken part if they were obliged to complete all 5 IATs.

The demographic data collection form was also kept as brief and uncontroversial as possible. However, this meant that potentially useful demographic differences could not be explored or potential covariates controlled. For example, implicit and explicit weight attitudes have been shown to vary by participant body mass index (BMI; Phelan et al., 2014). However, BMI was not requested as it was thought it might discourage participation, particularly among females as there is normative discontent among women in revealing their weight.

Finally, test-retest reliability was not established in this sample, which may be particularly important given the potential for contextual factors to influence IAT scores.

4.5. Future Research

Additional studies are needed to attempt to replicate the present findings using a larger sample size and employing more than one measure of implicit bias as recommended by (Oswald et al., 2015). Studies have previously included an Affect Misattribution Procedure (AMP) as this does not rely on response latencies. However, as with all other indirect measures, results from the AMP are often only weakly correlated with IAT scores suggesting the two measures assess different constructs. More detailed demographic information should also be collected including other factors on which IAT scores are known to vary such as level of education, political leanings, socio-economic status and body mass index (Kuppens & Spears, 2014; Brian A Nosek et al., 2007). Given the paucity of data on male and minority ethnic psychologists, future studies should also target these groups specifically as studies in the general population suggest implicit attitudes and stereotypes may differ among these groups relative to white females. Furthermore, testing of at least a subsample of participants in a controlled setting will be necessary to establish whether IAT data collected via the internet is comparable to data collected in a more traditional laboratory setting. Studies suggest that this is generally true (Nosek et al., 2002). However, given how vulnerable indirect measures of attitudes and stereotypes are to contextual factors, comparative studies using the IAT are necessary.

Of primary importance for future research is to establish whether IAT scores predict behaviours that may influence the therapeutic alliance or decisions in a way that may result in unintentional discrimination. Currently, only one study among applied psychologists has aimed to predict such behaviour. However, this study employed questionnaires to measure expected behaviour for hypothetical clients (Katz & Hoyt, 2014). Ideally future studies should determine whether scores on implicit measures predict behaviours in actual client-therapist interactions with several co-raters rating behaviours live or via video recordings. However, this kind of research is difficult and costly to conduct. An interim step might be to see whether IAT scores predict actual client outcome data.

It is also important to establish whether there is any evidence of marginalisation of overweight clients within psychology services potentially through audit studies of electronic patient information. While weight is not routinely collected as an equal opportunity monitoring variable in the same way ethnicity is, it may be collected routinely by other professionals in multidisciplinary services making it possible for such an audit to be conducted at least in some services.

4.6. Conclusions

In conclusion, the findings from this study lend support to previous research which suggests that applied psychologists are similar to the general population in possessing negative implicit attitudes towards dark-skinned, gay, overweight and older people and having stereotypes associating men with 'career' and women with 'family'. This may have implications for equitable provision of psychology services and therapy outcomes for minority ethnic groups, gay people, older people and overweight people. Furthermore, implicit gender stereotypes among clinical psychologists may contribute to sex disparities in leadership positions within the profession.

In contrast, except for weight, explicit attitudes and stereotypes were consistent with egalitarian values suggesting trainee and clinical psychologists are motivated to control the effect of any bias they may possess. All groups held implicit and explicit negative attitudes towards overweight people. However, this

is an under-researched area and the present findings require replication and future studies are needed to determine whether these biases and attitudes observed in this sample predict discriminatory behaviours.

The findings from this study are strengthened by their consistency with previous research among applied psychologists, medical professionals and the general population. However, the generalisability of the findings is restricted by the representativeness of the sample and the limitations of the IAT itself.

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APPENDIX A: Ethical Approval

School of Psychology Research Ethics Committee

NOTICE OF ETHICS REVIEW DECISION For research involving human participants BSc/MSc/MA/Professional Doctorates

REVIEWER: Dr Irina Anderson

SUPERVISOR: Dr Matthew Jones Chesters

COURSE: Professional Doctorate in Clinical Psychology

STUDENT: Alison Blencowe

TITLE OF PROPOSED STUDY: Implicit attitudes among trainee and qualified clinical psychologists in the UK

DECISION OPTIONS:

1. **APPROVED:** Ethics approval for the above named research study has been granted from the date of approval (see end of this notice) to the date it is submitted for assessment/examination.
2. **APPROVED, BUT MINOR AMENDMENTS ARE REQUIRED BEFORE THE RESEARCH COMMENCES** (see Minor Amendments box below): In this circumstance, re-submission of an ethics application is not required but the student must confirm with their supervisor that all minor amendments have been made before the research commences. Students are to do this by filling in the confirmation box below when all amendments have been attended to and emailing a copy of this decision notice to her/his supervisor for their records. The supervisor will then forward the student's confirmation to the School for its records.
3. **NOT APPROVED, MAJOR AMENDMENTS AND RE-SUBMISSION REQUIRED** (see Major Amendments box below): In this circumstance, a revised ethics application must be submitted and approved before any research takes place. The revised application will be reviewed by the same reviewer. If in doubt, students should ask their supervisor for support in revising their ethics application.

DECISION ON THE ABOVE-NAMED PROPOSED RESEARCH STUDY

(Please indicate the decision according to one of the 3 options above)

Approved

Minor amendments required *(for reviewer):*

Major amendments required *(for reviewer):*

ASSESSMENT OF RISK TO RESEARCHER *(for reviewer)*

If the proposed research could expose the researcher to any of kind of emotional, physical or health and safety hazard? Please rate the degree of risk:

HIGH

MEDIUM

LOW

Reviewer comments in relation to researcher risk (if any):

Reviewer (*Typed name to act as signature*): Irina Anderson

Date: 14/12/2016

This reviewer has assessed the ethics application for the named research study on behalf of the School of Psychology Research Ethics Committee

Confirmation of making the above minor amendments (*for students*):

I have noted and made all the required minor amendments, as stated above, before starting my research and collecting data.

Student's name (*Typed name to act as signature*):

Student number:

Date:

(Please submit a copy of this decision letter to your supervisor with this box completed, if minor amendments to your ethics application are required)

PLEASE NOTE:

*For the researcher and participants involved in the above named study to be covered by UEL's insurance and indemnity policy, prior ethics approval from the School of Psychology (acting on behalf of the UEL Research Ethics Committee), and confirmation from students where minor amendments were required, must be obtained before any research takes place.

*For the researcher and participants involved in the above named study to be covered by UEL's insurance and indemnity policy, travel approval from UEL (not the School of Psychology) must be gained if a researcher intends to travel overseas to collect data, even if this involves the researcher travelling to his/her home country to conduct the research. Application details can be found here:
<http://www.uel.ac.uk/gradschool/ethics/fieldwork/>

Implicit attitudes among trainee and qualified clinical psychologists in the UK

Information Sheet

My name is Alison Blencowe and I am a Trainee Clinical Psychologist studying at the University of East London. I would like to invite you to take part in a research study. The study is part of my Professional Doctorate in Clinical Psychology. Before you decide, you need to understand why the research is being conducted and what it would involve. Please read through the following information carefully before deciding if you would like to take part in the research. Talk to others about the study if you wish. If something needs clarification or you have any unanswered questions, please do not hesitate to contact me using the details on the right.

What are the aims of the study?

Attitudes are the feeling we have about things: whether it is good or bad, pleasant or unpleasant, positive or negative. Attitudes we are not aware of can affect our behaviour. At the moment, there is very little research about implicit attitudes among clinical psychologists and none of this research has been done with psychologists in the UK. This study aims to compare implicit and explicit attitudes about people among trainee and qualified clinical psychologists and members of the general population. The findings from this research may help raise awareness of implicit attitudes and the implications for clinical psychology practice.

Why do you want me to take part?

You have been asked to take part because we would like to gain an understanding of implicit attitudes among psychologists and non-psychologists. To take part in the study, you will need to be at least 18 years of age, live in the UK and have enough fluency in English to understand and respond to written and verbal instructions.

Do I have to take part?

No, taking part is entirely your choice. If you do decide to take part you can withdraw from the study at any time without giving a reason. If you have not finished any of the tasks yet you can withdraw by closing the browser window and your data will be deleted. If you have already completed part of the study, you can contact me with your study identifier so that your data can be deleted. You do not have to give a reason. You will be able to withdraw up until the end of April 2017 when the data analysis for this study will be finalised.

What would taking part involve?

If you decide to take part, you will be asked to provide some general information about yourself (e.g. age) and to complete at least one of five Implicit Associations Tests (IAT). These tests will look at attitudes towards sex, sexuality, skin colour, age and weight. It is estimated that the study will take between 10 and 35

minutes depending on how many tests you decide to do.

Are there any disadvantages or risks to taking part?

At the end of each section you will receive a summary of your results with possible interpretations based on the research that has already been done. However, the University of East London and the researchers involved in this study make no claim for the validity of these suggested interpretations. Some people may find these interpretations challenging. Information about sources of support will also be provided should you find the suggested interpretations distressing.

Are there any benefits to taking part and what will happen to the results?

Taking part will help develop our understanding of implicit attitudes among clinical psychologists in the UK which may have implications for training and improvements in clinical practice. In appreciation of your contribution, you will also be invited to enter a prize draw to win a £20 Amazon voucher.

The results of the study will be written up as a doctoral thesis and submitted to an academic journal. The results may also be used in conference presentations. All the information you provide will remain anonymous. All the data collected as part of this study will be destroyed after 5 years.

Will my information remain confidential?

All the information you provide will remain confidential and the study database will only be shared with me and my supervisor. No personally identifiable information will be collected as part of the study. You will be assigned a unique identifying number which will be displayed on the first page of the study. You are encouraged to write it down. This number will be stored in the study database where your responses will be recorded. It will be the only way in which your data can be linked to you if you wish to withdraw from the study. The database will be stored in a password protected secure network folder.

Contact details required to enter the prize draw (i.e. email address) will be stored separately from the research database and will not be linked to your unique study identifier. A cookie will also be saved on your computer. Cookies are small text files saved on your computer when you first visit a website. They help websites recognise you when you come back. The cookie saved on your computer will only store your study identifier and progress information. Your responses will not be stored in this cookie. The use of cookies is necessary to ensure you are not asked to complete the same test more than once and to enable you to complete the tests over more than one session if you choose to.

What if I have concerns or complaints about this study?

If you have any concerns about the study you can talk to the researcher or their supervisor. If this does not resolve the problem, you can make a formal complaint through the University of East London ethics committee. Further details about this can be obtained from Dr Mary Spiller (chair of the Research Ethics sub-committee) whose details are contained at the end of this information page.

Who can I contact about the study?

If you have any questions about the study, please contact me using the following contact details:

Alison Blencowe, Trainee Clinical Psychologist, School of Psychology, University of East London, Water Lane, London E15 4LZ.

Email: u1438290@uel.ac.uk

If you have any concerns about how the study is being conducted, you can contact my supervisor or the chair of the research ethics committee using the details below:

[REDACTED], School of Psychology, University of East London, Water Lane, London E15 4LZ.

Tel: 020 8223 4603.

Email: [REDACTED]

Chair of the School of Psychology Research Ethics Sub-committee:

Dr Mary Spiller, School of Psychology, University of East London, Water Lane, London E15 4LZ.

Tel: 020 8223 4004.

Email: m.j.spiller@uel.ac.uk

Thank you for taking the time to read this information. Please save or print this information for your records.

If you would like to take part in the study, please click continue.

Continue >>

APPENDIX C: Consent Form

Implicit attitudes among trainee and qualified clinical psychologists in the UK

Consent Form

Name of researcher: Alison Blencowe

I confirm I have read and understood the information page.

I have been given the opportunity to ask questions about the study and have received satisfactory answers.

I understand that my involvement in the study is voluntary.

I understand that I can withdraw from the study up to the end of April 2017 without giving a reason.

I understand that if I withdraw during the study all the information I provided will be deleted.

I understand that I will not be able to withdraw my responses for completed tests if I am unable to provide my unique study identifier.

I understand that the data I provide will be anonymous and will be confidential between the researcher and her supervisor.

I understand that a cookie will be installed on my computer to record my progress through the study and that it will not store any of my responses.

I understand that all information about the study will be destroyed after 5 years.

I hereby freely and fully consent to participate in the study, which has been fully explained to me.

Please indicate your consent by clicking 'YES' below.

No

YES

APPENDIX D: IAT Stimuli

Age Implicit Association Test Stimuli

Category **Items**
Good Lovely, Glorious, Attractive, Spectacular, Delight, Glad, Friendship, Happy

Bad Annoy, Yucky, Ugly, Poison, Awful, Selfish, Abuse, Hurtful

Old People



Young People



Sexuality Implicit Association Test Stimuli

Category	Items
Good	Cherish, Appealing, Magnificent, Joyous, Cheerful, Glorious, Enjoy
Bad	Annoy, Sickening, Horrific, Sadness, Dirty, Negative, Pain, Abuse
Gay People	  Gay People, Homosexual, Gay
Straight People	 Straight, Straight People, Heterosexual

Weight Implicit Association Test Stimuli

Category **Items**

Good Cherish, Enjoy, Friendship, Triumph, Attractive, Delightful,
Friend, Celebrate

Bad Angry, Ugly, Disgust, Evil, Nasty, Negative, Awful, Grief

Fat People

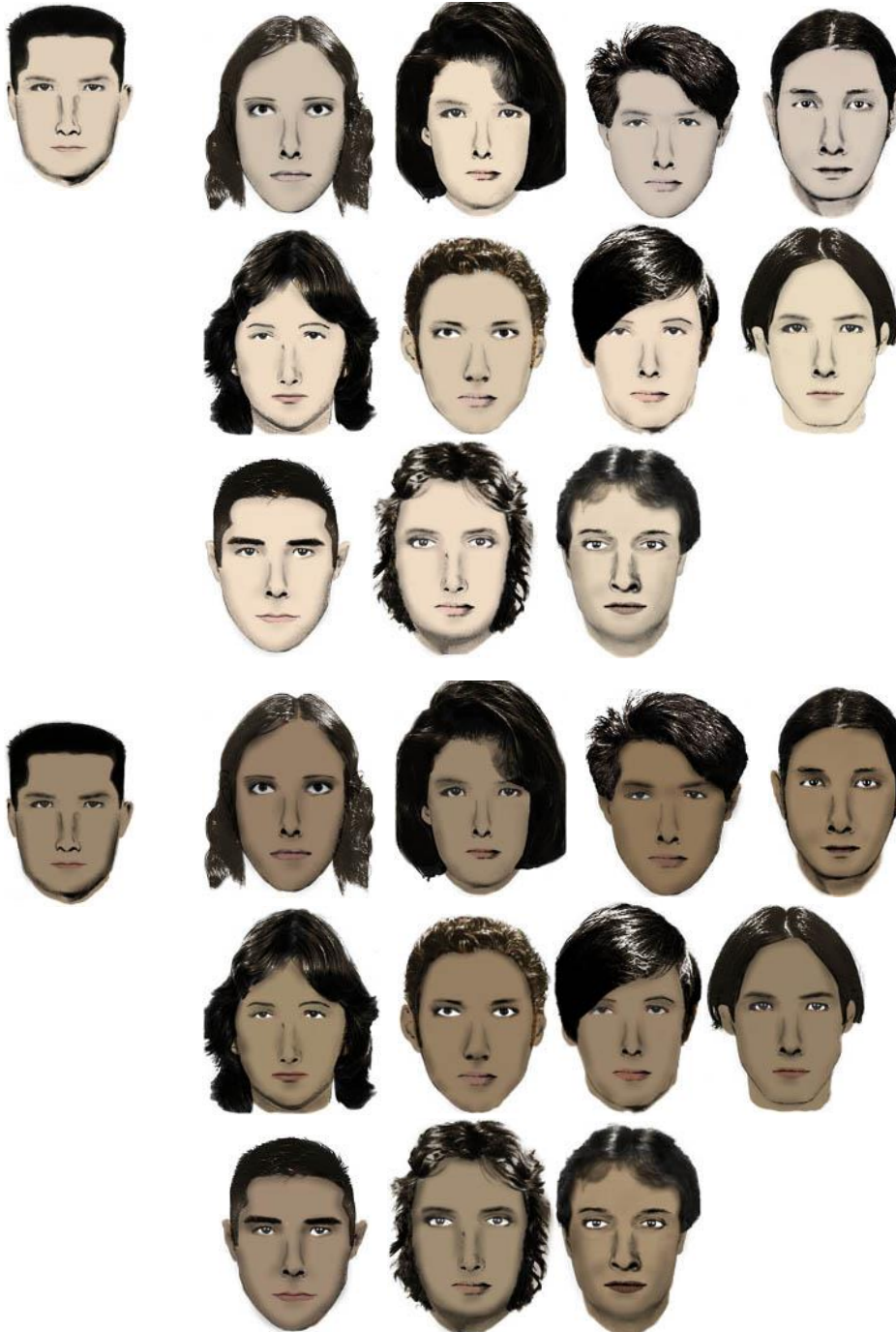


Thin
People



Skin Tone Implicit Association Test Stimuli

Category	Items
Good	Happy, Celebrate, Lovely, Triumph, Beautiful, Pleasing, Fantastic, Appealing
Bad	Grief, Nasty, Rotten, Evil, Ugly, Sadness, Awful, Tragic



Gender-Career Implicit Association Test Stimuli

Category	Items
Male	Ben, Paul, Daniel, John, Jeffrey
Female	Rebecca, Michelle, Emily, Julia, Anna
Career	Career, Corporation, Salary, Office, Professional, Management, Business
Family	Wedding, Marriage, Parents, Relatives, Family, Home, Children

APPENDIX E: Thermometer Questionnaires

Age Semantic Differential

How warm or cold do you feel towards
Old People?

10 – Extremely Warm

9 – Very Warm

8 – Moderately Warm

7 – Somewhat Warm

6 – Slightly Warm

5 - Neither Warm nor Cold

4 – Slightly Cold

3 – Somewhat Cold

2 – Moderately Cold

1 – Very Cold

0 – Extremely Cold

How warm or cold do you feel towards
Young People?

10 – Extremely Warm

9 – Very Warm

8 – Moderately Warm

7 – Somewhat Warm

6 – Slightly Warm

5 - Neither Warm nor Cold

4 – Slightly Cold

3 – Somewhat Cold

2 – Moderately Cold

1 – Very Cold

0 – Extremely Cold

Sexuality Semantic Differential

How warm or cold do you feel towards
Gay People?

10 – Extremely Warm

9 – Very Warm

8 – Moderately Warm

7 – Somewhat Warm

6 – Slightly Warm

5 - Neither Warm nor Cold

4 – Slightly Cold

3 – Somewhat Cold

2 – Moderately Cold

1 – Very Cold

How warm or cold do you feel towards
Straight People?

10 – Extremely Warm

9 – Very Warm

8 – Moderately Warm

7 – Somewhat Warm

6 – Slightly Warm

5 - Neither Warm nor Cold

4 – Slightly Cold

3 – Somewhat Cold

2 – Moderately Cold

1 – Very Cold

0 – Extremely Cold

0 – Extremely Cold

Weight Semantic Differential

How warm or cold do you feel towards
Fat People?

How warm or cold do you feel towards
Thin People?

10 – Extremely Warm

10 – Extremely Warm

9 – Very Warm

9 – Very Warm

8 – Moderately Warm

8 – Moderately Warm

7 – Somewhat Warm

7 – Somewhat Warm

6 – Slightly Warm

6 – Slightly Warm

5 - Neither Warm nor Cold

5 - Neither Warm nor Cold

4 – Slightly Cold

4 – Slightly Cold

3 – Somewhat Cold

3 – Somewhat Cold

2 – Moderately Cold

2 – Moderately Cold

1 – Very Cold

1 – Very Cold

0 – Extremely Cold

0 – Extremely Cold

Skin Tone Semantic Differential

How warm or cold do you feel towards
Light skinned people

How warm or cold do you feel towards
Dark skinned people?

10 – Extremely Warm

10 – Extremely Warm

9 – Very Warm

9 – Very Warm

8 – Moderately Warm

8 – Moderately Warm

7 – Somewhat Warm

7 – Somewhat Warm

6 – Slightly Warm

6 – Slightly Warm

5 - Neither Warm nor Cold

5 - Neither Warm nor Cold

4 – Slightly Cold

4 – Slightly Cold

3 – Somewhat Cold

3 – Somewhat Cold

2 – Moderately Cold

2 – Moderately Cold

1 – Very Cold

1 – Very Cold

0 – Extremely Cold

0 – Extremely Cold

Gender-Career Semantic Differential

How strongly do you associate **career** with males and females?

- 7 - Strongly male
- 6 - Moderately male
- 5 - Slightly male
- 4 - Neither male nor female
- 3 - Slightly female
- 2 - Moderately female
- 1 - Strongly female

How strongly do you associate **family** with males and females?

- 7 - Strongly male
- 6 - Moderately male
- 5 - Slightly male
- 4 - Neither male nor female
- 3 - Slightly female
- 2 - Moderately female
- 1 - Strongly female

APPENDIX F: Distribution Properties and Normality Statistics for D-scores and Thermometer Scores

Table 17: IAT D-score distribution properties and normality statistics

		n	M	SD	Skew	Skew. Z- score	Kurt.	Kurt. Z- score	S. Wilk	Sig.
Age	CP	49	-0.27	0.40	0.28	0.83	-0.14	-0.20	0.97	0.26
	TCP	80	-0.24	0.34	-0.04	-0.15	-0.03	-0.06	1.00	1.00
	Control	45	-0.37	0.32	0.45	1.28	-0.28	-0.41	0.97	0.31
	ALL	174	-0.28	0.35	-0.24	-0.11	-0.20	-0.47	0.99	0.93
Gender-Career	CP	44	-0.37	0.30	0.39	1.09	-0.26	-0.37	0.96	0.10
	TCP	83	-0.39	0.33	0.61	2.29	1.63	3.11	0.97	0.07
	Control	48	-0.44	0.32	-0.16	-0.46	-0.40	-0.59	0.99	0.90
	ALL	175	-0.38	0.30	0.54	2.45	1.41	3.25	0.98	0.60
Sexuality	CP	52	-0.15	0.41	0.07	0.22	0.03	0.05	0.99	0.95
	TCP	86	-0.10	0.39	0.23	0.87	-0.85	-1.65	0.97	0.05
	Control	53	-0.13	0.46	0.43	1.33	-0.33	-0.51	0.97	0.27
	ALL	191	-0.95	0.45	0.09	0.40	-0.60	-1.40	0.98	0.15
Skin Tone	CP	50	-0.38	0.39	0.22	0.66	-0.18	-0.27	0.98	0.50
	TCP	77	-0.27	0.42	0.36	1.33	-0.24	-0.44	0.98	0.38
	Control	50	-0.44	0.43	0.36	1.07	-0.45	-0.68	0.97	0.23
	ALL	177	-0.33	0.41	0.23	1.06	-0.37	-0.86	0.99	0.28
Weight	CP	53	-0.33	0.38	-0.04	-0.12	-0.67	-1.03	0.98	0.48
	TCP	87	-0.30	0.39	0.10	0.37	0.63	1.24	0.98	0.13
	Control	52	-0.30	0.39	0.10	0.31	-0.75	-1.16	0.98	0.53
	ALL	192	-0.28	0.37	-0.19	-0.86	-0.58	-1.34	0.98	0.29

Table 18: Thermometer score distribution properties and normality statistics

		n	M	SD	Skew	Skew. Z- score	Kurt.	Kurt. Z- score	S. Wilk	Sig.
Age	CP	49	0.14	1.35	0.94	2.76	2.91	4.35	0.81	0.00
	TCP	80	0.54	1.36	1.58	5.87	3.93	7.40	0.78	0.00
	Control	45	-0.16	1.77	-0.47	-1.34	0.86	1.24	0.91	0.00
	ALL	174	0.23	1.42	-0.9	-4.33	2.46	5.71	0.86	0.00
Gender-Career	CP	44	-1.50	1.36	-0.41	-1.15	-0.71	-1.01	0.91	0.00
	TCP	83	-1.47	1.24	-0.56	-2.11	0.14	0.27	0.92	0.00
	Control	48	-1.06	1.55	-0.89	-2.61	0.33	0.48	0.85	0.00
	ALL	175	-1.37	1.33	-0.59	-2.69	-0.50	-1.16	0.90	0.00
Sexuality	CP	52	0.06	0.75	0.19	0.58	9.48	14.59	0.58	0.00
	TCP	86	0.01	0.71	2.19	8.45	12.48	24.29	0.60	0.00
	Control	53	0.15	2.12	0.02	0.07	4.06	6.30	0.76	0.00
	ALL	191	0.04	1.40	0.51	2.37	12.02	27.89	0.59	0.00
Skin Tone	CP	50	0.04	0.78	-1.41	-4.18	19.00	28.71	0.35	0.00
	TCP	77	0.05	0.63	-3.01	-10.98	24.02	44.35	0.45	0.00
	Control	50	0.14	1.21	-2.28	-6.78	13.50	20.40	0.64	0.00
	ALL	177	0.13	0.70	-0.47	-2.18	13.11	30.41	0.52	0.00
Weight	CP	53	-0.17	1.09	0.16	0.50	4.41	6.84	0.76	0.00
	TCP	87	-0.67	1.68	-0.50	-1.94	1.80	3.52	0.88	0.00
	Control	52	-0.56	1.43	-0.96	-2.90	2.49	3.83	0.81	0.00
	ALL	192	-0.56	1.50	-0.76	-3.50	3.11	7.22	0.82	0.00

APPENDIX G: Histograms for D-scores (all participants).

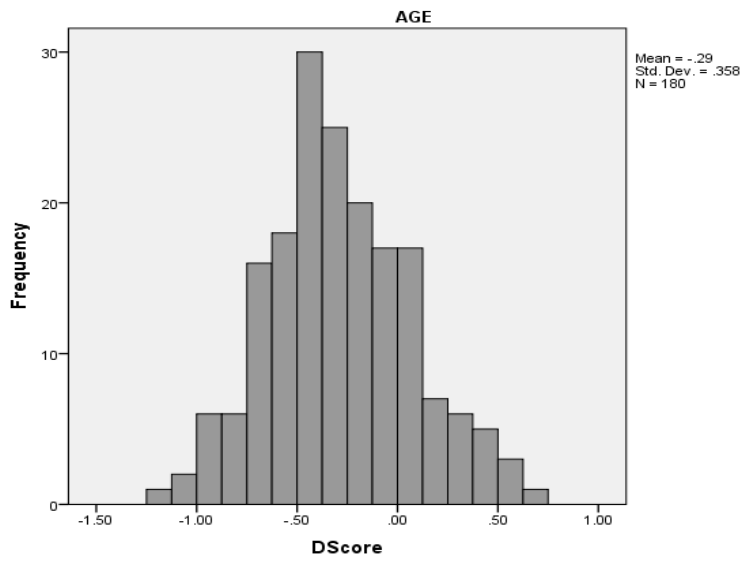


Figure 1: Histogram plot of Age IAT D-scores.

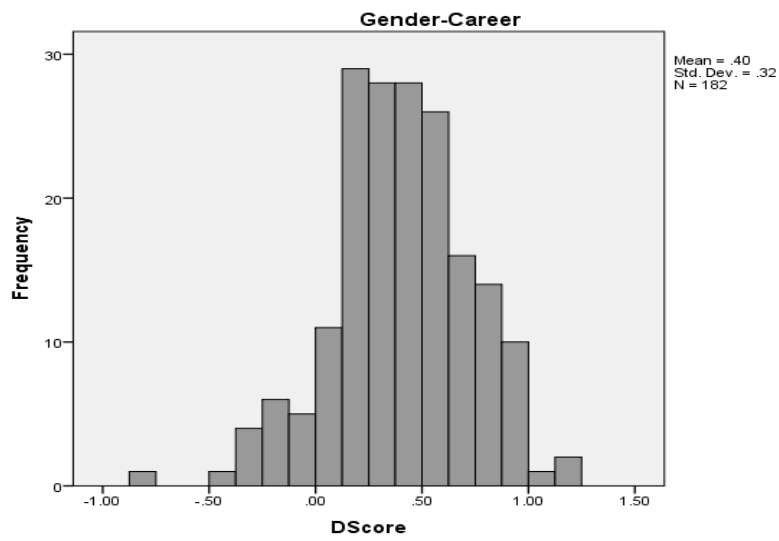


Figure 2: Histogram plot of Gender-Career IAT D-scores

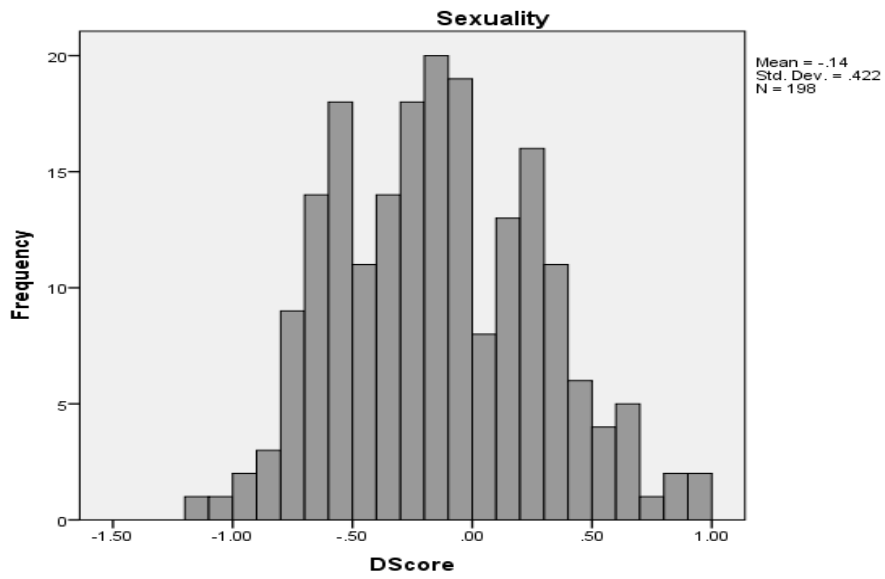


Figure 3: Histogram plot of Sexuality IAT D-scores

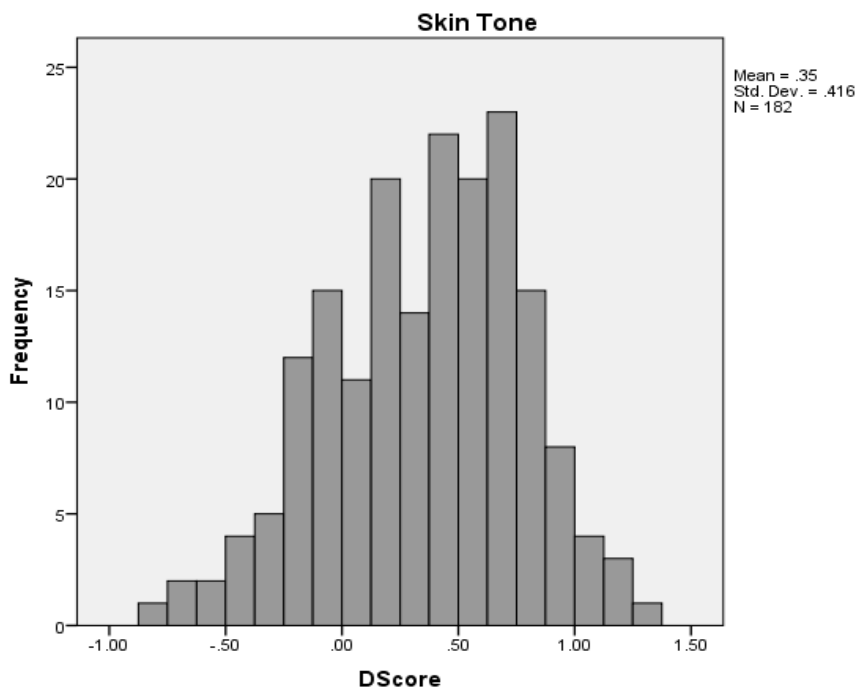


Figure 4: Histogram plot of Skin Tone IAT D-scores

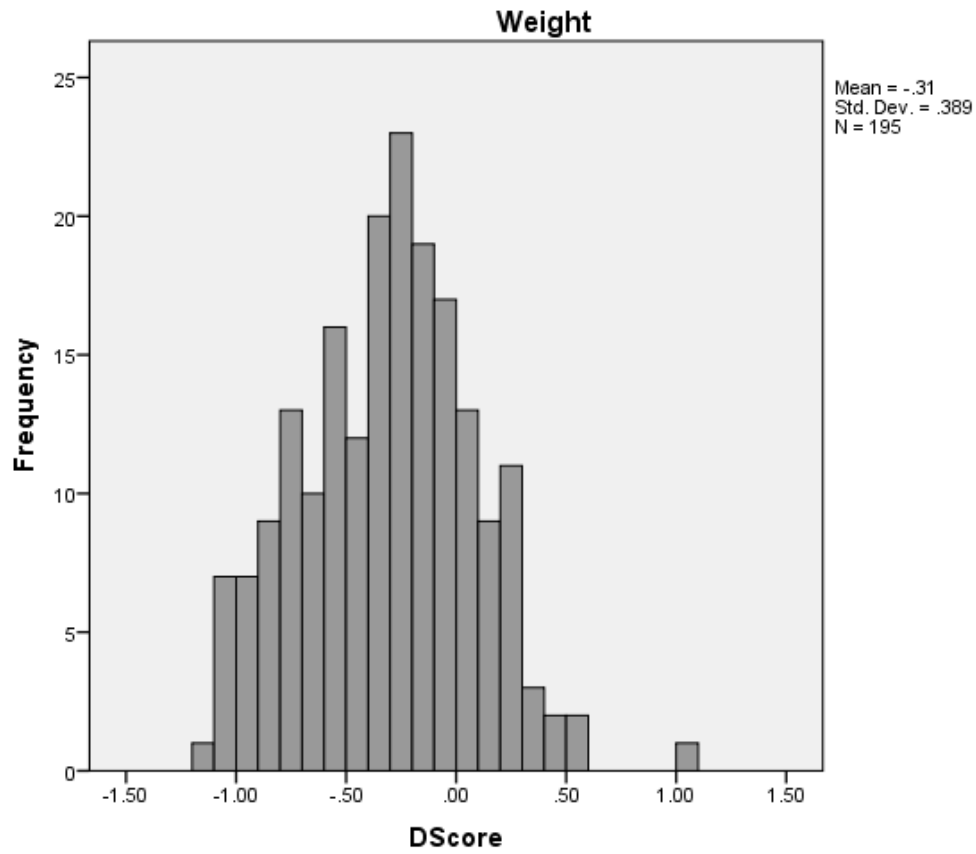


Figure 5: Histogram plot of Weight IAT D-scores

The outlier visible in this histogram was retained as it did not deform the data.