Developing the Implicit Relational Assessment Procedure (IRAP) as a Measure of Implicit Homonegativity

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Thesis submitted to the Department of Psychology, Faculty of Science & Engineering, in fulfilment of the requirements for the degree of Doctor of Philosophy, Maynooth University

July 2015

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Acknowledgements

I am sincerely grateful to a number of people without whom the work associated with this thesis would not have been possible:

First, the most intelligent man I ever met
Professor Dermot Barnes-Holmes. It has been an honor and a privilege to complete a PhD under your supervision. Thanks for everything.

Dr. Fiona Lyddy
You represent for me everything that is good in psychology. From the very beginning, when I started my undergrad, you always had your door open. Thank you.

All the postgrads and especially
Trish, Ian, Mary, and Joe thank you for your wonderful and hopefully lifelong friendship. Micah, Nigel and of course Diana – return soon pal. Joanne and Liz thanks for *always* being there!

The Department of Psychology
To <u>*all*</u> of the staff in the Department for being so friendly and helpful <u>*all*</u> of the time.

IRCSET & NUIM
For scholarships that made this possible.

Participants
To everyone who participated in the studies, this would not have been possible without you.

My Family
Mammy, Grace, Georgina, Aindrias, Michelle, Peter, Emma-Jane and Louie. Thanks for everything. I love you.

Amanda
My soul mate. Thank you for your wise words, laughter, road-trips and for always believing in me. You're amazing. I love you.

Dedicated to Michelle and Liz

Abstract

The current thesis delineates a programme of research that sought to design, develop, and refine an IRAP that could be used as a reasonably reliable and valid measure of implicit homonegativity. A novel feature of the programme was the introduction of a multi-dimensional approach for screening participant sexual orientation. An additional purpose of the current research was to provide the first systematic analysis of implicit homonegativity in Ireland. Over the course of a series of experiments, the IRAP was used to explore implicit homonegativity with a particular focus on: (a) its malleability as a result of situational/context manipulation effects (Experiment 1; Chapter 3) and prior exposure to gay-related exemplars (Experiment 2; Chapter 4); (b) known-group differences and the implications of sensitive multi-dimensional sexual orientation screening (Experiment 3 & 4; Chapters 5 & 6); (c) the impact of response latency restrictions (Experiment 4 & 6; Chapters 6 & 8); (d) the moderating impact of self-reported motivation to control homonegativity on IRAP responses (Experiment 1; Chapter 3); and (e) the impact of single versus multiple labels on the IRAP (Experiment 6; Chapter 8). In addition, Chapter 7 (Experiment 5) again using a known-groups approach, presents the first IAT study to investigate implicit homonegativity in Ireland.

Support for the reliability of the IRAP was provided when the same general pattern of pro-straight and anti-gay biases were observed across most of the IRAPs (although moderated by a number of variables). The known-groups studies (Experiments 3 and 4) provided strong support for the validity of the Homonegativity-IRAP (and demonstrated the utility of the multi-dimensional approach to sexual orientation screening that was

employed) because it clearly discriminated between Exclusive-Heterosexuals (EH), Non-Exclusive-Heterosexuals (NEH) and Gay, Lesbian, Bisexual (GLB) groups. In addition, reducing the response latency criterion from 3000ms to 2000ms served to increase the size of the IRAP effects and produce a pattern of responding that was more consistent with sexual orientation group status. Unlike the 3000ms IRAP and the IAT, the 2000ms IRAP did not correlate with a measure of social desirability. Arguably the most important finding was that subtle changes in the number and type of stimuli that were employed in the IRAP had a dramatic impact on the size of the *D*-IRAP effects. Overall, the research reported in the current thesis provides support for the reliability and validity of the Homonegativity-IRAP and suggests that it is a relatively robust measure that could usefully be employed in future investigations of implicit homonegativity.

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Chapter 1: General Introduction

The Assessment of Anti-Gay Attitudes: Social-Cognitive Research

Negative attitudes toward homosexuality have a long history. Prior to the Stonewall riots in Greenwich Village in 1969, psychological research focused mainly on the causes and cures for what was considered the homosexual 'pathology' (Foucault, 1967; Masters, Johnson, & Kolodny, 1995; Weeks, 1983). For example, by the 1930s Nazi medical authorities had accumulated a wealth of literature chronicling the so-called 'degeneracy' of gay men and lesbian women (Proctor, 1995; Weeks, 1983). Until the 1950s, gay men and lesbian women were diagnosed as mentally disordered and as such were imprisoned, given shock and drug therapies and in many cases executed (Terry & Urla, 1995). During the 1960s, however, researchers switched their attention from diagnosis to the study of attitudes toward homosexuality. This new focus on attitudes was paved by Weinberg's (1972) introduction of the term 'homophobia,' which he defined as "the dread of being in close quarters with *homosexuals* – and in the case of *homosexuals* themselves, self-loathing" (p. 4; emphasis added). Recently, Herek (2000) proposed that the term homophobia be replaced by the less emotionally loaded term 'sexual prejudice' (i.e., negative attitudes toward an individual because of his or her actual or perceived sexual orientation). Herek (2000) suggested that anti-gay attitudes are more akin to prejudice than phobia. Yet another word in the anti-gay-attitude vernacular is the term 'homonegativity,' which has been defined by Morrison and Morrison (2002) as derogatory attitudes toward gay men and lesbian women. Although these terms are based upon slightly different theoretical conceptualizations, they each refer to anti-gay beliefs and, thus, are used synonymously here.

The present thesis begins with an overview of the US, European and Irish Poll data spanning approximately the last two decades and follows with a discussion of the Modern Homonegativity Scale (MHS; Morrison & Morrison, 2002) which was developed to capture subtle forms of explicit prejudice toward gay men and lesbian women. The problems associated with self-report measures lead us to a discussion of the IAT (Greenwald, McGhee, & Schwartz, 1998) which is the most popular and researched measure of implicit attitudes. A range of studies that have used the IAT for the assessment of implicit homonegativity will be discussed and the influence of a small number of moderating variables on the relationship between implicit and explicit attitudes will be given some prominence. Specifically, at the time of writing, the current thesis aimed to develop an alternative measure of implicit homonegativity, and so, in that context, particular emphasis will be placed upon the moderating roles of: (a) variations of the assessment situation in which an IAT is undertaken (i.e., a Public versus Private administration of the IAT); (b) exposure to exemplars prior to an IAT; (c) a moderating variable that has received considerable research attention, namely, the role of motivations to conceal homonegative reactions; and (d) participant sexual orientation -- an area that has, to date, received very little research attention despite its importance. In closing the chapter, a range of implicit reaction time measures that offer an alternative to the IAT as a measure of implicit homonegativity will be introduced.

Self-Report Measures of Homonegativity

In attempting to measure anti-gay attitudes, psychologists have traditionally relied on direct self-report methods, such as questionnaires (De Houwer, 2006). One of the

earliest American Opinion Surveys of attitudes toward homosexuality was a 1965 Harris Poll which found that 70% of respondents reported that gay men and lesbian women were harmful to American life (Herek, 2002). During 1970, more than 70% of a representative household nationwide probability sample of 30,018 American adults reported that sexual acts between two persons of the same sex were always wrong (Levitt & Klassen, 1974). More than 80% reported that they would not associate with gay men or lesbian women if they could help it (Levitt & Klassen, 1974, p. 42). In addition, 65.2% reported that same-sex relations are 'obscene and vulgar,' 43.1% strongly agreed that gay men and lesbian women 'are a high security risk for government jobs,' and 73.5% agreed that gay men and lesbian women 'are dangerous in occupations involving children (Levitt & Klassen, 1974, p. 34).

Analyses of the polls spanning more than two decades, however, reveal that in the West, self-reported negative attitudes toward gay men and lesbian women are fading (see Herek, 2000; Hicks & Lee, 2006; Steffens & Wagner, 2004; Yang, 1997, for reviews). The findings, however, are not clear-cut (see Yang, 1997). For example, Loftus' (2001) analysis of the 1973 to 1998 General Social Survey data (GSS; which employed a large national area probability sample of non-institutionalized adults), revealed that between the years of 1973 and 1976 U.S. respondent's attitudes regarding the morality of homosexuality became quite liberal. This liberal trend was interrupted by the expression of more conservative attitudes between 1976 and 1990, after which time a liberal trend resumed.

Altemeyer's (2001) investigation (from 1984 to 1998) similarly showed an increase in liberal attitudes toward homosexuality among Canadian University students

and their parents, although beginning at an earlier date than that suggested by Loftus. In another analysis of the GSS data, Treas (2002) showed a decrease in liberal attitudes toward same-sex relations over a ten-year period. Specifically, in 1973 more than 74.3% of respondents reported that same-sex relations are 'always wrong.' This figure increased to 76.8% in 1988 and by 1998 the figure had dropped to 58%. Young people were observed to be a significant source of the latter decrease (Treas, 2002).

A recent joint analysis of the 1970s to 2003 Gallup Polls and the 2000 National Election Study (NES) data, conducted by Hicks and Lee (2006), suggested that U.S. attitudes toward same-sex relations have become more positive. Again however, the findings were mixed. In 1977, for example, 43% of respondents said that same-sex relations should be legalized. In contrast, by 2001, only 54% agreed with this statement. By May 2003 the figure rose to 60% in agreement. Two months later, however, a more conservative 50% endorsed the legalization of same-sex sexual relations.

Analyses of recent research conducted in Ireland and in Europe also seem to reveal that self-reported attitudes toward gay men and lesbian women are becoming more liberal. For example, a 2006 national opinion poll commissioned by GLEN suggested that 84% of respondents were in favour of some form of legal recognition of same-sex relationships (O'Connell, 2008). Specifically, most (i.e., 51%) were in favour of marriage while the remainder (i.e., 33%) preferred civil partnership. Attitudes toward allowing gay men and lesbian women adoption rights, however, were less liberal, with only 39% expressing support compared to 37% objecting to adoption rights for lesbian and gay couples (O'Connell, 2008). A liberalizing trend in Irish attitudes toward homosexuality was evident in the European Values Study (EVS) data (as fielded in Ireland) from 1982,

1990 and 1999-2000. Specifically, in 1999-2000, 38% of the Republic of Ireland expressed strongly negative attitudes to homosexuality, compared to 56% in 1990 and 62% in 1981 (Fahey, Hayes, & Sinnott, 2005).

On a European level, the 2006 Eurobarometer (Eurobarometer, S., 2006; Walsh & Conlon, 2008; Gerhards, 2010), asked citizens in Every European Member State if they thought '*homosexual marriages should be allowed throughout Europe*.' Less than half of those surveyed (i.e., 42%) agreed that such marriages should be allowed throughout Europe. Support for same-sex marriage was highest in Sweden (i.e., 71%), Denmark (i.e., 69%) and the Netherlands (i.e., 82%) and lowest in Romania (i.e., 11%). In Ireland, 41% of citizens supported the introduction of same-sex marriage – that is, a 10% drop in positivity compared to the aforementioned national poll conducted in Ireland that same year. Again, consistent with the 2006 national poll, attitudes toward allowing gay men and lesbian women adoption rights were less liberal, with only 31% of Europeans and 30% of Irish respondents expressing support (O'Connell, 2008).

The 2008 Eurobarometer (Eurobarometer, S., 2008), asked EU citizens (on a scale ranging from 1 = *very uncomfortable* to 10 = *very comfortable*) *'How would you personally feel about having a homosexual (gay man or lesbian woman) as a neighbour?*' Irish citizens expressed moderate comfort and gave a rating of 8.6, Romania was least comfortable and gave a rating of 4.8, and the EU average was 7.9. More recently, a special Eurobarometer (Eurobarometer, S., 2012) asked EU citizens (on a 10 point scale) *'How would you feel if a gay, lesbian or bisexual person were appointed to the highest elected political position in [OUR COUNTRY]?*' Irish citizens gave a rating of 8.2

expressing moderate comfort when compared to the European average (i.e., 6.6) and the country with the least liberal views (i.e., Latvia, 3.2).

While the trends summarized herein relied upon large random samples, there are limitations to drawing conclusions from such data. In particular, the wording and ordering of questions may have affected the observed trend lines. In addition, the majority of studies outlined (e.g., Eurobarometer, S., 2006; Fahey, Hayes, & Sinnott, 2005; Hicks & Lee, 2006; Levitt & Klassen, 1974; Loftus, 2001; Treas, 2002; Yang, 1997) asked questions about sex-unspecified same-sex relations. Previous research (e.g., Kite & Whitely, 1996) has shown that using the generic term '*homosexual*' in place of gay men and lesbian women in survey questions often produces an assumption that the target is male.

The study of self-reported attitudes toward gay men and lesbian women has conventionally relied upon measures that assess 'traditional homonegativity', which focuses on religious or moral objections (Morrison, Kenny, & Harrington, 2005). Items such as gay men and lesbian women "should *not* be allowed to be members of churches or synagogues", and "Homosexuality is a social corruption that can cause the downfall of a civilisation" taken from opinion polls (see Levitt & Klassen, 1974) provide an illustration of the concept. Given the mixed results obtained with measures that assess traditional homonegativity, it has recently been suggested that the assessment of 'modern homonegativity' may reveal a more subtle kind of prejudice toward gay men and lesbian women (Morrison, Kenny, & Harrington, 2005). Modern homonegativity is contingent upon the espousal of at least *one or more* of the following beliefs about gay men and lesbian women:

> … (a) Gay men and lesbian women are making unnecessary demands for social change (e.g., the right to marry); (b) prejudice and discrimination against gay men and lesbian women have become a thing of the past; and (c) gay men and lesbian women place too much emphasis on their sexuality and, in so doing, are culpable for their own marginalization (Morrison, Kenny, & Harrington, 2005, p. 220-221).

The Modern Homonegativity Scale (MHS; Morrison & Morrison, 2002) was developed to measure the construct of "modern homonegativity". Attitudinal (Morrison, et al. 2005) and behavioural (Morrison, et al. 2002) evidence in support of the reliability and validity of the measure has been provided. Specifically, a study conducted in the West of Ireland showed that 46% of male respondents endorsed the following statement from the MHS:'*Gay men should stop shoving their lifestyle down other people's throats*" and 29% agreed with the statement "*Lesbian women should stop shoving their lifestyle down other people's throats*" (Morrison et al., 2005, p. 243). In a Canadian study, Morrison and Morrison (2002) revealed that participants high in modern homonegativity (as measured by the MHS), avoided sitting beside a confederate wearing a T-shirt with a pro-gay or pro-lesbian slogan.

In summary, while the data from the polls over the last decades suggest that attitudes toward gay men and lesbian women are becoming more liberal, it appears that subtle forms of homonegativity may have replaced more traditional forms. In drawing this conclusion, however, it should be recognized that many studies reporting an increasingly liberal trend in attitudes towards homosexuality have relied upon convenience and student samples drawn from university settings, and thus the generalizability of the findings is compromised (see Kite & Whitley, 1996, for a review). Although it should also be noted that the results reviewed here, from numerous American

public opinion polls employing representative national samples, point to a similar liberal trend.

Problems with Self-Report Measures

In recent times, confounds inherent in self-report methods have been generally noted (e.g., de Jong, 2002; Gemar, Segal, Sagratti, & Kennedy, 2001; Raja & Stokes, 1998; Teachman, Gregg, & Woody, 2001). For example, individuals may be aware that their attitudes are socially undesirable and, therefore, employ strategies to conceal them from researchers (Paulhus, 1984; Rust & Golombok, 1999). Alternatively, individuals may not be aware that they hold a particular attitude and, thus, fail to report it (Dambrun & Guimond, 2004). These problems are further compounded by the fact that the way in which questions are presented or phrased in self-report instruments may influence an individual's response (Rasinski, 1989). Furthermore, even if a self-report measure of subtle prejudice is used, such as the MHS, it is still relatively easy to self-present an egalitarian view (cf. Fazio, 1995), once a participant is aware of what constitutes subtle prejudice.

Implicit Attitudes

In order to circumvent these problems, researchers have devoted increasing attention to studying the nature of implicit attitudes. As defined by Greenwald and Banaji (1995), implicit attitudes are *"introspectively unidentified or inaccurately identified traces of past experience that mediate favorable or unfavorable feeling, thought, or action toward social objects"* (p. 8; see also Wilson, Lindsey, & Schooler, 2000, for a

similar theoretical argument). Although debate continues over the adequacy of this definition (see De Houwer, 2006), the core argument is that implicit attitudes are often unconscious and, thus, their influence on subsequent behaviors may go unnoticed. Insofar as implicit attitudes are unconscious, traditional explicit measures, such as questionnaires and open-ended interviews, will likely fail to capture these psychological variables. As a result, researchers have attempted to develop reaction-time based methodologies in which implicit attitudes are inferred based on response speed and accuracy (see De Houwer, 2006).

The Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) is currently the most popular reaction-time based measure of implicit cognition and its basic effect has been replicated many times (Greenwald, Nosek, Banaji, & Klauer, 2005). For example, the IAT has been used to assess implicit cognitions in domains such as sexism (e.g., Rudman & Glick, 2001), racism (e.g., Greenwald et al., 1998), religious stereotyping (e.g., Rudman, Greenwald, Mellott, & Schwartz, 1999) and ageism (Dasgupta & Greenwald, 2001) as well as a variety of political issues (see Nosek, Banaji, & Greenwald, 2002) and self esteem (e.g., Bosson, Swann, & Pennebaker, 2000). As an indirect measure of implicit attitudes, the IAT rests on the assumption that participants should categorize concepts together that are strongly associated in memory more rapidly than concepts that are weakly associated (Greenwald et al., 1998).

In a seminal study, Greenwald et al. (Experiment 1) used the IAT to test responses to four categories of items (e.g., flowers, insects, pleasant words, and unpleasant words). The researchers assumed that the concept *flower* and the attribute *pleasant* are associated in memory as are the concept *insect* and the attribute *unpleasant.* Based on this

assumption, Greenwald et al. reasoned that responses should be faster when response key assignment was congruent (e.g., key 1 = "flower" and "pleasant" versus key 2 = "insect" and "unpleasant"), rather than incongruent (e.g., key 1 = "flower" and "unpleasant" versus key 2 = "insect" and "pleasant"). As predicted, mean response latencies were shorter for congruent relative to incongruent tasks.

In a subsequent investigation, Greenwald et al. (1998; Experiment 3) employed the IAT to determine White college students' implicit attitudes toward Black people The IAT presented traditional Black names (e.g., "Jamel") and White names (e.g., "Hank") together with positive words (e.g., "friend") and negative words (e.g., "murder"). Greenwald et al. predicted that responses should be faster when response key assignment was congruent (e.g., key 1 = "White names" and "pleasant" versus key 2 = "Black names" and "unpleasant") rather than incongruent (i.e., White-unpleasant versus Black-pleasant). Results were congruent with their prediction and, thus, a pro-White/anti-Black implicit bias was inferred from participants' IAT performance. Critically, results for explicit measures diverged from those obtained on the IAT.

In addition to the IAT, a range of so-called reaction time based implicit measures, such as the Go/No-go Association Task (GNAT; Nosek & Banaji, 2001), Evaluative Priming (Fazio, Sanbonmatsu, Powell, & Kardes, 1986), the Emotional Stroop (Pratto & John, 1991) and the Extrinsic Affective Simon Task (EAST; De Houwer, 2003) have been offered. With the exception of Sequential Priming and the EAST, these alternative measures will not be discussed. To our knowledge, the EAST is the only *established* reaction time implicit measure apart from the IAT that has been used to assess implicit homonegativity.

The Implicit Measurement of Homonegativity

In the 14 years since the publication of the original Homosexuality-IAT study (Banse, Seise and Zerbes, 2001) there are at least thirty-four published studies from across the US and Europe that have used the IAT to assess implicit homonegativity. Over this period, there has been considerable variation in the particular stimuli (e.g., pictures, words and symbols –sometimes in combination, sometimes not) employed across studies and laboratories. Although this procedural variation may serve to reduce the comparability of results across studies, typically studies have repeatedly reported in-group implicit biases for heterosexual participants and neutral implicit biases/no bias for lesbian and gay participants (for a review see Cullen & Barnes-Holmes, 2009).

There have, however, been moderating variables. Specifically, a growing body of empirical evidence suggests that implicit and explicit homonegative attitude relationships are moderated by various inter-individual, demographic, affective, cognitive, motivational, and situational factors as well as procedural factors (see Blair, 2002; Dasgupta & Rivera, 2008; Dasgupta, DeSteno, Williams, & Hunsinger, 2009; Jonathan, 2008; Jellison, McConnell, & Gabriel, 2004; Nicolas & Skinner, 2012; Nosek, Greenwald & Banaji, 2005; Nosek et al., 2007; Rowatt, et al., 2006; Hatzenbuehler, Dovidio, Nolen-Hoeksema, & Phills, 2009; Inbar, Pizarro, Knobe, & Bloom, 2009; Steffens, 2005). The impact of moderating variables on implicitly assessed homonegativity is theoretically significant because implicit measures may be vulnerable to some of the same confounds inherent in explicit measures.

As stated earlier in the chapter, however, the most important moderating variables in the context of the current thesis are: (a) variations of the assessment situation in which

an implicit measure is undertaken; (b) exposure to exemplars prior to an implicit measure; (c) the role of motivation to conceal homonegative reactions; and (d) participant sexual orientation. These will now be discussed in turn.

The Moderating Influence of Situational Factors

One variable that has reliably been observed to robustly influence self-reported explicit attitudes is the assessment situation (Lemm & Banaji, 2001). Specifically, research has consistently shown that participants self-report more positive attitudes toward stigmatized groups when assessed in public as opposed to in private (e.g., Blanchard, Crandall, Brigham, & Vaughn, 1994; Plant & Devine, 1998). To date, however, the investigation of situational factors as potential moderators of the relationship between implicit and explicit homonegativity has received very little empirical attention.

In a classical experimental manipulation of the social situation, American researchers Boysen, Vogel and Madon (2006), conducted two experiments to explore the moderating influences of situational *and* motivational variables on heterosexual male and female[1] participants'implicit and explicit homonegativity. Participant sexual orientation was assessed via an item embedded in a demographic questionnaire. No details, however, were provided regarding the specific sexual orientation screening question used but the authors note that no participant reported a sexual orientation that was primarily bisexual or homosexual.

The IAT was a conceptual replication of the Banse, Seise, & Zerbes, (2001) Homosexuality-IAT and used a combination of picture and word stimuli. Specifically,

[1] The experiment employed mostly female participants.

implicit attitudes to *both* male and female sexual orientation were assessed by testing responses to the following four categories of items: straight (i.e., 10 photographs of mixed sex couples), gay (i.e., 10 photographs of same sex couples; 5 male-male couples, 5 female-female couples), pleasant words, and unpleasant words[2]. Explicit measures of anti-gay bias, namely, the Heterosexism Scale (Park & Bieschke, 2002) and the Index of Homophobia (Hudson & Rickets, 1980) were completed after the IAT. Participants assigned to the '*public assessment condition'* were told that the experimenter would be privy to their IAT and explicit scores. In the '*private assessment condition'* all measures were completed in private and participants were informed that their attitudes toward homosexuality would remain private.

Consistent with earlier research (e.g., Banse, Seise & Zerbes, 2001), participants generally produced pro-straight in-group biases on the IAT. The bias was reduced by more than half when assessed in the public assessment situation. The same pattern emerged on explicitly assessed attitudes. Implicit and explicit attitudes diverged in the public setting but in the private setting they were weakly correlated, but only for one of the explicit measures (i.e., the Index of Homophobia) -- this measure-specific effect is not discussed by the authors.

In the second experiment, participants completed the IAT used in Experiment 1, in a public assessment situation under either a '*bogus pipeline'* or '*no-bogus pipeline'* condition. All participants believed that skin conductance and heart rates would be monitored following completion of the IAT (although none were actually monitored). Participants in the no-bogus pipeline condition believed that this was part of a separate

[2] The evaluative concepts of good and bad were represented by 10 pleasant and 10 unpleasant words taken from Greenwald, McGhee, and Schwartz, (1998).

study but those in the bogus pipeline condition believed that the experimenter would have access to their 'true' attitudes toward homosexuality. A manipulation check revealed that participants in the latter condition were significantly more nervous than their no-bogus pipeline counterparts. The basic assumption was that participants in the bogus-pipeline condition would not be motivated to manipulate their IAT performance (because the "truth" would be revealed by the skin conductance measure); in contrast, participants in the no-bogus-pipeline condition would be motivated to the same level as participants in the public condition in Experiment 1. Explicit attitudes were not assessed in Experiment 2.

Overall and consistent with Experiment 1, participants generally produced pro-straight in-group biases on the IAT. Interestingly, implicit homonegativity was unaffected by the bogus pipeline manipulation. The authors thus concluded that the impact of the public setting on the IAT performance occurred via a process that remains outside participants' awareness or voluntary control. Broadly similar findings were reported in a subsequent study reported by Gabriel, Banse, and Hug (2007) although their research focused on helping behaviours as well as measures of implicit and explicit attitudes.

The Moderating Influence of Exemplar Exposure Prior to the IAT

Another issue that has received some relatively recent attention is the moderating influence of exposure to positive and negative exemplars prior to a Homosexuality-IAT (e.g., Nicolas & Skinner, 2012). Indeed, more generally, a number of studies have found that exposure to counter-stereotypical exemplars prior to an implicit measure serves to

weaken implicit bias (Dasgupta & Asgari, 2004; Dasgupta & Greenwald, 2001; Lowery, Hardin, & Sinclair, 2001; Sinclair, Lowery, & Hardin, 2005).

An American based study, reported by Dasgupta and Rivera (2008), was the first to determine the joint influence of long–term personal contact with gay men and lesbian women, and short–term exposure to pro-gay/pro-lesbian exemplars, on heterosexual male and female participant's implicit homonegativity and behavioral intentions to discriminate (i.e., voting). The authors, however, did not report how participant sexual orientation was assessed. In the first experiment, participants completed a demographic questionnaire followed by a general knowledge task purportedly about social groups or the environment. The task was actually designed to provide short term exposure to pro-gay and pro-lesbian exemplars. During the general knowledge task, participants were exposed to positive images and descriptions of (a) famous gay men and lesbian women (experimental condition) or (b) flowers (control condition). Participants were advised to remember the information encountered during the general knowledge task, prior to completing a Lesbian vs. Heterosexual IAT and a Gay-Men vs. Heterosexual IAT[3]. Additionally, long-term prior contact with lesbian women and gay men was assessed via a specifically designed questionnaire. Explicit homonegativity was not assessed.

Experiment 2 (described to participants as ostensibly unrelated) was conducted a week later, in a new room, with a new experimenter. A paper and pencil 'memory test' was presented to participants who were again exposed to the pictures of the famous gay

[3] The IATs employed a mixture of images and words as stimuli and were presented to participants in counterbalanced order On the Gay-Men-IAT, for example, responses to the following four categories of items were assessed: heterosexual (i.e., photographs of different-sex couples), gay men (i.e., photographs of same-sex male couples), pleasant words (e.g., *'paradise'*), and unpleasant words (e.g., *'poison'*). The Lesbian-IAT differed from the Gay-Men-IAT by replacing the same sex male couple photographs with photographs of same-sex female couples.

people (experimental condition) and flowers (control condition) that they had encountered in Experiment 1. On the 'memory test' the pictures were accompanied by a brief correct and incorrect description and participants were required to circle the correct description. This was done to ensure that the exemplars remained accessible. Finally, in a simulated election, participants were asked to anonymously indicate how they would vote on a variety of referenda that also included questions about same-sex marriage, gay/lesbian adoption, and anti-gay job discrimination and subsequently deposit their ballot in a sealed box.

The results showed that heterosexual participants produced strong implicit in-group biases with significant anti-gay and anti-lesbian responses on the IAT. Consistent with Nosek, Greenwald and Banaji (2005) differences in implicit attitudes toward homosexuality emerged between the two IAT tasks. In particular, implicit homonegativity was stronger when gay men as opposed to lesbian women were emphasized on the IAT.

Regression analyses revealed that greater long-term contact with lesbian women and gay men predicted less implicit homonegativty and more pro-gay voting intentions. An inverse pattern emerged for participants that had few gay or lesbian long-term contacts. Irrespective of long-term contact, however, short-term exposure to pro-gay exemplars resulted in *all* participants showing less implicit homonegativity and more pro-gay voting intentions. In addition, voting intentions produced by participants that had been exposed to pro-gay exemplars were indistinguishable from those produced by participants with substantial long-term contact experiences. A further regression analysis

revealed that the effects of long– and short–term exposure to lesbians and gay men on explicit behavioral intentions were not mediated by changes in implicit attitudes.

The Moderating Influence of Motivation to Respond without Homonegativity

The most empirically researched moderating variable in the extant implicit homonegativity literature, is motivation to respond without homonegativity and it is embedded in many of the studies in the current thesis. In general, IAT studies that have examined the moderating influence of motivation to conceal homonegativity repeatedly show heterosexual in-group implicit biases (Banse, Seise & Zerbes, 2001; Boysen, Vogel & Madon, 2006; Dasgupta & Rivera, 2006: Jellison, McConnell, & Gabriel, 2004; Lemm, 2006; Rohner & Björklund, 2006) and neutral/no biases for gay and lesbian participants (Rohner & Björklund, 2006). Interestingly, two early studies showed lesbian (Banse, et al.) and gay (Banse et al. and Jellison et al.) in-group implicit biases on the IAT. In addition, across the studies, results pertaining to the relationship between homonegativity and motivations to be egalitarian appear mixed.

To illustrate, Rohner, et al., (2006) and Boysen, et al., (2006) directly manipulated motivation to conceal homonegativity (using a public versus private context) and in the former study reported no relationships between implicit anti-gay attitudes and the motivation to control homonegativity but did in the latter. Jellison, et al. (2004) assessed self-reported *personal* motivation to control homonegativity and also found no relationships. In contrast, research that distinguished between self-reported *levels* and *sources* of motivation did show a relationship (e.g., Banse, Seise & Zerbes, 2001; Lemm, 2006). Specifically, in one study, individuals with a *weak/low* motivation to control

prejudice showed more homonegativity on both the IAT and a cognitive (but not affective) explicit measure than those who were strongly motivated (Banse, et al.). Another study showed that a *low* level of *internal* motivation to control homonegativity predicted less implicit anti-gay attitudes (Lemm, 2006). In addition, combinations of implicit homonegativity and conscious processes (e.g., lacking behavioural control and weak motivation to be egalitarian) predicted discriminatory behaviour (Dasgupta & Rivera, 2006). In another study, internal motivation to control homonegativity was assessed both explicitly and experimentally by the absence or presence of an experimenter who sought support for a local gay organisation (Gabriel, Banse, & Hug, 2007). The results of their Swiss study showed that the relationship between implicit homonegativity and helping behaviour were moderated by *both* motivational (i.e., internal) and situational (i.e., public vs. private assessment context) variables. Specifically, more helping behaviour was shown in the public rather than private situation. Individuals who were less internally motivated to control homonegativity showed corresponding implicit and explicit attitudes, while a divergence was shown for highly motivated individuals. Helping behaviour in the public setting *only* was predicted by implicit attitudes and motivation to control homonegativity. Surprisingly, in the public setting, participants who had more positive implicit attitudes and a strong motivation to control homonegativity, showed the least helping behaviour for a gay organisation.

In summary, across the studies, there appears to be a variegated relationship between homonegativity and motivation to conceal it. Typically, studies that directly manipulate motivation to control homonegativity show no relationships between implicit anti-gay bias and motivation to control homonegativity. Studies that have used self-report

assessments of motivation to control homonegativity, however, often do show relationships and particularly so, when levels (e.g., weak vs. strong) and sources (e.g., internal vs. external) of motivation are distinguished. Specifically, in studies where participants are weakly motivated to control homonegativity implicit homonegativity (and indeed, homonegative behavior) tends to be stronger. Critically, however, weak levels *combined* with internal sources of motivation to control homonegative responding, tend to produce less implicit anti-gay bias and a convergence between implicit and explicit measures. In contrast, strong levels *combined* with internal sources of motivation to control homonegativity, tends to produce the reverse of this pattern.

The Moderating Role of Participant Sexual Orientation: Known Groups IAT Studies

One final, core, yet neglected area, in the context of the current thesis concerns the role of participant sexual orientation as a moderator of implicit and explicit homonegativity. Indeed, a novel feature of the present thesis will be the introduction of a conceptually complex multi-dimensional method for screening participant sexual orientation. It is particularly striking to note that twenty of the thirty-four published IAT studies that have reported an assessment of implicit homonegativity failed to report if and how participant sexual orientation was screened. At the time of writing, only six published studies used a known-groups approach and some form of participant sexual orientation screening measure to assess whether implicit and explicit homonegativity would be related and differ as a function of participants' sexual orientation.

The first of these studies comprised two experiments and was reported by Banse, Seise, and Zerbes (2001). In their first experiment, a known-groups approach (i.e., heterosexual male and female and gay men and lesbian women) was used to examine the psychometric properties of their Homosexuality-IAT. In addition to the Homosexuality-IAT, explicit affective and cognitive attitudes were assessed on separate sub-scales of a German translation of the Attitudes Toward Lesbian and Gay Men Scale (ATLG-R: Herek, 1988). Participant sexual orientation was assessed via a two-item measure tapping sexual identity/behavior (i.e., "*How would you describe yourself concerning your sexual identity/sexual behavior?"*). Questions were answered on a five-point scale ranging from 1 = *exclusively heterosexual* to 5 = *exclusively homosexual*. Individuals scoring a mean greater than 2 or lower than 4 were excluded from the analyses.

The Homosexuality-IAT used picture and word stimuli and assessed implicit attitudes to *both* male and female sexual orientation by testing responses to the following four categories of items: heterosexual (e.g., photographs of mixed sex couples), gay men and lesbian women (e.g., photographs of same sex couples; 5 male, 5 female), pleasant words, and unpleasant words. Banse et al. assumed that for heterosexual participants, the concepts *heterosexual + pleasant* are likely associated in memory as are *gay men/lesbian women + unpleasant.* The reverse was assumed for the gay and lesbian participants. It was posited that speed and accuracy of responding on the IAT would reflect these associations.

Results showed that, in general, implicit and explicit attitudes toward homosexuality were relatively positive. Implicit and explicit attitudes differed as a function of participant sexual orientation and converged to reveal in-group biases for both

groups (i.e., heterosexual and gay men/lesbian women). Specifically, the Homosexuality-IAT correlated moderately with explicit cognitive attitudes toward homosexuality and strongly with the affective attitudes. A main effect for sexual orientation suggested that compared to gay men and lesbian women, heterosexuals were more explicitly and implicitly homonegative. These main effects, however, were not qualified by a gender x sexual orientation interaction effect.

Other known-groups studies have found broadly similar results, with both heterosexual and gay/lesbian groups producing in-group biases on the IAT and on the explicit measures (e.g., De Houwer & De Bruyckner, 2007; Experiment 3; Jellison, McConnell, & Gabriel, 2004; Rohner & Björklund, 2006; Steffens & Buchner, 2003; Steffens, 2005). The in-group effect is typically stronger for heterosexuals than for gay and lesbian groups who typically show weak to no in-group implicit bias on the IAT (e.g., Jost, Banaji, & Nosek, 2004). Other IAT studies, that have employed only heterosexual participants or not provided details pertaining to sexual orientation screening, repeatedly report heterosexual in-group implicit biases (e.g., Breen & Karpinski, 2013; Cardinas & Barrientos, 2008; Dasgupta & Rivera, 2006; Dasgupta, DeSteno, Williams, & Hunsinger, 2009; Inbar, Pizzaro Knobe & Bloom, 2009; Jost, Banaji, & Nosek, 2004; Lemm, 2006; Nosek, Greenwald, & Banaji, 2005; Nosek, et al., 2007; Rowatt, et al., 2006; Tsang, & Rowatt, 2007).

Across the studies, explicit attitudes typically differed as a function of participant sexual orientation and weakly to moderately converged with the IAT to reveal in-group biases for both groups. In studies that distinguished cognitive and affective explicit attitudes, the IAT correlated moderately with explicit cognitive attitudes toward

homosexuality and strongly with the affective attitudes (e.g., Banse, Seise & Zerbes, 2001, De Houwer & De Bruyckner, 2007). This issue will be revisited in a later section toward the end of the chapter. Finally, it is worth mentioning that while many of the implicit homonegativity studies reviewed assessed the impact of gender differences on implicit and explicit attitudes very few studies actually found a significant gender difference (but see Steffens, 2005; and also Banse, Seise, and Zerbes, 2001, who found a descriptive trend).

Some inconsistencies in the research. A number of inconsistencies were evident across the IAT studies and these will be discussed in turn. The first issue relates to stimulus modality. Specifically, there was wide variability across the studies with regard to the stimuli employed. Some studies used only verbal stimuli, others employed only picture stimuli, and some used a combination of the two. Evidence to suggest that stimulus modality has no effect on implicit attitudes was provided by two of the studies that examined implicit homonegativity using the IAT (Nosek, Greenwald, & Banaji, 2005; Lemm, 2006). In contrast, researchers' investigating other constructs (such as fear of spiders) with a different implicit measure to the IAT have provided evidence to suggest that picture stimuli activate attitudes more directly than verbal stimuli (e.g., Huijding & de Jong, 2005; 2006). Interestingly, however, a recent IAT study in the domain of racial bias that compared verbal stimuli (i.e., stereotypical names for Black versus White people such as Tyrone vs. Brandon) with picture stimuli (i.e., Black vs. White faces) showed less implicit prejudice when picture as opposed to word stimuli were used (Foroni & Bel-Bahar, 2010). At the time of writing, however, the precise mechanisms underlying the differential effects that are sometimes obtained on implicit

measures with picture and word stimuli are not understood. In any case, these findings suggest that the decision to use verbal versus picture stimuli on implicit measures requires careful consideration in terms of its impact on recorded levels of implicit bias.

Furthermore, some studies did not make clear that exemplars representing the category 'gay' were related to homosexuality; thus, for example, participants may have perceived the task to be an assessment of same and opposite-sex platonic or romantic relationships and not attitudes toward gay and straight people. A second issue pertains to the target categories. Specifically, many of the studies assessed attitudes towards *both* lesbian women and gay men, while others focussed on attitudes toward gay men *or* lesbian women only. This makes cross-study comparisons difficult. In addition, explicit measures that were compared to implicit measures, varied with regard to their specificity. Specifically, some explicit measures required participants to rate "Gay" relative to "Straight," while others required participants to rate "Gay" alone (i.e., not relative to "Straight"). Furthermore, when semantic differentials were used they did not always use the terms employed with the implicit measures. Finally, it appears that for many, if not all of the studies, relatively crude indicants of sexual orientation were employed. Given that implicit measures are sensitive to group differences it would be important for future studies to employ more sensitive multidimensional screens (more details on this issue will be provided in a later section).

Possible Alternatives to the IAT

Evidence in support of the reliability and validity of the IAT as a measure of implicit cognition has been reported across a wide variety of domains (e.g., Fazio &

Olsen, 2003; Nosek, Banaji, & Greenwald, 2002). A number of limitations inherent in the measure, however, have also been identified (see Arkes, & Tetlock, 2004; Blanton & Jaccard, 2006; Blanton, Jaccard, Gonzales, & Christie, 2006; Cunningham, Preacher, & Banaji, 2001; De Houwer, 2002; Fiedler, Messner, & Bluemke, 2006; Nosek & Sriram, 2007). Two limitations in particular will be discussed in turn. The first is that the IAT provides a measure of *relative* associative strength and, thus, cannot be used to measure the valence of individual concepts (De Houwer, 2002; Nosek, Greenwald, & Banaji, 2005). The second limitation concerns the fact that the IAT provides a relatively *indirect* measure of implicit attitudes.

The IAT provides a relativistic measure because each trial involves presenting both of the relevant categories, such as *Gay* and *Straight.* Thus, the IAT effect is based on responses that occur in the context of both categories, rather than each independently. As a result, a pro-straight/anti-gay IAT effect could indicate that a participant has a positive attitude to "Straight" and a neutral attitude to "Gay", or it could indicate a neutral attitude to "Straight" and a negative attitude to "Gay". That is, the IAT can indicate that x is preferred to y, but it cannot reveal to what extent x and y are liked or disliked, *per se.* The studies outlined subsequently offer alternatives to the IAT as a methodology for the assessment of implicit homonegativity.

The EAST. In order to circumvent the relativistic nature of the IAT, the EAST (De Houwer, 2003) was developed to assess implicit attitudes toward individual concepts. Unlike the IAT, the EAST is based on a comparison of performance on trials within a single task rather than on a comparison of performances on different tasks. On some trials, white words are presented while on other trials the words are coloured green

or blue. Participants are required to press a key in response to the meaning of white words (e.g., left = positive, right = negative) and the colour of the green and blue words (e.g., left = green, right = blue). The premise is that responses become extrinsically associated with positive or negative valence. Thus, responses should be faster when a positive word is presented in green (the positive colour) rather than blue (the negative colour). Similarly, responses should be faster when a negative word is presented in blue rather than green. In other words, performance should be superior on trials in which participants are required to categorize colored positive words positively and colored negative words negatively.

A Belgian study employed a known-groups approach to: (a) test the validity of the EAST and the IAT; and (b) determine if implicit homonegativity as measured by the EAST and IAT differed as a function of participant sexual orientation (De Houwer & De Bruyckner, 2007; Experiment 3). The IAT used was a conceptual replication of the IAT developed by Banse, Seise, & Zerbes, (2001) with the exception that photographs were replaced by word stimuli. Thus, implicit attitudes toward *both* male and female homosexuality were assessed. The terms that had been employed in the IAT were retained for use in the EAST, with the exception that the targets '*homosexual*' and '*heterosexual*' were replaced by the terms '*hetero,*' '*gay,*' '*lesbian,*' and the neutral stimulus, '*######.*' Explicit cognitive and affective attitudes toward homosexuality were also assessed.

Implicit attitudes as measured by the IAT, but *not* the EAST, differed as a function of participant sexual orientation. Specifically, both groups produced in-group implicit biases on the IAT. Furthermore, on the explicit measures gay men and lesbian women reported

more positive attitudes toward homosexuality than heterosexuals. Consistent with Banse et al. (2001), the IAT correlated weakly with explicit cognitive attitudes toward homosexuality but strongly with affective attitudes, suggesting that the IAT captures spontaneous evaluative cognitions. The correlations observed for the IAT, but not the EAST, provided support for the validity of the IAT while the EAST failed its challenge to offer an alternative measure of implicit bias.

Sequential Priming. Another alternative to the IAT, which has been offered recently, is the Sequential Priming Procedure. Similar to the EAST, it does not share the IAT's limitation of being a relativistic measure because evaluations of target stimuli are based upon associations between the target stimulus and its preceding prime alone. Only one published study has employed sequential priming as a measure of implicit attitudes to homosexuality (Meir, Robinson, Gaither & Heinert, 2006). Specifically, these authors developed the procedure to assess: (a) the moderating influence of self-deception on heterosexual males' implicit attitudes toward gay men; and (b) implicit cognitive reactivity to images of gay sexual activity.

In the Sequential Priming Procedure heterosexual males were presented with a prime stimulus followed by a reaction-time measurement of their target stimulus evaluations. There were two categories of primes (i.e., A = images of clothed or semi-clothed gay couples in sexual poses and B = images of neutral objects such as a chair or a lamp). A single prime was presented on each trial. Participants were invited to categorize the primes vocally as either "Gay" or "Neutral" with both speed and accuracy. Immediately following the prime categorizations, a positive (e.g., "great," "good") or negative (e.g., "awful," "bad") target word appeared on the screen. Participants were

instructed to categorize the words as ‘positive’ or ‘negative,’ again with speed and accuracy, by pressing the appropriate response key. Reaction times were assessed on the basis of four conditions: gay/positive, gay/negative, neutral/positive, and neutral/negative. If presentation of the gay prime resulted in faster categorizations of positive as opposed to negative target words, this was assumed to indicate that the participant had a positive bias toward the gay prime. In contrast, if the gay prime resulted in faster categorizations of negative rather than positive targets, this was assumed to be evidence of a negative bias toward the gay prime. Participants also were exposed to a picture viewing-time task that measured time spent viewing images of gay and heterosexual sex. Self-reported self-deception and attitudes toward homosexuality were assessed via questionnaires.

Consistent with research using the IAT for the assessment of implicit homonegativity, participants generally produced implicit and explicit in-group biases. Additionally, implicit and explicit homonegativity were evident in participants who were high (as opposed to low) in self-deception. Participants who were both high in self-deception and explicitly anti-gay spent less time viewing images of gay sex in the viewing-time task in comparison to those reporting low levels of self-deception. The findings suggest that anti-gay individuals with high levels of self-deception react to images of gay sex in a homo*phobic* aversive manner, while anti-gay individuals with low levels of self-deception react to such images in a homo*negative* manner.

Interim Summary and Conclusions

In general, implicit attitudes as measured by the IAT and the Sequential Priming Procedure (but not the EAST) differed as a function of group status. Heterosexual in-group implicit biases were repeatedly shown. Non-heterosexuals repeatedly produced weak in-group to neutral implicit homonegative biases. In contrast, both groups produced clear in-group biases on the explicit measures. Support for the theoretical distinctiveness of implicit and explicit attitudes was provided, such that the majority of studies showed weak and diverging implicit-explicit attitude relationships. Additional analyses of the EAST and Sequential Priming Procedure's reliability and validity are needed. Furthermore, additional analyses will be needed to test the controllability of these measures and their vulnerability to motivational influences.

Before introducing the background to the research reported in the current thesis, two general issues arising from the foregoing review seem important.

Failures to conceptually and operationally define sexual orientation. Despite attempts to investigate known-group validity, many, indeed most, researchers failed to address in any clear or systematic way the operational and/or conceptual definition of participant sexual orientation. Although, some of the studies reviewed here *did* employ a single-dimension self-identification assessment of sexual orientation (e.g., on a Kinsey-type bipolar scale), this method has been heavily criticized as an over-simplification. Specifically, many have argued that self-identification focuses solely on the identity-dimension but fails to consider other relevant dimensions (e.g., Chung, & Katayama, 1996; Coleman, 1987; Klein, Sepekoff, & Wolf, 1985; Storms, 1980). Although there is agreement that object choice when forming sexual relationships appears relatively stable,

the objects that elicit sexual arousal appear to be fluid (e.g., Klein, et al., 1985). When sexual orientation is assessed categorically, approximately 10% of individuals identify as lesbian, gay or bisexual (Sell, Wells, & Wypij, 1995). Other individuals, however, appear to lie on a continuum or various continua (Blumstein & Schwartz, 1977; Brooks & Quina, 2009; Diamond, 2008a, 2008b; Mock & Eibach, 2012; Peplau & Garnets, 2000; Rosario, Schrimshaw, Hunter, & Braun, 2006; Ross, Daneback, & Mansson, 2012; Savin Williams, Joyner, & Rieger, 2012). Given the lack of consensus in the literature (cf. Berkey, Perelman-Hall, & Kurdek, 1990), it is not possible to make a 'definitive' recommendation regarding the 'best' measure for the assessment of sexual orientation. Nevertheless, it appears that multi-dimensional measures offer more conceptual complexity than simple self-identification measures. The research presented in the current thesis will attempt to address this concern.

Relationship between implicit and explicit attitudes. Within the domain of prejudice, a divergence between performance on implicit and explicit attitude measures has been viewed as evidence to support the theoretical distinctiveness of implicit and explicit cognitions (e.g., Greenwald & Banaji, 1995; Greenwald, McGhee, & Schwartz, 1998). A majority of the studies reviewed here, revealed diverging and weak relationships between implicit and explicit attitude measures. Interestingly, however, a number of medium to strong relationships also were observed. Although the findings appear contradictory, two types of variables (i.e., individual difference variables and procedural variables) may help to explain the conditions under which implicit and explicit attitudes are related.

First, attention was focussed, across studies, on the role of one individual difference variable in particular (i.e., motivation). Specifically, when participants were *internally* motivated to control their prejudice (e.g., Lemm, 2006) at a *low* level (e.g., Banse, Seise, & Zerbes, 2001), implicit and explicit attitudes were shown to correlate. Conversely, when participants were *internally* motivated but at a *high* level, implicit and explicit attitudes diverged (e.g., Gabriel, Banse, & Hug, 2007). Second, the procedural variable that may account for the presence or absence of a relationship between implicit and explicit attitudes is the type of explicit or implicit measure employed. Consistent with the view that implicit measures tap affective or evaluative cognitions (e.g., Wilson, Lindsey, & Schooler, 2000), strong relationships between explicit *affective* and implicit attitudes were observed (e.g., Banse, et al., 2001). Furthermore, relationships between implicit and explicit attitudes were shown only in studies that employed the IAT as a measure of implicit homonegativity, whereas studies that employed the EAST and the Sequential Priming Procedure showed weak and diverging relationships. The research presented in the current thesis will also investigate the relationship between implicit and explicit attitudes towards sexual orientation.

Chapter 2: Behaviour Analysis, Attitudes, Relational Frame Theory, the Implicit Relational Assessment Procedure and the Relational Elaboration and Coherence (REC) Model

The previous chapter detailed the mainstream approach to the measurement of explicit and implicit anti-gay attitudes. A particular emphasis was focused on the Implicit Association Test (IAT), the gold standard approach to the measurement of implicit attitudes. Several important limitations inherent in the IAT were noted. The current chapter will introduce an alternative measure of implicit attitudes, namely the Implicit Relational Assessment Procedure (IRAP), which seems to address some of the limitations outlined earlier. Conceptually, the IRAP emerged from a different psychological tradition, behaviour analysis, to that which gave rise to the IAT. What follows is an account of the behaviour analytic approach to psychology and more specifically to attitudes. The final part of the chapter will provide a detailed account of the IRAP and some of the research that has used the IRAP for the measurement of implicit attitudes across a wide variety of domains.

Behavior Analysis

The central postulate of behaviorism is that there can be a science of behavior (Baum, 1994). Thus, behaviorism is a *philosophy* of science. The scientific approach to studying the behavior of organisms has come to be known as behavior analysis (Leslie & O'Reilly, 1999). Put simply, behavior analysis is the study of behavior and the variables that influence behavior (Grant & Evans, 1994). As such, it is an active and productive discipline within the general field of psychology. According to behavior analysis the goal of the scientist is to predict and influence behavior (both overt and covert), defined as any and all activities that an organism can engage in (Grant & Evans, 1994). Behaviour

analysis focuses on specifying functional relationships between manipulable independent variables (IV) found in the environment and behavior (dependent variable [DV]; see Baer, et al., 1968, 1987). When relevant manipulable variables are identified, the scientist then has the potential to influence and change the functionally related behavior as desired (Grant & Evans, 1994). The taxonomy on functional relations produces a scientific description of behavior, without appeal to internal mental events or hypothetical constructs (Baum, 1994; Grant & Evans, 1994). It allows for the application of the same experimental analyses to both overt and covert behaviors and avoids what, from a behavioral perspective, might be referred to as the "explanatory fictions" of the mind and mental states (Nye, 1975).

The behavior-analytic approach to psychology avoids using mentalistic concepts, such as attitudes, as explanations for behavior (Day, 1980; Grant & Evans, 1994). However, the functional relationships that are involved in behaviours that are typically taken as indicators of attitudes do require systematic empirical analysis. One area of behavior analysis that is particularly relevant in this regard is the study of derived stimulus relations.

Relational Frame Theory

Relational Frame Theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001) is a modern behavior analytic approach to human language and cognition that has emerged within the last 20 years. RFT is an explicitly psychological theory that aims to develop an adequate behavioral psychology of human language and cognition that is functional, empirically based and of practical utility (Hayes & Barnes-Holmes, 2004). Relational

Frame Theory is derived from investigations of derived relational responding (Hayes et al., 2001). Sidman (1971) was the first to alert researchers to the phenomenon that has since become known as derived relational responding. In other words, Sidman demonstrated the emergence of novel behavior that had not been directly trained or reinforced. Having trained participants in a series of related conditional matching performances using arbitrary stimuli, Sidman showed that several untaught performances emerged according to a pattern which he called "stimulus equivalence".

For example, if a participant was taught to choose arbitrary stimulus B in the presence of arbitrary stimulus A, and to choose arbitrary stimulus C in the presence of arbitrary stimulus B -- then several untrained performances would typically emerge, including choosing A given B and B given C, thus reversing the taught relations (referred to as symmetry) and choosing C given A (transitivity) and A given C (combined symmetry and transitivity). Sidman named the overall pattern 'stimulus equivalence' because the participant appeared to be responding to the stimuli as mutually substitutable or equivalent. An entire research program headed by Sidman devoted to the study of stimulus equivalence subsequently emerged (see Sidman, 1994, for a review).

The phenomenon of stimulus equivalence generated much excitement within behavior analysis because it suggested a means by which to greatly expedite response repertoires. A more compelling motivation to further explore the phenomenon, however, was provided by empirical research that suggested a strong link between stimulus equivalence and human language across a variety of contexts (Barnes-Holmes, Barnes-Holmes, Smeets, Cullinan, & Leader, 2004; Cowley, Green, & Braunling-Mc Morrow, 1992; Devany, Hayes, & Nelson, 1986; Kendall, 1983; Wulfert & Hayes, 1988). Barnes

(1994) detailed the following five specific research areas that provide empirical support for the link between stimulus equivalence and human language. First, whereas derived equivalence is readily demonstrated by verbally-able humans, it has not been unequivocally demonstrated by nonhumans or by non verbally-able humans (Barnes, McCullagh, Keenan, 1991; Devany et al., 1986; Dugdale & Lowe, 2000; Hayes, 1989; Sidman & Tailby, 1982). Second, learning to name stimuli may facilitate equivalence responding in young children (Dugdale & Lowe, 2000). Third, equivalence procedures can be used for treating language impairments in verbally disabled humans (e.g., Cowley, Green, & Braunling-McMorrow, 1992). Fourth, stimulus equivalence has been used to develop a behaviour-analytic interpretation of both symbolic meaning and the generative nature of grammar (Barnes & Holmes, 1991; Barnes-Holmes, Barnes-Holmes, & Cullinan, 2000; Hayes & Hayes, 1989; Wulfert & Hayes, 1988). Finally, equivalence phenomena have been applied to human verbal behaviors such as social categorization (e.g., Roche & Barnes, 1996; Watt, Keenan, Barnes, & Cairns, 1991) and logical reasoning (Barnes & Hampson, 1993). Additionally, neuropsychological FMRI studies have revealed similar brain activation patterns during the formation of equivalence relations and the semantic processing underlying language (Dickins et al., 2001). Overall, the evidence suggests that the control exerted over behavior by stimuli participating in equivalence classes appears to parallel the control that verbal stimuli exert over human behavior (Hayes & Hayes, 1989).

Several theories have been advanced to account for the link between derived relations and language (e.g., naming theory; Horne & Lowe, 1997; Relational Frame Theory; Hayes, Barnes-Holmes, & Roche, 2001). From among these, Relational Frame

Theory (RFT) provides the most comprehensive account and has the most empirical support. According to RFT, derived stimulus relations constitute the core of what has been missing from an adequate behavioral account of human language (Hayes & Wilson, 1993). In accounting for derived equivalence relations, RFT appeals to the concept of arbitrarily applicable relational responding (Barnes-Holmes, Barnes-Holmes, Smeets, Cullinan, & Leader, 2004). This idea developed from the basic finding (now referred to as non-arbitrary relational responding) that organisms ranging from insects to primates can learn to respond to the *non-arbitrary* (i.e., formal) relations among stimuli (e.g., bigger than, darker than; see Reese, 1968). In addition, RFT assumes that given an appropriate history of multiple exemplar training, verbally-able humans are also capable of responding to *arbitrary* relations between and among stimuli (Hayes, et al., 2001).

According to RFT, these latter relations are not defined by the formal properties of the stimuli involved but by some other features of the *context* outside of the stimuli being related (Hayes, et al., 2001). To illustrate, imagine that I show a 'normally' developing child a picture of a cat (stimulus A) and say "This *is* a cat" (stimulus B). I might also tell the child that a cat (stimulus B) makes the sound "mee-ow" (stimulus C). RFT proposes that the presence of contextual cues such as the spoken word "*is*" can bring a repertoire of arbitrarily applicable relational responding to bear on the stimuli such that the child will thereafter treat them as "going together" and can derive novel relations between the stimuli that were not explicitly trained. For example, if I later show the child pictures of different animals and ask "Which one says 'mee-ow'?" then cat might readily be pointed out, even though this is an untrained (i.e., novel or generative) response.

RFT contends that this kind of performance is based on a history of reinforcement for responding relationally to pictures and words (and vice versa), and indeed to other pairs of objects in the presence of contextual cues (such as "*is*") that serve to control the relational response. Furthermore, following a history of training across multiple exemplars, the process of relating becomes so abstracted (i.e., a process of refinement) that it can be arbitrarily applied to any stimuli (Hayes, et al., 2001). This process of arbitrarily applicable relational responding has also been referred to as relational framing, rooted in the metaphor of an empty frame in to which any content may be placed.

From an RFT perspective, stimulus equivalence represents an instance of relational framing that is brought to bear by a certain feature of the context in which the task occurs, including the training context itself (Hayes, et al., 2001, p26). For example, the matching to sample context in which one is trained to pick a stimulus consistently in the presence of another stimulus can itself function as a contextual cue signaling that the two stimuli are the same. Consequently, further relational responses will be derived. According to RFT, this particular type of relational framing is framing in accordance with the relation of coordination or sameness. RFT allows for many diverse forms of relational framing including opposition, distinction, comparison, hierarchy, perspective, etc. and the properties of the derived relational responses involved vary widely (Barnes, 1994). For example, a frame of opposition has the property that an opposite of an opposite is the same, an opposite of an opposite of an opposite is an opposite, and so on (Hayes Barnes-Holmes, & Roche, 2001). Overall therefore, RFT is broader in scope than stimulus equivalence.

All forms of relational framing are characterized by three defining properties -- namely mutual entailment, combinatorial entailment and transformation of stimulus function (Hayes, Barnes-Holmes & Roche, 2001). The term mutual entailment reflects the fundamental bi-directionality of relational responding (Hayes et al., 2001). Specifically, if X is related to Y in a given context, then a relationship between X and Y is entailed. The relationship between the stimuli can be symmetrical (i.e., as in the case of equivalence or coordination), but this is not always the case. For example, if X were smaller than Y, the relationship is not symmetrical but rather is mutually entailed, yielding two separate relations; "X is smaller than Y" and "Y is bigger than X" (Hayes et al.).

The term combinatorial entailment refers to derived stimulus relations involving two or more sets of relations. Without combinatorial entailment it would be impossible to define the relevant forms of relational frames (Hayes et al., 2001). Specifically, if in a given context X is related to Y and Y is related to Z, then a relation is entailed between X and Z and conversely, Z and X. This property may include, but is not limited to, the transitive relations found in stimulus equivalence. For relations that are mutually entailed, the specified relationship between X and Y always entails a relationship between Y and X at the same level of precision. With combinatorial entailment, however, the derived relationship may be less precise than the original relationship. For example, if X is different to Y and Y is different to Z, it follows that the relationship between X and Z and Z and X is unknown. Indeed, the unknown nature of the latter relationships, themselves constitute stimulus relations.

Finally, the term transformation of stimulus function refers to the transformation of any psychological function associated with one of the stimuli involved in a relational frame to any or all of the other stimuli participating in that frame (Barnes, 1994; Hayes et al., 2001; Hayes & Wilson, 1993). The functions are always transformed in accordance with the relational frame involved. Specifically, if two stimuli participate in a frame of comparison, such that stimulus X is "more than" stimulus Y, and stimulus Y is known to have an aversive function, then stimulus X will acquire a stronger aversive function than Y.

From an RFT perspective, the three defining properties of relational framing constitute the core of what has been missing from an adequate behavioral account of stimulus equivalence and human language (Hayes & Wilson, 1993). Specifically, the specification of these three processes as central to understanding language provides a means of studying language and other complex forms of behavior in purely *functional* terms (Hayes, et al., 2001). From this perspective, languaging or verbal behavior constitutes the action of framing events relationally (Hayes et al., 2001, p.43). Furthermore, both the speaker and the listener engage in this process (Hayes & Hayes, 1989). When the speaker does so they are speaking with meaning, and when a listener does so, they are listening with understanding (Hayes & Wilson, 1993). Critically, it is the framing of these events that indicates that the behavior is verbal for the speaker and listener (Hayes & Wilson, 1993). Thus, verbal meaning is not a mental event; it is a highly specified behavioral process (Hayes & Barnes- Holmes, 2004). Similarly, a verbal stimulus is a stimulus that has its functions, in part, because it participates in relational frames (Hayes, et al., 2001).

In summary, RFT "provides an alternative, behavior-analytic approach to verbal events that is theoretically consistent, is built on existing principles, is in contact with some of the latest empirical evidence, and is fully subject to behavior analysis directed toward prediction and control" (Hayes & Wilson, 1993, p. 228). Critically, the provision of an appropriate behavioral account of language has facilitated a behavioral approach to the study of the verbal phenomenon of attitudes.

Relational Frame Theory and Attitudes. From an RFT perspective, attitudinal behavior is verbal responding with respect to an attitude-object that involves transformation of the "evaluative" stimulus functions of that object. The first empirical behavior analytic study designed to model attitudes as verbal phenomena was conducted by Grey and Barnes (1996). The study, comprising two experiments, sought to examine the contribution of stimulus equivalence to the formation of attitudes towards novel stimuli that had not previously been directly paired with an attitude-forming event. In Experiment 1, participants were trained using a match-to-sample procedure using nonsense syllable stimuli to form three three-member equivalence relations (i.e., A1-B1-C1; A2-B2-C2; A3-B3-C3). One member from two of these classes (B1 and B2) was placed on a label affixed to one of two video cassettes. The (viewed) videos depicted either a romantic or a religious scene. Subsequently, participants were presented with four new videos that were labeled with the remaining nonsense syllables from the equivalence training (i.e., A1, C1, A2, C2). Next, participants were asked to categorize the four unseen videos as "good" or "bad". As the content had not been directly experienced, the purpose of this task was to examine the influence of their participation in equivalence classes. In other words, the task modeled a phenomenon in which an

individual forms an attitude about a novel object for which they have no history of reinforcement or direct experience. Results indicated that participants acquired attitudes towards the unseen videos that were in accordance with the derived equivalence relations with their evaluations of the originally viewed videos.

In a subsequent experiment, the researchers demonstrated a stimulus equivalence model of attitude formation and change. First, contextual control through equivalence relations was incorporated into the procedure to determine if performance on the categorization tasks could be manipulated. Specifically, match to sample training was provided such that the phrases “moral content” and “dramatic presentation” became members of two separate equivalence relations along with a number of arbitrary stimuli. Participants were subsequently tested in these derived stimulus relations. Next, participants were presented with a violent sexual video that was labeled with one of the nonsense syllables in the remaining relation from the equivalence training (i.e., B3). Finally, participants were exposed to the same categorization tasks from Experiment 1. The results revealed that the categorization of the videos came under the contextual control of two arbitrary stimuli because of their participation in equivalence relations with the two phrases (i.e., “moral content” and “dramatic presentation”). For example, when a participant was asked to categorize a sexually violent video given a contextual cue that participated in an equivalence relation with “moral content”, the video was categorized as “Bad.” But when the cue was equivalent to “dramatic presentation” the video was categorized as “Good”

In addition, Grey and Barnes (1996) demonstrated that watching the sexually violent content altered the evaluative functions exercised by some of the videos.

Specifically, participants that categorized the videos with sexual content as morally bad in the first categorization task, no longer retained this classification after watching the sexually violent material. That is, participants changed their attitudes towards other stimuli in this response class. In summary, Grey and Barnes provided a basic empirical model of the formation of attitudes as a transformation of evaluative stimulus functions through stimulus equivalence -- and suggested that contextually controlled transfer, in particular, may explain social psychological findings in which people report different attitudes on the same issues in different contexts (Eagly & Chaiken, 1993).

Other researchers have since conducted behavior analytic explorations of attitude formation and change. For example, Moxon, Keenan, and Hine (1993) applied the stimulus equivalence paradigm to the examination of gender-role attitudes, and Roche, Barnes, and Smeets (1997) provided an experimental analogue of attitude formation and change that advanced the work of Grey and Barnes (1996).

The RFT approach to analyzing attitudes as verbal behavior has been shown to be relevant to the unveiling of prejudicial and other socially sensitive attitudes. In the early 1990s, a behavior analytic study sought to examine the sensitive topic of religious categorization (Watt, Keenan, Barnes, & Cairns, 1991). Two samples of adult participants, (i.e., a population living in Northern Ireland and a population of English participants not living in Northern Ireland) were exposed to match-to-sample training. The training involved matching Catholic family names and nonsense syllables (A-B training) and matching nonsense syllables and Protestant symbols (B-C training). In Northern Ireland, the verbal community frequently categorizes specific family names and symbols with either the Protestant or the Catholic religions. This type of categorization

would rarely be undertaken by English participants. In the critical equivalence test (C-A relations) participants were required to match the Protestant symbols directly to the Catholic names. All participants successfully completed the training phase; the English participants completed the equivalence test but several Northern Irish participants failed it. In effect, the socially sensitive verbal relations, previously established within the Northern Irish verbal community, appeared to disrupt the formation of laboratory-induced equivalence relations. This approach has also been employed in studies that seek to; (a) discriminate between anxious and non anxious patients (Leslie, Tierney, Robinson, Keenan, Watt, & Barnes, 1993); (b) assess participants' attitudes towards themselves (Barnes, Lawlor, Smeets, & Roche, 1996); (c) assess attitudes of North Americans to Middle Easterners (Dixon, Dymond, Rehfeldt, Roche, & Zlomke, 2003); and (d) develop a diagnostic tool to identify children who have been sexually abused (McGlinchey, Keenan, & Dillenburger, 2000).

Relational Frame Theory, the IAT and the IRAP

It has been argued (Barnes-Holmes, et al., 2006) that the behavioural processes captured by equivalence-based procedures in the study of attitudes are broadly similar to those processes that are involved in the IAT (see Chapter 1 for a full description of the IAT). The core argument is that the typical IAT effect (i.e., faster average response latencies for pairing of consistent [e.g., Flowers + Good, Insects + Bad] than for pairing of inconsistent [e.g., Flowers + Bad, Insects + Good] stimuli) occurs because participants are required to respond to functionally similar equivalence classes as functionally equivalent during the consistent task but are required to respond to functionally

nonequivalent classes as functionally equivalent during the inconsistent task. In effect, responses are slower for the inconsistent task because they involve responding against previously established derived or verbal relations (O'Toole, Barnes-Holmes, & Smyth, 2007). Broadly speaking, this is the same behavioral explanation that was provided by Watt, Keenan, Barnes, & Cairns (1991) for the disruption of equivalence class formation when the stimuli participated in mutually exclusive verbal categories such as Catholic and Protestant.

The methodological basis for the development of the IRAP was provided for by the IAT (see Barnes-Holmes, Hayden, Barnes-Holmes, & Stewart, 2008) and an early RFT-based procedure known as the Relational Evaluation Procedure (REP; Barnes-Holmes, Healy, & Hayes, 2000; Hayes & Barnes, 1997). The REP requires that participants evaluate, or report on, the stimulus relation that is presented on a given trial. For example, two identical shapes might be presented with the relational terms "Same" and "Opposite," and participants are required to indicate, typically *without time pressure*, that the relation is "Similar." Several studies employed the REP in the analysis of relational responding in adult humans (Cullinan, Barnes, & Smeets, 1998; Cullinan, Barnes-Holmes, & Smeets, 2000, 2001; O'Hora, Barnes-Holmes, Roche, & Smeets, 2004; O'Hora, Pelaez, & Barnes-Holmes, 2005; Stewart, Barnes-Holmes, & Roche, 2002, 2004). Indeed, initially, the IRAP was called the IREP but the former acronym was soon adopted because it can be read as "I rap", as in "I talk quickly", which theoretically is what the IRAP asks of the participant.

Unlike the IAT (and EAST and Sequential Priming) *each* trial of the IRAP asks participants to confirm or deny a specific attitude or belief directly, by responding to a

previously established verbal relation between a label stimulus (word, statement or picture) and a target term (e.g., Gay – Normal = Similar or Opposite?). In brief, the IRAP requires participants to respond accurately *and* quickly in ways that are either consistent or inconsistent with their putative attitudes. Theoretically, it is assumed that overt relational responses defined as consistent on the IRAP will be preceded by incipient or private responses that occur at a higher probability than those responses defined as inconsistent; the probability of such responses is assumed to be determined by historical and current contextual variables. The basic rationale is that participants' should respond more quickly on tasks that reflect their attitudes than on tasks that do not, because incipient relational responding will coordinate more frequently with the consistent overt responding. In other words, during inconsistent trials participants' responding is expected to be slower, as they respond against their more probable incipient relational responses. The extent of the observed difference between consistent and inconsistent trials is assumed to provide an index of the strength of the specific attitude being assessed (see Barnes-Holmes, Murphy, Barnes-Holmes, & Stewart, 2010; Cullen, Barnes-Holmes, Barnes-Holmes, & Stewart, 2009; for an extended discussion).

The first study to employ the IRAP (Barnes-Holmes, Hayden, Barnes-Holmes, & Stewart, 2008) involved presenting four words on each trial – a label stimulus (i.e., "Pleasant" or "Unpleasant"), a positively or negatively valenced target stimulus (e.g., "caress" or "hate"), and two relational terms (i.e., "Similar" and "Opposite"). The response-contingent feedback for consistent blocks of trials coordinated with previously established relations, but opposed such relations during inconsistent blocks. Predictably, response latencies were shorter for consistent than for inconsistent trials (e.g., participants

responded more quickly to Unpleasant-Hate–Similar than to Unpleasant–Hate--Opposite).

More recently, in a study of implicit ethnocentrism, white Irish participants were exposed to blocks of IRAP trials that involved responding in a manner consistent with a pro-white stereotype and to other blocks of trials that involved responding in accordance with a pro-black stereotype (Barnes-Holmes, Murphy, Barnes-Holmes & Stewart, 2010, Experiment 2). Specifically, the IRAP involved presenting one of two sample stimuli, "Safe" or "Dangerous" and two sets of target stimuli -- one set comprised images of black people (e.g., three color photographs of black men holding guns) and the other comprised images of white people (e.g., three color photographs of white men holding guns). All six men were wearing plain white t-shirts and were standing in front of the same red-brick background. The response options "True" and "False" appeared at the bottom of the screen.

The IRAP involved presenting each set of target terms with both samples and thus four different trial-types were created (i.e., Safe-White; Dangerous-White; Safe-Black; Dangerous-Black). Participants were required to respond as quickly and accurately as possible to the relation between the sample and target terms by pressing the appropriate response key in order to choose one of the two response options (i.e., 'True' or 'False'). The results revealed a significant in-group pro-white effect on the *Safe-White* IRAP trial type; that is, participants responded more quickly to *Safe-White-True* than to *Safe-White-False.* In addition, a significant out-group anti-black effect was shown on the *Dangerous-Black* trial type (i.e., responding more quickly to *Dangerous-Black-True* than to *Dangerous-Black-False*). In contrast, no significant effects were observed on the

remaining *Dangerous-White* and *Safe-Black* trial types. Critically, the fact that the IRAP produced these *separate* trial type effects indicates the advantage of the IRAP over the IAT. Specifically, the results showed that participants only showed an anti-black effect when the Black men were presented with negative terms and a pro-white effect when White men were presented with positive terms. In contrast, an IAT could only reveal that white was preferred to black.

The fact that the IRAP permits a more fine-grained analysis of implicit biases may provide a clearer analysis of the impact of interventions designed to bring about changes in attitudes. Indeed, this was demonstrated in a recent study that sought to examine the malleability of age-related implicit biases (Cullen, Barnes-Holmes, Barnes-Holmes & Stewart, 2009; Experiment 2). Specifically, the study, which was an analogue of prior IAT based work conducted by Dasgupta and Greenwald (2001), assessed whether exposure to pro-old/anti-young exemplars prior to an ageism IRAP, would result in a change in the effects for both young and old IRAP trial types, or a change for one but not the other trial type[4]. More specifically, some of the participants were first exposed to pro-old exemplars (pictures of admired elderly/disliked young individuals). A subsequent IRAP involved presenting one of two sample stimuli—"young people" or "old people"—and a target stimulus, which was either a negative stereotypical term for old people (e.g., "slow," "tired," "stagnant") or a positive term for young people (e.g., "enthusiastic," "energetic," "creative"). The results indicated that the effect of pro-old exemplar training differentially affected implicit attitudes to *young* and *old* by slightly weakening the pro-young but completely reversing the anti-old bias and the effect endured for twenty-four hours. In effect, the anti-old bias appeared to be more malleable than the pro-young bias.

[4] In Experiment 1 of the study reported by Cullen, et al. the IRAP showed a pro-young bias.

Once again, the standard IAT could not provide this level of analytic detail because it yields only one overall relative bias score. In contrast, the IRAP showed the effect of exemplars on responding to young and old independently.

A second IRAP malleability study (Barnes-Holmes, Murphy, Barnes-Holmes & Stewart, 2010), provided a conceptual replication of the Boysen, Vogel, and Madon, (2006) homonegativity IAT study (discussed in chapter 1) using a 3000ms IRAP to explore the impact of a public versus private manipulation of assessment context on implicit racism (i.e., *black* versus *white*). In the public assessment context participants were personally identifiable. Specifically, the experimenter sat beside participants while the task was being completed and informed them that their levels of bias on the IRAP would be observable. In addition, participants in the public context were required to provide each of their self-reported questionnaire responses openly to the experimenter. In contrast, participants in the private assessment context performed the task in private and were assured of confidentiality. They were confident that the experimenter would not look at their IRAP scores or self-report measures in any way that would be identifiable and they were further asked not to include any personally identifying information.

Surprisingly, the results indicated that in private, participants showed a significant pro-black implicit bias on the IRAP, while in public they showed a significant pro-white implicit bias. A further investigation was conducted to examine if responding in a public context, but with a more restricted latency criterion (i.e., 2000ms), would impact significantly upon implicit racism. The public context data from Experiments 1 and 2 were compared and revealed stronger pro-white biases and an anti-black bias in the latter experiment. Explicit racial attitudes, however, were positive/neutral. These findings

highlighted the importance of increasing 'automaticity' on the IRAP via reducing response latency for the detection of implicit bias in socially sensitive domains.

In summary, relatively recent research has examined the malleability of implicit ageist and racist responses by investigating the effect of exemplar exposure prior to an IRAP and manipulating the assessment context in which an IRAP is undertaken. Barnes-Holmes et al. (2010) highlighted the importance of increasing 'automaticity' on the IRAP via reducing response latencies – an issue that will be further explored in the current thesis. At the time of writing, no published IRAP study had investigated the malleability of implicit homonegativity; either via prior exemplar intervention or via manipulations of the assessment context in which the task is undertaken. The work presented in the current thesis, therefore, will use the IRAP to further explore these issues.

The basic IRAP effect has now been replicated across an increasing number of other studies, which have shown that the IRAP; (i) compares well with the IAT as a measure of individual differences (Barnes-Holmes, Murtagh, Barnes-Holmes, & Stewart, 2010; Barnes-Holmes, Waldron, Barnes-Holmes, & Stewart, 2009), (ii) is not easily faked (McKenna, Barnes-Holmes, Barnes-Holmes, & Stewart, 2007), (iii) may be used as a measure of implicit self-esteem (Vahey, Barnes-Holmes, Barnes-Holmes, & Stewart, 2009), and (iv) produces effects that clearly diverge from those obtained from explicit measures when targeting socially sensitive attitudes (Dawson, Barnes-Holmes, Gresswell, Hart, & Gore, 2009; Power, Barnes-Holmes, Barnes- Holmes, & Stewart, 2009; Roddy, Stewart, & Barnes-Holmes, 2010). In short, therefore, a growing range of studies have demonstrated that the IRAP provides considerable promise as a measure of implicit attitudes. Critically, a recent meta-analysis of the extent to which IRAP effects

correlate with relevant criterion variables in the clinical domain has shown that it compares favorably with all other implicit measures, including the IAT (Vahey, Nicholson, & Barnes-Holmes, 2015). Before introducing a summary of the research to be reported in the current thesis, it seems important to provide a brief outline of the Relational Elaboration and Coherence (REC) model (Barnes-Holmes, et al., 2010; Cullen, et al., 2009), a theoretical account that seeks to provide a well-defined conceptual basis for the effects that have been obtained with the IRAP.

The Relational Elaboration and Coherence Model

The REC model is an RFT based, functional account of implicit and explicit biases. A core aspect of this account is the notion that relational responses develop over time. Thus, when a stimulus is encountered, a relational response will occur relatively quickly, and this may be followed by additional relational responses. These additional relational responses may occur as a response to the stimulus itself or be directed toward the initial response to the stimulus. Given enough time, these additional relational responses will likely form a coherent relational network. In short, relational responding may be brief and immediate or it can be extended and elaborated.

According to the REC model, brief and immediate relational responding forms the basis for implicit bias[5]. In particular, the REC model assumes that specific IRAP trials may produce an immediate and relatively brief relational response before the participant actually presses a response key. By definition, the most probable immediate response will

[5] Although conceptually distinct, the preferred behavioural terms 'brief and immediate relational responding' and the terms 'implicit' and 'automatic' will be used interchangeably throughout the current thesis to refer to the biases captured on the IRAP, IAT and other reaction-time based implicit measures. Similarly the behavioural terms 'elaborated and extended relational responding' and the terms 'explicit biases/attitudes' will also be used interchangeably (see Hughes, Barnes-Holmes, and Vahey, 2012).

be emitted first most often, and thus any IRAP trial that requires a key press that coordinates with that immediate response will be emitted relatively quickly; if, however, an IRAP trial requires a key press that opposes the immediate relational response, then it may be emitted less quickly. Critically, the REC model assumes that the probability of the initial brief and immediate relational response on the IRAP will often be determined by the verbal history of the participant and current contextual variables (Barnes-Holmes, et al., 2010; Cullen, et al., 2009)

In addition, the REC model assumes that responses to explicit measures likely reflect relatively elaborate and coherent relational responding. In other words, when asked to express an attitude or belief on a particular issue, it is likely that a person will produce a relational response that coheres with one or more other relational responses in his or her behavioral repertoire (see Barnes-Holmes, Hayes, & Dymond, 2001). Imagine, for example, that a participant indicated that "gay people are healthy" on a semantic differential. This simple relational response would likely cohere with other relevant relational networks, such as "My gay friend is constantly exercising in the gym," or "The lesbian couple living next door are vegetarians," and/or "I am not homophobic." Critically, explicit measures typically are not completed under high time pressure, and thus participants have sufficient time to engage in the extended relational responding that is needed to produce a response that coheres with one or more other relational responses. When exposed to the IRAP, however, the impact of a participant's elaborated relational responding would be absent or much reduced because there is insufficient time, on a trial-by-trial basis, to engage in the additional and sometimes complex relational activity that serves to generate a relationally coherent response.

A core aspect of the REC model is the notion that immediate or automatic evaluative responses may or may not cohere with subsequent relational responding; when they cohere, so-called implicit and explicit biases will typically converge, but when they do not, they will typically diverge. In other words, it is assumed that participants typically "reject" their immediate and brief relational responses (or automatic evaluations) if they do not cohere with their more elaborate and extended relational responding.

The Current Research

At the time of writing, only one publication had reported a preliminary attempt to use the IRAP as a measure of implicit homonegativity (Cullen & Barnes-Holmes, 2009, which constituted an early pilot study for the research reported in the current thesis). As outlined in the previous chapter, however, numerous studies using implicit measures (IAT, EAST and semantic priming) have investigated this area of implicit bias. The purpose of the research reported in the current thesis, therefore, was to design, develop and refine an IRAP that could be used as a reasonably reliable and valid measure of implicit homonegativity. An additional purpose of the current research was to provide the first systematic analysis of implicit homonegativity in Ireland. Specifically, the IRAP will be used to explore implicit homonegativity across five empirical studies focusing on: (a) its malleability as a result of situational/context manipulation effects and prior exposure to gay-related exemplars; (b) known-group differences and the implications of sensitive multi-dimensional sexual orientation screening; (c) the impact of response latency restrictions; (d) the moderating impact of self-reported motivation to control

homonegativity on IRAP responses; and (e) the impact of single versus multiple labels on the IRAP.

In terms of a "roadmap" for the thesis, Chapter 3 presents the first empirical study of the doctoral research programme. This initial study directly explored the context sensitivity of the IRAP in a manipulation of a public versus private assessment situation. Chapter 4 presents the second study of the thesis, which investigated the impact of exposure to exemplars, prior to the IRAP, on levels of implicit homonegativity. Chapter 5 presents Study 3, which used a known groups methodology, to explore the predictive validity of the IRAP for the assessment of implicit homonegativity. In addition, Study 3 also explores sensitive multi-dimensional screening of participant sexual orientation as a moderator of implicit homonegativity. Chapter 6 presents the fourth study of the thesis, which further explored the predictive validity of the IRAP using known-groups for the assessment of implicit homonegativity. In particular, the study examined the impact of reducing the response latency restriction on the IRAP relative to the study reported in the previous chapter. Chapter 7 presents the fifth experiment, which involved a known-groups study to determine if the in-group implicit biases found for heterosexual (a typically strong bias) and sexual minority groups (a typically weak bias), found in IAT studies, would be replicated with the IAT in an Irish context. Chapter 8 presents the sixth and final experiment, which investigated the impact of single versus multiple labels on levels of implicit homonegativity as assessed via the IRAP. Chapter 9 provides a conclusion to the thesis with a review and discussion of the main findings across the six empirical studies.

Chapter 3: Assessing the Malleability of Implicit Homonegativity as a Result of a Public/Private Assessment Context Manipulation

Experiment 1

As discussed earlier, over the past 14 years numerous published studies have used reaction-time measures (i.e., the IAT and the Sequential Priming Procedure) for the assessment of implicit homonegativity, and have consistently reported heterosexual in-group implicit biases. In addition, the research findings have typically showed weak and diverging relationships between implicit and explicit homonegativity.

One variable that has been shown to moderate the relationship between implicit and explicit homonegativity is the assessment situation. Indeed, research has shown that participants frequently self-report more positive and less negative attitudes toward out-groups when assessed publicly as opposed to privately (e.g., Blanchard, Crandall, Brigham, & Vaughn, 1994; Plant & Devine, 1998). Critically, implicit measures are theorized to be less sensitive than explicit measures to such context effects (Greenwald & Banaji, 1995).

Empirical research, however, has shown that implicit homonegativity as measured via the IAT, has been found to be susceptible to variations of the assessment context in much the same way as explicitly assessed homonegativity (e.g., Boysen, Vogel & Madon, 2006). Specifically, in a study reported by Boysen, et al., study (discussed in Chapter 1) heterosexual participants, when assessed in private, produced pro-straight in-group implicit bias on the IAT, but showed reduced bias by more than half when assessed in a public context. The same pattern emerged on explicitly assessed attitudes. It appears,

therefore, that the IAT may share, with self-report measures, a vulnerability to variations of the assessment context in which biases are assessed.

At the time of writing, one published study had investigated the context sensitivity of the IRAP (albeit in the domain of racism) to a public/private assessment situation manipulation (Barnes-Holmes, Murphy, Barnes-Holmes, & Stewart, 2010) and this failed to replicate the effects reported by Boysen, Vogel, and Madon (2006) for the IAT. A pattern somewhat consistent with Boysen et al., emerged, however, with the explicitly assessed attitudes. As yet, no published IRAP study had investigated implicit homonegativity (but see Cullen & Barnes-Holmes, 2009; for published pilot data) or its malleability via manipulations of the assessment context in which the task is undertaken. In fact, across the published literature, many studies assessed implicit biases toward both lesbian women *and* gay men, while other studies focused on biases toward gay men *or* lesbian women only. In the context of designing an IRAP that could be used as a reasonably reliable and valid general measure of implicit homonegativity, it seemed prudent at the beginning of the research programme to identify non-stereotypical terms[6] representing *straight* and *gay* that in principle could apply to a straight or gay person without reference to gender. Specifically, in constructing the list for *gay people* it was deemed important to identify negative terms that in principle could also apply to a straight person. The converse was true for *straight people*, in that the terms chosen were positive and could in principle apply to a gay person.

One particular moderating variable that has been the focus of considerable research attention concerns motivation to control homonegativity. Boysen, et al. (2006)

[6] In contrast to the Boysen, et al., IAT study in which words and picture stimuli were used in combination, Experiment 1 of the current thesis employed *only* words as stimuli. This procedural departure from Boysen, et al., was influenced by evidence indicating that word stimuli inserted into an implicit measure appears to enhance implicit biases (Foroni & Bel-Bahar, 2010).

provided a direct manipulation of motivation via a public versus private assessment context manipulation. Typically, however, researchers have employed self-reported assessments of motivation to control homonegativity. As outlined in Chapter 1, the results have been somewhat mixed. The current experiment sought to investigate this variable and incorporated a self-report measure of motivation to control homonegativity with a view to conducting regression analyses, to determine if the relationship between IRAP responses and explicit responses are moderated by motivation to control homonegativity.

In conclusion, the first experiment reported in the current thesis sought to determine if manipulating the private versus public assessment context would impact upon implicit homonegativity as assessed via the IRAP in a manner consistent with that observed in the Boysen, Vogel, and Madon (2006) IAT study. Specifically, we predicted that consistent with research that has used the IAT and sequential priming in this domain, a pro-straight in-group implicit bias would be produced on the IRAP by participants in the private context. Further, we also sought to determine if any bias effects observed with the IRAP would be sensitive to a public/private manipulation. The current study also sought to explore the possible moderating influence of self-reported levels of motivation to control homonegativity on the IRAP. The final purpose of the current research was to provide the first systematic analysis of implicit homonegativity in Ireland.

Method

Participants

Sixty-three participants completed Experiment 1. Thirty-nine were randomly assigned to the Private condition and 24 were randomly assigned to the Public condition. Participants were a convenience sample of second year undergraduate psychology students attending the National University of Ireland, Maynooth. No data pertaining to participant sexual orientation were gathered because the experiment was conducted as part of an undergraduate psychology practical. Participants completed the experiment in a group setting in a large computer laboratory housed in the University's Department of Psychology.

Materials and Apparatus

Public versus private manipulation materials. Participants assigned to the public condition were provided with a form containing a written statement describing the general nature of the study. The statement read: "*You are about to take a measure of homonegativity on a computer. When you finish the test the computer will calculate the level of bias you have towards gay people on a scale from 0, meaning low bias, and 100, meaning the most bias possible. After I record your computer score, your bias will also be evaluated using some surveys"*. A space was provided underneath for (a) their name, and (b) an own-word interpretation of the statement. This procedure was implemented to ensure that participants understood and were aware that their level of bias toward gay people was being assessed via implicit and explicit measurement procedures. In effect, the statement was used as a means to elicit feelings of social desirability within the

public-context group, such that these participants may attempt to appear less homonegative on the IRAP and explicit measures.

In contrast to the Public condition, participants in the private context were provided with no information concerning the purpose of the IRAP or other measures, and were simply provided with envelopes for their completed explicit measures and were not asked to write their names or any identifying information on the materials. Note, however, that the experimenters used the participants' seating positions in the laboratory as a means of insuring that the data for the implicit and explicit measures for each participant were correctly identified.

Screening Measures

All participants completed the Cognitive Failures Questionnaire (CFQ; Broadbent, Cooper, FitzGerald & Parkes, 1982), which was administered to assess cognitive failure/fatigue and included 25 items (see Appendix F). All items were worded in the same direction. The scale used a five-point Likert scale (*1 = very often, 2 = quite often, 3 = occasionally, 4 = very rarely, 5 = never*), with total scores ranging from 0-100. Higher scores represent greater levels of cognitive failure. Internal consistency for the scale is typically high (Cronbach's alpha = .91) and it is stable over long periods of time, with a test-retest reliability rate of 0.82 (Wallace, Kass, & Stanny, 2002).

The 13 item Marlow-Crowne Social Desirability Scale – Short Form-C (MCSD-SF-C; Reynolds, 1982) was administered to assess socially desirable responding and self-presentational biases (see Appendix G). Eight items (1, 2, 3, 4, 6, 8, 11, 12) were assigned values of *T (true)* = 1 and *F (false)* = 2, and five items (5, 7, 9, 10, 13) were reverse scored where *T* = 2 and *F* = 1. The scale was summed with total scores ranging

from 13 to 26, with higher scores indicating a stronger tendency towards socially desirable responding. Due to the nature of the construct and measure, internal consistency typically ranges from .70 to .80.

Implicit Measure

Implicit Relational Assessment Procedure (IRAP). All participants completed the IRAP on personal computers with Intel Pentium 4 processors, QWERTY keyboards and standard 16" monitors. The IRAP software presented stimuli and recorded participants' responses. On each trial, one of two label stimuli ("Straight" or "Gay") and a single positive or negative target stimulus (e.g., "Safe" or "Dangerous") were presented by the program (see Figure 3.1 and Table 3.1). Two response options (i.e. "Similar" and "Opposite") were also presented on each IRAP trial. The positive and negative target stimuli were selected following a literature review that sought to generate a range of positive descriptors for straight people and stereotypically negative descriptors for gay people. In constructing the list for *gay people* it was deemed important to identify negative terms that in principle could also apply to a straight person. The converse was true for *straight people*, in that the terms chosen were positive and could in principle apply to a gay person. In addition, the IRAP software presented IRAP instructions and a consent form.

Explicit Measures

Semantic differentials scales. Participants completed 12 paper-based semantic differential scales (see Appendix H), six for gay people, and six for straight people. These 7-point scales (-3 to +3) were anchored at either end by the following polar-opposite adjective pairs (taken from the IRAP): decent – offensive, healthy – sick, unacceptable –

acceptable, dangerous – safe, natural – unnatural and abnormal – normal. Positive scores indicated a positive bias, negative scores indicated a negative bias, and a score of zero indicated no particular bias.

Feeling thermometer scales. Two separate paper-based feeling thermometers (see Appendix I, adapted from Dasgupta & Greenwald, 2001) were used to assess the favorability of participants' explicit feelings about straight and gay people[7]. Participants were asked to mark an appropriate position on a picture of a thermometer numerically labelled at 10º intervals from 0º (cold or unfavorable) to 99º (warm or favorable). Marking 50º on the thermometer was deemed to indicate no particular bias. Both the semantic differential scales and feeling thermometers were presented individually on A4-sized paper sheets.

Modern Homonegativity Scale (MHS: Morrison, Kenny & Harrington, 2005). This scale (see Appendix J), which exists in two parallel forms (one measuring modern prejudicial attitudes toward gay men [MHS-G] and the other focusing on lesbian women [MHS-L]) uses a five-point Likert scale *(1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree),* with total scores ranging from 10 to 60. Item 3 (i.e., "*Gay men/lesbian women do NOT have all the rights they need*") was reversed scored. Higher scores represent greater levels of Modern Homonegativity.

Motivation to Control Homonegativity Scale. Plant and Devine's (1998) internal and external motivation to respond without prejudice scale (IMS/EMS) was adapted such that motivations to control prejudice toward gay (as opposed to black people) were

[7] Additionally, attitudes toward *straight men, straight women, gay men, gay women/lesbians, bisexual people, bisexual men, bisexual women, Protestants, Catholics, Muslims, people who inject illegal drugs, people with AIDS, Black people, White people, Travellers, pro-life supporters, and pro-choice supporters* were assessed via feeling thermometer measures. The data are not discussed here.

assessed (see Appendix K). The instrument exists in two subscales. Specifically, one 5-item subscale (i.e., IMS) measures internal motivations to suppress homonegativity (due to internal/personal beliefs) and the other 5-item scale (i.e., EMS) focuses on external motivations (i.e., due to external/social pressures). Participants indicate their level of agreement with each item on a 9-point scale that ranges from *1 = strongly disagree* to *9 = strongly agree*, with total scores ranging from 5 to 45. Item 8 (i.e., "*According to my personal values, using stereotypes about gay men and lesbian women is OK*") was reverse coded. High scores on each scale reflect higher levels of that type of motivation.

Procedure

Upon entering the laboratory, participants were first required to sign a written consent form (see Appendix R), which assured them that they were free to discontinue participation at any time without incurring penalty. The experiment consisted of three phases. During Phase 1 participants were randomly assigned to either a Public or a Private Assessment Setting. Phase 2 involved exposure to the IRAP. In Phase 3 participants completed the screening measures (i.e., CFQ and MCSD-SF-C), the explicit measures of homonegativity (i.e., the semantic differential scales, feeling thermometers, and MHS-G/MHS-L), and a measure of motivation to control homonegativity (i.e., IMS/EMS)[8]. Participants completed the experiment in a group setting as part of an in-class undergraduate practical assignment.

Phase 1: Assignment to Public versus Private Assessment Setting

Participants assigned to the Private Assessment Condition were asked to place their completed questionnaires in a large sealed envelope and were further instructed *not*

[8] Evidence indicates that responding to an implicit measure prior to an explicit/self-report measure does not induce reactance or assimilation tendencies in self-report (Nosek, Greenwald, & Banaji, 2005).

to write any identifying information on any of the materials. They were told that the experimenter would *not* examine their scores immediately after they had completed the measures, with the implication being that it would not be possible to link levels of homonegativity to specific participants (because the questionnaires were gathered into a single jumbled pile at the end of the session).

In contrast, participants assigned to the Public Assessment Condition were given a "public" statement informing them about the general nature of the study. They were required to translate the statement into their own words and to write their names on the form before proceeding to the IRAP. Participants in the Public Assessment Condition were further told that the experimenter would examine their scores immediately after they had completed the measures, thus implying that the experimenter would be privy to each individual's level of homonegativity.

Phase 2: Implicit Measure

Implicit Relational Assessment Procedure (IRAP). Included in the IRAP computer program were on-screen standardized instructions, which participants read in their own time, pressing the space bar to move between screens. The instructions described the IRAP procedure and how to complete the task, emphasizing the need for both accuracy and speed. At no point, however, were the participants informed which tasks were deemed pro-straight or pro-gay.

On each trial of the IRAP, four stimulus words appeared on screen simultaneously. Specifically, for each trial a Label stimulus, either "Gay" or "Straight", appeared at the top-centre position of the screen with a single target word (e.g., "decent") that appeared in the mid-centre of the screen (see Table 1, for the stimulus arrangements

for all trial-types). The two relational terms, “Similar” and “Opposite”, appeared at the bottom left- and right-hand corners. The phrases “PRESS ‘d’ FOR”, and “PRESS ‘k’ FOR” appeared directly above the two relational terms. The relational terms alternated position randomly from left to right across trials.

Participants were required to choose one of the two relational terms by pressing the appropriate response key when presented with a Label and target stimulus; all other computer keys were disabled. Choosing the relational term that was deemed correct for that particular block of trials removed all stimuli from the screen for a 400ms interval before the next trial was presented. Choosing the relational term that was deemed incorrect for that particular block of trials produced a red ‘X’ mid-screen directly below the target stimulus. The IRAP program only proceeded to the 400ms interval (and the next trial) when the correct relational term was selected.

Label 1: Straight	**Label 2:** Gay
Response Option 1: Similar	**Response Option 2:** Opposite
Target Stimuli Consistent with Label 1	**Target Stimuli Consistent with Label 2**
Normal	Abnormal
Natural	Unnatural
Safe	Dangerous
Healthy	Sick
Acceptable	Unacceptable
Decent	Offensive

Table 3.1: The Stimulus Arrangements for All Trial-types

The IRAP comprised of between eight and ten blocks of 24 trials. Specifically, between two or four pairs of practice blocks were followed by a fixed set of six test blocks. Within each block, the two Label stimuli ("Gay" and "Straight") were presented randomly across trials with the constraint that each was presented 12 times within a 24-trial block. The 12 target stimuli were also presented in a random sequence with the added constraint that each term was presented twice, once in the presence of each Label stimulus. Thus each block of IRAP trials involved presenting four different trial-types, with each trial-type presented six times (see Figure 3.1 for an illustration of the four trial-types).

The order in which IRAP blocks were presented was not counterbalanced across participants because previous research has found that this variable does not interact significantly with the critical IRAP effect (e.g., McKenna, et al., 2007; Power, et al. 2009; Vahey, et al. 2009). The first block of trials required responses that were deemed relationally consistent with a pro-straight/anti-gay bias (hereafter referred to as pro-straight). For example, when presented with the Label "Straight" and any of the positive target words, choosing the relational term "Similar" was deemed correct and progressed the IRAP program to the next trial. If the relational term "Opposite" was chosen this was deemed incorrect and the red 'X' appeared. The same feedback contingencies were applied to the other three trial-types: "Straight" – Negative Target – Opposite = Correct / Similar = Incorrect; "Gay" – Positive Target – Similar = Incorrect / Opposite = Correct; "Gay" – Negative Target – Similar = Correct / Opposite = Incorrect. The second block of trials reinforced responses that were deemed relationally consistent with a pro-gay bias (i.e., each of the feedback contingencies described above were reversed; see Figure 3.1).

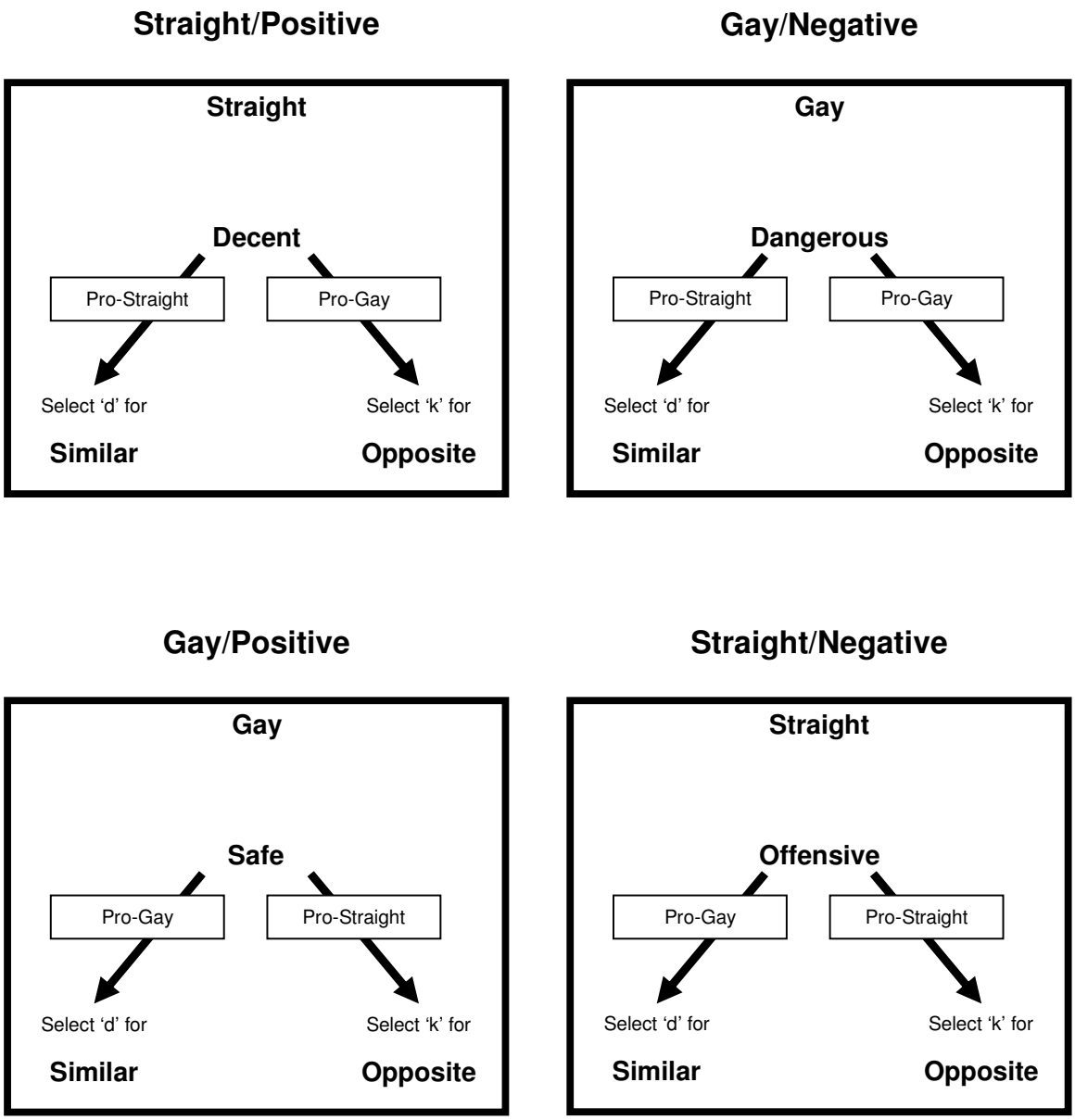

Figure 3.1: Examples of the four IRAP trial-types. The Label ("Straight" or "Gay"), target word (Safe, offensive, etc.) and response options (Similar and Opposite) appeared simultaneously on each trial. Arrows with superimposed text boxes indicate which responses were deemed pro-straight or pro-gay (boxes and arrows did not appear on screen). Selecting the pro-straight response option during a pro-straight block, or the pro-gay option during a pro-gay block, cleared the screen for 400 ms before the next trial was presented; if the pro-gay option was chosen during a pro-straight block, or the pro-straight option during a pro-gay block, a red X appeared on screen until the participant emitted the alternative response.

For the first two practice blocks, participants were informed that it was a practice phase and errors were expected. Participants were required to reach a standard of >=80% correct responses, and a median response time of <=3000ms. These criteria were used to ensure that participants understood, and were complying with the IRAP instructions. If participants failed to achieve the two criteria for either of the two practice blocks, the required standard, and the standard of responding they had achieved, were presented on the screen. Participants were allowed two attempts (a total of four practice blocks) to achieve the practice criteria, and if they failed to do so, they were thanked, debriefed and their data were discarded. Following the successful completion of the practice blocks, six test blocks were presented in a sequence that alternated between pro-straight and pro-gay blocks. No performance criteria were applied during the test blocks in order to proceed, but if a participant's performance fell below 80% accuracy for any test block the data for that participant were discarded. When all six test blocks had been completed a message appeared on the computer screen asking the participant to report to the researcher.

Before each block of trials, a message appeared on screen informing participants that the following block was either a practice or a test. In the latter case, the message also stated, "Go fast – a few errors are okay". Following each block of trials, feedback was presented on screen detailing the percentage of correct responses and the median response latency for that block. In addition, a message informed participants that all of the previously correct and wrong answers would be reversed in the next block.

Phase 3: Explicit measures

The final phase of the experiment involved presenting participants with the screens and explicit measures described in the Materials and Apparatus section. The

measures were presented in the following order: CFQ, MCSD-SF-C, IMS/EMS, MHS-G/MHS-L, the six semantic differential scales for straight people and the other six for gay people and finally the 19 feeling thermometers. Participants were allowed to complete these measures at their own pace, and having done so they were debriefed and thanked for their participation.

Ethical Considerations

The current research was approved by the Research Ethics Committee at Maynooth University. Each participant provided informed consent on their own behalf and were aware that they could cease participation in the study at any time. Ethical conduct in accordance with the Psychological Society of Ireland (PSI) and the agencies/bodies that funded the research (IRCSET; and NUIM) were adhered to (for all of the experiments reported in the current thesis).

Results and Discussion

Screening Measures

All participants completed the 25-item CFQ and the 13-item MCSD-SF. The mean scores on the CFQ for the two conditions were similar (Public $M = 41.04$, Private $M = 44.5$), and did not differ significantly ($p = .28$). Responses to the MCSD-SF were also similar (Public $M = 18.25$, Private $M = 18.36$) and again did not differ significantly ($p = .87$). Thus, any differences that might emerge between the two groups on the implicit and explicit measures are unlikely due to individual differences in cognitive failures or social desirability.

Implicit Measure

Data preparation. The primary datum was response latency defined as the time in milliseconds that elapsed between the onset of a trial and a correct response emitted by a participant. To control for individual variations in speed of responding that may act as a possible confound when analyzing between group differences, the response latency data for each participant were transformed into *D*-IRAP scores (Barnes-Holmes, Murtagh, Barnes-Holmes, & Stewart, 2010; Barnes-Holmes, Waldron, Barnes-Holmes, & Stewart, 2009; Cullen, & Barnes-Holmes, 2008; Vahey, Barnes-Holmes, Barnes-Holmes, & Stewart, 2009) using an *adaptation* of the Greenwald, Nosek, and Banaji (2003) *D*-algorithm.

The steps involved in calculating the *D*-IRAP scores were as follows: (1) only response-latency data from the six test-blocks were used; (2) latencies above 10,000 ms were removed from the dataset; (3) if the data from a participant contained more than 10% of test-block trials with latencies less than 300 ms that participant was removed from the analyses (none were removed on this basis); (4) twelve standard deviations for the four trial-types were calculated: four for the response-latencies from test-blocks 1 and 2, four from the latencies from test-blocks 3 and 4, and a further four from test-blocks 5 and 6; (5) 24 mean latencies were then calculated for the four trial types in each test-block; (6) difference scores for each of the four trial types were calculated, for each pair of test blocks, by subtracting the mean latency of the pro-straight test-block from the mean latency of the corresponding pro-gay test block; (7) each difference score was then divided by its corresponding standard deviation from step 4, yielding 12 *D*-IRAP scores; one score for each trial-type for each pair of test blocks; (8) four overall trial-type *D*-

IRAP scores were then calculated by averaging the scores for each trial-type across the three pairs of test blocks; (9) an overall *D*-IRAP score was calculated by averaging all 12 trial-type *D*-IRAP scores from step 7.

The foregoing data transformation yields positive *D*-scores for positive bias, and negative scores for negative bias, towards *straight*. In contrast, for the two Gay trial-types negative *D*-scores indicate positive bias and positive scores indicate negative bias. In order to facilitate direct comparisons across the trial-types, the signs for the Gay trial-type *D*-scores were reversed (i.e., + scores became – scores, and vice versa). Following this additional data transformation, positive *D*-scores now indicate positive bias towards *both straight* and *gay* and negative scores indicate negative bias towards both groups (note, previously published IRAP studies have not included this final transformation).

Data analyses. Although *D*-IRAP scores are used for the purposes of statistical analysis, the raw mean latencies and standard errors for the four trial-types for pro-straight and pro-gay blocks, under public- and private- contexts, are presented in Appendix A (latencies greater than 10,000 ms were removed from the analyses).

The *D*-IRAP scores for the four trial-types under the public- and private-contexts are presented in Figure 3.2. The data show that the *D*-IRAP effects for each trial-type were broadly similar across public and private settings. For three of the trial-types (*Straight Positive*, *Straight Negative,* and *Gay Positive*) the effects showed positive biases; responding "Similar" more quickly than "Opposite" on *Straight-Positive* and *Gay-Positive* trial-types, and "Opposite" more quickly than "Similar" for *Straight-Negative*. For the *Gay-Negative* trial-type, however, both groups showed a very small negative bias, responding "Similar" more quickly than "Opposite." A 2x4 mixed repeated measures

analysis of variance (ANOVA) with private- and public-contexts as the between-participant variable and trial-type as the within-participant variable yielded a single significant main effect for trial-type F (1, 61) = 3.25, p =.02, η_p^2 = .05 but no effect for context or interaction (all *ps* >.9).

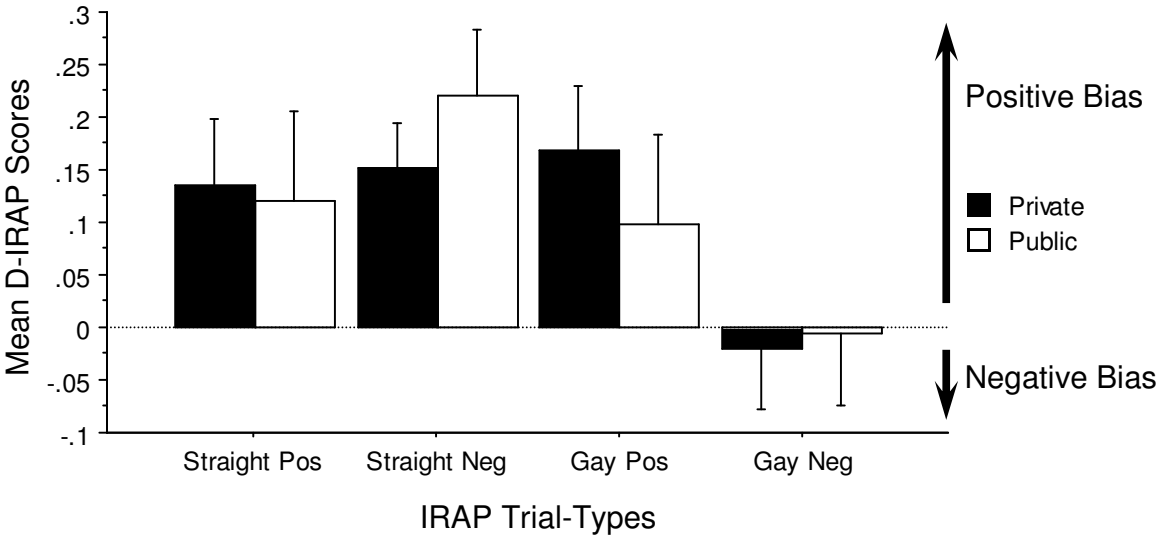

Figure 3.2: Overall mean *D*-IRAP scores for the public and private context groups with respect to the four IRAP trial-types. On the graph positive D-IRAP scores reflect a pro-straight implicit bias and negative D-IRAP scores reflect a pro-gay bias. The zero-point reflects no bias. The data show that the *D*-IRAP effects for each trial-type were broadly similar across public and private settings. For three of the trial-types (*Straight Positive*, *Straight Negative,* and *Gay Positive*) the effects showed positive biases; responding "Similar" more quickly than "Opposite" on *Straight-Positive* (e.g., Straight – Safe = Similar) and *Gay-Positive* (e.g., Gay – Safe = Similar) *trial*-types, and "Opposite" more quickly than "Similar" for *Straight-Negative* (e.g., Straight – Dangerous = Opposite). For the *Gay-Negative* trial-type, however, both groups showed a very small negative bias, responding "Similar" more quickly than "Opposite" (e.g., Gay – Dangerous = Similar).

Given that context produced no main or interaction effects, the data for the private and public settings were collapsed. Fisher's PLSD post-hoc tests indicated that the *D*-IRAP effect for the *Gay-Negative* trial-type differed significantly from the other three trial-types (*ps* < .03), with the remaining between-trial-type comparisons being non-significant (*ps* > .4). Four one-sample *t*-tests were then conducted on the collapsed data to

determine if the *D*-IRAP trial-type scores differed significantly from zero. Significant IRAP effects were revealed for the *Straight-Positive*, *Straight-Negative* and *Gay-Positive* trials-types ($t = 2.6$, $p = .01$, $t = 5$, $p = .0001$, and $t = 2.8$, $p = .006$, respectively), but not for *Gay-Negative* ($t = -.36$, $p = .7$). Overall, therefore, the foregoing analyses revealed that the IRAP produced a response pattern that indicated a positive bias towards both *straight* and *gay*, but difficulty in denying *Gay-Negative* relations.

Explicit Measures

Semantic differential scales. Semantic differential scales were scored by averaging the six items for *straights* and the six items for *gays* to create two indices, in which positive scores indicated positive attitudes and negative scores negative attitudes. The overall mean scores for the private (*Straight*, $M = 1.74$, $SE = .164$; and *Gay*, $M = .83$, $SE = .15$; $d = .9$) and public (*Straight*, $M = 1.92$, $SE = .19$; and *Gay*, $M = 1.13$, $SE = .14$; $d = .98$)) contexts indicated relatively positive attitudes to both *straights* and *gays*, with stronger effects for the former over the latter. A 2x2 mixed repeated measures ANOVA with explicit rating (*straight* versus *gay*) as the repeated measure and context (public versus private) as the between participant variable indicated that the preference for *straight* over *gay* was significant $F(1, 61) = 53.43$, $p = .0001$, $\eta_p^2 = .47$; the main effect for context and the interaction were non-significant ($ps > .6$).

Feeling thermometer scales. The two feeling thermometers yielded an evaluative rating for each sexual orientation category (*straight* vs. *gay*) in which higher scores represented more favorable attitudes. The overall mean scores for the private (*Straight*, $M = 76.54°$, $SE = 2.78$; *Gay,* $M = 67.64°$, $SE = 3.18$, $d = .47$) and public (*Straight,* $M = 77.42°$, $SE = 3$; *Gay,* $M = 75°$, $SE = 3.27$, $d = .16$)) contexts showed that both groups

indicated slightly more favorable attitudes toward *straight* than *gay*. A 2x2 mixed repeated measures ANOVA, indicated that the preference for *straight* over *gay* was significant $F(1, 61) = 58$, $p = .02$, $\eta_p^2 = .09$, but once again context and the interaction were non-significant (*ps* > .3).

Modern Homonegativity Scale. The two parallel forms of the MHS were scored identically (i.e., one for *gay males* [MHS-G] and one for *lesbian women* [MHS-F]), with higher scores indicating greater levels of homonegativity. On the MHS, participants in the private setting reported slightly less homonegativity toward *lesbian women* (M = 24.26, SE = 1.19) compared with *gay men* (M = 25.23, SE = 1.21 respectively, d = -.13), but in the public setting this pattern was marginally reversed (*Lesbian women,* M = 24.2, SE = 1.38; *Gay men,* M = 24, SE = 1.27 respectively, d = .02). A 2x2 mixed ANOVA yielded no significant main effects (all *ps* >.7), but an interaction was recorded, F (1, 61) = 4.1, $p < .05$, $\eta_p^2 = .06$. Given the significant interaction, two separate ANOVAs were conducted, one for the public condition and one for the private condition. The former proved to be non-significant ($p = .8$), but the private setting ANOVA revealed a significant effect, $F(1,38) = 10.42$, $p = .003$, $\eta_p^2 = .22$. Thus, less homonegativity was expressed toward *lesbian women* compared with *gay men* in the private, but not in the public setting.

Motivation to Control Homonegativity. The two forms of the Motivation to Control Homonegativity Scale (i.e., one for *internal* items [IMS] and one for *external* items [EMS]) were scored identically, with higher scores indicating greater levels of internal/external motivation to control homonegativity. Participants in both contexts reported higher levels of internal than external motivation with higher levels for each

observed in the Private setting (Internal, Private, M = 36.74, SE = 1.37, Public, M = 28.42, SE = .83, d = 7.35: External, Private, M = 21, SE = 1.55, Public, M = 17.67, SE = 1.51, d = 2.18). A 2x2 mixed repeated measures ANOVA with scale type (*internal* versus *external*) as the repeated measure and context (*public* versus *private*) as the between participant variable yielded main effects for source of motivation, $F(1, 61) = 75.61$, $p < .0001$, $\eta_p^2 = .55$, and context, $F(1, 61) = 16.204$, $p = .0002$, $\eta_p^2 = .21$, but no interaction ($p > .1$). Thus, the Private setting appeared to increase both internal and external motivation to conceal prejudice.

Implicit-Explicit Correlations

A correlation matrix was calculated in which each of the IRAP effects (i.e., the four trial-types and the overall *D*) were correlated with each of the 10 explicit measures (Straight and Gay Feeling Thermometers, Straight and Gay Semantic Differential Scales, the MHS-G and MHS-F, Motivation to Conceal Homonegativity Internal and External, the CFQ and the MCSD[9]). Of the 50 correlations only one significant effect was observed; *Straight-Positive* IRAP trial-type with the *Straight* feeling thermometer (r = -.342, n = 63, p = .006). In effect, stronger *Straight-Positive D*-IRAP scores predicted weaker pro-straight biases on the feeling thermometer. The correlation between *Gay-Positive* IRAP trials and *Internal Motivation to Control Homonegativity* approached significance (r = .227, n = 63, p = .07), but all other correlations were non-significant (remaining $ps > .11$).

[9] Although the CFQ and the MCSD were employed primarily as screening measures they were included in the correlational analyses for exploratory purposes.

Moderating Influence of Motivation to Control Homonegativity on the Implicit-Explicit Attitude Relationship

In order to determine if either internal or external motivation to control homonegativity moderated the relationship between the implicit and explicit measures a series of six separate hierarchical regression analyses were conducted. For each regression analysis, the overall *D*-IRAP variable was used to predict responses to one of the following three explicit measures: (i) the feeling thermometers, (ii) the semantic differentials, and (iii) the MHS. Each regression analysis was conducted twice, once with external motivation as the moderating variable and once with internal motivation as the moderator.

For feeling thermometers and semantic differentials, composite scores for each measure were created by subtracting Gay from Straight scores; a composite score for the MHS was calculated by averaging the Gay and Lesbian scales. Separate interaction terms were created by multiplying the independent variable (i.e., overall *D*-IRAP Score) by the IMS and by the EMS. Before conducting the regression analyses the data for each of the measures were standardized (i.e., transformed into *z*-scores). The first step of each hierarchical regression involved entering the Overall *D*-IRAP scores with either the EMS or IMS as predictors of *one* of the dependent variables (e.g., Semantic Differentials). The Independent variable (Overall *D*-Score) x Motivation interaction (e.g., EMS) was entered as a second step. None of the six regression analyses showed significant interaction effects (all $ps > .14$).

Summary and Conclusion

The results revealed that in general the measures of explicit attitudes did not yield strong evidence of homonegative bias, although across the measures *gays* evoked less positive responses than *straights*. Interestingly, evidence of a homonegative bias was observed on the *Gay-Negative*, but not on the *Gay-Positive* trial-type of the IRAP.[10] The IRAP, feeling thermometer, and semantic differential scale measures were unaffected by the context in which the tests were undertaken. In contrast, MHS scores were sensitive to the assessment context, such that less homonegativity was expressed toward *lesbian women* compared with *gay men* in private, but not in public. In addition, the Private setting served to increase both internal and external sources of motivation to conceal prejudice. Thus, although the public/private context manipulation did not impact upon the IRAP it had an impact on some of the explicit measures (i.e., the MHS, IMS and EMS). With the exception of a single significant inverse correlation between the *Straight-Positive* IRAP trials and the *straight* feeling thermometer, implicit and explicit attitudes were uncorrelated. Motivation to Control Homonegativity did not moderate the relationship between implicit and explicit biases.

In conclusion, the IRAP showed a positive bias for both straight and gay. Critically, however, the IRAP did produce evidence of implicit homonegativity, with both groups (Public and Private) showing a very small negative bias on the *Gay-Negative* (but not on the *Gay-Positive*) trial-type. The fact that this effect only emerged for the

[10] Although the IRAP effect for the *Gay-Negative* trial-type was not significantly different from zero (in a negative direction) it seems appropriate to label this "absence of an effect" homonegativity. Specifically, the near zero score indicates that participants responded "Similar" and "Opposite" with equal speed to such relations as "Gay-Sick" and "Gay-Dangerous". The fact that there was a clear bias towards responding "Opposite" on the *Straight-Negative* trial-type indicates that the participants could "defend" the in-group but not the out-group at an implicit level, and it seems entirely appropriate to label this pattern of responding an example of homonegativity.

Gay-Negative trial-type could be seen as consistent with evidence suggesting the influence of a negativity bias in attitude formation (cf. Kunda, 1999). That is, when negatively valenced stimuli are presented with '*Gay*,' this serves to activate an implicit anti-gay bias, which is not observed when positively valenced stimuli are present. Contrary to Boysen, Vogel, and Madon (2006) implicit homonegativity captured by the IRAP, however, was unaffected by the manipulation of the public versus private assessment context. Consistent with previous research (e.g., Blanchard, Crandall, Brigham, & Vaughn, 1994; Lemm & Banaji, 2001; Plant & Devine, 1998) the public/private context manipulation did impact upon some of the explicit measures. Specifically, in the Private Setting (but not in the Public Setting) participants discriminated in favour of *lesbian women* over *gay men* on the Modern Homonegativity Scale. This effect could be explained by the fact that participants in the public context showed higher levels of both internal and external motivation to conceal homonegativity.

In attempting to explain why the IRAP unlike the IAT failed to show an effect for the assessment context manipulation, it could be argued that unlike the IAT and the explicit measures, the IRAP was less 'contaminated' by self-presentational concerns. Admittedly, at this stage in the research programme this explanation for the divergence between the results of the two experiments remains speculative. Critically, while Experiment 1 of the current thesis provided a conceptual replication of the Boysen, et al., IAT study, it did not seek to provide a direct methodological replication of same. It was noted earlier, that unlike the IAT study, the IRAP study employed only word stimuli (i.e., not a combination of words and pictures). In addition, given that photographs of same- and mixed-sex couples were utilised on the IAT it remains unclear if Boysen, et al.,

assessed implicit biases toward same- and mixed-sex relationships as opposed to implicit homonegativity *per se*. On the IRAP, however, the exemplars/terms representing the target categories (i.e., '*Straight*' and '*Gay*') appeared to unambiguously target implicit homonegativity. Given these slight methodological differences between the two experiments a direct comparison of the results would be unwise at this time.

In any case, given that the IRAP employed in the current study showed its capability to capture implicit pro-straight and homonegative biases, participants in the next experiment were again exposed to the same IRAP to determine if the IRAP effects produced here would be replicated --- particularly with regard to the effect produced on the *Gay-Negative* trial-type. Having discovered that the bias effects observed with the IRAP were not sensitive to a public/private manipulation, the next experiment sought to determine the influence of prior exposure to positive and negative exemplars on implicit and explicit homonegativity.

Chapter 4: Assessing the Malleability of Implicit Homonegativity as a Result of Exposure to Exemplar Training Prior to the IRAP

Experiment 2

Consistent with more than a decade of (mainly IAT) research that has documented the pervasiveness of implicit homonegativity (e.g., Banse, Seise & Zerbes, 2001; Breen & Karpinski, 2013; Cardinas & Barrientos, 2008; Inbar, Pizzaro Knobe & Bloom, 2009; Jellison, McConnell, & Gabriel, 2004; Jost, Banaji, & Nosek, 2004) the previous experiment also found evidence of such homonegativity (on the *Gay-Negative* trial-type) with the IRAP. Indeed, the pervasiveness of implicit homonegativity in the published literature has prompted a search for interventions designed to attenuate such bias.

Early theorizing had viewed implicit bias as fixed, impervious to volitional control and immutable (Bargh, 1999; Devine, 1989). Several studies, however, have shown that implicit biases are malleable in response to: (a) situational variables such as personal contact with stigmatized outgroup members and vicarious contact through media exposure (e.g., Dasgupta & Rivera, 2008); (b) internal states such as expectancies (e.g., Blair & Banaji, 1996) and motivation to control prejudice (e.g., Lemm, 2006); and finally (c) practice or training (Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000). One approach to assessing the malleability of implicit attitudes involves presenting participants with a series of exemplars that are designed to affect their attitudes toward a specific target prior to exposure to an implicit measure (e.g., Dasgupta & Asgari, 2004; Dasgupta & Greenwald, 2001; Lowery, Hardin, & Sinclair, 2001).

At the time of writing there was only one published IAT study that had examined the malleability of homonegativity using exposure to exemplars (Dasgupta & Rivera, 2008). In this study, an experimental group of participants' were presented with a series of pro-gay exemplars (i.e., positive pictures of famous gay males and lesbian women) and a control group were presented with positively valenced but irrelevant exemplars (i.e., pictures of flower species). Participants then completed IATs designed to assess homonegativity. Although the study was designed to assess other moderating variables (e.g., historical contact with gay people), results revealed that relative to those in the control condition, participants who were exposed to pro-gay exemplars all showed less implicit homonegativity on the IATs.

To date, only one published study has used the IRAP to investigate the malleability of implicit bias using an exemplar exposure intervention (Cullen, Barnes-Holmes, Barnes-Holmes & Stewart, 2009; Experiment 2) but it did not focus on homonegativity. The IRAP study provided a replication of Dasgupta and Greenwald's (2001) IAT study and focused on the malleability of implicit ageism. Consistent with the Dasgupta, et al. IAT study, Cullen, et al. showed that exposure to pro-old exemplars (i.e., pictures of admired elderly/disliked young individuals) prior to the IRAP significantly weakened implicit pro-young preferences. Critically, however, the results of the IRAP study showed the differential impact of pro-old exemplar training on implicit attitudes to *young* and *old* people. Specifically, the pro-old exemplars slightly weakened the pro-young but completely reversed the anti-old bias thus showing that the anti-old bias was more malleable than the pro-young bias. As noted previously, the IAT yields only one

overall relative bias score, and thus the Dasgupta, et al. study was incapable of providing a comparable level of analytic detail.

In view of the fact that the IRAP employed in Experiment 1 evidenced a homonegative bias on the *Gay-Negative* trial-type, and the fact that the public/private assessment context manipulation had no significant impact on IRAP performance, the current study employed the same IRAP in a "standard private context". Given that Experiment 1 was the first study to assess implicit homonegativity using the IRAP, one purpose of the current study was to replicate the homonegativity bias observed in the previous study (i.e., a near zero score on the *Gay-Negative* trial-type). The second purpose of the current study was to explore the potential impact of exposure to pro- and anti-gay exemplars on IRAP performance.

Method

Participants

The participants (N = 28; n = 15 female, n = 13 male, Age; M = 20.5 years, SE = 1.9 years) were a convenience sample of experimentally naïve general operative workers from a computer factory based in a University town in County Kildare, Ireland. The participants were randomly allocated (based on seating arrangements) to one of two conditions. Prior to completing the IRAP, half of the participants (n = 7 female, n = 7 male) were exposed to positive images of gay men and lesbian women (i.e., pro-gay exemplars). The remaining participants (n = 8 female, n = 6 male) were exposed to negative images of gay men and lesbian women (i.e., anti-gay exemplars). Data from a further 8 participants was excluded from analysis because of a failure to complete the practice phase of the IRAP. Exclusion criteria required that all participants be fluent

English speakers and that they had normal or corrected to normal vision. No financial or other incentives (other than the knowledge that they were assisting in scientific research), were offered for participation in the experiment**.** Participants completed the experiment in a group setting in a large computer laboratory housed in the Department of Psychology at the National University of Ireland, Maynooth. No data pertaining to participant sexual orientation were gathered because some of the participants were personally known to the experimenter.

Materials and Apparatus

The materials and apparatus employed in Experiment 1 (with the exception of the Public/Private materials and the Motivation to Control Homonegativity scale) were employed in Experiment 2, but additional materials were used for the exemplar training (see below).

Exemplar training materials

Selection of exemplars. Pictures of 20 well-known gay men and lesbian women were obtained from the internet using the Google™ search engine (see Appendix P). Ten pictures featured in the category for admired gay and lesbian individuals (hereafter referred to as pro-gay, e.g., Graham Norton), and ten featured in the category for disliked gay and lesbian individuals (hereafter referred to as anti-gay, e.g., Jeffrey Dahmer). All pictures were created in RGB full colour and standardized to 4x6cm in dimension. Each picture was then centered on a single A4 sheet of paper, and these were used to construct four separate booklets; two practice booklets and two test booklets.

Booklets. The practice booklet (see Appendix Q) for the pro-gay condition contained 10 pictures of generally *admired* gay men and lesbian women. The anti-gay

booklet[11] contained 10 pictures of generally *disliked* gay men and lesbian women. The name of each individual was positioned 1cm above the picture. Just below the picture were two profile descriptions placed side-by-side, one being true and the other one false. Throughout the booklet, the left-right positions of these true and false descriptions alternated randomly. An "answer box" appeared directly beneath these descriptions with the words "A or B?" printed underneath. The correct profile description was printed on the back of each page along with a yes/no question which asked 'Did you know this person was gay/lesbian?'

The test booklet for each condition was identical to the practice booklet, with the exception that neither the correct description nor the question reminding the participants of the individual's sexual orientation was presented on the back of each page.

Implicit measure

The Implicit Relational Assessment Procedure (IRAP). The IRAP was identical to Experiment 1.

Explicit measures

The screening measures (i.e., the Cognitive Failures Questionnaire and the Marlow-Crowne Social Desirability Scale Short Form – C) and explicit attitude measures (i.e., the twelve semantic differential scales, two feeling thermometers and the two Modern Homonegativity scales) that were used in Experiment 1 were employed in the current experiment.

[11] In order to circumvent any negativity toward gay men and lesbian women that may have been acquired during the experimental procedure, all participants that had been exposed to anti-gay exemplars were exposed to pro-gay exemplars prior to leaving the laboratory. The pro-gay exemplars were specifically designed to elicit positive attitudes toward gay people. In any event, all participants were thoroughly debriefed afterwards.

Procedure

Upon entering the laboratory, participants were first required to sign a written consent form, which assured them that they were free to discontinue participation at any time without incurring penalty. The experiment consisted of four phases. During Phase 1 participants were randomly assigned to one of two conditions (i.e., pro-gay or anti-gay). Phase 2 involved exposure to the exemplars. In Phase 3, participants were exposed to the IRAP. Finally, in Phase 4 participants completed the screening measures and the explicit measures of homonegativity. Participants completed the experiment in a group setting.

Phase 1: Assignment to Pro- versus Anti-Gay Exemplar Conditions

Twenty-eight participants were assigned randomly (based on seating positions) to one of two conditions: 14 to a pro-gay condition and 14 to an anti-gay condition.

Phase 2: Exemplar exposure

The exemplar task was presented as a 'General Knowledge Task' assessing participants' familiarity with famous and infamous individuals. The exemplar task was a two part exercise in which each participant was given (1) a Practice Booklet; and (2) a Test Booklet to be completed in turn. Only the data from those participants who achieved 100% correct in completing the Test Booklet were used in subsequent analyses. That is, participants were required to select the correct profile for each famous/infamous individual.

Phase 3: Implicit measure

Participants completed an IRAP identical to that employed in Experiment 1, and then continued to Phase 4.

Phase 4: Explicit attitude measures

Participants completed the explicit measures (in the same order) that had been employed in Experiment 1.

Results and Discussion

Exemplar Exposure

Practice phase. Table 4.1 shows the number of participants who correctly identified exemplars presented to them in the practice booklet. The results show that a greater number of positive relative to negative exemplars were identified. A chi-square analysis indicated, however, that the difference between the two groups was not significant ($p > .13$). In addition, the pro-gay IRAP group (exposed to the positive images) correctly recognised 70.7% of exemplars as being publicly gay, whereas the anti-gay IRAP group (exposed to the negative images) correctly identified just 29.3%.

Test Phase. During the exemplar test phase, all fourteen participants exposed to pro-gay exemplars identified 100% correctly. For the anti-gay exemplars, 13 participants identified 100% correctly and 1 identified 90% correctly.

Number of participants		Number of images identified
Positive exemplars ($N = 14$)	Negative exemplars ($N = 14$)	
10	4	10/10
3	4	9/10
1	2	8/10
	2	7/10
	2	6/10

Table 4.1: Number of participants who correctly identified the profile descriptions of the exemplars in the practice booklet.

Screening Measures

All participants completed the 25-item CFQ and the 13-item MCSD-SF. The mean scores on the CFQ for the two conditions were similar (Pro-Gay Group $M = 46.07$, Anti-Gay Group $M = 43.60$), and did not differ significantly ($p = .63$). Responses to the MCSD-SF were also similar (Pro-Gay Group $M = 18.64$, Anti-Gay Group $M = 18.00$) and again did not differ significantly ($p = .55$). Thus, any differences that might emerge between the two groups on the implicit and explicit measures are unlikely due to individual differences in cognitive failures or social desirability.

Implicit Measure

Data preparation. The IRAP latency data were transformed using the same algorithm employed in Experiment 1.

Data analyses. Consistent with Experiment 1, the raw mean latencies and standard errors for the four trial-types, under pro-gay and anti-gay exemplar conditions, are presented in Appendix B (latencies greater than 10,000 ms were removed from the analyses). The *D*-IRAP scores for the four trial-types for the pro-gay and anti-gay exemplar groups are presented in Figure 4.1, and indicate positive biases in each case. The data show that the *D*-IRAP effects for trial-type were broadly similar across pro-and anti-gay exemplar conditions for three of the trial-types, with the *Straight-Positive* effect for the Anti-Gay condition over twice that of the Pro-Gay condition. The variance for each IRAP effect was relatively large. A 2x4 mixed repeated measures ANOVA with pro- and anti-gay exemplars as the between-participant variable and trial-type as the within-participant variable yielded no main or interaction effects (all *ps* >.2). Four separate follow-up one-way between-group ANOVAs confirmed that the difference in

IRAP effects between the exemplar conditions was non-significant for each trial-type (*ps* > .35). These analyses thus confirmed that the different exemplars did not impact significantly on participants' implicit attitudes towards gay and straight people.

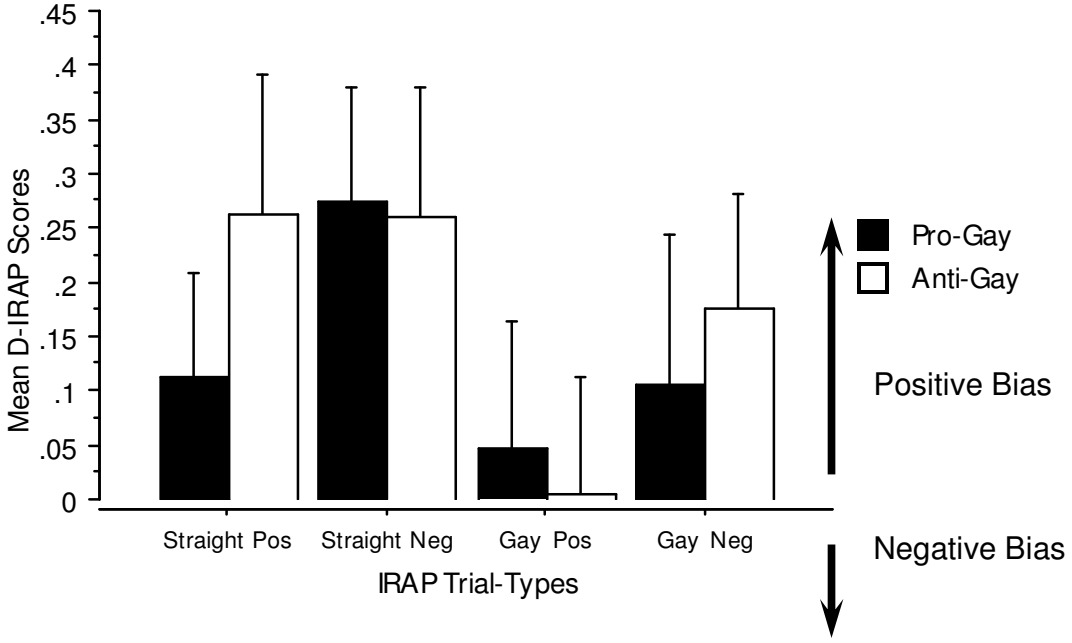

Figure 4.1: Overall mean *D*-IRAP scores for the pro-gay and anti-gay exemplar groups with respect to the four IRAP trial-types. On the graph positive D-IRAP scores reflect a pro-straight implicit bias and negative D-IRAP scores reflect a pro-gay bias. The zero-point reflects no bias. The data show that the *D*-IRAP effects for three trial-types were broadly similar across pro- and anti-gay exemplar exposures. The Straight-Positive effect for the anti-gay exemplar group, however, was over twice that of the pro-gay exemplar group. For all four trial-types (*Straight Positive*, *Straight Negative, Gay Positive,* and *Gay-Negative*) the effects showed positive biases; responding "Similar" more quickly than "Opposite" on *Straight-Positive* (e.g., Straight – Safe = Similar) and *Gay-Positive* (e.g., Gay – Safe = Similar) *trial*-types, and "Opposite" more quickly than "Similar" for *Straight-Negative* (e.g., Straight – Dangerous = Opposite) and Gay-Negative (e.g., Gay – Dangerous = Similar) *trial-types*.

Given that the exemplars produced no main or interaction effects, the data for the pro-gay and anti-gay exemplars were collapsed. One-sample *t*-tests revealed significant IRAP effects for the *Straight-Positive* and *Straight-Negative* IRAP trial-types ($t = 2.3$, $p =$

.03, and $t = 3.4$, $p = .002$, respectively), but not for *Gay-Positive* or *Gay-Negative* trial-types ($t = .34$, $p = .74$, and $t = 1.6$, $p = .12$, respectively). Overall, therefore, the IRAP produced a response pattern indicative of a positive bias towards both *straights* and *gays*, but only the straight biases were statistically significant. Thus, although the current experiment failed to reproduce exactly the same pattern of significant differences observed in Experiment 1 (perhaps due to a considerably lower *n* -- 28 versus 63), a pro-straight bias emerged in the context of the one-sample t-tests.

Explicit Measures

The data from the explicit measures were prepared for analysis in the same way as the data from Experiment 1.

***Semantic differential scales*.** The overall mean scores for the pro-gay (*Straight*, $M = 1.77$, $SE = .28$; *Gay*, $M = 1.4$, $SE = .40$; $d = 1.07$) and anti-gay exemplar groups (*Straight*, $M = 2.1$, $SE = .28$; and *Gay*, $M = 1.2$, $SE = .47$; $d = -3$) indicated relatively positive attitudes to both *straights* and *gays*, with stronger effects for the former over the latter. A 2x2 mixed repeated measures ANOVA with explicit rating (*straight* versus *gay*) as the repeated measure and exemplars (pro-gay versus anti-gay) as the between participant variable indicated that the preference for *straight* over *gay* was significant $F(1, 26) = 5.6$, $p = .03$, $\eta_p^2 = .2$. The main effect for exemplar and the interaction were non-significant (*ps* > .3). Thus, straight people were rated as significantly more positive than gay people, with no impact from the exemplars.

***Feeling thermometer scales*.** The overall mean scores for the pro-gay (*Straight*, $M = 82.6°$, $SE = 4.7$; *Gay,* $M = 74.1°$, $SE = 5.5$, $d = 1.7$) and anti-gay (*Straight,* $M = 84°$, $SE = 3.6$; *Gay,* $M = 68.43°$, $SE = 7.4$, $d = 2.7$) exemplar groups showed that both groups

indicated more favorable attitudes toward *straight* than *gay*. A 2x2 mixed repeated measures ANOVA indicated that the preference for *straight* over *gay* was significant $F(1, 26) = 8.2$, $p = .0083$, $\eta_p^2 = .24$, but once again exemplars and the interaction were not (*ps* > .4). Thus, straight people were again rated as significantly more positive than gay people, with no impact from the exemplar training.

Modern Homonegativity Scale. On the MHS, the pro-gay exemplar group expressed moderately positive attitudes towards *lesbian women* and *gay men* that were virtually indistinguishable (*Lesbian women, M* = 26.29, *SE* = 1.9; and *Gay men, M* = 26.50, *SE* = 1.7; respectively, *d* = -0.12). The anti-gay exemplar group showed a similar pattern (*Lesbian women, M* = 27.4, *SE* = 2.23; *Gay men, M* = 27.9, *SE* = 2.34 respectively, *d* = -0.22). A 2x2 mixed ANOVA yielded revealed no significant effects (all *ps* > .5).

Implicit-Explicit Correlations

A correlation matrix of the IRAP effects (i.e., the four trial-types and the overall *D*-IRAP score) with each of the 8 explicit measures (Straight and Gay Feeling Thermometers, Straight and Gay Semantic Differential Scales, the MHS-G and MHS-F, the CFQ and the MCSD[12]) was calculated. Of the 40 correlations only one significant effect was observed; an inverse correlation between the *Straight-Positive* IRAP trial-type and the *Gay* feeling thermometer ($r = -.401$, $n = 26$, $p = .03$). In other words, stronger *Straight-Positive D*-IRAP scores predicted weaker pro-gay biases on the feeling thermometer. The correlations between *Gay-Negative* IRAP trials and *Gay Semantic Differential Scales,* and between *Gay-Negative* IRAP trials and *Gay Feeling*

[12] Although the CFQ and the MCSD were employed primarily as screening measures they were included in the correlational analyses for exploratory purposes.

thermometers approached significance (*ps* = .07), but all other correlations were non-significant (remaining *ps* > .8).

Summary

The results of the implicit and explicit measures indicated that exposure to the pro-and anti-gay exemplars did not impact significantly on participants' attitudes regarding gay and straight people. Across the explicit measures *straights* were rated more positively than *gays*, an effect broadly consistent with the IRAP data. With the exception of a single significant (and two approaching significance correlations) implicit and explicit attitudes were not related.

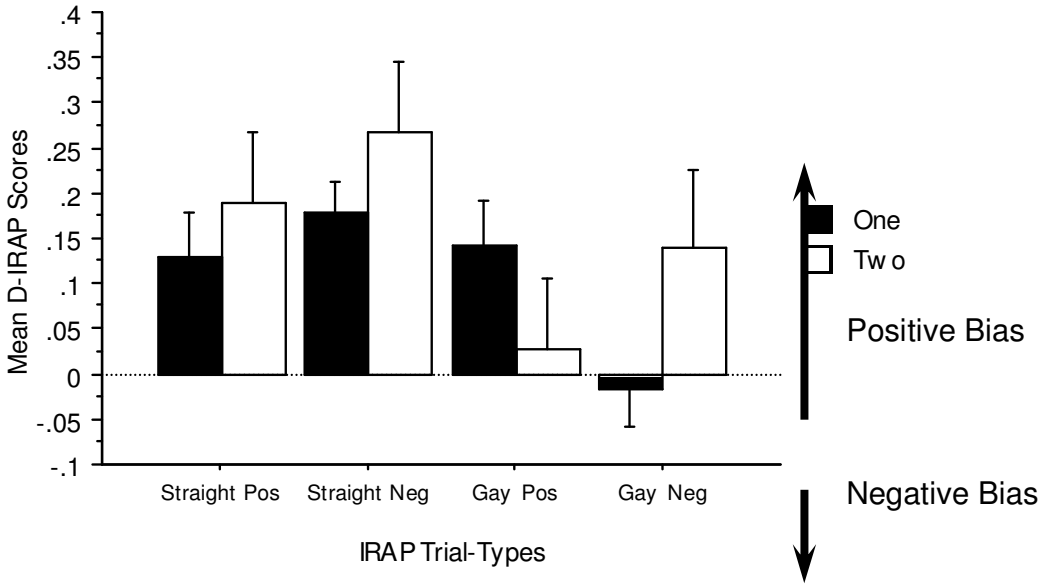

Figure 4.2: Post-hoc comparison of Experiment 1 and Experiment 2 showing overall mean *D*-IRAP scores for each experiment, with respect to the four IRAP trial-types. On the graph positive D-IRAP scores reflect a pro-straight implicit bias and negative D-IRAP scores reflect a pro-gay bias. The zero-point reflects no bias. The data show a relatively strong *Gay-Positive* effect in Experiment 1 compared to a weak *Gay-Positive* effect in Experiment 2. Additionally, the *Gay-Negative* effect was weakly negative in Experiment 1 but moderately positive in Experiment 2.

A Post-hoc Comparison of Experiments 1 and 2

As noted previously, the pattern of *D*-IRAP effects differed somewhat across Experiments 1 and 2 (see Figure 4.2), in that (i) the Gay-Positive effect was relatively strong in Experiment 1 but weak in Experiment 2, and (ii) the Gay-Negative effect was weakly negative in Experiment 1 but moderately positive in Experiment 2. Given this difference in the descriptive statistics, a post-hoc analysis of the combined data set across the two experiments was undertaken.

A 2x4 mixed repeated measures ANOVA with Experiment 1 and 2 as the between-participant variable and trial-type as the within-participant variable yielded a single significant main effect for trial-type $F(1, 89) = 2.8$, $p = .04$, $\eta_p^2 = .03$, but no effect for experiment or interaction (all *ps* >.17). Fisher's PLSD post-hoc tests indicated that the *D*-IRAP effect for the *Gay-Negative* trial-type differed significantly from the *Straight-Positive* and *Straight-Negative* trial-types (*ps* < .003), with the remaining between-trial-type comparisons being non-significant (*ps* > .09). Four one-way between-participant follow-up ANOVAs indicated that the differences for each trial-type between Experiments 1 and 2 were non-significant (ps > .08). Overall, therefore, the differences observed in the descriptive statistics did not prove to be significant.

Summary and Conclusion

Consistent with Experiment 1, the results of Experiment 2 revealed that in general the measures of explicit attitudes did not yield strong evidence of homonegative bias. In particular, across the semantic differential and feeling thermometer measures *gays* evoked less positive responses than *straights*. The IRAP data showed a broadly similar pattern to the explicit measures, with positive biases toward both straight and gay but

only the straight biases were statistically significant. Unlike Experiment 1, participants did not appear to show a difficulty in denying *Gay-Negative* relations but did show a difficulty in confirming *Gay-Positive* relations. The IRAP and explicit measures were unaffected by prior exposure to pro- or anti-gay exemplars. Overall, therefore, the IRAP data again showed evidence for implicit homonegativity (i.e., a weak effect on the *Gay-Positive* trial-type). Again, consistent with Experiment 1, implicit and explicit biases were unrelated save but for a single significant inverse correlation between the *Straight-Positive* IRAP trial-type and the *(gay)* feeling thermometer. A post-hoc analysis of the combined data from across Experiment 1 and 2 revealed that the descriptive differences between the two experiments did not prove to be significant.

In conclusion, although the IRAP showed a positive bias for both straight and gay it did capture some evidence of implicit homonegativity. Notably, consistent with Experiment 1, the IRAP revealed a significant pro-straight bias on the *Straight-Positive* and *Straight Negative* trial types. In contrast with Experiment 1, however, there was some evidence to suggest that participants had a difficulty in confirming *Gay-Positive* relations (e.g., Gay – Safe = Similar).

Contrary to Dasgupta and Riveras' (2008) IAT data, implicit homonegativity as captured by the IRAP was unaffected by exposure to pro- and anti-gay exemplars. Furthermore, unlike an earlier IRAP study that showed the differential impact of pro- versus anti- exemplar training on implicit biases to *young* and *old* people (Cullen, Barnes-Holmes, Barnes-Holmes & Stewart, 2009; Experiment 2), the current study showed no such effects. The lack of an effect for exemplar exposure might possibly be explained by the fact that the sample was small (i.e., $n = 28$) and the variance for each IRAP effect was

relatively large. The source of this variance remains unclear, but it is worth noting that, consistent with the main bulk of the literature concerning the assessment of implicit homonegativity, participant sexual orientation was not recorded. Although 10% of our sample might identify as lesbian, gay or bisexual if assessed categorically (cf. Sell, Wells, & Wypij, 1995), it is possible that a larger number of the current sample might have self-identified as GLB. Indeed, Steffens and Buchner (2003), found with the IAT, that implicit bias toward gay men did show a less tolerant trend when 'non-heterosexuals' were removed from their analyses. It would seem prudent therefore to include an assessment of participant sexual orientation in subsequent experiments.

Given that the IRAP used in the current study again provided some evidence of implicit homonegativity (albeit on the *Gay-Positive* rather than the *Gay-Negative* trial-type), participants in the next study were again exposed to the same IRAP to determine if one or other, or perhaps both patterns, of D-IRAP effects would be observed again. In addition, having failed to find an effect for the pro- versus anti-gay exemplar training, the next study employed a known-groups methodology to explore the predictive validity of the IRAP for the assessment of implicit homonegativity. Specifically, participant sexual orientation was assessed using a sensitive multi-dimensional screening measure and the results of this measure were used to examine potential differences among three different categories of sexual orientation.

Chapter 5: Employing a Known-Groups Methodology with Multi-Dimensional Screening of Participant Sexual Orientation to Explore the Predictive Validity of the IRAP for the Assessment of Implicit Homonegativity

Experiment 3

As noted previously, most published IAT studies that have reported an assessment of implicit homonegativity failed to address in any clear or systematic way the operational and/or conceptual definition of participant sexual orientation. Indeed, as discussed in Chapter 1, only six empirical studies in the extant literature have used a known-groups approach along with some form of participant sexual orientation screening measure to assess whether implicit and explicit homonegativity would be related and differ as a function of participants' sexual orientation.

In general, these studies have found broadly similar results, with both heterosexual and gay/lesbian groups producing in-group biases on the IAT and on the explicit measures, although the effects are sometimes weaker for the gay and lesbian participants. In these studies, sexual orientation has either been (a) assumed or (b) assessed on a single dimension via a relatively crude and reductive indicant such as a single-item question targeting sexual identity (e.g., Banse, Seise, & Zerbes, 2001; "*How would you describe yourself concerning your sexual identity/sexual behavior?"*with a response recorded on a five-point scale ranging from 1 = *exclusively heterosexual* to 5 = *exclusively homosexual*).

Critically, problems associated with self-identification of sexual identity have been generally noted (Cullen & Barnes-Holmes, 2009). For example, the use of self-identification is open to self-deception (Lovelock, 2014). In addition, research has shown that measures of sexual orientation often do not correlate with a participants' self-

identification label (Morgan, 2013; Worthington & Reynolds, 2009). Some researchers (e.g., Shively & De Cecco, 1977) have argued that self-identification of sexual identity is a complex multivariate process, comprising a range of different variables (e.g., biological sex, gender identity, social sex-role, and sexual orientation) that may contribute toward how sexual orientation is self-identified. Indeed, single-dimension assessments (especially the Kinsey Scale) have been criticized for their over simplistic assumption that heterosexuality and homosexuality lie on opposing ends of a continuum (e.g., Storms, 1978, 1980) as well as their failure to consider multi-variable aspects of sexual orientation (e.g., Coleman, 1987; Klein, Sepekoff, & Wolf, 1985).

As discussed in the introduction, there is little consensus in the literature regarding how best to assess sexual orientation (e.g., categorically versus continuously) and we have suggested that multi-dimensional measures might offer more conceptual complexity than simple self-identification measures. Indeed, a novel feature of the present thesis will be the introduction of a conceptually complex multi-dimensional method for screening participant sexual orientation. Thus, in the context of using the IRAP to test its sensitivity to group differences it seemed prudent to consider, in addition to self-identification, a range of different variables that may contribute toward how sexual orientation is self-identified.

One multi-dimensional measure of sexual orientation that seems to offer many advances over the popular Kinsey Scale (Kinsey, Pomeroy & Martin, 1948) is the Klein Sexual Orientation Grid (KSOG; Klein, Sepekoff, & Wolf, 1985; see Cullen and Barnes-Holmes, 2009 for a discussion). In brief, Klein, et al., (1985) conceptualized sexual orientation as 'multivariate and dynamic' (p. 38) and temporally in flux. The KSOG

(Klein, et al., 1985) was developed to test the validity of this conceptualization. Consistent with Klein's conceptualization of sexual orientation, Experiment 3 of the current thesis will use a modified version of the KSOG (discussed in the method section) that incorporates a self-identification dimension.

Given that the IRAP used in Experiments 1 and 2 provided some evidence of implicit homonegativity (on the *Gay-Positive* and the *Gay-Negative* trial-types), participants in the current study were again exposed to the same IRAP to determine if one or other, or perhaps both patterns of D-IRAP effects would be observed again. At the time of writing, no published IRAP study had reported a known-group assessment of implicit homonegativity. The primary goal of the current study was to test the prediction that performance on the IRAP will differ as a function of participant sexual orientation. Specifically, Experiment 3 employed a known-groups approach to determine if the in-group implicit biases found for heterosexuals (a typically strong bias) and sexual minorities (a typically weak bias), found in IAT studies, would be replicated with the IRAP in an Irish context. Additionally, although pro-straight biases were recorded on the IRAP in Experiments 1 and 2, we noted that sexual orientation was not assessed. Such biases therefore cannot be taken to indicate an in-group bias. With the incorporation of sexual orientation screening, Experiment 3 will address this concern. Finally, Experiment 3 at the time it was conducted was the first study of implicit homonegativity with GLB participants in Ireland.

Method

Participants

Fifty-two white Irish participants (Age; M = 24.8 years, SE = .9 years) completed Experiment 3. The KSOG was used to categorise participants into three different groups; exclusive-heterosexuals (EH), non-exclusive-heterosexuals (NEH), and GLB. The EH group reported almost exclusive opposite-sex interest and/or behaviour; the NEH group reported predominant, but not exclusive, opposite-sex interest and/or behaviour; the GLB group reported predominant same-sex interest and/or behaviour, or a distribution of interest/behaviour towards both sexes that was defined as bi-sexual by the KSOG (screening measure details provided subsequently).

Seventeen of the participants were screened as EH (n = 11 males, 6 females), and thirteen as NEH (5 males, 8 females). Both groups of heterosexual participants were predominantly obtained from a convenience sample of undergraduate students recruited from across a variety of disciplines studying at the National University of Ireland, Maynooth. Twenty-two participants were screened as GLB (10 males, 12 females), and were obtained from the convenience sample of undergraduate students or were purposively recruited via advertising placed in a national gay newspaper and from a variety of Irish University GLB societies[13].

Exclusion criteria required that all participants be fluent English speakers and that they had normal or corrected to normal vision. No financial or other incentives (other

[13] Considerable difficulty was encountered in recruiting EH, NEH and GLB participants for Experiment 3 and this was largely due to discrepancies between the participants' self-identified sexual identity versus the researcher-imposed category derived from the multidimensional sexual orientation screening instrument (i.e., KSOG). Specifically, many participants self-identifying as heterosexual males and females, lesbian women or gay men, screened as bisexual on the KSOG. In addition, there were particular difficulties recruiting EH participants. In particular, many participants self-identifying as extremely or strongly heterosexual screened as NEH (and sometimes bisexual) on the KSOG.

than the knowledge that they were assisting in scientific research), were offered for participation in the experiment. All participants completed the experiment on an individual basis in a private setting free from noise and other distractions.

Materials and Apparatus

The materials and apparatus employed in Experiments 1 and 2 (with the exception of the Public/Private materials, exemplars, and the Motivation to Control Homonegativity scale) were employed in Experiment 3, but additional materials were used to screen for participant sexual orientation (see below).

Implicit measure

Implicit Relational Assessment Procedure (IRAP). The IRAP was identical to that employed in Experiments 1 and 2.

Screening measures

The two screening measures that were used in the previous experiments were employed again (i.e., the Cognitive Failures Questionnaire and the Marlow-Crowne Social Desirability Scale SF-C). Additionally, a modified version of the multi-variable and dynamic Klein Sexual Orientation Grid (KSOG; Klein, Sepekoff, & Wolf, 1985; Klein, 1993, see also Cullen & Barnes-Holmes for a discussion) was used to screen for participant sexual orientation. The original grid includes seven dimensions of sexual orientation (i.e., A = *Sexual Attraction*, B = *Sexual Behavior*, C = *Sexual Fantasies*, D = *Emotional Preference*, E = *Social Preference*, F = *Hetero/Gay Lifestyle*, and G = *Self Identification*). Each of these dimensions is assessed across three temporal dimensions (i.e., *Past, Present* and *Ideal*), thus yielding a total of 21 scores. A factor-analytic study (Weinrich, et al. 1993) found that all of the dimensions of sexual orientation proposed by

Klein in the KSOG load on the first orthogonal factor, which accounts for most of the variance, and thus the dimensions appear to be measuring the same construct. A second study (Weinrich, et al.) employing two disparate samples, however, showed that emotional and social preferences loaded onto a second factor, suggesting that these dimensions may also measure something other than sexual orientation. Thus, these two dimensions were excluded from the screening system employed in the current study.

Participants were asked to rate the three dimensions of *Sexual Attraction, Sexual Behavior* and *Sexual Fantasies* along seven-point scales (i.e., 1 = *Other Sex Only*, 2 = *Other Sex Mostly*, 3 = *Other Sex Somewhat More*, 4 = *Both Sexes Equally*, 5 = *Same Sex Somewhat More*, 6 = *Same Sex Mostly*, and 7 = *Same Sex Only*). Participants were then asked to rate the two dimensions of *Hetero/Gay Lifestyle*, and *Self Identification* along seven-point scales (i.e., 1 = *Hetero Only*, 2 = *Hetero Mostly*, 3 = *Hetero Somewhat More*, 4 = *Hetero/Gay-Lesb. Equally*, 5 = *Gay-Lesb. Somewhat More*, 6 = *Gay- Lesb. Mostly*, and 7 = *Gay-Lesb. Only*). In addition, for each of the five sexual orientation dimensions, participants were required to rate each across three temporal dimensions; one for participant's past, one for the present (defined as the preceding year), and one based on the participant's ideal choice. Thus, in the version of the grid employed in the current study, participants produced a total of 15 scores, each ranging between 1 and 7. The five scores for each of the sexual orientation dimensions were summed to create a single value for each temporal dimension (i.e., a summed score for past, present and ideal). An average score calculated across the three temporal scores was subsequently generated to determine the overall sexual orientation score, ranging between a possible minimum of 5 and a possible maximum of 35. Finally, for the purpose of a known-groups analysis,

participants were classified according to three distinct categories based upon their scores,[14] such that; participants with scores ranging from 5 to 7 were categorized as "*EH*," participants with scores ranging from 8 to 17 were categorized as "*NEH*," and participants with scores ranging from 18 to 35 were categorized as "*GLB*".

Explicit attitude measures

The explicit attitude measures that were used in Experiments 1 and 2 were employed in the current experiment (i.e., the twelve semantic differential scales, two feeling thermometers and the two Modern Homonegativity scales).

Procedure

Upon entering the laboratory, participants were first required to sign a written consent form, which assured them that they were free to discontinue participation at any time without incurring penalty. Participants then completed an IRAP identical to that employed in Experiments 1 and 2. Subsequently, each participant completed the explicit attitude and screening measures in the same order that had been employed in the previous experiments, but with the KSOG presented last.

Results and Discussion

Screening Measures

The mean scores on the CFQ for the three sexual orientation groups were similar (Exclusively Heterosexual, $M = 39.41$; Non-Exclusively Heterosexual, $M = 46.31$; and

[14] We acknowledge that Klein, et al. (1985) had originally conceptualized sexual orientation as a construct that may change over time and cannot easily be captured by a single number. A single number reflecting sexual orientation was employed in the current experiment, however, because the research was designed primarily to assess levels of prejudice toward gay people as opposed to the assessment of temporal changes in sexual orientation *per se.* Thus, consistent with Klein, et al. a conceptual definition of sexual orientation as multivariate and dynamic is not compromised by the operational definitions that we have chosen to employ.

GLB, $M = 44.36$), and did not differ significantly ($p > .16$). Responses to the MCSD-SF were also similar (Exclusively Heterosexual, $M = 18.82$; Non-Exclusively Heterosexual, $M = 18$; and GLB, $M = 19.36$), and again did not differ significantly ($p > .19$). Thus, any differences that might emerge between the groups on the implicit and explicit measures are unlikely due to individual differences in cognitive failures or social desirability.

Implicit Measure

Data preparation. The IRAP latency data were transformed using the same algorithm employed in Experiments 1 and 2.

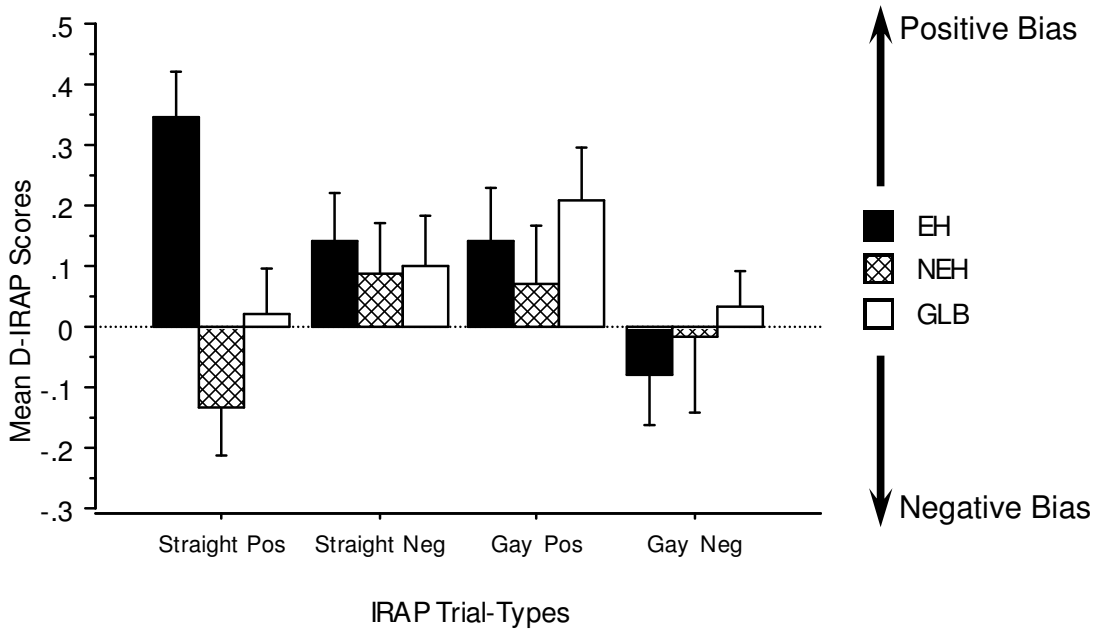

Figure 5.1: Overall mean *D*-IRAP scores for the exclusive-heterosexual (EH), non-exclusive-heterosexual (NEH), and GLB sexual orientation groups with respect to the four IRAP trial-types. Positive *D*-IRAP scores reflect a pro-straight implicit bias and negative *D*-IRAP scores reflect a pro-gay bias. The zero-point reflects no bias.

Data analyses. The raw mean latencies and standard errors for the four trial-types for pro-straight and pro-gay blocks for the EH, NEH and GLB sexual orientation groups

are presented in Appendix C (latencies greater than 10,000 ms were removed from the analyses). The overall mean *D*-IRAP scores for the four trial-types for the three groups are presented in Figure 5.1 and show a broadly similar pattern for the groups for *Straight Negative,* and *Gay Positive* trial-types.

For the *Straight-Positive* and *Gay-Negative* trial-types, however, the effects for the EH and NEH groups diverged from those of the GLB group. Specifically, on the *Straight-Positive* trial-type the EH and GLB groups showed strong and weak positive bias, respectively, responding "Similar" more quickly than "Opposite." In contrast, the NEH group showed a negative bias, responding "Opposite" more quickly than "Similar." For the *Gay-Negative* trial-type both the EH and NEH groups showed relatively weak negative bias, responding "Similar" more quickly than "Opposite," but the *GLB* group showed a weak positive bias, responding "Opposite" more quickly than "Similar."

A 3x4 mixed repeated measures ANOVA, with sexual orientation as the between-participant variable and trial-type as the within-participant variable, failed to yield significant main effects for trial-type and sexual orientation ($p > .11$), but a significant trial-types interaction was recorded, $F_{(6,147)} = 2.267$, $p < .05$, $\eta_p^2 = .08$. Simple effects tests for between-group differences ($\alpha = .05$)[15] indicated that EH differed significantly from both NEH and GLB for the Straight-Positive trial-type, with no significant differences for the other three trial-types. Within-group simple-effect comparisons yielded one significant difference -- between the *Straight-Positive* and *Gay-Negative* trial-types for the EH group. The interaction effect thus appeared to be driven largely by an EH in-group bias observed with respect to the *Straight-Positive* trial-type.

[15] Tukey-Kramer tests were employed and thus the alpha levels were not adjusted.

Four one-sample *t*-tests were conducted separately for each sexual orientation group to determine if the *D*-IRAP trial-type scores differed significantly from zero. For the EH group, a single significant IRAP effect was revealed for the *Straight-Positive* trial-type ($t = 4.8$, $p = .0002$), with no significant effects for the NEH group. The GLB group produced one significant effect for the *Gay-Positive* trial-type ($t = 2.4$, $p = .03$). Overall, therefore, the EH in-group bias that emerged from the previous analyses was thus observed again with the one-sample t-tests, accompanied by a GLB in-group bias on one-trial-type.

Explicit Measures

The data from the explicit measures were prepared for analysis in the same way as the data from Experiments 1 and 2.

***Semantic differential scales*.** The overall mean scores for the three groups indicated relatively positive attitudes to both *straights* and *gays* (EH, *Straight*, $M = 2.4$, $SE = .15$, *Gay*, $M = 1.49$, $SE = .30$; $d = 3.84$; NEH, *Straight*, $M = 1.9$, $SE = .29$, *Gay*, $M = 2.0$, $SE = .20$; $d = -0.4$; GLB, *Straight*, $M = 1.75$, $SE = .20$, *Gay*, $M = 2.37$, $SE = .16$; $d = -3.4$). The EH group showed a more positive attitude for *straights* relative to *gays*; the NEH group produced almost equally positive attitudes; and the GLB group showed stronger positivity for *gays* relative to *straights*. A 2x3 mixed repeated measures ANOVA with explicit rating scale (*straight* versus *gay*) as the repeated measure and sexual orientation (EH, NEH, GLB) as the between participant variable failed to indicate main effects for either sexual orientation or for rating (*ps* > .7), but the interaction was significant $F_{(2, 49)} = 8.5$, $p = .0007$, $\eta_p^2 = .26$.

Simple effects tests for between-group differences (α =.05) indicated that the EH group differed significantly from the GLB group for the *Gay* scale, with no significant differences between the groups for the *Straight* scale. Within-group simple-effect comparisons yielded two significant differences between the *Straight* and *Gay* scales – one for EH and one for GLB. The interaction effect thus appeared to be driven largely by an EH in-group bias observed with respect to the *Straight* scale and a GLB in-group bias observed with respect to the *Gay* scale.

***Feeling thermometers*.** The overall mean scores showed that both the EH and NEH groups indicated more favorable attitudes toward *straight* than *gay*, but the GLB group showed a preference for *gay* over *straight* (EH*, Straight*, $M = 93.1°$, $SE = 1.6$, *Gay,* $M = 72.9°$, $SE = 4.4$, $d = 6.1$; NEH, *Straight,* $M = 81.2°$, $SE = 5.7$, *Gay,* $M = 77.5°$, $SE = 5.5$, $d = 0.7$; GLB, *Straight,* $M = 75.8°$, $SE = 3.9$; *Gay,* $M = 81.7°$, $SE = 3.3$, $d = -1.6$). A 2x3 mixed repeated measures ANOVA yielded a significant main effect for thermometer-type (*straight* versus *gay*), $F_{(1, 49)} = 5.7$, $p = .0200$, $\eta_p^2 = .1$, and a significant interaction with sexual orientation, $F_{(2, 49)} = 10.50$, $p = .0002$, $\eta_p^2 = .3$ (the main effect for sexual orientation was non-significant, $p = .6$).

Simple effects tests for between-group differences (α =.05) indicated one significant effect -- EH versus GLB for the *Straight* feeling thermometer. Within-group simple-effect comparisons yielded two significant differences between the *Straight* and *Gay* feeling thermometers – one was for the EH group and one for the GLB group. Similar to the semantic differentials, the interaction effect appeared to be driven largely by EH and GLB in-group biases.

Modern Homonegativity Scale. On the MHS, the EH group expressed moderately positive attitudes towards *lesbian women* and *gay men* with the latter attitude being slightly more negative (*Lesbian women, M* = 29.75, *SE* = 1.3, *Gay men, M* = 31.13, *SE* = 1.81, *d* = -0.88). The NEH group showed a pattern of means that were more positive when compared to the EH group, with little difference in the two target attitudes (*Lesbian women, M* = 19, *SE* = 2.07; *Gay men, M* = 19.9, *SE* = 2, *d* = -0.44). Finally, the *GLB* group showed the most positive attitudes of the three groups, with little difference between the target attitudes (*Lesbian women, M* = 18.64, *SE* = 1.53; *Gay men, M* = 18.91, *SE* = 1.43, *d* = -0.18). A 2x3 mixed ANOVA revealed two significant main effects, one for sexual orientation, $F_{(2, 48)} = 15.8$, $p = .0001$, $\eta_p^2 = .4$, and one for scale-type (MHS-L versus MHS-G), $F_{(1, 48)} = 5.4$, $p = .0247$, $\eta_p^2 = .1$, but no significant interaction ($p > .4$). Fisher's PLSD post-hoc tests indicated that the attitudes toward gay men and lesbian women expressed by the EH *group* differed significantly from those expressed by the NEH and *GLB* groups (*ps* < .0001), with the remaining between-group comparison being non-significant ($p < .8$). Overall, therefore, the EH group showed more homonegativity than the other two groups, with an overall effect that favoured *lesbian women* over *gay men.*

Implicit-Explicit Correlations

A correlation matrix of the IRAP effects was calculated (i.e., the four trial-types and the overall *D*-IRAP score with each of the 8 explicit measures; *Straight* and *Gay* Feeling Thermometers, *Straight* and *Gay* Semantic Differential Scales, the MHS-G and MHS-L, the CFQ and the MCSD[16]). Of the 40 correlations only one significant effect

[16] Although the CFQ and the MCSD were employed primarily as screening measures they were included in the correlational analyses for exploratory purposes.

was observed; *Gay-Negative* IRAP trial-type and the *MCSD* ($r = .31$, $n = 51$, $p = .03$). In other words, stronger levels of social desirability predicted stronger pro-gay bias on the *Gay-Negative* trial-type. The correlation between the *Straight-Positive* IRAP trial-type and the *MHS-L* approached significance ($p = .06$), suggesting that greater pro-straight bias predicted less positive attitudes towards lesbian women. The remaining 38 correlations were non-significant ($ps > .8$).

Summary and Conclusion

In summary, the findings revealed EH and GLB in-group biases on the IRAP (i.e., a significant effect for EH on the *Straight-Positive* trial-type and a significant effect for GLB on the *Gay-Positive* trial-type); no significant IRAP effects were observed for the NEH group. The results revealed that in general the measures of explicit attitudes did not yield strong evidence of homonegative bias. On the feeling thermometers and semantic differential scales, the EH group showed a more positive bias for *straight* than *gay* while the opposite pattern held for the GLB group; the NEH group was relatively neutral on these measures. With the exception of a single significant correlation between the *Gay-Negative* IRAP trial-type and the *MCSD*, implicit and explicit attitudes were uncorrelated.

In conclusion, the IRAP and explicit measure data reported here are broadly consistent with data from other homonegativity known groups' studies that have shown heterosexual in-group bias on the IAT and on the explicit measures. The current study also found a gay/lesbian in-group bias, which has been reported in some but not all previous IAT studies in this domain. Critically, in contrast to the extant known groups' literature, the current study assessed participant sexual orientation multi-dimensionally.

This more complex approach to sexual orientation screening, yielded two separate heterosexual groups (i.e., Exclusive Heterosexuals, EH; and Non-Exclusive Heterosexuals, NEH) and a Gay, Lesbian, Bisexual (GLB) sexual minority group for comparison.

The data attested to the value of our screening approach with performances on the IRAP and the explicit measures differing as a function of sexual orientation. Specifically, categorizing heterosexuals into two distinct groups seems to be important. In the current study, although EHs showed implicit and explicit in-group biases on the IRAP, the Semantic Differentials and Feeling Thermometers, the NEHs showed no evidence of implicit or explicit in-group bias on these measures.

The pro-straight implicit biases produced in Experiments 1 and 2 of the current thesis were replicated in the current study with the EH group for the *Straight-Positive* but not the *Straight-Negative* IRAP trial-type. The composition of the samples in the earlier IRAP experiments, however, remains unclear in terms of sexual orientation and thus making direct comparisons among the three studies would be unwise. With that said, an interesting pattern emerged for the *Gay-Negative* trial-type in the current experiment. Specifically, all three groups failed to show a significant bias score in either direction. In effect, the EH group failed to *confirm* that gay was negative and the GLB group, perhaps most surprisingly, failed to *deny* that gay was negative (at a significant level). At the same time, the pattern of differences among the three groups could be considered broadly consistent with their sexual orientations, in that the EH group tended towards a negative bias, the NEH group produced a close to zero score, and the GLB group tended towards positivity.

At this point, it is important to note that shortly after the current study was conducted unrelated IRAP research, focused on implicit racism, indicated that reducing the response latency criterion from 3000ms to 2000ms appeared to increase in-group bias, particularly on the trial-type that aimed to assess out-group negativity (Barnes-Holmes, Murphy, Barnes-Holmes & Stewart, 2010). Given this finding, it seemed important to repeat the current experiment but employing the reduced 2000ms latency criterion. The study reported in the next chapter thus attempted to replicate the current experiment but required participants to respond within 2000ms.

Chapter 6: A Partial Replication of Experiment 3 with a Reduction in the IRAP Response Latency Criterion

Experiment 4

As discussed in the previous chapter, IRAP research that focused on implicit racism was conducted shortly after Experiment 3 and it indicated that reducing the response latency criterion from 3000ms to 2000ms appeared to increase in-group bias, particularly on the trial-type that aimed to assess out-group negativity (Barnes-Holmes, Murphy, Barnes-Holmes & Stewart, 2010). On that basis, it seemed prudent to repeat Experiment 3 but with a reduced (2000ms) latency criterion.

The current study also employed an additional measure that was not used in the previous experiment. A small number of published IAT studies had attempted to assess the relationship between implicit homonegativity and helping behavior (e.g., Rohner & Björklund, 2006; Gabriel, Banse, & Hug, 2007), and thus a relevant measure was included in the current study. Specifically, participants were asked if they were willing to provide assistance in supporting gay rights, with the level of assistance varying in terms of demand (e.g., signing a petition; providing personal details in order to be contacted by a gay rights organization; attending a gay-rights public event; etc).

Method

Participants

Sixty-six white Irish participants (Age; M = 26.1 years, SE = 1.08 years) completed Experiment 4. The KSOG was used to categorise participants into three

different groups; exclusive-heterosexuals (EH), non-exclusive-heterosexuals (NEH), and GLB. Eighteen of the participants were screened as EH (n = 4 males, 14 females), and twenty-six as NEH (7 males, 19 females). Both groups of heterosexual participants were predominantly obtained from a convenience sample of undergraduate students recruited from across a variety of disciplines studying at the National University of Ireland, Maynooth. Twenty-two participants were screened as GLB (11 males, 11 females), and were obtained from the convenience sample of undergraduate students or were purposively recruited via advertising placed in a national gay newspaper and from a variety of Irish University GLB societies. Exclusion criteria required that all participants be fluent English speakers and that they had normal or corrected to normal vision. No financial or other incentives (other than the knowledge that they were assisting in scientific research), were offered for participation in the experiment. All participants completed the experiment on an individual basis in a private setting free from noise and other distractions.

Materials and Apparatus

The materials and apparatus employed in Experiment 3 were employed in Experiment 4. Additional materials were used to screen for participants willingness to provide help and support for gay rights (see Appendix M and see below).

Implicit measure

The IRAP was identical to that employed in Experiment 3 with the exception that the response latency criterion on the IRAP were reduced from 3000ms to 2000ms.

Screening measures

The two screening measures that were used in the previous experiments were employed again (i.e., the Cognitive Failures Questionnaire and the Marlow-Crowne Social Desirability Scale SF-C). The modified version of the multivariable and dynamic Klein Sexual Orientation Grid (KSOG; Klein, Sepekoff, & Wolf, 1985; Klein, 1993, see also Cullen & Barnes-Holmes for a discussion) that had been employed in Experiment 3 was used to screen for participant sexual orientation.

Explicit attitude measures

The explicit attitude measures that were used in Experiment 3 were employed in the current experiment (i.e., the twelve semantic differential scales, two feeling thermometers and the two Modern Homonegativity scales).

Behavioral measure

A specifically constructed nine-item measure of helping behavior was administered to assess participant's willingness to be contacted by a gay organization in order to support gay rights in a variety of settings (see Appendix M). The nine items were assigned values of *1 (help/details provided)* and *0 (no help/no details)*. The measure was summed with total scores ranging from 0 to 9, with higher scores indicating a stronger tendency towards helping.

Procedure

Upon entering the laboratory, participants were first required to sign a written consent form, which assured them that they were free to discontinue participation at any time without incurring penalty. Participants then completed an IRAP identical to that

employed in previous experiments (with the exception that the latency criterion was reduced to 2000ms). Subsequently, each participant completed the explicit attitude and screening measures in the same order that had been employed in the previous experiment, but with the additional behavioural measure presented last.

Results and Discussion

Screening Measures

The mean scores on the CFQ for the three sexual orientation groups were similar (Exclusively Heterosexual, $M = 43.17$; Non-Exclusively Heterosexual, $M = 41.72$; and GLB, $M = 43.41$), and did not differ significantly ($p > .86$). Responses to the MCSD-SF were also similar (Exclusively Heterosexual, $M = 17.39$; Non-Exclusively Heterosexual, $M = 19.28$; and GLB, $M = 17.50$), and again did not differ significantly ($p > .17$). Thus, any differences that might emerge between the groups on the implicit and explicit measures are unlikely due to individual differences in cognitive failures or social desirability.

Implicit Measure

Data preparation. The IRAP latency data were transformed using the same algorithm employed in Experiment 3.

Data analyses. The raw mean latencies and standard errors for the four trial-types for pro-straight and pro-gay blocks for the EH, NEH and GLB sexual orientation groups are presented in Appendix D (latencies greater than 10,000 ms were removed from the analyses). The overall mean *D*-IRAP scores for the four trial-types for the three groups are presented in Figure 6.1 and show a broadly similar pattern of positive bias for GLB

group across the four trial-types. The pattern of bias scores for the EH group were in stark contrast to the GLB group, in that the bias scores were relatively strong for the two *Straight* trial-types and weakly positive on the *Gay-Positive* trial-type and weakly negative on the *Gay-Negative* trial-type. The NEH group showed a relatively strong positive implicit bias on the *Straight-Positive* trial-type, but relatively weaker but positive effects across the remaining three trial-types.

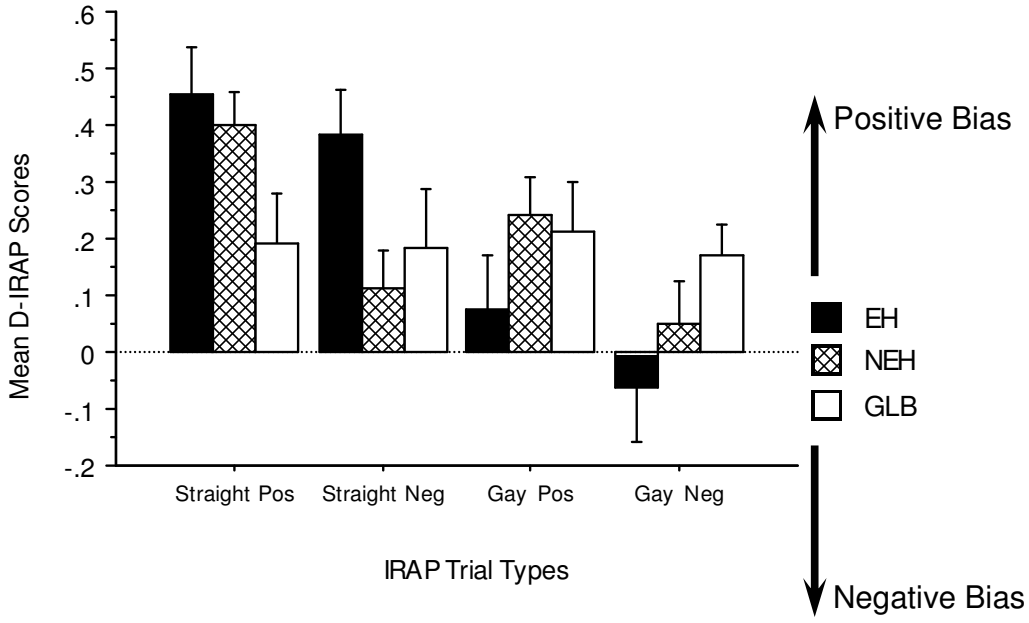

Figure 6.1: Overall mean *D*-IRAP scores for the Exclusive-Heterosexual (EH), Non-Exclusive-Heterosexual (NEH), and Gay, Lesbian, Bisexual (GLB) sexual orientation groups with respect to the four IRAP trial-types. On the graph positive *D*-IRAP scores reflect a pro-straight implicit bias and negative *D*-IRAP scores reflect a pro-gay bias. The zero-point reflects no bias.

A 3x4 mixed repeated measures ANOVA, with sexual orientation as the between-participant variable and trial-type as the within-participant variable, yielded a significant main effect for trial-type, $F_{(3,189)} = 7.557$, $p < .0001$, $\eta_p^2 = 0.11$, and a significant interaction effect, $F_{(6,189)} = 3.202$, $p < .0051$, $\eta_p^2 = .09$.There was no main effect for

sexual orientation ($p = .94$). Simple effects tests for between-group differences ($\alpha = .05$)[17] indicated group differences across three of the four trial types (no significant differences were recorded for the Gay-Positive trial-type). Specifically, GLB differed significantly from both EH and NEH for the Straight-Positive trial-type and they differed significantly from the EH group for the Gay Negative trial-type. The NEH differed significantly from the EH group on the Straight Negative trial-type. Within-group simple-effect comparisons for the EH group yielded significant differences between *Straight-Positive* and *Gay-Positive, Straight-Positive* and *Gay-Negative,* and *Straight-Negative* and *Gay-Negative* trial-types. For the NEH group, significant differences were recorded between *Straight-Positive* and *Straight-Negative* trials and between *Straight-Negative* and *Gay-Positive* trial-types. No significant differences were recorded for the GLB group. The interaction effect thus appeared to be driven largely by strong EH in-group implicit bias observed with respect to the two *Straight* trial-types; weaker NEH in-group implicit bias evidenced only on the *Straight-Positive* trial-type; and no evidence of GLB implicit biases.

Four one-sample *t*-tests were conducted separately for each sexual orientation group to determine if the *D*-IRAP trial-type scores differed significantly from zero. For the EH group, a significant IRAP effect was revealed for the *Straight-Positive* ($t = 5.6$, $p < .0001$) and *Straight-Negative* ($t = 4.7$, $p = .0002$) trial-types. The NEH group produced significant effects for the *Straight-Positive* ($t = 6.7$, $p < .0001$) and *Gay-Positive* ($t = 3.6$, $p = .0015$) trial-types. Finally, significant effects for the GLB group were recorded on *Straight-Positive* ($t = 2.2$, $p = .0418$), *Gay-Positive* ($t = 2.4$, $p = .0264$), and *Gay-Negative* ($t = 3.2$, $p = .0042$) trial-types. Overall, therefore, the inferential statistics were broadly in

[17] Tukey-Kramer tests were employed and thus the alpha levels were not adjusted.

accordance with the descriptive analyses illustrated in Figure 6.1, with the EH group producing evidence of relatively strong in-group positive implicit bias, the GLB group producing no evidence of implicit in-group bias, and the NEH group indicating relatively limited evidence of in-group implicit bias, except for a strong bias score on the *Straight-Positive* trial-type, and a failure to deny negativity at a significant level on the *Gay-Negative* trial-type.

Explicit Measures

The data from the explicit measures were prepared for analysis in the same way as the data from Experiment 3.

***Semantic differential scales*.** The overall mean scores for the three groups indicated relatively positive attitudes to both *straights* and *gays* (EH, *Straight*, $M = 1.6$, $SE = .25$, *Gay*, $M = 1.1$, $SE = .34$; $d = 1.68$; NEH, *Straight*, $M = 1.96$, $SE = .18$, *Gay*, $M = 2.1$, $SE = .16$; $d = -0.82$; GLB, *Straight*, $M = 1.8$, $SE = .23$, *Gay*, $M = 2.2$, $SE = .16$; $d = -2.02$). The EH group showed a more positive attitude for *straights* relative to *gays*; the NEH group did not appear to discriminate between *straights* or *gays* but did produce slightly more positive attitudes overall; and the GLB group showed stronger positivity for *gays* relative to *straights*. A 2x3 mixed repeated measures ANOVA with explicit rating scale (*straight* versus *gay*) as the repeated measure and sexual orientation (EH, NEH, GLB) as the between participant variable failed to indicate a main effect for rating ($p > .9$), but the main effect for sexual orientation $F_{(2, 63)} = 3.6$, $p = .03$, $\eta_p^2 = .10$ and the interaction was significant $F_{(2, 63)} = 7.2$, $p = .0015$, $\eta_p^2 = .19$. Simple effects tests for between-group differences ($\alpha = .05$) indicated that the EH group differed significantly from both the NEH and the GLB group for the *Gay* scale, with no significant differences

between the groups for the *Straight* scale. Within-group simple-effect comparisons yielded one significant difference -- between the *Straight* and *Gay* scales for the GLB group. The interaction effect thus appeared to be driven largely by an EH in-group bias observed with respect to the *Straight* scale and a GLB in-group bias observed with respect to the *Gay* scale.

***Feeling thermometers*.** In general, attitudes were relatively positive toward both groups on the feeling thermometers. The overall mean scores showed that both the EH and GLB groups produced favorable in-group biases, and the NEH group produced relatively equal positivity toward *gay* and *straight* and again produced slightly more positive attitudes overall (EH*, Straight*, $M = 81.3°$, $SE = 4.5$, *Gay,* $M = 67°$, $SE = 6.5$, $d = 2.56$; NEH, *Straight,* $M = 89.1°$, $SE = 2.7$, *Gay,* $M = 87.7°$, $SE = 2.4$, $d = 0.55$; GLB, *Straight,* $M = 78.9°$, $SE = 3.9$; *Gay,* $M = 84.7°$, $SE = 3.3$, $d = -1.61$).

A 2x3 mixed repeated measures ANOVA yielded a significant main effect for sexual orientation, $F_{(2, 63)} = 4.6$, $p = .01$, $\eta_p^2 = .13$, and a significant interaction with thermometer type (*straight* versus *gay*), $F_{(2, 63)} = 6.1$, $p = .004$, $\eta_p^2 = .16$. The main effect for thermometer-type was non-significant ($p = .2$). Simple effects tests for between-group differences ($\alpha = .05$) indicated that the EH group differed significantly from both the NEH and the GLB group for the *Gay* feeling thermometer with no significant differences between the groups for the *Straight* thermometer. Within-group simple-effect comparisons yielded a single significant difference between the *Straight* and *Gay* feeling thermometers for the EH group. Similar to the semantic differentials, the interaction effect on the thermometers appeared to be driven largely by EH and GLB in-group biases.

Modern Homonegativity Scale. On the MHS, the groups expressed little difference between ratings of *lesbian women* and *gay men (*the latter attitude was slightly more negative in Experiment 3). The EH group expressed moderately positive attitudes towards *lesbian women* and *gay men* (*Lesbian women, M* = 22.94, *SE* = 2.3, *Gay men, M* = 22.61, *SE* = 2.05, *d* = 0.15). The NEH group showed a pattern of means that were more positive when compared to the EH group (*Lesbian women, M* = 20.6, *SE* = 1.27; *Gay men, M* = 20.24, *SE* = 1.36, *d* = 0.27). Finally, the *GLB* group showed the most positive attitudes of the three groups (*Lesbian women, M* = 16.29, *SE* = 1.11; *Gay men, M* = 18.05, *SE* = 1.13, *d* = -1.57). A 2x3 mixed ANOVA revealed a significant main effect for sexual orientation, $F_{(2, 61)} = 3.26$, $p = .045$, $\eta_p^2 = .1$, and a significant interaction effect $F_{(2, 61)} = 4.7$, $p = .012$, $\eta_p^2 = .1$, but no significant main effect for scale-type (MHS-L versus MHS-G), ($p > .27$). Simple effects tests for between-group differences ($\alpha = .05$) indicated that the EH group differed significantly from the GLB group for the *Female* scale *(i.e., attitudes toward lesbian women)* with no significant differences between the groups for the *Male* scale. Within-group simple-effect comparisons yielded a single significant difference -- between the *Male* and *Female* scales for the GLB group – an effect that favoured *lesbian women* over *gay men.* Overall, therefore, the EH group showed more homonegativity than the other two groups -- and particularly so towards lesbian woman when compared with the GLB group, who showed a preference for lesbian women over gay men.

Behavioral Measure

On the behavioural helping measure, the heterosexual groups expressed little difference between levels of willingness to help (*EH, M* = 2.67, *SE* = 0.77, *NEH, M* =

2.81, *SE* = 0.71) and were overall only slightly willing to help. The GLB group expressed somewhat *more* (but moderate) willingness to help gay rights (*GLB, M* = 5.41, *SE* = 0.69). A one-way ANOVA revealed that the groups differed significantly in relation to their willingness to provide help, $F_{(2, 63)} = 4.5$, $p = .01$, $\eta_p^2 = 0.1$. Post-hoc, Fisher's PLSD tests, indicated that the GLB group was significantly more willing to help than the EH group ($p = .01$) and the NEH group ($p = .01$), with no significant difference between the two heterosexual groups ($p > .9$). Overall, therefore, the GLB group showed more willingness to help gay rights than the other two groups.

Implicit-Explicit Correlations

A correlation matrix of the IRAP effects was calculated (i.e., the four trial-types and the overall *D*-IRAP score with the behavioral measure of willingness to help and each of the 8 explicit measures; *Straight* and *Gay* Feeling Thermometers, *Straight* and *Gay* Semantic Differential Scales, the MHS-G and MHS-L, the CFQ and the MCSD[18]). Of the 45 correlations the following seven significant effects were observed: *Straight-Positive* IRAP trial-type and the *Female Modern Homonegativity Scale* ($r = .28$, $n = 64$, $p = .03$) suggesting that greater pro-straight bias on the *Straight-Positive* IRAP trial-type predicted less positive attitudes towards lesbian women on the MHS-L; *Straight-Negative* IRAP trial-type and both *Male* and *Female Modern Homonegativity Scales* ($r = .49$, $n = 64$, $p < .0001$, and $r = .48$, $n = 64$, $p < .0001$, respectively) suggesting that greater pro-straight bias on the *Straight-Negative* IRAP trial-type predicted less positive attitudes towards gay men and lesbian women on the MHS; *Gay-Positive* IRAP trial-type and the *Gay Semantic Differential Scale* ($r = .26$, $n = 64$, $p = .04$) suggesting that stronger *Gay-*

[18] Although the CFQ and the MCSD were employed primarily as screening measures they were included in the correlational analyses for exploratory purposes.

Positive IRAP scores predicted stronger pro-gay biases on the semantic differential scales; an inverse correlation between *Gay-Positive* IRAP trial-type and the *Female Modern Homonegativity Scale* (r = -.28, n = 64, p = .03) suggesting that stronger anti-gay bias on the MHS-L predicted weaker pro-gay bias on the *Gay-Positive* IRAP trial-type; and inverse correlations between the *Gay-Negative* IRAP trial-type and both *Male* and *Female* versions of the *Modern Homonegativity Scale* (r = -.32, n = 64, p = .009, and r = -.35, n = 64, p = .005, respectively) suggesting that greater anti-gay bias on both versions of the MHS predicted greater anti-gay bias on the *Gay-Negative* IRAP trial-type. The correlation between the *Straight-Negative* IRAP trial-type and the *Gay Semantic Differential Scale* approached significance (p = .06) as did the correlation between the *Straight-Negative* IRAP trial-type and the *CFQ* (p = .06). The remaining 38 correlations were non-significant (ps > .1).

Summary and Conclusion

Relative to the study reported in the previous chapter using a 3000ms latency criterion, the 2000ms IRAP appeared to generate stronger evidence of heterosexual in-group biases. For example, significant positivity was obtained on both *Straight-Positive* and *Straight-Negative* trial-types in the current study for the EH group (significant positivity was only obtained on the *Straight-Positive* trial-type using 3000ms). In addition, the 2000ms IRAP produced a clear (if non-significant) positivity bias on the *Straight-Positive* trial-type for the NEH group; in the previous study the effect was (non-significantly) negative. Additionally, the GLB group produced clear and significant positive biases with the 2000ms IRAP across three of the trial-types (only the *Straight-*

Negative positive effect was non-significant). In the previous study only the *Gay-Positive* trial-type yielded a significant effect.

Overall, therefore, reducing the latency criterion from 3000 to 2000ms appeared to produce a pattern of IRAP trial-type effects that more closely matched what one might expect based on the three sexual orientation categories employed in these two studies (e.g., the GLB group denied gay-negative relations at a significant level at 2000ms but failed to do so at 3000ms). Critically, the divergence between the groups on the *Gay-Negative* IRAP trial type, in the current study, again lends support to the utility of our screening approach, and particularly so with regard to distinguishing two apparently distinct heterosexual groups. Specifically, the data show that the negativity biases shown by the heterosexuals on the *Gay-Negative* trial-type differed as a function of heterosexual category (e.g., the NEH group were weakly positive but the EH were weakly negative).

Consistent with the previous studies reported in the thesis, the results revealed that in general the measures of explicit attitudes did not yield strong evidence of homonegative bias. On balance, some of the results from the explicit measures were broadly consistent with the three categories of sexual orientation employed here. On the feeling thermometers and semantic differential scales, the EH group showed a more positive bias for *straight* than *gay* while the opposite pattern held for the GLB group. Consistent with the previous study, the NEH group was *relatively* neutral on these measures but did produce slightly more positive attitudes overall when compared with the other groups. The EH group showed stronger homonegative bias on the Modern Homonegativity Scale (MHS) than the other groups. On the behavioral measure of

willingness to help gay rights, the GLB group showed more (i.e., moderate) willingness to help than the EH and NEH groups (i.e., weak).

Relative to the previous study, where there was a single correlation between the 3000ms IRAP and explicit measures (i.e., *Gay-Negative* IRAP trial-type and the *MCSD*), a number of significant correlations were obtained between the 2000ms IRAP (i.e., all four trial-types) and explicit measures (i.e., Gay Semantic Differential, MHS-L, and MHS-G), providing support for the convergent validity of the 2000ms IRAP as a measure of implicit homonegativity. Willingness to help gay rights, however, was not related to any of the three trial-types of the IRAP.

Before closing, a particularly interesting result that emerged for the GLB group in the current study is the divergence between their implicit and explicit measures. The GLB group showed no evidence of implicit in-group bias on the IRAP. In fact, the GLB group showed no discrimination between the four trial-types on the IRAP and showed moderate positivity in each case. They did, however, show an in-group bias on the explicit measures, perhaps suggesting some in-group 'volitional' pride. In contrast, the EH group showed a preference for straight over gay across both implicit and explicit measures.

In conclusion, the data from the IRAP and the explicit measures reported here, are again, broadly consistent with data from other homonegativity known groups' studies that have shown heterosexual in-group bias on the IAT and on explicit measures. Critically, restricting the response latency criterion on the IRAP to 2000ms (rather than 3000ms) produced effects that appeared to be more consistent with the categories of sexual orientation that were employed. This finding is broadly supportive of the IRAP research on racial biases reported by Barnes-Holmes, Murphy, Barnes-Holmes, and Stewart,

(2010), which showed stronger evidence of in-group racial bias on a 2000ms IRAP (relative to a 3000ms version). We shall return to this, other related issues, in the General Discussion chapter at the end of the thesis.

At this stage in the research programme, it was noted that no Irish study had used the IAT to investigate implicit homonegativity. Additionally, no published IAT study had screened participant sexual orientation multi-dimensionally. Consequently, it was considered important to determine if the effects typically found in published homonegativity IAT studies would be replicated in an Irish context. The next study thus retained the multi-dimensional sexual orientation screening measures that had been used in Experiments 3 and 4 and employed a known-groups methodology to determine if implicit (as assessed via the IAT) and explicit homonegativity would be related and differ as a function of sexual orientation group status.

Chapter 7: Using the IAT for the Assessment of Implicit Homonegativity in an Irish Context: A Known-Groups Approach with Multi-Dimensional Sexual Orientation Screening

Experiment 5

At this point in the research program, an IRAP had been developed that was capable of capturing implicit homonegativity (especially on the *Gay-Negative* trial-type), was evidently capable of capturing clear sexual orientation group differences, was un-influenced by motivation to control homonegativity and was relatively unaffected by the assessment context. In addition, our multi-dimensional approach to sexual orientation screening had proved useful.

As noted previously, published IAT studies have consistently reported heterosexual in-group implicit biases and sometimes gay/lesbian in-group biases. In addition, the research findings have typically shown weak and diverging relationships between implicit and explicit homonegativity. At the time of writing, however, no published study had used the IAT to investigate implicit homonegativity in Ireland. Additionally, no published homonegativity study had used the IAT (or another established reaction time based implicit measure) in conjunction with multi-dimensional participant sexual orientation screening.

Consequently, before proceeding further with the IRAP research program, it was considered important to determine if the effects typically found in published homonegativity IAT studies would be replicated in an Irish context. The next study retained the multi-dimensional sexual orientation screening measures that had been used in Experiments 3 and 4 and employed a known-groups methodology to determine if

implicit (as assessed via the IAT) and explicit homonegativity would differ as a function of sexual orientation group status.

Method

Participants

Fifty-nine white Irish participants (n = 34 female, n = 26 male, Age; M = 30 years, SE = 1.35 years) completed Experiment 5. Nineteen of the participants were screened as EH (n = 11 males, 8 females), and twenty-three as NEH (7 males, 16 females). Both groups of heterosexual participants were obtained predominantly from a convenience sample of undergraduate students recruited from across a variety of disciplines studying at the National University of Ireland, Maynooth. Seventeen participants were screened as GLB (7 males, 10 females), and were obtained from the convenience sample of undergraduate students or were purposively recruited via advertising placed in a national gay newspaper and from a variety of Irish University GLB societies. Exclusion criteria required that all participants be fluent English speakers and that they had normal or corrected to normal vision. No financial or other incentives (other than the knowledge that they were assisting in scientific research), were offered for participation in the experiment. All participants completed the experiment on an individual basis in a private setting free from noise and other distractions.

Materials and Apparatus

The materials and apparatus employed in Experiment 4 were employed in Experiment 5, with the exception that the IAT was used instead of the IRAP.

Screening Measures

The two screening measures that were used in the previous experiments were employed again (i.e., the Cognitive Failures Questionnaire and the Marlow-Crowne Social Desirability Scale SF-C). Consistent with previous experiments, a modified version of the multivariable and dynamic Klein Sexual Orientation Grid (KSOG; Klein, Sepekoff, & Wolf, 1985; Klein, 1993) was used to screen for participant sexual orientation.

Implicit Measure

Implicit Association Test (IAT). All participants completed the IAT on personal computers with Intel Pentium 4 processors, QWERTY keyboards and standard 16" monitors. The IAT software presented instructions, stimuli and recorded participants' responses. The stimuli employed with the IAT task consisted of two sets of three words that were deemed to be associated with either Straight ("Heterosexual", "Heterox", "Straight") or Gay ("Homosexual", "Homox", "Gay") and a further two sets of six words that were classified as positively (normal, natural, safe, healthy, acceptable, decent) or negatively (abnormal, unnatural, dangerous, sick, unacceptable, offensive) valenced. An extensive search of the implicit homonegativity literature concerning previously employed word stimuli failed to yield alternative non-pejorative terms for "Gay" or "Homosexual". Indeed, a more general search of terms (e.g., *google, yahoo, google scholar*) also failed to find positive alternative words. The term "Homo" (literally meaning *same*) albeit with its attendant negative connotations, appears to be ubiquitously employed as a term for homosexual. The addition of the suffix "-ox" to the already familiar prefix "Homo-" was considered a useful strategy for changing its status to a

neutrally valenced word. Consequently, the term "Homox" was constructed as a non-derogatory term that participants were instructed, for the purpose of the experiment, to associate with the category "Gay" and "Homosexual". A corresponding counterpart "Heterox" (meaning *different/other*) was fashioned to represent the category "Straight" and "Heterosexual". Again, participants were instructed, for the purpose of the experiment, to associate the term "Heterox" with the category "Straight" and "Heterosexual". Participants did not proceed to complete the IAT until the researcher was satisfied that that exemplars representing the target categories "Gay" and "Straight" were understood by participants to be associated with said categories.

Explicit attitude measures

The explicit attitude measures that were used in Experiment 4 were employed in the current experiment (i.e., the twelve semantic differential scales, two feeling thermometers and the two Modern Homonegativity scales).

Procedure

Upon entering the laboratory, participants were first required to read and sign a written informed consent form, which assured them that they were free to discontinue participation at any time without incurring penalty. The experiment consisted of two phases. During Phase 1, participants were exposed to the IAT. In Phase 2, participants completed the screening measures (i.e., CFQ and MCSD-SF-C), the explicit measures of homonegativity (i.e., the semantic differential scales, feeling thermometers, and MHS-G/MHS-L) and the KSOG in the same order that had been employed in the previous experiments.

Phase 1: Implicit Association Test (IAT)

After reading and signing the informed consent, each participant was seated in front of a computer and randomly assigned to either a consistent-first or inconsistent-first sequence (described subsequently). Next, participants were invited to start the IAT computer software. The IAT program presented the following instructions across a number of display pages while the participant moved forwards and backwards through the pages using the space bar to proceed and the ‘‘d’’ key to return to the previous page:

> *INSTRUCTIONS FOR THE SORTING TASKS*
> *For each of several sorting tasks you will be shown words one at a time in the middle of the computer screen. Your task is to sort each item into its correct category as fast as you can by pressing EITHER the ‘d’ key or the ‘k’ key. IMPORTANT: Press the ‘d’ key using your left index finger, or the ‘k’ key using your right index finger. The categories associated with the ‘d’ and ‘k’ keys will be shown at the top of each screen. Please pay close attention to these category labels—they change for each sorting task!*
> *For one of the sorting tasks you will be classifying words as being either, ‘Straight’ or ‘Gay’. In the other sorting task you will be classifying words as being either ‘Good’ or ‘Bad’. For each task, please judge each item on the basis of which group it appears to belong to. Please examine the next page carefully. It gives key assignment instructions for the next series of categorization trials. Press the space bar to continue.*

After pressing the space bar, the display screen for the first sorting task was presented. The specific sequence of sorting tasks, which were divided into seven blocks, differed depending on whether the participant had been assigned to the Pro-Straight/Anti-Gay or Pro-Gay/Anti-Straight conditions. The sequence of tasks for the Pro-Straight/Anti-Gay condition will now be described in detail.

Block 1: Straight-Gay discrimination. The first sorting task presented the phrase ‘‘Press ‘d’ For’’ in the top-left corner and ‘‘Press ‘k’ For’’ in the top right corner of the computer screen. These two phrases appeared in black. Approximately 8 cm underneath

these instructions the word ‘‘Straight’’ appeared on the left and the word ‘‘Gay’’ appeared on the right. These two words were written in green. From the participant’s perspective, therefore, the instructions read ‘‘Press d for Straight’’ and ‘‘Press k for Gay’’. These instructions remained on the screen throughout the first block. The following additional instructions appeared before the first trial:

> *IF YOU MAKE AN ERROR YOU WILL SEE A RED ‘X’ BELOW THE STIMULUS – WHEN THIS HAPPENS, YOU HAVE TO MAKE THE CORRECT RESPONSE TO PROCEED. THIS IS PRACTICE – ERRORS ARE EXPECTED. READ THE INSTRUCTIONS, ABOVE, THEN PRESS THE SPACE BAR TO START.*

When the participant pressed the space bar the additional instructions were removed immediately and 500 ms later the first stimulus (see Table 7.1, for the stimulus arrangements for all trial-types) was presented in the centre of the computer screen. The stimulus remained on screen until the participant pressed either the ‘d’ or ‘k’ key on the computer keyboard. If a participant pressed the correct key, ‘d,’ given any of the straight-related target words (*heterosexual, heterox, straight*) and ‘k’ given any of the gay-related words (*homosexual, homox, gay*), the target was immediately removed from the screen and the next target was presented 400 ms later. If a participant pressed the incorrect or an invalid key (i.e.,‘d’ for a gay-related word, ‘k’ for a straight-related word, or any other key on the keyboard), a red ‘X’ immediately appeared directly underneath the target word and remained on screen. When the participant pressed the correct key both the target and the red ‘X’ immediately disappeared and the next target was presented 400 ms later. Each of the three straight related and three gay related target words were presented randomly,

without replacement, in groups of six trials for a total of 24 trials (i.e., each target was presented four times).

Immediately following the completion of trial 24, the screen cleared and performance feedback was presented to the participant. The feedback specified the percentage of correct responses and the median response time produced by the participant during the first block. The percentage of correct responses was defined as the total number of trials completed without an error divided by 24 and then multiplied by 100. The median response time was calculated across all trials, including those on which an error occurred. The response time for each trial was defined as the duration, in milliseconds, from the presentation of the target word to the first correct response. Immediately below the feedback message was a request for the participant to press the space bar to proceed. Upon doing so the screen cleared and the following instruction appeared: *Please examine the next page carefully. It gives key assignment instructions for the next series of categorization trials. Press the space bar to proceed.* When the participant pressed the space bar the program proceeded to Block 2 of the IAT.

GOOD	BAD	STRAIGHT	GAY
Normal	Abnormal	Heterosexual	Homosexual
Natural	Unnatural	Heterosexual	Homosexual
Safe	Dangerous	Heterox	Homox
Healthy	Sick	Heteox	Homox
Acceptable	Unacceptable	Straight	Gay
Decent	Offensive	Straight	Gay

Table 7.1: Target-Word Sets Used in the IAT

Block 2: Good–Bad discrimination. Block 2 was similar to Block 1 except for the following differences. First, the two instructions at the top left and right hand corners of the screen read ‘‘Press ‘d’ for Good’’ and ‘‘Press ‘k’ for Bad’’, respectively. Second, the words ‘‘Good’’ and ‘‘Bad’’ were written in blue rather than green, and were positioned approximately 2 cm underneath the ‘‘Press ‘d’’’ and ‘‘Press ‘k’’’ phrases. Third, the additional instructions were reduced for Block 2 such that the sentence referring to errors and the red ‘X’ was removed (note, however, that the program treated errors for this and all other blocks in exactly the same way as in Block 1). Finally, the six good-related words (*normal, natural, safe, healthy, acceptable, and decent*) and six bad-related words (*abnormal, unnatural, dangerous, sick, unacceptable, and offensive*) were presented as target stimuli. Each of the twelve good and bad words were presented randomly, without replacement, in groups of twelve trials for a total of 24 trials (i.e., each target was presented twice).

Block 3: Pro-Straight/Anti-Gay categories practice. This third block was similar to the previous two blocks except for the following differences. First, the instructions at the top left and top right corners of the screen were combined from Blocks 1 and 2 such that they now read ‘‘Press ‘d’ for Good or Straight’’ and ‘‘Press ‘k’ for Bad or Gay’’. The colors of the words used in the previous blocks remained unchanged (the word ‘‘or’’ in both the left and right trials appeared in gray). Second, all 18 target words — six good-related, three straight-related, six bad-related, and three gay-related — were presented randomly, without replacement, in two groups of 18 trials (i.e., each target was presented at least once, but not more than twice, across the 24 trials).

Block 4: Pro-Straight/Anti-Gay categories test. The fourth block was similar to Block 3, except that the first sentence of the additional instructions now read: *This is the test— Go fast, making a few errors is ok.* Furthermore, 48 trials were presented rather than 24.

Block 5: Gay–Straight discrimination. This block was similar to Block 1 except that the left–right positioning of the two instructions was reversed—participants now were required to press left for gay-related targets and to press right for straight-related targets. Before this block commenced, the following instructions were presented to warn the participants that the key assignments were about to change:

> *The next few blocks will change one of the categorization tasks. You will have on-screen reminders at the top throughout the block. Please use this block to remember the instruction and learn the task so you will be able to respond rapidly in the following blocks.*

Block 6: Pro-Gay/Anti-Straight categories practice. Block 6 was similar to Block 3 except that the two instructions at the top left and right corners of the screen asked participants to respond according to the new key assignments; ‘‘Press ‘d’ for Good or Gay’’ and ‘‘ Press ‘k’ for Bad or Straight’’.

Block 7: Pro-Gay/Anti-Straight test. The final block was similar to Block 6, except that the first sentence of the additional instructions now read: *This is the test— Go fast, making a few errors is ok.* Furthermore, 48 trials were presented rather than 24. Immediately after the last trial (i.e., trial 48), the screen cleared and the following message appeared: *“That is the end of this part of the experiment. Please report to the experimenter’’*.

Pro-Gay/Anti-Straight-First condition. The procedure for this condition was similar to that described above, except that the positions of Blocks 1, 3, and 4 were switched with those of 5, 6 and 7, respectively.

Phase 2: Explicit Measures

The final phase of the experiment involved presenting participants with the screening and explicit measures described in the Materials and Apparatus section. The measures were presented in the following order: CFQ, MCSD-SF-C, MHS-G/MHS-L, the six semantic differential scales for straight people, and the other six for gay people and finally the feeling thermometers and KSOG. Participants were allowed to complete these measures at their own pace, and having done so they were debriefed and thanked for their participation.

Results and Discussion

Screening Measures

The mean scores on the CFQ for the three sexual orientation groups showed relatively low levels of cognitive failure (Exclusively Heterosexual, $M = 37$, $SE = 3.34$; Non-Exclusively Heterosexual, $M = 47$, $SE = 3.13$; and GLB, $M = 42$, $SE = 2.42$), and did not differ significantly ($p > .05$). Responses to the MCSD-SF (Exclusively Heterosexual, $M = 19$, $SE = .62$; Non-Exclusively Heterosexual, $M = 19$, $SE = .62$; and GLB, $M = 17$, $SE = 1.12$), indicated a relatively weak tendency towards socially desirable responding and again did not differ significantly ($p > .28$). Thus, any differences that might emerge between the groups on the implicit and explicit measures are unlikely due to individual differences in cognitive failures or social desirability.

Implicit Measure

Data preparation. The IAT effect is derived from response latency, which is measured on each trial from the point of target onset to the first *correct* response emitted by the participant. Response latencies were transformed into *D*-scores, using an algorithm described by Greenwald, Nosek, and Banaji (2003), which controls for individual variations in speed of responding that may act as a possible confound when analyzing between group differences. The version of the *D*-algorithm employed for the current study was computed as follows: (i) latencies above 10,000 ms were eliminated; (ii) all data for a participant were removed if he or she produced more than 10% of trials with latencies less than 300 ms; (iii) means for trials in each of the four blocks (3, 4, 6, 7) were computed; (iv) one standard deviation was computed for all trials in blocks 3 and 6, and another for blocks 4 and 7; (v) the difference scores between blocks 3 and 6, and between blocks 4 and 7, were computed, taking the Pro-Straight/Anti-Gay from the Pro-Gay/Anti-Straight blocks; (vi) each difference score was divided by its associated standard deviation; and (v) these two scores were added together and divided by two. A positive *D*-score signifies a preference for *Straight* over *Gay*, whereas a negative score indicates a preference for *Gay* over *Straight.*

Data analyses. Initially, the aim was to counterbalance the order in which participants were exposed to the two IAT sequences (*Pro-Straight/Anti-Gay-First* versus *Pro-Gay/Anti-Straight-First*). However, this proved to be extremely difficult when applying the multidimensional screening provided by the KSOG-m. That is, very high numbers of participants would need to have completed the study in order to provide sufficient numbers for each cell. Given the time constraints and the difficulty in recruiting

willing participants, it was necessary to accept that some cells would contain very low numbers (EH: Pro-Straight/Anti-Gay-First n = 12, Pro-Gay/Anti-Straight-First n = 7; NEH: Pro-Straight/Anti-Gay-First n = 15, Pro-Gay/Anti-Straight-First n = 8; GLB: Pro-Straight/Anti-Gay-First n = 14, Pro-Gay/Anti-Straight-First n = 4). Consequently, preliminary analyses to determine if group interacted significantly with the order in which participants completed the IAT was not possible, and thus the data were simply collapsed across this method variable.

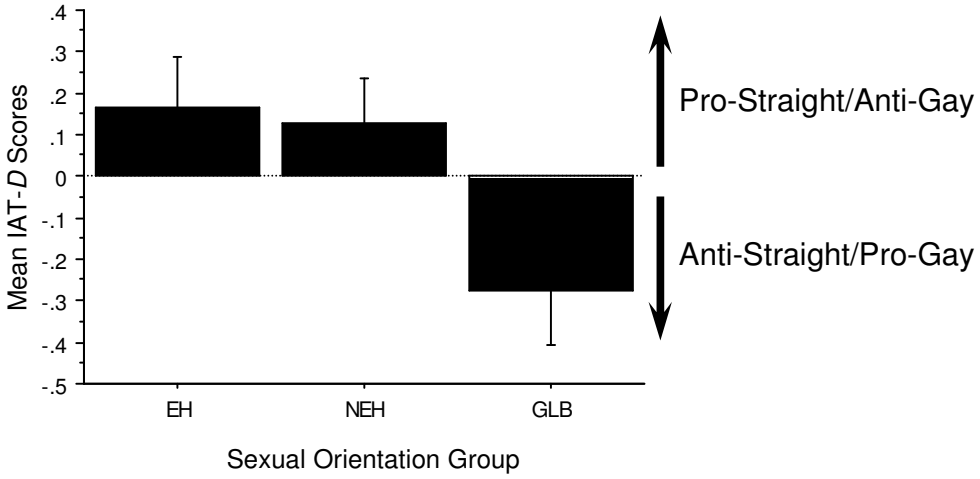

Figure 7.1: Overall mean IAT-*D* scores for the Exclusive-Heterosexual (EH), Non-Exclusive-Heterosexual (NEH), and Gay, Lesbian, Bisexual (GLB) sexual orientation groups. On the graph positive IAT-*D* scores reflect a pro-straight implicit bias and negative IAT-*D* scores reflect a pro-gay bias. The zero-point reflects no bias.

The mean IAT-D scores for the heterosexual groups (Exclusively Heterosexual, M = .16, SE = .13; and Non-Exclusively Heterosexual, M = .13, SE = .11) showed a positive but weak to moderate bias toward straight people relative to gay people. An inverse pattern indicative of a positive bias toward gay people relative to straight people was produced by the GLB group (M = -.27, SE = .13). A one-way ANOVA (see Figure 7.1) yielded a significant effect for sexual orientation $F_{(2, 56)} = 3.7$, $p = .03$, $\eta_p^2 = .12$.

Fisher's PLSD post-hoc tests indicated that the IAT effect for the GLB group differed significantly from the EH (*ps* < .02) and NEH (*ps* < .03) groups. Three one-sample *t*-tests were conducted for each sexual orientation group to determine if the *D*-IAT scores differed significantly from zero. The analyses indicated a significant effect for the GLB group only; t (17) = -2.15, p = .046 (remaining *ps* > .21). Overall, the foregoing analyses revealed that for the heterosexual groups the IAT produced a response pattern that indicated a weak/moderate bias favouring *straights* over *gays*, and a strong bias favouring *gays* over *straights* for the GLB group.

Explicit Measures

***Semantic differential scales*.** Semantic differential scales were scored by averaging the six items for *straights* and the six items for *gays* to create two indices, in which positive scores indicated positive attitudes and negative scores negative attitudes. The overall mean scores for the three groups indicated relatively positive attitudes to both *straights* and *gays* (EH, *Straight*, M = 1.6, SE = .24, *Gay*, M = 1.3, SE = .24; d = 1.25; NEH, *Straight*, M = 1.9, SE = .21, *Gay*, M = 2.08, SE = .19; d = -0.90; GLB, *Straight*, M = 1.9, SE = .28, *Gay*, M = 2.3, SE = .21; d = -1.62). The EH group showed a more positive attitude for *straights* relative to *gays*; the NEH group did not appear to discriminate between *straights* or *gays* but did produce slightly more positive attitudes overall; and the GLB group showed stronger positivity for *gays* relative to *straights*. A 2x3 mixed repeated measures ANOVA with explicit rating scale (*straight* versus *gay*) as the repeated measure and sexual orientation (EH, NEH, GLB) as the between participant variable failed to indicate a main effect for sexual orientation or rating (*ps* > .08), but the interaction was significant $F_{(2, 55)} = 7.2$, p = .002, η_p^2 = .21.

Simple effects tests for between-group differences (α =.05) indicated that the EH group differed significantly from both the NEH and the GLB group for the *Gay* scale, with no significant differences between the groups for the *Straight* scale. The interaction effect thus appeared to be driven largely by the stronger pro-gay/in-group attitudes expressed by the GLB on the semantic differential scales.

***Feeling thermometers*.** The two feeling thermometers yielded an evaluative rating for each sexual orientation category (*straight* vs. *gay*) in which higher scores represented more favorable attitudes. Overall the groups indicated relatively positive attitudes to both *straights* and *gays* (EH*, Straight*, $M = 78°$, $SE = 4.0$, *Gay,* $M = 78°$, $SE = 4.0$, $d = 0$; NEH, *Straight,* $M = 80.6°$, $SE = 3.5$, *Gay,* $M = 80°$, $SE = 4.0$, $d = 0.16$; GLB, *Straight,* $M = 80°$, $SE = 4.0$; *Gay,* $M = 78°$, $SE = 4.7$, $d = 0.46$). Additionally, participants did not express a particular preference for *gay* or *straight.* A one-way repeated measure ANOVA failed to yield any significant effects ($p > .49$).

***Modern Homonegativity Scale*.** The two parallel forms of the MHS were scored identically (i.e., one for *gay males* [MHS-G] and one for *lesbian women* [MHS-F]), with higher scores indicating greater levels of homonegativity. On the MHS, the groups expressed relatively egalitarian and positive attitudes toward the target groups. Specifically, the EH group expressed moderately positive attitudes towards *lesbian women* and *gay men* (*Lesbian women,* $M = 26.16$, $SE = 1.7$, *Gay men,* $M = 25.56$, $SE = 1.60$, $d = 0.36$). The NEH group showed a pattern of means that were more positive when compared to the EH group (*Lesbian women,* $M = 22.36$, $SE = 1.81$; *Gay men,* $M = 22.73$, $SE = 1.82$, $d = -0.20$). Finally, the *GLB* group showed the most positive attitudes of the three groups (*Lesbian women,* $M = 19.31$, $SE = 1.61$; *Gay men,* $M = 22.50$, $SE = 1.51$, $d =$

-2.04) with some slight evidence of a preference for *lesbian women* over *gay men*. A one-way repeated measure ANOVA failed to yield any significant main or interaction effects ($p > .07$).

Implicit-Explicit Correlations

An overall correlation matrix of the IAT effects was calculated (i.e., the overall *IAT* effect with each of the 8 explicit measures; *Straight* and *Gay* Feeling Thermometers, *Straight* and *Gay* Semantic Differential Scales, the MHS-G and MHS-L, the CFQ and the MCSD[19]). Of the 8 correlations only the correlation between the *IAT* and the *MCSD* was significant ($r = -.28$, $p = .04$), suggesting that greater *pro-straight* bias on the IAT predicted less socially desirable responding on the MCSD. The remaining 7 correlations were non-significant ($ps > .13$).

Summary and Conclusion

The findings revealed relatively strong in-group bias for the GLB participants on the IAT, with weaker non-significant biases for the EH and NEH groups. That is, in an Irish context, the results of Experiment 5, diverged to some extent from the extant literature with regard to the heterosexual participants. Specifically, the published literature typically reports strong heterosexual in-group biases on the IAT. Positive attitudes overall were expressed on the semantic differential scales with some evidence for an EH in-group bias and relatively strong evidence for a GLB in-group bias. Attitudes expressed by the NEH group were relatively egalitarian on this measure.The groups did not discriminate between gay or straight on the feeling thermometers. Overall, on the MHS participants produced relatively egalitarian and positive attitudes towards the target

[19] Although the CFQ and the MCSD were employed primarily as screening measures they were included in the correlational analyses for exploratory purposes.

categories and the groups did not discriminate between attitudes towards lesbian women and gay men. With the exception of a single significant correlation between the IAT and the MCSD - implicit and explicit attitudes were uncorrelated.

Contrary to the IRAP data reported in the previous study in which the GLB group showed explicit but not implicit in-group bias, GLB participants in the current IAT study showed in-group bias on both the implicit and the explicit measures. Although the IAT showed evidence for in-group biases, it differed from the IRAP (Experiments 3 and 4) in that it failed to yield any clear evidence that such biases differed between the EH and NEH groups. At this point in the research programme it remained unclear why the IAT yielded effects that differed from the IRAP, particularly the results obtained in Experiments 3 and 4. We shall reflect further upon this issue in the final (General Discussion) chapter of the thesis, but before doing so the data from one final study will be presented in the next chapter, which may be relevant to making comparisons between the data obtained from the current IRAP and the IAT.

In reflecting upon the similarities and differences between the IRAP and the IAT, a possibly important structural difference was noted. Unlike the IAT, the IRAP in each of the studies reported thus far in the current thesis employed single as opposed to multiple labels to represent the sexual orientation category under assessment. That is, the IRAP employed the labels “Straight” and “Gay”, whereas the IAT required the use of more than a single stimulus to represent these two categories (e.g, Gay, Homosexual, Homox, etc. versus Straight, Heterosexual, Heterox, etc.). When the current research was being conducted, no IRAP study had employed multiple labels in the assessment of implicit biases, or considered examining the impact of using single versus multiple labels. Thus it

was deemed important for the final study of the current research programme to focus on this particular issue.

The next study retained the reduced IRAP latency criterion (i.e., 2000ms) that had been successfully employed in Experiment 4 and compared a single versus a multiple label Homonegativity-IRAP to determine if implicit biases would differ across the two types of IRAP.

Chapter 8: Exploring the Impact of Using Single versus Multiple Labels in the IRAP in the Context of Assessing Implicit Homonegativity

Experiment 6

As discussed earlier, a possibly important structural difference between the IRAP and IAT was noted. Specifically, in contrast to the IAT, the IRAP employed in each study of the current thesis employed single (i.e., "Straight" and "Gay") as opposed to multiple labels (e.g., "Gay", "Homosexual", "Homox", etc. versus "Straight", "Heterosexual", "Heterox", etc) to represent the sexual orientation category under assessment. When the current research was being conducted, however, no IRAP study had employed multiple labels in the assessment of implicit biases, or considered examining the impact of using single versus multiple labels. It was therefore considered prudent to focus on this particular issue for the final study of the current research programme.

Given time constraints at the point at which this final study was conducted participants were selected randomly from the general university population without screening for sexual orientation. In effect, the primary focus of Experiment 6 was on the impact of using single versus multiple labels in the IRAP in the context of assessing homonegativity. The current study retained the reduced IRAP latency criterion (i.e., 2000ms) that had been successfully employed in Experiment 4 and compared a single versus a multiple label Homonegativity-IRAP to determine if implicit biases would differ across the two versions of the IRAP. Given the relatively small samples that were employed in the current study (9 versus 12 participants) we refrained from conducting correlational analyses (see Vahey, Nicholson, & Barnes-Holmes, 2015).

Method

Participants

Twenty-one white Irish participants (Age; *M* = 22 years, *SE* = 2 years) completed Experiment 5. The participants were randomly allocated to one of two groups (Single-Label [SL] IRAP, *n* = 7 males, *n* = 5 females, Age; *M* = 23.3 years, *SE* = 3.4 years; Multiple-Label [ML] IRAP, *n* = 3 males, *n* = 6 females, Age; *M* = 20 years, *SE* = .7 years). All participants were recruited from a convenience sample of undergraduate students attending the National University of Ireland, Maynooth.

Exclusion criteria required that all participants be fluent English speakers and that they had normal or corrected to normal vision. No financial or other incentives (other than the knowledge that they were assisting in scientific research), were offered for participation in the experiment. All participants completed the experiment on an individual basis in a private setting (i.e., seated in a small experimental cubicle in the Department of Psychology at the National University of Ireland, Maynooth) free from noise and other distractions. No data pertaining to participant sexual orientation were gathered.

Materials and Apparatus

The materials and apparatus employed in the earlier Experiments (with the exception of the Public/Private materials, exemplars, and the Cognitive Failures Questionnaire) were employed in Experiment 6. Additional materials were used to screen for participant attitudes toward same-sex marriage (i.e., the Attitudes Toward Same-Sex Marriage Scale; ATSM: Pearl & Paz-Galupo, 2007; see Appendix N) and together with the measure of *modern* homonegativity, a measure of *traditional* homonegativity was

employed (i.e., The Attitudes Toward Lesbian Women and Gay Men Scale, Revised Version; ATLG-R: Herek, 1994; see Appendix O).

Screening measures

All participants completed the same Marlow-Crowne Social Desirability Scale SF-C that had been used in the previous experiments.

Implicit Measures

Single-Label [SL] IRAP and Multiple-Label [ML] IRAP. The SL-IRAP was similar to that employed in previous experiments except that response latency criterion on the IRAP were reduced to 2000ms and the response options "True" and "False" (instead of "Similar" and "Opposite") were presented on all trials. The ML-IRAP was similar to the SL-IRAP except that the software presented one of six label stimuli (i.e., "Gay" or "Straight," "Homosexual" or "Heterosexual," "Homophile" or "Heterophile") on each trial (see Table 8.1 for complete ML-IRAP stimulus sets).

Label 1: Straight, Heterosexual, Heterophile	**Label 2:** Gay, Homosexual, Homophile
Response Option 1: True	**Response Option 2:** False
Target Stimuli Consistent with Label 1	**Target Stimuli Consistent with Label 2**
Normal	Abnormal
Natural	Unnatural
Safe	Dangerous
Healthy	Sick
Acceptable	Unacceptable
Decent	Offensive

Table 8.1: The Full Stimulus Arrangements for ML- IRAP Trial-types

Explicit Measures

The same Semantic Differential Scales, Feeling Thermometers, and Modern Homonegativity Scales that had been employed in the earlier experiments were employed in the current experiment. In addition, two measures that had not been employed in the previous IRAP experiments were employed. These measures are described below.

The ATLG-R is a 20-item scale, which exists in two non-parallel forms. One 10-item scale measures *traditional* attitudes toward lesbian women (ATL-R) and the other measures *traditional* attitudes toward gay men (ATG-R). Both forms employ nine-point Likert scales *(1 = strongly disagree, 9 = strongly agree),* with summed ATL-R and ATG-R subscale scores ranging from 10 (extremely positive attitudes) to 90 (extremely negative attitudes). That is, higher scores represent greater levels of *traditional* homonegativity. Six items (i.e., ATL-R items 2, 4 and 7; and ATG-R items 11, 15 and 17) were reverse scored. Internal consistency for the scale is typically high (Cronbach's alpha = .90) and it yields a test-retest reliability alpha rate of 0.84 for the ATL-R, 0.83 for the ATG-R and 0.90 for the entire ATLG-R (Davis, Yarber, Bauserman, Schreer & Davis, 1998).

The ATSM is a 17-item scale that measure general attitudes toward same-sex marriage using a five-point Likert scale *(1 = strongly disagree, 2 = disagree somewhat, 3 = neither agree nor disagree, 4 = agree somewhat, and 5 = strongly agree),* with total scores ranging from 17 (highly negative attitudes) to 85 (highly positive attitudes). That is, higher scores indicate greater levels of tolerance for gay marriage. Eight items (1, 5, 9, 11, 13, 14, 16 and 17) were reverse scored. Internal consistency for the scale is typically high (Cronbach's alpha = .96) and it yields a test-retest reliability alpha rate of 0.97

(Pearl & Paz-Galupo, 2007). At the time of writing, the current research appeared to be the first Irish study to employ this measure.

Procedure

Upon entering the laboratory, participants were first required to sign a written consent form, which assured them that they were free to discontinue participation at any time without incurring penalty. The experiment consisted of two phases. Phase 1 involved exposure to one of the two IRAPs. In Phase 2, participants completed the screening measures and the explicit measures of homonegativity in the same order that had been employed in the previous experiments but with the newly added ATL/ATG and ATSM measures presented last.

Participants assigned to the SL-IRAP group completed an IRAP identical to that employed in previous experiments (with the exception that the response options "True" and "False" were presented on all trials). The ML-IRAP was similar to the SL version, except that it employed six label stimuli, three representing the concept *Gay* and three representing the concept *Straight*. Thus on any trial, one of the six label stimuli was presented at the top of the screen with one of the 12 target stimuli (used in the SL-IRAP). The algorithm controlling the presentation of trials within each block of the ML-IRAP was similar to that of the regular version (each target stimulus was presented once with each type of label stimulus, yielding 24 trials per block). The program also insured that within each block, each target stimulus was presented no more than four times with any individual label stimulus.

Prior to completing the ML-IRAP participants were given two instructions. First they were told that "for the purpose of the current study, the term 'heterophile' should be

taken to refer to a person who is attracted to, or is sexually oriented towards a member of the opposite sex … in other words a heterosexual person". Subsequently, participants were advised that "for the purpose of the current study, the term 'homophile' should be taken to refer to a person that is attracted to, or is sexually oriented towards a member of the same sex … in other words a gay or lesbian person". Although the use of these two words as synonyms for "Gay" and "Straight" was not ideal because they would be unfamiliar to the participants, more familiar alternatives to 'homophile', that had not been used in some contexts as a pejorative term (e.g., "homo", "queer"), could not be found.

Having finished the IRAP, participants then completed the explicit measures at their own pace. All participants were then debriefed and thanked for their participation.

Results and Discussion

Screening Measures

Responses to the MCSD-SF for the two IRAP groups were similar (SL, M = 17.92; and ML, M = 18.89), and did not differ significantly ($p > .38$). Thus, any differences that might emerge between the IRAP groups on the implicit and explicit measures are unlikely due to individual differences in social desirability.

Implicit Measure

Data preparation. The IRAP latency data were transformed using the same algorithm employed in the previous Experiments.

Data analyses. The raw mean latencies and standard errors for the four trial-types for pro-straight and pro-gay blocks for the SL and ML IRAP groups are presented in Appendix E. The overall mean *D*-IRAP scores for the four trial-types for the two groups

are presented in Figure 8.1 and show that the pro-straight effects for the ML group were stronger than for the SL group. The effects for the gay-positive trial-type were weakly positive for the SL group and close to neutral for the ML group. For the gay-negative trial-type the ML group showed a relatively strong negative bias, whereas the SL group was close to neutral. A 2x4 mixed repeated measures ANOVA, with IRAP-type as the between-participant variable and trial-type as the within-participant variable, yielded a single significant main effect for trial-type, $F_{(3, 57)} = 31.33$, $p = .0001$, $\eta_p^2 = .6$, and a significant interaction effect, $F_{(3, 57)} = 10.25$, $p = .0001$, $\eta_p^2 = .35$. Simple effects tests for between-group differences ($\alpha = .05$)[20] indicated that the SL IRAP group differed significantly from the ML IRAP group for the *Straight-Positive*, *Straight-Negative* and *Gay-Negative* trial-types, with no significant difference for the *Gay-Positive* trial-type. Within-group simple-effect comparisons for the SL IRAP group, yielded significant differences between the *Straight-Positive* and *Straight-Negative* trial-types, and between the *Straight-Positive* and *Gay-Negative* trial-types. Within-group comparisons for the ML IRAP group indicated that with the exception of the *Straight-Positive* vs *Straight-Negative* comparison all differences were significant among the trial-types. The interaction effect thus appeared to be driven largely by relatively large *D*-IRAP effects for the ML-IRAP group that differed across trial-types more dramatically than for the SL-IRAP group.

[20] Tukey-Kramer tests were employed and thus the alpha levels were not adjusted.

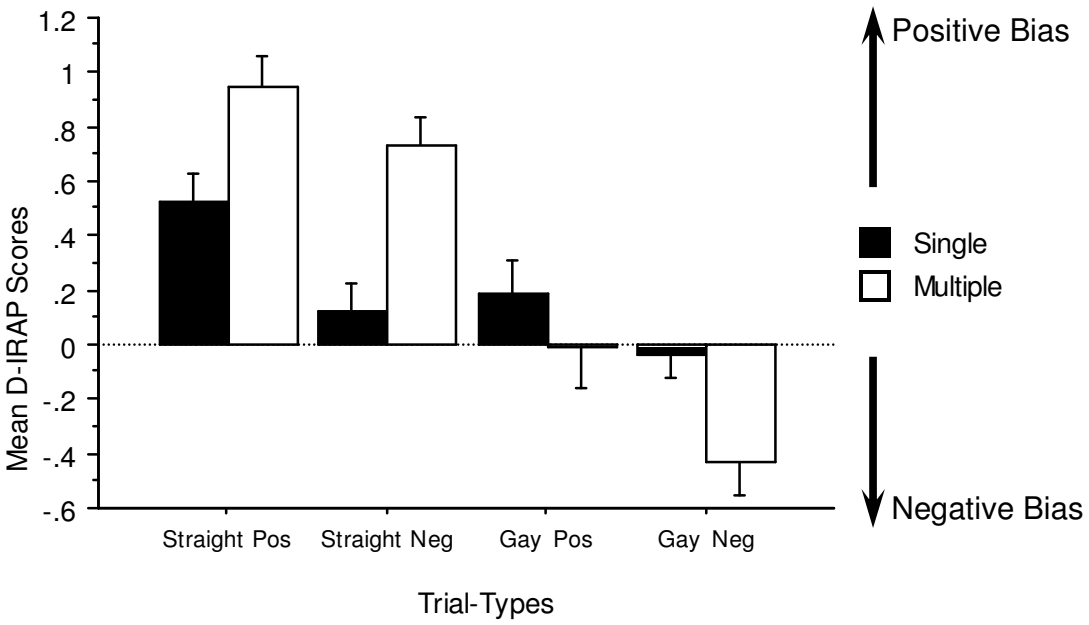

Figure 8.1: Overall mean *D*-IRAP scores for the Single Label (SL) and Multiple Label (ML) IRAP versions with respect to the four IRAP trial-types. On the graph positive *D*-IRAP scores reflect a positive implicit bias and negative *D*-IRAP scores reflect a negative bias. The zero-point reflects no bias.

Four one-sample *t*-tests were conducted separately for each IRAP group to determine if the *D*-IRAP trial-type scores differed significantly from zero. For the SL IRAP group, a single significant IRAP effect was revealed for the *Straight-Positive* trial-type ($t = 4.8$, $p = .0005$). In contrast, the ML IRAP group produced significant effects for the *Straight-Positive, Straight-Negative,* and *Gay-Negative* trial-types ($t = 9.07$, $p < .0001$; $t = 6.49$, $p = .0002$; and $t = -3.63$, $p = .0067$; respectively).

Explicit Measures

The data from the explicit measures (with the exception of the ATLG-R and ATSM) were prepared for analysis in the same way as the data from the previous Experiments.

Semantic differential scales. The overall mean scores for the two groups indicated mildly positive attitudes to both *straights* and *gays* (SL, *Straight*, $M = 1.5$, $SE = .28$, *Gay*, $M = 1.40$, $SE = .25$; $d = 0.10$; ML, *Straight*, $M = 1.90$, $SE = .28$, *Gay*, $M = 1.50$, $SE = .27$; $d = 0.48$). A 2x2 mixed repeated measures ANOVA with explicit rating scale (*straight* versus *gay*) as the repeated measure and IRAP Type (SL, ML) as the between participant variable failed to indicate significant main or interaction effects ($ps > .2$).

Feeling thermometers. The overall mean scores showed that both the SL and ML IRAP groups indicated favorable attitudes toward *straight* and *gay* (SL*, Straight*, $M = 78.1°$, $SE = 5.7$, *Gay, M* = 72.25°, $SE = 5.9$, $d = 0.3$; ML, *Straight, M* = 81.9°, $SE = 5.6$, *Gay, M* = 77.56°, $SE = 6.3$, $d = 0.24$). Similar to the semantic differentials, a 2x2 mixed repeated measures ANOVA failed to yield any significant effects ($ps > .1$).

Modern Homonegativity Scale. On the MHS, the two IRAP groups expressed similar levels of moderately positive attitudes towards both *lesbian women* and *gay men* (SL, *Lesbian women, M* = 25.5, $SE = 1.6$, *Gay men, M* = 25.08, $SE = 2.1$, $d = 0.06$; ML, *Lesbian women, M* = 27.3, $SE = 2.2$; *Gay men, M* = 26.9, $SE = 2.3$, $d = 0.07$). Consistent with the semantic differentials and feeling thermometers, a 2x2 mixed ANOVA failed to yield any significant effects ($ps > .5$).

Attitudes Toward Lesbian Women and Gay Men Scale. The ATLG-R is a 20-item scale, existing in two non-parallel forms. One 10-item scale measures *traditional* attitudes toward lesbian women (ATL-R) and the other measures *traditional* attitudes toward gay men (ATG-R). Both forms employ nine-point Likert scales *(1 = strongly disagree, 9 = strongly agree),* with summed ATL-R and ATG-R subscale scores ranging from 10 (extremely positive attitudes) to 90 (extremely negative attitudes). That is, higher

scores represent greater levels of *traditional* homonegativity. Six items (i.e., ATL-R items 2, 4 and 7; and ATG-R items 11, 15 and 17) were reverse scored. On the ATLG-R, both IRAP groups expressed generally negative attitudes (a score above 45) towards both *lesbian women* and *gay men* (SL, *Lesbian women, M* = 78.3, *SE* = 4.2, *Gay men, M* = 73.9, *SE* = 4.0, *d* = 0.31; ML, *Lesbian women, M* = 68.3, *SE* = 5; *Gay men, M* = 68, *SE* = 4, *d* = 0.02). Again, a 2x2 mixed ANOVA failed to yield any significant effects (*ps* > .18).

Attitudes Toward Same-Sex Marriage Scale. The ATSM is a 17-item scale that measure general attitudes toward same-sex marriage using a five-point Likert scale *(1 = strongly disagree, 2 = disagree somewhat, 3 = neither agree nor disagree, 4 = agree somewhat, and 5 = strongly agree),* with total scores ranging from 17 (highly negative attitudes) to 85 (highly positive attitudes). That is, higher scores indicate greater levels of tolerance for gay marriage. Eight items (1, 5, 9, 11, 13, 14, 16 and 17) were reverse scored. On the ATSM, both groups expressed relatively positive attitudes toward gay marriage (SL, *M* = 63, *SE* = 3.6; ML, *M* = 69.9, *SE* = 2.5); a one-way between-participant ANOVA proved to be non-significant (*p* > .13).

Summary and Conclusion

The results of the current experiment indicate that the ML-IRAP produced larger *D*-IRAP effects indicative of pro-straight and anti-gay biases. Specifically, the pro-straight effects (i.e., *Straight-Positive* and *Straight-Negative* trial-types) for the ML-IRAP group were much stronger than for the SL-IRAP group. On the *Gay-Positive* trial-type the SL-IRAP showed weakly positive implicit bias, whereas the implicit bias was close to neutral for the ML-IRAP. Critically, on the *Gay-Negative* trial-type the ML-IRAP

showed a significant strong negative bias score whereas the SL-IRAP was relatively neutral on this trial-type. Crucially, the ML-IRAP reported in the current study is the first IRAP study in the present thesis to find evidence for significant anti-gay bias (i.e., on the *Gay-Negative* trial-type).

Consistent with Experiments 1 and 2, the composition of the sample in the present study remains unclear in terms of sexual orientation and thus it would be imprudent to make a direct comparison with the 2000ms SL-IRAP in Experiment 4 or the IAT study reported in Experiment 5 (both of which screened for sexual orientation). Nonetheless, the pattern of implicit bias appears consistent with a typical heterosexual in-group bias – albeit with less positivity on the *Gay-Positive* trial-type than that produced in Experiment 4 for the EH and NEH groups.

As noted, relative to the SL-IRAP, the ML-IRAP produced larger *D*-IRAP effects. Perhaps these effects could be explained by the addition of multiple labels, or indeed, they could be a function of the change in the terms/labels. That is, it remains unclear if the apparent increase in implicit homonegativity observed with the ML-IRAP was simply due to the use of more than one label or the use of labels that we had not previously employed in any IRAP thus far (e.g., "homosexual"). Thus, it could be the case that if the label "homosexual" was used in an SL-IRAP it would have produced levels of implicit homonegativity similar to those observed with the ML-IRAP. In effect, the current study does not demonstrate that the addition of the other labels "Homosexual", and "Homophile" in the ML-IRAP served to evoke the category "Gay" more fully and more harshly than the single label "Gay". Nevertheless, the current data do highlight that the even relatively subtle changes in the stimuli that are employed in an IRAP may have a

quite dramatic impact on the size of the D-IRAP effects produced by the measure. We will pick up on this issue in further detail in the next and final chapter (the General Discussion) of the thesis.

Critically, none of the explicit measures yielded significant differences between the two IRAP groups. Consistent with all of the experiments reported in the current thesis, attitudes were moderately positive towards gay people on the explicit measures (i.e., feeling thermometers, semantic differential scales, MHS and the newly added ATSM). At the time of writing, the current research appeared to be the first Irish study to employ the ATSM and the findings are perhaps unsurprising given that also at the time of writing Ireland voted to change its constitution to allow same sex marriage. The SL- and ML-IRAP groups failed to discriminate between *straight* and *gay* on the semantic differential scales and feeling thermometers. Similarly, on the MHS the groups did not discriminate between *lesbian women* and *gay men.* Notably, the responses produced on the feeling thermometers, semantic differential scales and the MHS in the current study are not unlike those produced by the NEHs in Experiments 3, 4 and 5, -- although in the current study sexual orientation was not screened. In contrast to the MHS data (which purports to capture modern homonegativity), both IRAP groups reported negative attitudes toward *lesbian women* and *gay men* on the ATLG-R, which measures old-fashioned homonegativity. The ATLG-R had not been included in the previous studies reported in the current thesis.

In conclusion, the data from the current experiment broadly replicated the trends observed thus far using the SL-IRAP reported. Critically, however, the data from the ML-IRAP appeared to produce stronger pro-straight and anti-gay biases. Indeed, on some of

the trial-types, the effects on the ML-IRAP were up to six times larger than those produced on the SL-IRAP. Furthermore, the ML-IRAP is the first IRAP in the current thesis to produce a significant anti-gay implicit bias (i.e., on the *Gay-Negative* trial-type).

Chapter 9: General Discussion

Overview

The purpose of the research reported in the current thesis was to design, develop and refine an IRAP that could be used as a reasonably reliable and valid measure of implicit homonegativity. An additional purpose of the current research programme was to provide the first systematic analysis of implicit homonegativity in Ireland and examine its relationships with a variety of alternative self-report attitudinal indices.

Specifically, the first experiment, presented in Chapter 3, investigated the malleability of the Homonegativity-IRAP as a result of situational/context manipulation effects in addition to an assessment of the moderating impact of self-reported motivation to control homonegativity. Experiment 2, presented in Chapter 4, investigated the malleability of the IRAP as a result of prior exposure to gay-related exemplars. The third experiment, presented in Chapter 5, explored the predictive validity of the IRAP using known-groups and assessed the moderating impact of sensitive multi-dimensional participant sexual orientation screening on implicit homonegativity. Experiment 4, presented in Chapter 6, further explored the predictive validity of the IRAP using a known-groups approach but modified what appeared to be an important procedural parameter of the IRAP (i.e., the response latency criterion). Experiment 5, reported in Chapter 7, used a known-groups approach to determine if the in-group implicit biases found for heterosexual and sexual minority groups typically found in IAT studies, would be replicated with the IAT in an Irish context. Chapter 8 presented the sixth and final experiment, which investigated the impact of single versus multiple labels on levels of implicit homonegativity as assessed via the IRAP.

In this final chapter of the thesis, the major findings of the six empirical investigations conducted will be summarized and the wider implications of the research will be discussed.

Summary of the Findings

The first empirical investigation (Experiment 1; Chapter 3) of the current research sought to determine if directly manipulating the private versus public assessment context would impact upon implicit homonegativity as assessed via the IRAP in a manner consistent with that observed in an IAT study reported by Boysen, Vogel and Madon (2006). Specifically, the IAT researchers reported a reduction in implicit homonegativity in a public as opposed to a private context. Experiment 1 of the current research programme also assessed the possible moderating influence of self-reported levels of motivation on both implicit and explicit homonegativity.

The results revealed that contrary to Boysen, Vogel, and Madon (2006) implicit attitudes to "Straight" and "Gay" were unaffected by a direct manipulation of the public versus private assessment context. Additionally, the IRAP showed significant positive implicit biases for both Straight (i.e., *Straight-Positive* and *Straight-Negative* trial-types) and Gay (i.e., *Gay-Positive* trial-type). Critically, however, the IRAP captured implicit homonegativity, with both groups (Public and Private) showing a very small negative bias on the *Gay-Negative* (but not on the *Gay-Positive*) trial-type.

Self-reported attitudes toward "Straight" and "Gay" did not yield strong evidence of homonegative bias, although across the measures *gays* evoked less positive responses than *straights*. Feeling thermometers and semantic differential scale measures were

unaffected by the context in which the tests were undertaken. Consistent with previous research (e.g., Blanchard, Crandall, Brigham, & Vaughn, 1994; Lemm & Banaji, 2001; Plant & Devine, 1998), however, the public/private context manipulation did impact upon *some* of the explicit measures. Specifically, on the Modern Homonegativity Scale (MHS) less homonegativity was expressed toward *lesbian women* compared with *gay men* in the private setting, but not in the public setting. Participants in the private assessment context also showed higher levels of both internal and external sources of motivation to control homonegativity, which might explain the pattern of results on the MHS. Implicit and explicit biases largely unrelated with the exception of a single significant inverse correlation (i.e., between the *Straight-Positive* IRAP trials and the *straight* feeling thermometer). Furthermore, self-reported Motivation to Control Homonegativity did not moderate the relationship between implicit and explicit biases.

The IRAP results from Experiment 1 provide an interesting contrast to the results obtained by Boysen, et al. with the IAT, regarding the impact of the assessment context manipulation on levels of implicit homonegativity. We noted in Chapter 3, that the IRAP study did not attempt to provide a direct replication of the IAT study (i.e., Boysen et al. may have assessed something *other* than implicit homonegativity with the IAT). Specifically, there were subtle differences between Experiment 1 and the earlier IAT study in terms of the stimuli that were inserted into the implicit measures. Therefore, we cautioned against directly comparing the results of the two experiments. With that said, however, it appears that the IRAP may be less susceptible to the influence of deliberate attempts to control responding, than the IAT and the explicit measures. Indeed research has shown that participants have a difficulty 'faking' IRAP responses despite having been

instructed to do so (McKenna, et al., 2007). In addition, the data suggest that requisite consideration should be applied in all future studies to the careful selection of suitable stimuli for use in implicit measures, as subtle differences in this regard may influence levels of implicit homonegativity.

Given that the IRAP employed in Experiment 1 showed its ability to capture homonegativity (i.e., a near zero score on the *Gay-Negative* trial-type), and the fact that the public/private assessment context manipulation had no significant impact on IRAP performance, Experiment 2 (Chapter 4), employed the same IRAP in a "standard private context". Experiment 2 had two main aims: the first aim was to determine if the implicit homonegativity bias observed in the previous study would be replicated and the second aim was to assess the potential impact of prior exposure to pro- and anti-gay exemplars on IRAP performance.

The results of Experiment 2, revealed that unlike Dasgupta and Riveras' (2008) IAT data, implicit homonegativity, as assessed via the IRAP, was unaffected by prior exposure to pro- or anti-gay exemplar training. The data from Experiment 2 also contrasted with the data from an earlier IRAP study that showed the differential impact of pro- versus anti- exemplar training on implicit biases to *young* and *old* people (Cullen, Barnes-Holmes, Barnes-Holmes & Stewart, 2009; Experiment 2).

Although the IRAP, similar to Experiment 1 showed a positive bias for both straight and gay it again captured some evidence of implicit homonegativity. Specifically, the significant pro-straight bias on the *Straight-Positive* and *Straight Negative* trial types re-emerged in Experiment 2. In contrast with Experiment 1, which showed a very small negative bias on the *Gay-Negative* trial-type, this was positive in Experiment 2, but

participants had a difficulty in confirming *Gay-Positive* relations (i.e., a weak effect on the *Gay-Positive* trial-type). Critically, however, a post-hoc analysis of the combined IRAP data from across Experiments 1 and 2 revealed that the descriptive differences between the two experiments did not prove to be significant.

Similar to Experiment 1, the measures of explicit attitudes did not yield strong evidence of homonegative bias and in general across the measures *gays* evoked less positive responses than *straights*. The IRAP data showed a broadly similar pattern to the explicit measures, with positive biases toward both straight and gay but only the straight biases were statistically significant. On the MHS, groups expressed moderately positive attitudes towards *lesbian women* and *gay men* that were virtually indistinguishable. Consistent with the IRAP data, the explicit measures were also unaffected by prior exemplar exposure. Again, implicit and explicit biases largely unrelated with the exception of a single significant inverse correlation (i.e., between the *Straight-Positive* IRAP trial-type and the *gay* feeling thermometer).

A limitation of Experiment 2, which might explain the lack of an effect for exemplars, is the fact that the sample was small (i.e., $n = 28$) and the variance for each IRAP effect was relatively large. While the source of this variance remains unclear, it must be acknowledged that consistent with the greater proportion of the IAT literature in this domain, participant sexual orientation was not recorded. Indeed, sexual orientation was not recorded for ethical reasons because of the perceived social sensitivity attendant to gathering such information from some participants that were personally known to the experimenter. A further consequence of not screening for sexual orientation is that we

cannot determine if the pro-straight biases produced in either Experiment 1 or 2 reflect in-group biases. Experiment 3 sought to address this concern.

The results of the Homonegativity-IRAP (Experiment 2) also differed from the results of an earlier Ageism-IRAP study that showed an effect for prior exemplar exposure on levels of implicit bias (Cullen, et al., 2009). Specifically the exemplars in Experiment 2 might have failed to influence levels of implicit homonegativity because attitudes to sexuality could perhaps be considered to be more socially sensitive and less malleable than attitudes toward age (*or at least as assessed using the particular stimuli in these two IRAP experiments*). Indeed, as noted above, sexual orientation was not screened owing to its perceived social sensitivity. Critically, the stimuli employed in the Ageism-IRAP (e.g., brilliant-slow, energetic-tired, enthusiastic-weary, etc.,) were relatively mild when compared to the stimuli employed in the Homonegativity-IRAP (e.g., healthy-sick, safe-dangerous, normal-abnormal, etc.).

Given that the IRAP used in Experiment 2 was again capable of capturing some evidence of implicit homonegativity (although this time on the *Gay-Positive* as opposed to the *Gay-Negative* trial-type) participants in Experiment 3 were re-exposed to the same IRAP to determine if one or other, or perhaps both patterns, of *D*-IRAP effects would be observed again. In addition, having failed to find an effect for the pro- versus anti-gay exemplar training, the next study employed a known-groups methodology to explore the predictive validity of the IRAP for the assessment of implicit homonegativity.

The approach to sexual orientation screening that was employed in Experiment 3, was more complex than approaches used to date in the IAT literature (as stated earlier most IAT studies did not screen sexual orientation at all) and yielded two separate

heterosexual groups (i.e., Exclusive Heterosexuals, EH; and Non-Exclusive Heterosexuals, NEH) and a Gay, Lesbian, Bisexual (GLB) sexual minority group for comparison. Experiment 3 aimed to test the prediction that performances on the IRAP, and explicit measures, would differ as a function of participant sexual orientation.

The results attested to the utility of our multi-dimensional approach to sexual orientation screening with performances on the IRAP and the explicit measures differing as a function of sexual orientation. Specifically, the GLB group produced implicit (i.e., on the *Gay-Positive* trial-type) and explicit in-group biases (i.e., a more positive bias for *gay* than *straight*) on the IRAP, the Semantic Differentials and Feeling Thermometers, respectively. Critically, however, categorizing heterosexuals into two distinct groups proved extremely valuable. That is, although EHs showed implicit (i.e., on the *Straight-Positive* trial-type) and explicit (i.e., a more positive bias for *straight* than *gay*) in-group biases on the aforementioned measures, the NEHs showed no such evidence of implicit or explicit in-group bias. In addition, the pro-straight implicit biases produced in Experiments 1 and 2 with a randomly recruited sample (of unidentified sexual orientation), were replicated in Experiment 3 with the EH group for the *Straight-Positive* but not the *Straight-Negative* IRAP trial-type.

Critically, an interesting pattern emerged for the *Gay-Negative* trial-type. Specifically, all three groups failed to show a significant bias score in either direction. In effect, the EH group failed to *confirm* that gay was negative and the GLB group, perhaps most surprisingly, failed to *deny* that gay was negative (at a significant level). At the same time, the pattern of differences among the three groups could be considered broadly consistent with their sexual orientations, in that the EH group tended towards a negative

bias, the NEH group produced a close to zero score, and the GLB group tended towards positivity. Experiment 3 yielded a two other results that were consistent with Experiments 1 and 2. Specifically, the measures of explicit attitudes did not yield strong evidence of homonegative bias. And, consistent with the first two studies reported in the current thesis, implicit and explicit biases largely unrelated save for the exception of a single significant correlation (i.e., between the *Gay-Negative* IRAP trial-type and the *MCSD).*

Overall, the IRAP and explicit measure data reported in Experiment 3 are broadly consistent with data from other homonegativity known groups' studies that have shown heterosexual in-group bias on the IAT and on the explicit measures. Experiment 3 also revealed a gay/lesbian in-group bias, which has been reported in some but not all previous IAT studies in this domain.

Shortly after Experiment 3 was conducted, unrelated IRAP research that focused on implicit racism indicated that reducing the response latency criterion from 3000ms to 2000ms appeared to increase in-group bias, particularly on the trial-type that aimed to assess out-group negativity (Barnes-Holmes, Murphy, Barnes-Holmes & Stewart, 2010). Given this finding, it seemed important to repeat Experiment 3 but with a reduced latency criterion (i.e., 2000ms). Consequently, Experiment 4 attempted to provide a replication of Experiment 3 but required participants to respond within 2000ms on the IRAP.

Results showed that relative to the 3000ms IRAP (Experiment 3), the 2000ms IRAP (Experiment 4) appeared to generate stronger evidence of heterosexual in-group biases. For example, at 2000ms EH participants produced strong and significant positive biases on the *Straight-Positive* and *Straight-Negative* trial-types. On the 3000ms IRAP,

however, significant positivity was only obtained on the *Straight-Positive* trial-type. In addition, on the 2000ms IRAP, the NEH group produced a clear positivity bias on the *Straight-Positive* trial-type -- an effect that was non-significantly negative on the 3000ms IRAP. Interestingly, the GLB group showed clear and significant positivity on the 2000ms IRAP across three of the four trial-types (only the *Straight-Negative* positive effect was non-significant). In contrast, only the *Gay-Positive* trial-type yielded a significant effect at 3000ms (Experiment 3).

Critically, the divergence between the groups on the *Gay-Negative* trial-type became more apparent, again attesting to the value of our approach to sensitive multidimensional sexual orientation screening. Specifically, at 2000ms, the pattern of biases observed on the *Gay-Negative* trial-type differed as a function of heterosexual category, with the NEH group showing a weakly positive bias and the EH group showing a weakly negative bias. Additionally, the GLB group produced a significant positive bias on the *Gay-Negative* trial-type at 2000ms but did not in the earlier 3000ms IRAP study.

Consistent with the trend reported for the explicit measures in the previous studies, in general, the feeling thermometers, semantic differential scales and Modern Homonegativity Scale (MHS) did not show strong evidence of homonegativity. Indeed, the pattern of results on some of the explicit measures were broadly consistent with the three categories of sexual orientation that were employed. Specifically, on the feeling thermometers and semantic differential scales, the EH group showed a more positive bias for *straight* than *gay* while the GLB group showed the reverse of this pattern. Consistent with the previous study, the NEH group was more positive overall when compared to the EH and GLB groups on these measures and their responses to *straight* and *gay* were

relatively egalitarian. Relative to the other groups, the EH group showed stronger homonegativity on the Modern Homonegativity Scale. On the behavioral measure of willingness to help gay rights, the GLB group were more willing to help (i.e., moderately willing) than the heterosexual groups (i.e., weakly willing).

Results also showed that relative to the 3000ms IRAP, the 2000ms Homonegativity-IRAP appeared to provide evidence in support of its convergent validity. Specifically, there were a number of significant correlations between all four trial-types of the 2000ms IRAP and the explicit measures of homonegativity (i.e., Gay Semantic Differential, MHS-L, and MHS-G). Critically, the 2000ms IRAP was uncorrelated with social desirability. In contrast, the 3000ms IRAP in the previous study (although yielding only a single significant correlation) was related to social desirability (i.e., *Gay-Negative* IRAP trial-type and the *MCSD*). Not a single IRAP trial-type was related to willingness to help gay rights in Experiment 4.

Of particular note, the GLB group showed a divergence between their responses on the implicit and explicit measures in Experiment 4. Specifically, GLBs showed no evidence of in-group implicit bias on the IRAP and instead, showed moderate positivity on each of the four trial-types. In fact, the GLB group did not discriminate between the IRAP trial-types at all. In contrast, however, GLB participants did show an explicit in-group bias, perhaps suggesting some in-group 'volitional' pride. The EH group, however, showed a preference for *straight* over *gay* across both implicit and explicit measures.

Overall, the IRAP and explicit measure results from Experiment 4, are again broadly consistent with the results of other known groups' homonegativity studies that repeatedly show heterosexual in-group biases on the IAT and explicit measures.

Crucially, reducing the response latency criterion on the IRAP from 3000ms to 2000ms served to produce effects that appear more consistent with the sexual orientation categories that were employed (i.e., EH, NEH and GLB). This finding is consistent with Barnes-Holmes, Murphy, Barnes-Holmes, and Stewart, (2010), who showed stronger evidence of in-group racial bias on a 2000ms IRAP (relative to a 3000ms version). We will revisit this issue in the *Wider Implications* section later in the current chapter.

At this point in the research program, an IRAP had been developed that was capable of capturing implicit homonegativity (especially on the *Gay-Negative* trial-type), was evidently capable of capturing clear sexual orientation group differences, was un-influenced by motivation to control homonegativity and was relatively unaffected by the assessment context. In addition, our multi-dimensional approach to sexual orientation screening had proved useful.

As stated earlier, published IAT studies in the domain of implicit homonegativity regularly report heterosexual in-group implicit biases and sometimes gay/lesbian in-group biases. In addition, weak and diverging relationships between implicit and explicit homonegativity are typically reported. At the time of writing, however, there were no published studies investigating implicit homonegativity in Ireland using the IAT. Moreover, no published study had used the IAT (or another established reaction time based implicit measure) in conjunction with multi-dimensional participant sexual orientation screening for the assessment of implicit homonegativity. Before proceeding further with the IRAP research programme, it was considered important to address this gap in the literature. Consequently, Experiment 5 used the IAT and employed a known groups' methodology to determine if implicit and explicit homonegativity would differ as

a function of sexual orientation group status. Specifically, Experiment 5 investigated the extent to which the effects typically found in published homonegativity IAT studies would be replicated in an Irish context. The multi-dimensional sexual orientation screening measures that had been successfully employed in Experiments 3 and 4 were again retained for use.

The results from Experiment 5 contrasted with the results from the IRAP in the previous two studies (i.e., Experiments 3 and 4), in so far as, weaker non-significant in-group biases were produced by heterosexual participants on the IAT. Indeed, unlike the IRAP (Experiments 3 and 4), the IAT failed to yield any clear evidence that such biases differed between EH and NEH participants. In addition, a strong in-group bias was produced by the GLB participants on the IAT. The GLB group, however, showed no evidence of in-group implicit bias on the 2000ms IRAP (Experiment 4).

Consistent with Experiment 4, the groups generally showed positive biases on the semantic differential scales with both GLB and EH participants showing explicit in-group biases and NEH participants showing no particular bias on this measure. On the feeling thermometers and MHS, the groups again were relatively positive but did not discriminate between the respective target categories. Contrary to the IRAP data reported in Experiment 4, in which the GLB group showed explicit but not implicit in-group bias, GLB participants in the IAT study, showed evidence for in-group bias on both the implicit and the explicit measures (i.e., on semantic differential scales). In addition, implicit and explicit attitudes were uncorrelated save but for a single significant correlation between the IAT and the MCSD.

Experiment 5 was the first IAT study conducted in an Irish context to assess implicit homonegativity. We noted earlier, that *sometimes* gay/lesbian in-group implicit biases are reported in studies that have used the IAT (e.g., Banse, Seise, & Zerbes, 2001; Jellison, McConnell & Gabriel, 2004). Typically, said studies compare heterosexual and homosexual (i.e., gay/lesbian or lesbian only or gay men only) groups. Crucially, the GLB group in Experiment 5 included bisexual participants as well as lesbian and gay participants (i.e., a sexual minority/potential targets of prejudice) and as such does not provide a direct comparison with the extant literature. With that said, however, a strong pro-gay implicit bias was produced by the GLB group on the IAT in Experiment 5. The results of Experiment 5, however, diverged to some extent from the published IAT literature in which relatively strong heterosexual in-group implicit biases are typically reported. In fact, the IAT in Experiment 5 yielded relatively weak evidence for heterosexual in-group implicit bias (i.e., both EH and NEH participants).

A possible explanation for the differences observed between the IAT reported here and the IAT effects typically reported in the published literature, could be that the IAT does not impose a response latency criterion and might be 'contaminated' to some extent by self-presentational biases. Notably, the stimuli employed in the IAT (Experiment 5) were taken from the IRAP and as such, were relatively blunt (e.g., 'sick,' 'dangerous,' 'unnatural,' etc.,) relative to the stimuli typically employed in IAT studies in this domain. Consequently, bearing in mind the lack of time pressure on the IAT and the nature of the stimuli employed, it is not surprising that our IAT correlated with the Marlowe-Crown Social Desirability Scale (MCSD). It is worth noting, however, that

researchers that have used the IAT for the assessment of implicit homonegativity generally do not report having assessed self-presentation or social desirability.

Before reflecting on why the IAT yielded effects that differed from the IRAP, particularly the results obtained in Experiments 3 and 4 the key findings from Experiment 6, the final study in the thesis (Chapter 8), will be considered. At this point in the research programme a possibly important structural difference between the IRAP and IAT which may be relevant to making comparisons between the two implicit measures was noted. Specifically, unlike the IAT, the IRAP employed in each study of the current thesis employed single (i.e., "Straight" and "Gay") as opposed to multiple labels (e.g., "Gay", "Homosexual", "Homox", etc. versus "Straight", "Heterosexual", "Heterox", etc.,) to represent the sexual orientation category under assessment. When the current research was being conducted no IRAP study in any domain had employed multiple labels in the assessment of implicit biases, or considered systematically examining the impact of using single versus multiple labels.

The final study in the thesis (Experiment 6), specifically sought to examine the impact of using single versus multiple labels in the context of assessing implicit homonegativity. Experiment 6 retained the reduced IRAP latency criterion (i.e., 2000ms) that had been successfully employed in Experiment 4 and compared a single versus a multiple label Homonegativity-IRAP to determine if implicit homonegative bias as measured by the two versions of the IRAP would differ.

The results of Experiment 6 showed that relative to the SL-IRAP, the ML-IRAP provided stronger evidence of its ability to capture pro-straight and anti-gay implicit biases. Specifically, for the ML-IRAP group the pro-straight *D*-IRAP effects (i.e.,

Straight-Positive and *Straight-Negative* trial-types) were much larger than for the SL-IRAP group. In addition, the implicit bias was close to neutral on the *Gay-Positive* trial-type for the ML-IRAP group but was weakly positive for the SL-IRAP group. In other words, relative to the SL-IRAP group, the ML-IRAP group showed a stronger difficulty in confirming that gay is positive on the *Gay-Positive* trial type. Critically, however, on the *Gay-Negative* trial-type the ML-IRAP showed a significantly strong negative bias score whereas the SL-IRAP was relatively neutral on this trial-type. Crucially, the ML-IRAP was the first IRAP study in the present thesis to find evidence for significant (and relatively strong) anti-gay bias on the *Gay-Negative* trial-type.

Consistent with Experiments 1 and 2, sexual orientation was unscreened in Experiment 6 and thus the composition of the sample remains unclear in terms of sexual orientation. Consequently, it would be imprudent directly compare the IRAP data from Experiment 6 with that of Experiment 4 or the IAT study reported in Experiment 5 (both of which screened for sexual orientation). With that said, however, the pattern of implicit biases shown in Experiment 6 appears consistent with a typical heterosexual in-group bias – albeit with less positivity on the *Gay-Positive* trial-type than that produced in Experiment 4 for the EH and NEH groups.

As noted, relative to the SL-IRAP, the ML-IRAP produced larger *D*-IRAP effects. Perhaps these effects could be explained by the addition of multiple labels, or indeed, they could be a function of the change in the terms/labels. That is, it remains unclear if the apparent increase in implicit homonegativity observed with the ML-IRAP was simply due to the use of more than one label or the use of labels that we had not previously employed in any IRAP thus far (e.g., "homosexual"). Perhaps if the label "homosexual"

was used in an SL-IRAP it would have produced comparable levels of implicit homonegativity with that produced on the ML-IRAP. In effect, Experiment 6 does not demonstrate that the addition of the other labels "Homosexual" and "Homophile" in the ML-IRAP served to evoke the category "Gay" more fully and more harshly than the single label "Gay". Indeed, Experiment 6 was not designed to assess this. Nevertheless, the results demonstrate that the even relatively subtle changes in the stimuli that are employed in an IRAP may have a substantial impact on the size of the D-IRAP effects produced by the measure. We will pick up on this issue later in this chapter.

Consistent with the trend reported in all of the experiments reported in the current thesis, self-reported attitudes toward gay people (i.e., feeling thermometers, semantic differential scales, MHS and the newly added ATSM) were moderately positive in Experiment 6. Critically, however, there were no significant differences between the IRAP groups in terms of their ratings on the explicit measures. At the time of writing, Experiment 6 appeared to be the first Irish study to employ the ATSM to assess attitudes toward same-sex marriage. The positivity expressed by participants on said scale in Experiment 6, is perhaps unsurprising given that at the time of writing, Ireland voted to change its constitution to allow same sex marriage. Contrary to the earlier experiments, the SL- and ML-IRAP groups were equally positive toward *straight* and *gay* on the semantic differential scales and feeling thermometers. In addition, the groups did not discriminate between *lesbian women* and *gay men* on the MHS (which purports to capture modern homonegativity) and again were moderately positive toward both target groups. As noted earlier, the ATLG-R was newly introduced in Experiment 6 and was designed to capture traditional homonegativity. Contrary to the MHS data, both IRAP

groups reported strongly negative attitudes toward *lesbian women* and *gay men* on this measure. It is worth noting that although sexual orientation was not screened in Experiment 6, attitudes expressed on the feeling thermometers, semantic differential scales and the MHS were not unlike those expressed by NEH participants in Experiments 3, 4 and 5. Importantly, it remains unclear, if or to what extent the sexual orientations of the samples employed in Experiments 1 and 2 were different to the sample employed in Experiment 6.

Overall, Experiment 6 broadly replicated the pro-straight and anti-gay biases captured on the SL-IRAPs employed across the studies reported in the current thesis. Critically, however, the data from the ML-IRAP showed a largely similar pattern to the SL-IRAP but produced even stronger *D*-IRAP effects. In fact, relative to the SL-IRAP, the effects produced on some of the ML-IRAP trial-types were up to six times larger. Crucially, the ML-IRAP is the first IRAP in the current thesis to show a significant anti-gay implicit bias (i.e., on the *Gay-Negative* trial-type).

In conclusion, the five IRAP studies reported in the current thesis led to the development and refinement of an IRAP suitable for the assessment of implicit homonegativity. Support for the reliability of the measure was provided when the same overall pattern of pro-straight and anti-gay biases (consistently on the *Gay-Negative* trial-type) were observed with increasing strength across all of the experiments. The known-groups studies (Experiments 3 and 4) provided strong support for the validity of the Homonegativity-IRAP because it clearly discriminated between EH, NEH and GLB groups. In addition, reducing the response latency criterion from 3000ms to 2000ms served to increase the size of the effects and produce a pattern of responding that was

more consistent with sexual orientation group status. Finally, subtle changes in the number and type of stimuli that are employed in the IRAP had a dramatic impact on the size of the D-IRAP effects.

Wider Implications

The IRAP as a Measure of Implicit Homonegativity. As discussed earlier, the purpose of the research reported in the current thesis was to design, develop and refine an IRAP that could be used as a reasonably reliable and valid measure of implicit homonegativity. The current findings suggest that the IRAP may indeed be a useful tool for the assessment of implicit homonegativity. Across all of the studies, the IRAP consistently captured significant pro-straight biases on the *Straight-Positive* trial-type. In addition, significant pro-straight biases were captured on the *Straight-Negative* trial-type for unscreened participants in Experiments 1 and 2, for the EH group in Experiment 4 and on the 2000ms ML-IRAP in Experiment 6. Critically, across the studies (with the exception of Experiment 2, for which relatively high levels of variance were recorded) anti-gay implicit biases, although not all significant, were captured on the *Gay-Negative* trial-type for unscreened participants (i.e., Experiments 1, and 6), EH (i.e., Experiments 3, and 4), and NEH groups (i.e., Experiment 3). Overall, the presence and/or strength of the implicit homonegativity observed across the studies reported in the current thesis appeared to be moderated by three key variables; (i) the participants' self-reported sexual orientation, (ii) the latency criterion employed with the IRAP, and (iii) the number (or possibly nature) of the label stimuli inserted into the implicit measure. In addition, the type of implicit measure employed also appeared to impact upon the level of implicit

homonegativity, in that the IRAP produced significant differences between the EH and NEH groups but the IAT did not. Furthermore, there was limited evidence for homonegativity with the explicit measures, in that in all heterosexual participants were at least moderately positive towards gay and straight people (with one exception, the ATLG-R in Experiment 6).

The IRAP as a Measure of In-Group/Out-Group Bias. It seems important at this stage to make a distinction between homonegativity and in-group/out-group bias. In the former case, the negativity is specific to a particular group (i.e., a sexual minority), whereas in the latter case the concept refers to a bias towards one's own group. When caste in this light we can ask questions about the extent to which heterosexual and GLB groups showed different patterns of implicit and explicit biases. In this context, it is interesting that there was limited evidence of an in-group bias for the GLB groups on the IRAP -- in fact, there was no evidence at all on the 2000ms IRAP – but there was relatively strong evidence of such bias on the IAT and explicit measures. How might we explain this difference across the two implicit measures?

One possible explanation is that the level of automaticity that was required on the IAT was somewhat lower than on the IRAP, or at least the 2000ms version of the latter measure. Specifically, we are suggesting that reducing the amount of time available to participants to respond on each trial of an implicit measure increases automaticity thus reducing the impact of so-called contaminating variables, such as the role of self-presentation strategies. In this regard, it is important to note that consistent with common practice the IAT did not involve asking participants to achieve a particular latency (or

accuracy) criterion or punish in any way slow responding. In contrast, the IRAPs applied latency (and accuracy) criteria and indeed demonstrated that the strength and pattern of effects changed when the latency criterion was reduced from 3000 to 2000ms. In this context it is interesting that performance on the IAT and on the 3000ms IRAP both correlated with a measure of social desirability (MCSD), but no such correlation was obtained with the 2000ms version of the IRAP. As argued above, therefore, perhaps the bias scores observed on the IAT and the 3000ms IRAP were more contaminated or influenced by self-presentation variables.

At this point it is worth noting that in the IAT study the GLB participants showed an explicit in-group bias (on the semantic differentials), whereas there was limited evidence of a strong explicit in-group bias for either the EH or NEH groups. Given the correlation between the IAT and the MCSD, the relatively strong in-group bias observed for the GLB group and the relatively weak effects observed for the heterosexual groups makes sense. In making this argument we are assuming that it would be deemed socially acceptable to express positive attitudes towards sexual minorities, particularly among young university students, but unacceptable to express homonegativity. Of course, this explanation remains somewhat post-hoc and speculative but it is broadly consistent with an IRAP study on racial bias, which showed that reducing the latency criterion increased anti-black bias effects and is generally consistent with a theoretical model of the IRAP effect and implicit attitudes more generally (Barnes-Holmes, Murphy, Barnes-Holmes, & Stewart, 2010), which we will consider subsequently.

The current findings and the REC model. The IRAP data presented in the current thesis suggests that it provides considerable promise as a measure of implicit

homonegativity. Furthermore, during the course of the research programme three key variables were identified that appeared to moderate the general pattern of implicit homonegative response biases on the IRAP among heterosexual groups; (i) participants' self-reported sexual orientation; (ii) manipulation of the response latency criterion; and (iii) and the number and/or nature of the label stimuli employed within the IRAP. The REC model (outlined in Chapter 2), aims to provide a well-defined conceptual basis for the effects that have been obtained with the IRAP (Barnes-Holmes, et al., 2010; Cullen, et al., 2009). We now turn to an account of how the REC model might be used to explain the general pattern of implicit homonegativity among the heterosexual groups and its moderation by the aforementioned key variables.

Implicit homonegativity. Across many of the studies reported in the current thesis groups of participants who were assumed to be predominantly heterosexual or were screened formally as such, produced responses biases on the IRAP (and IAT) that could be considered homonegative. In contrast, evidence for explicit homonegativity using self-report measures was extremely limited from study to study. The REC model appears to explain this apparent divergence between the implicit and explicit measures with relative ease.

Specifically, the REC model can explain this difference between the measures by appealing to a property of relational responding termed relational coherence. For example, on the so-called implicit measure, the first brief and immediate relational response to occur for a heterosexual participant might involve a negative evaluation of gay people (i.e., the out-group) based on a verbal history arising from immersion in a predominantly heterosexual culture in which gay people are stigmatized in the media,

church, and healthcare, etc., as "promiscuous," "sinful," "disgusting," "dangerous," "sick," etc. The initial implicit response, however, may not cohere with other, subsequent elaborated relational responses (such as "I am not homophobic") that follow this initial response. Consequently, brief and immediate versus extended and elaborated responding will conflict with one another. To resolve or reduce this incoherence, further relational elaboration may be required. Additional elaboration in search of relational coherence may give rise to responding to the initial relational response as "wrong" and so, would likely be rejected, resulting in a divergence between responding on the implicit and explicit measures. In explaining the results of the studies reported in the current thesis, therefore, the effects of elaboration and the search for relational coherence may have '*washed out*' (i.e., on the feeling thermometers and semantic differential scales) the impact of prior history as well as other contextual contaminants that served to produce the initial brief and immediate relational responding.

Moderating impact of sexual orientation. Undoubtedly, sexual orientation moderated implicit homonegativity. Specifically, the IRAP distinguished between the two heterosexual groups (i.e., EH and NEH) and the pattern of differences between the heterosexuals was more clear when the response latency criterion was reduced from 3000ms (Experiment 3) to 2000ms (Experiment 4). Critically on the IAT, (where no response latency criterion was imposed) no differences between the heterosexuals were detected and the GLB group showed a strong in-group bias. Given that the 3000ms IRAP and the IAT correlated with a measure of social desirability we will focus on the 2000ms IRAP (Experiment 4) for the remainder of the current section.

When considering relational history and relational coherence, the strong EH in-group bias on the 2000ms IRAP (i.e., *Straight-Positive* and *Straight-Negative* trial-types) may have emerged from exposure to some of the verbal and nonverbal behavioral contingencies that operate for heterosexual participants who have grown up and live in Catholic Ireland. For example, EH individuals might typically have a prior history of very little immersion in gay culture combined with constant interaction with their own (dominant) in-group. Additionally, a heterosexual developmental learning history in which heterosexuality is considered normative and conceivably modeled by parents would likely favor a relationally coherent assumption in which a heterosexual *is* currently heterosexual and *will be* heterosexual in the future. Indeed, on the multi-dimensional sexual orientation screening measure that we employed (i.e., the KSOG) the EH participants self-reported never having contemplated *not* being heterosexual. Additionally, an EH prior learning history may have served to evoke anti-gay brief and immediate relational responses on the *Gay-Negative* IRAP trial-type.

The pattern of responding for the NEH group on the 2000ms IRAP (i.e., significant in-group bias on the *Straight-Positive* trial type but moderately positive biases on the remaining trial-types) can also be explained by the REC model by appealing to the impact of prior learning history and relational coherence. Specifically, the NEH participants were probably also largely immersed in heterosexual company and likely had constant interaction with their own (dominant) in-group, but also self reported (i.e., on the KSOG) predominant, but not exclusive, opposite-sex interest and/or behaviour. The positivity toward the GLB out-group on the IRAP may reflect a broader more flexible relational repertoire when compared to the EH group.

With regard to the GLB participants, they likely had prior histories of immersion in and constant interaction with the dominant out-group (i.e. heterosexuals) and heterosexual parents, siblings and other family members, etc. Such a history may have served to evoke positive brief and immediate relational responses to '*Straight*' on the IRAP. Conversely, given a history of immersion in GLB culture in which pride is reinforced, automatic positivity towards the in-group also seems likely.

The response latency criterion. The response latency criterion that was employed on the implicit measures used in the various studies reported in the current thesis appeared to moderate implicit homonegativity. The REC model seems to explain why a different pattern of results was produced on the 3000ms and 2000ms IRAPs and the IAT. In particular, it can be argued that the level of automaticity required on the 2000ms IRAP was greater than that required on both the 3000ms version and on the IAT, and as such, the pattern of biases recorded on the latter measures was "contaminated" to some degree by extended and elaborated relational responding. Indeed, the pattern of effects obtained on the 2000ms IRAP made more sense in the context of participant sexual orientation than the effects observed on the 3000ms version or the IAT. Indeed, as noted previously, performances on the IAT and on the 3000ms IRAP correlated with a measure of social desirability suggesting a potentially contaminating influence of self-presentational variables on these measures (no such correlation was obtained with the 2000ms version of the IRAP).

Employing multiple labels. Another variable that appeared to moderate implicit homonegativity was the number (and possibly the type) of labels that were employed by the IRAP. Although the REC model makes no specific predictions about this, the

somewhat more negative valence of the stimuli on the ML-IRAP (e.g., "homosexual") may have evoked a particular aspect of prior learning history that was not tapped with the positively valenced label (e.g., "gay") that was used on the SL-IRAP. Thus, it could be the case that if the label "homosexual" was used in an SL-IRAP it would have produced levels of implicit homonegativity similar to those observed with the ML-IRAP. It might also be the case that the addition of multiple labels (e.g., "Homosexual" and "Homophile") may have served to broaden the class or indeed evoke the category "Gay" more fully to include negative as well as positive stereotypes. In any case, the data from the ML-IRAP do highlight that even relatively subtle changes in the stimuli that are employed in an IRAP may have a quite dramatic impact on the size of the *D*-IRAP effects produced by the measure.

Future Directions

The studies reported in the current thesis resulted in the development of a relatively reliable and valid Homonegativity-IRAP. Specifically, the data showed that the IRAP clearly discriminated between sexual orientation groups and captured pro-straight and anti-gay implicit biases with increasing strength across successive procedural refinements. Nevertheless, a number of issues arising from the current programme of research will need to be addressed in future studies that seek to explore implicit anti-gay bias. Four areas in particular warrant further investigation: (1) sexual orientation screening; (2) the response latency criterion; (3) the role of the stimuli that are inserted into an implicit measure; and (4) interventions designed to reduce implicit homonegativity.

First, the data reported in the current thesis clearly showed that sexual orientation moderated implicit homonegativity (i.e., implicit homonegativity on the IRAP consistently differed between the two heterosexual groups EH and NEH and a GLB group). To date, however, sexual orientation screening has been rarely reported in published experiments (i.e., only six of thirty-four) that have attempted to investigate implicit homonegativity using known-groups approaches. When studies *do* report an assessment of sexual orientation, relatively crude indicants of self-identification have been favored over more complex approaches. Critically, given the sensitivity of implicit measures to group differences future studies in this domain should employ measures to screen for participant sexual orientation.

Certainly, the results from Experiments 3, 4 and 5 of the current thesis suggest that in addition to self-identification, however, a range of different variables that may contribute to how sexual orientation is self-identified should also be considered. Indeed, discrepancies between participants' self-identified sexual identity and the category imposed from the multi-dimensional sexual orientation screening instrument that was employed in the current thesis were noted. Specifically, many participants that had self-identified as heterosexual were screened as bisexual (e.g., Experiment 3). In fact, research has shown that removing even small numbers of '*non-heterosexual*' participants from data analyses has resulted in stronger implicit homonegativity on the IAT (see Steffens & Buchner, 2003). Consequently, in future studies, researchers investigating implicit homonegativity would do well to employ the sensitive multidimensional sexual orientation screening instrument and approach that was employed in the current thesis.

Second, consistent with Barnes-Holmes, et al., (2010) the results reported in the current thesis revealed that increasing the level of automaticity on the IRAP by reducing the latency criterion from 3000ms to 2000ms increased the predictive validity of the procedure (Experiment 4) and produced stronger, more reliable and replicated effects (Experiments 4 and 6). Consequently, future research in this and other socially sensitive domains should carefully consider the importance of implementing reduced latency criterions on the IRAP[21]. Third (and relatedly), future decisions regarding the selection of label and target stimuli for insertion into the IRAP will require nuanced consideration and piloting. For example, reduced latency criterions might better suit word and picture stimuli, whereas, statements (e.g., '*I think gay people are…*') inserted into the IRAP will likely necessitate longer latency criterions.

Crucially, the effects reported in the current thesis highlight the fact that subtle changes in the number and type of stimuli that are employed on the IRAP appear to influence participants' implicit biases. Specifically, Experiment 6 showed on the ML-IRAP that the insertion of six label stimuli showed: (a) effect sizes increasing by up to six times that of an SL-IRAP that employed only two labels; and (b) we saw, for the first time in the thesis, evidence for significant anti-gay bias on the *Gay-Negative* IRAP trial-type. Only future research can disentangle whether the aforementioned effects result from the introduction of *additional* or *novel* labels. One possible way in which future researchers might address this issue would be to design two separate 2000ms SL-IRAPS (i.e., one assessing '*heterosexual*' vs. '*homosexual*' and a second assessing '*heterophile*' vs. '*homophile*') for comparison with (a) the SL-IRAP (i.e., '*straight*' vs. '*gay*') and (b)

[21] At the time of writing a 'third generation IRAP' that seeks to calibrate the task to the individual participants rate of responding by replacing the "fixed" response latency criterion with a "floating" latency is being tested (see Hughes, & Barnes-Holmes, 2013).

the ML-IRAP. In addition, future research would do well to systematically explore the differential effects that are sometimes obtained on implicit measures with picture and word stimuli, as well as addressing questions concerning the processes underlying these differential effects.

The final issue that warrants further empirical investigation concerns the development of successful interventions to reduce implicit homonegativity. Indeed, the current thesis (Experiment 2) attempted to investigate the malleability of implicit homonegativity via a direct pro- and anti-gay exemplar exposure intervention. The intervention employed in Experiment 2, however, failed to impact implicit homonegativity. Later in the programme of doctoral research that was undertaken for the present thesis, the importance of screening sexual orientation (Experiment 3), the impact of reducing the latency criterion (Experiment 4) and the impact of including multiple labels (Experiment 6) on the IRAP was discovered. At the present time therefore, it remains unclear, *if* or *how* the exemplar intervention that was employed in Experiment 2, would impact a 2000ms Homonegativity-ML-IRAP. In particular, it will be important for any future IRAP study that attempts to investigate the impact of direct exemplar interventions to ensure that participant sexual orientation is recorded.

Conclusion

The programme of research reported in the current thesis lead to the development and refinement of an IRAP that could be used as a reliable and valid measure of implicit homonegativity. Support for the reliability of the IRAP was provided when the same general pattern of pro-straight and anti-gay biases were observed across most of the

IRAPs (although clearly moderated by a number of variables). The known-groups studies (Experiments 3 and 4) provided strong support for the validity of the Homonegativity-IRAP because it clearly discriminated between EH, NEH and GLB groups. In addition, reducing the response latency criterion from 3000ms to 2000ms served to increase the size of the effects and produce a pattern of responding that was more consistent with sexual orientation group status. Unlike the 3000ms IRAP and the IAT, the 2000ms IRAP did not correlate with a measure of social desirability. Finally, subtle changes in the number and type of stimuli that were employed in the IRAP had a dramatic impact on the size of the D-IRAP effects.

The research outlined in the current thesis also provides the first systematic analysis of implicit homonegativity in Ireland. Despite trends in the US, European and Irish polls suggesting that attitudes towards homosexuality have become more liberal in recent times, the heterosexual in-group and anti-gay implicit biases (e.g., on the *Gay-Negative* trial type) reported in the current thesis paint a rather different picture.

Indeed, the only evidence of implicit out-group prejudice in the current thesis was observed for the heterosexuals and the fact that this effect only emerged for the *Gay-Negative* trial-type is perhaps consistent with the influence of a negativity bias in attitude formation (see Cullen, et al. 2009; Kunda, 1999). Consequently, when negatively valenced stimuli are presented with 'Gay,' on the IRAP this may function to activate an implicit anti-gay bias, which is not observed when positively valenced stimuli are presented. The 'negativity bias' observed with the IRAP in the current thesis suggests that vigilance regarding the potential consequences of implicit homonegativity is particularly important. That is, although outward expressions of homonegativity may not

be deemed '*politically correct'* implicit homonegativity may well arise in situations where relative judgements are required. Such a situation, for example, might be when a gay versus straight candidate is being considered for a job promotion. In this situation, if a gay man or lesbian woman (but *not* a heterosexual man or woman) exhibits even a *single* behavior perceived to be negative, then he or she may become a casualty of both an out-group prejudice (assuming that the interviewer is heterosexual) and a negativity bias (cf. Cullen, et al. 2009).

At the same time, it should be recognized that during data collection for the current thesis, Ireland has gone through many changes, and currently attitudes towards lesbian women and gay men are arguably among the most liberal in the world. Indeed, over the past two decades the Irish government has extended its recognition of lesbian and gay rights (e.g., *Employment Equality Act, 1998; Equal Status Act, 2000)* and outlawed many forms of discrimination based on sexual orientation. During data collection the Irish government introduced Civil Partnership for same-sex couples and this was fully enacted and implemented from the start of 2011. Finally, at the time of writing (2015) Ireland became the first country to legalize gay marriage on a national level by popular vote in a referendum. Nevertheless, it should also be noted that data collection for Experiment 6, which showed the strongest anti-gay bias on all of the IRAPs used in the current research, was conducted around the time of the introduction of civil partnership for same-sex couples.

Consequently, despite self-reported positivity toward gay men and lesbian women and the introduction of equal rights (in some areas) for same sex couples in Ireland -- interventionists should encourage people to be aware that they may be more sensitive to

negative characteristics present in a gay rather than a straight individual. In any case, the data presented in the current thesis presents clear evidence of implicit homonegativity. Thus, any perceived liberalization of views regarding gay men and lesbian women should be treated with caution. Perhaps, more than anything else, this fact highlights the potential benefits in developing and using implicit measures, such as the IRAP, to assess socially and politically sensitive attitudes. The work presented in the current thesis contributes towards this research agenda.

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APPENDIX A

Raw Mean Latencies and Standard Errors for the Four Trial-Types for Pro-Straight and Pro-Gay Blocks, Under Public- and Private- Contexts.

Private Context

Straight Positive				Straight Negative				Gay Negative				Gay Positive			
Consistent		Inconsistent		Consistent		Inconsistent		Consistent		Inconsistent		Consistent		Inconsistent	
Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*
1508.44	239.52	1880.17	33.85	1623.72	54.64	1962.33	274.47	1428.89	25.16	1513.22	190.13	1397.50	41.61	1623.22	36.05
2158.17	291.03	1860.06	212.21	2219.83	81.02	2399.44	181.61	2089.33	313.98	2261.22	214.22	2160.89	306.82	2013.61	132.16
1796.67	112.21	1564.22	104.28	1821.61	163.77	1805.22	120.53	1930.83	287.93	1497.89	46.04	1666.56	155.26	1652.50	142.77
2423.17	268.19	1790.83	172.46	2514.44	596.49	2192.61	160.47	2006.72	249.83	2050.56	300.57	2174.61	206.63	2069.72	323.80
2764.33	251.26	2478.06	184.56	2732.67	110.95	2909.44	331.92	2566.77	126.87	2296.72	262.93	2571.17	182.91	2591.06	582.70
1894.67	134.41	2520.23	750.15	2381.50	273.78	2095.56	192.51	2384.11	202.98	2724.22	473.95	2128.06	119.63	2223.61	241.36
2179.39	253.70	1727.22	86.89	2395.17	220.95	3054.50	52.65	2227.33	324.69	1787.89	149.43	2152.72	124.16	2493.11	78.42
1792.78	184.85	1809.72	165.58	1888.00	274.42	2492.61	249.69	2103.67	70.34	1719.94	107.86	2218.50	236.62	2373.33	283.93
2003.00	241.67	2129.00	78.98	2125.72	44.75	2131.28	82.11	2115.17	285.22	1844.44	131.09	2204.83	236.38	1964.44	145.88
1728.78	29.99	1969.94	24.40	2062.28	9.62	2296.50	103.82	2195.44	226.42	1755.83	68.92	2022.22	187.78	1911.06	213.10
2649.17	216.98	2576.39	164.76	3093.17	164.49	2985.50	103.80	2660.78	286.15	2145.94	95.56	2625.22	145.61	2437.72	48.68
1913.06	63.14	1963.89	202.78	1885.33	50.39	2298.78	141.37	1867.22	161.37	1494.00	28.36	1866.72	170.53	1861.50	208.10
2390.83	330.68	2781.94	100.55	2706.22	310.20	3126.72	240.99	2830.33	375.22	1912.11	170.56	2751.11	509.42	3148.28	491.63
1641.22	55.57	2032.94	193.13	1897.39	44.84	2137.11	266.41	1507.39	138.52	1825.56	82.18	1756.33	141.81	1816.44	307.28
1716.78	64.83	2027.83	433.74	1785.44	193.13	2234.56	91.80	1479.39	105.30	1671.94	77.32	1988.83	196.77	1974.83	378.64
2131.33	268.47	1975.06	109.19	1885.72	152.17	2181.22	182.05	2296.67	184.30	2103.22	563.50	2287.39	163.07	1839.33	224.67
2327.17	232.03	2081.67	315.37	2660.56	608.96	2787.22	287.03	1747.33	89.40	1725.72	162.22	2445.39	434.35	1895.10	172.82
2379.22	173.91	2779.50	446.73	2993.89	366.43	2999.60	421.57	2896.78	868.26	1731.67	138.06	2320.33	180.73	2369.00	244.12
1926.94	154.92	1890.61	190.39	2526.89	212.35	2403.61	173.91	1891.56	201.58	2379.22	292.47	2096.28	152.65	2262.94	450.95
2253.56	105.51	2518.28	310.68	2471.39	207.78	2582.56	321.44	2265.56	146.22	2125.06	364.62	2316.83	354.95	2264.83	472.80
1735.167	146.99	1832.889	230.29	2529.278	485.39	2323.167	220.05	1928.889	341.73	1679.556	318.76	2114.611	117.38	2189.389	443.89
1935.556	246.93	2124.556	176.89	2143	99.95	2288.444	246.60	2285.833	266.59	2474.5	504.76	1753.667	198.83	2222.278	174.26
2146.278	291.44	1788.111	110.79	2385.056	170.20	2217.667	73.43	1889.611	141.10	2065.167	243.81	1659.444	238.28	1673	241.97
1815	110.72	1975.833	130.91	2022	233.59	2285.833	63.42	1704.167	242.57	1768.556	143.07	2238.222	93.27	1563.389	79.76
1516.333	30.43	2122.722	536.40	2033.889	157.65	2286.889	535.36	1897.222	281.19	1662.5	352.32	2157.944	189.12	1781.056	187.59
1209.167	119.31	1832.667	239.45	1524.5	122.02	1789.389	162.87	1315.444	104.55	1352.167	145.65	1245.944	92.98	1429	148.09
1204.444	84.82	1416.278	96.96	1266.167	23.70	1499.111	201.23	1469.778	31.45	1280.333	15.97	1423	142.28	1495.389	119.82
2007.778	297.08	2271.333	50.26	2131.722	124.54	2283.667	69.50	2076.833	272.48	1990.667	85.44	2309.556	76.79	2657.944	249.42
1976.944	286.71	2080.667	135.65	1974.611	254.71	1927.889	207.57	1744.889	111.74	1898.389	222.13	1849.389	62.66	1845.778	307.97
1510.278	116.71	1460.833	66.73	1888.889	160.15	1864.333	166.40	1767.222	216.86	1544.556	64.27	1756.278	98.10	1523.611	203.05
2306.111	91.12	2407.556	347.11	3343.222	509.15	3004.444	174.18	2548.389	341.37	2497.889	240.39	2148.278	233.44	2880.667	223.13
1518.278	121.65	1855.556	198.20	1629.944	80.99	2066.167	108.46	1406.611	118.38	1434.389	44.75	1476.5	104.23	1707.556	227.89
2021.056	107.62	2274.556	544.00	2148.5	333.53	2073.222	328.67	2788.833	351.64	2116.778	316.92	2337.222	289.83	2099.333	193.12
1251.278	49.79	1643.611	218.44	1654.222	141.59	1556.167	99.87	1374.722	72.78	1434.389	149.72	1637.778	49.80	1563.167	80.91
1341.056	129.93	1446.444	104.90	1554.333	127.76	1866.056	322.05	1662.778	99.59	1294.056	90.74	1609.444	302.97	1626.444	95.56
1651.833	188.43	1858.333	359.59	1977.889	332.84	2038.444	194.74	1625	243.95	1803.222	252.84	1754.556	164.51	2116.167	221.51
1882	266.17	2160	299.23	2053.111	145.30	1870.444	190.84	1983.167	10.82	1817.5	417.27	1917	263.31	2034.889	445.09
1819.111	83.74	1638.722	146.23	2035	178.51	1950.167	263.48	1776	461.17	1513.389	39.46	1612.056	34.51	1677.833	150.41
2861.167	440.30	2358.889	179.05	2667	428.91	2992.389	211.05	2081.167	244.28	2765.444	330.41	2446.556	266.39	2868.178	104.13

1896.50	27.01	1586.22	116.45	1789.50	172.48	2463.06	230.50	1626.50	174.77	1868.83	205.29	1860.94	165.52	1737.89	139.99
2376.39	501.29	2517.26	197.96	2817.44	80.27	2905.78	153.95	2486.78	144.36	1574.50	60.98	2354.33	192.09	2452.78	68.11
1564.22	180.98	1641.56	172.26	1658.39	135.95	1794.11	221.02	1829.17	211.14	1611.61	174.89	1743.50	147.48	1633.39	113.93
2009.94	135.47	1993.67	264.15	1839.22	227.00	2458.00	259.66	1752.00	142.43	2055.33	115.09	2329.72	399.82	1879.00	18.66
2507.17	594.76	2946.83	780.90	3565.41	450.10	2629.94	357.59	3023.50	71.49	3062.67	1096.02	2647.33	236.14	2270.89	140.22
2672.94	262.59	2330.39	748.40	2504.00	218.58	2353.33	77.39	1952.11	367.47	2178.00	405.26	2331.11	207.39	1610.17	132.78
1295.06	115.82	1652.06	233.34	1525.61	142.88	1783.83	64.28	1855.94	477.03	1550.61	258.54	1631.28	152.52	1552.89	65.39
2009.61	339.45	2483.61	160.10	2014.83	94.25	3127.67	743.47	2003.00	180.75	2467.67	377.15	2442.34	234.14	2298.11	188.00
2080.11	291.50	2178.72	172.72	2052.06	151.81	2090.67	119.18	2074.11	112.53	1849.94	40.95	2225.56	193.00	2398.89	345.86
2505.39	148.23	1767.50	61.76	2357.33	160.90	2644.19	505.75	2344.17	216.64	2410.83	351.53	2259.99	96.85	2912.83	619.56
1955.89	221.23	1959.94	179.01	2038.83	92.74	2155.39	186.18	1976.83	119.15	2052.89	259.63	1884.11	212.58	1804.78	176.55
3403.61	159.17	2603.89	395.83	2506.50	259.87	2441.33	417.01	2102.00	335.89	2023.61	143.60	2579.22	461.67	2217.22	291.04
1261.67	50.11	1792.89	26.02	1749.56	244.74	1843.56	74.98	1679.61	65.00	1651.22	181.30	1787.17	93.36	1662.67	71.88
1834.78	126.05	1672.11	28.40	1974.61	215.43	2359.72	106.79	1754.11	208.17	1585.89	138.97	1739.06	99.14	2065.06	98.02
2074.17	186.08	2396.89	256.98	2329.17	175.17	2384.61	143.33	2069.89	278.86	2275.11	292.79	2438.83	530.80	1913.11	202.47
1834.94	31.55	1842.61	39.85	2177.39	144.90	2524.72	334.65	1864.89	185.71	1793.17	30.46	1798.22	54.61	1926.83	163.77
1585.72	145.08	1496.83	175.97	1410.00	87.58	1448.61	45.08	1554.33	94.20	1263.61	28.53	1390.17	61.94	1421.50	83.85
1943.11	44.61	2223.50	110.21	2138.39	80.92	2414.72	373.62	2407.17	381.32	1651.17	208.90	1975.72	149.47	1962.83	73.81
1782.89	176.46	2064.28	221.55	2206.33	323.08	2400.78	414.13	1722.22	35.92	1351.61	29.55	1958.28	53.98	1928.28	433.15
1529.50	143.02	1706.33	154.52	1835.50	150.17	2144.28	65.67	1618.72	124.46	1729.72	189.41	1870.50	29.58	1908.67	221.08
1463.00	66.10	1602.06	84.40	1560.06	161.41	1666.50	78.19	1432.06	94.66	1375.39	81.10	1385.22	106.84	1528.50	79.34
1572.22	101.43	2301.83	162.62	2157.83	528.86	2089.00	422.16	1450.83	127.20	1614.78	113.95	1597.06	158.10	1821.28	215.55
2266.50	467.61	1820.61	59.44	2498.06	492.04	2646.33	73.03	1702.72	162.10	1951.94	322.23	1982.89	166.58	2453.22	150.66
1564.39	118.72	2156.06	104.97	2577.83	397.23	2641.56	538.91	1842.72	186.21	1572.44	199.14	2327.00	271.03	3142.33	211.54

Latencies greater than 10,000 ms were removed from the analyses.

APPENDIX B

Raw Mean Latencies and Standard Errors for the Four Trial-Types for Pro-Straight and Pro-Gay Blocks, Under Pro- and Anti-Gay Exemplar Exposures

Pro-Gay Exemplars

Straight Positive				Straight Negative				Gay Negative				Gay Positive			
Consistent		Inconsistent		Consistent		Inconsistent		Consistent		Inconsistent		Consistent		Inconsistent	
Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*
2230.77	65.71	2049.67	127.16	1899.33	193.46	2717.28	223.59	1744.39	159.73	2384.50	318.15	2654.50	195.47	2195.61	208.01
2665.72	427.75	2144.17	306.50	3022.39	321.05	3457.22	507.85	2295.17	314.38	2548.11	291.80	2524.50	132.34	3871.67	430.59
2200.11	236.35	1856.00	166.82	2006.44	230.16	2297.06	166.12	1646.89	126.08	1850.11	257.64	2205.83	368.28	1789.44	205.32
1814.06	164.85	1900.83	28.41	2176.00	122.06	2576.50	567.35	1897.61	155.47	1814.44	128.60	1968.11	92.34	2299.28	291.42
2069.72	280.02	1825.33	199.75	2596.17	82.38	2304.89	117.13	2409.89	343.50	2062.50	302.28	2498.00	186.82	2447.00	559.62
1322.56	107.91	1353.17	140.95	1330.28	30.63	1733.83	257.51	1422.89	75.18	1138.06	13.05	1697.22	180.47	1358.33	25.61
Missing!	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1607.83	16.64	2545.56	672.30	1839.00	170.55	2205.50	259.03	1820.89	104.44	1580.44	122.56	1631.56	78.95	1936.61	150.46
1486.94	174.12	1731.72	195.37	2359.44	307.88	2253.56	267.87	1539.06	12.77	1736.00	109.42	2375.00	288.26	1999.11	79.88
2049.50	137.13	2513.89	353.33	1934.89	187.52	2357.67	110.89	2512.33	195.11	2022.61	235.02	2123.22	77.75	1839.44	209.07
1350.67	161.78	1224.72	37.59	2072.00	388.28	1759.56	370.88	1623.17	132.28	1119.78	45.84	1885.24	159.04	1317.72	9.15
1522.56	90.41	1812.89	11.47	1589.00	45.37	1891.22	163.91	1422.22	55.56	1714.61	40.55	1478.78	166.74	1848.72	90.51
2127.61	121.59	2343.11	382.40	3384.28	690.97	2611.06	37.46	1920.67	36.59	2178.22	136.72	2300.11	365.14	2175.83	475.28
1666.61	74.23	1964.50	234.79	1835.94	118.42	2202.17	429.08	1615.44	190.10	1303.78	26.96	1844.67	44.97	1589.44	107.81
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Anti-Gay Exemplars

Missing!															
1459.11	77.72	1580.94	67.95	1844.83	143.12	2038.17	203.00	1471.28	30.68	1645.22	205.25	1571.17	111.61	1615.39	224.54
2182.33	450.39	1810.57	93.28	2924.78	570.19	2642.44	148.48	1639.33	170.95	1871.11	148.17	2173.83	193.73	1730.61	193.31
1262.22	156.36	1935.83	77.26	1503.50	69.69	2323.78	238.77	1596.39	127.62	2168.39	262.57	1592.83	243.62	2077.39	207.128
2233.67	266.82	1711.33	186.71	2347.11	174.70	2296.94	157.69	1956.11	280.36	2103.83	251.05	2212.33	66.15	2013.00	203.15
1716.50	69.52	1819.56	172.89	2129.89	104.93	1742.89	78.13	1729.78	133.18	1788.17	323.28	2125.83	221.50	2056.83	283.39
1577.44	71.23	1650.50	104.20	1592.67	170.77	1968.06	103.49	1549.72	77.66	1606.61	130.10	1689.72	139.02	1530.44	50.52
1946.83	256.51	1698.72	213.68	2170.72	352.31	1832.89	141.66	1878.22	203.45	1433.61	97.75	1771.33	119.77	1585.39	70.05
1651.06	107.05	2007.00	128.89	2155.22	132.61	2469.67	107.42	1914.89	199.15	2041.61	121.15	2176.28	245.91	2106.00	271.60
1777.33	66.13	1871.94	74.10	2017.33	142.79	2375.44	107.05	1809.06	142.03	1541.89	87.76	1652.00	113.86	1574.33	32.32
1565.94	103.49	2487.44	222.46	1956.61	167.23	3084.94	430.22	1544.56	114.42	2059.61	27.62	2041.00	179.04	2454.00	327.74
Missing!	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1806.89	76.23	2147.56	122.24	2220.28	353.75	2712.11	161.35	1961.78	90.09	1654.44	236.67	2167.39	127.03	1998.89	299.50
2980.04	165.67	2424.83	220.15	3036.61	77.11	2742.44	168.80	3052.56	383.09	2965.94	71.90	2762.11	236.23	2137.61	243.49
2230.77	65.71	2049.67	127.16	1899.33	193.46	2717.28	223.59	1744.39	159.73	2384.50	318.15	2654.50	195.47	2195.61	208.01

Latencies greater than 10,000 ms were removed from the analyses. The Raw Mean Latencies for three participants have been omitted from the table due to a computer error.

APPENDIX C

Raw Mean Latencies and Standard Errors for the Four Trial-Types for Pro-Straight and Pro-Gay Blocks, for EH, NEH and GLB Groups

EH Participants

Straight Positive				Straight Negative				Gay Negative				Gay Positive			
Consistent		Inconsistent		Consistent		Inconsistent		Consistent		Inconsistent		Consistent		Inconsistent	
Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*
1816.89	*154.41*	2798.83	*465.58*	2180.56	*77.03*	2532.39	*129.29*	2098.11	*238.79*	2200.94	*471.18*	2155.83	*252.37*	2155.83	*331.47*
1530.28	*151.90*	1992.94	*109.59*	1712.67	*74.51*	1709.33	*163.88*	1678.83	*300.13*	1618.11	*185.95*	1638.11	*93.07*	1934.11	*51.96*
2264.83	*404.37*	2410.72	*382.36*	2517.28	*470.85*	2742.22	*395.27*	2061.26	*311.69*	2467.00	*424.10*	2353.93	*437.02*	2423.22	*364.45*
2816.78	*762.10*	2772.44	*166.82*	2604.28	*158.33*	3574.48	*987.47*	2231.67	*157.49*	2423.56	*201.14*	1780.33	*198.95*	2401.83	*356.23*
1700.50	*254.47*	1608.56	*101.08*	2335.94	*300.01*	2138.06	*66.93*	1778.56	*205.89*	1571.17	*57.49*	2175.39	*236.12*	1848.06	*206.14*
1999.11	*190.38*	2241.33	*212.98*	2251.78	*22.00*	2730.83	*304.04*	2184.94	*108.33*	2492.17	*127.45*	2402.78	*701.01*	2676.17	*224.57*
2037.22	*532.06*	2176.22	*305.14*	2150.94	*201.34*	2777.67	*182.16*	2077.22	*72.92*	1841.94	*102.44*	1826.44	*80.37*	2339.44	*229.50*
1771.61	*142.40*	2154.56	*251.66*	1627.61	*81.61*	1876.78	*148.30*	1482.56	*56.87*	1585.83	*134.63*	1680.67	*141.14*	1696.33	*122.67*
1857.72	*240.28*	2154.44	*208.58*	2822.94	*53.48*	2280.56	*313.99*	2387.17	*186.09*	2826.33	*392.11*	2281.28	*401.53*	2167.56	*167.23*
1860.39	*191.63*	2091.28	*155.83*	2579.89	*36.41*	2204.94	*67.92*	1981.78	*301.36*	1412.39	*92.05*	1952.33	*79.90*	1995.61	*103.84*
1869.67	*130.99*	2225.72	*187.30*	1760.50	*93.16*	1864.50	*167.64*	1457.56	*113.41*	1718.67	*197.63*	1889.67	*171.77*	1712.67	*61.93*
2881.94	*364.38*	2372.44	*206.83*	2682.44	*315.43*	2658.89	*345.29*	2631.11	*158.32*	2024.22	*322.68*	2723.17	*385.76*	1964.44	*46.45*
1865.44	*101.30*	2380.22	*288.30*	2082.39	*135.31*	2228.33	*271.12*	2016.44	*33.52*	1628.50	*97.00*	1833.50	*51.20*	2329.78	*187.17*
1650.17	*42.66*	2151.06	*91.60*	1670.06	*85.36*	2182.44	*238.02*	1958.33	*108.17*	1391.50	*77.45*	1926.17	*55.25*	1907.54	*41.96*
1914.06	*91.74*	1858.56	*65.00*	2246.61	*44.10*	2059.06	*59.05*	1619.83	*36.44*	2394.42	*132.47*	1786.44	*152.21*	1841.28	*69.16*
1861.22	*394.98*	2404.44	*554.40*	2205.72	*69.97*	2537.33	*139.24*	1992.89	*246.18*	1507.72	*246.18*	2263.17	*380.10*	1957.50	*351.27*
1756.83	*115.81*	1997.44	*224.74*	1956.56	*113.38*	2166.61	*377.58*	2139.61	*46.05*	1960.00	*70.08*	2138.11	*93.52*	2242.28	*15.06*

NEH Participants

2307.22	*237.80*	2175.33	*176.20*	1928.78	*121.22*	2052.00	*70.59*	2154.56	*153.39*	2242.17	*86.83*	2592.06	*219.90*	2537.44	*110.06*
2329.00	*186.97*	2074.56	*154.86*	2470.44	*349.04*	2096.28	*158.41*	1613.78	*200.65*	2053.83	*189.80*	1958.44	*339.73*	1746.50	*34.56*
1856.72	*83.37*	1613.00	*36.07*	1941.89	*223.81*	1928.78	*157.61*	1676.22	*138.10*	1657.22	*158.48*	1783.89	*70.21*	1835.89	*134.13*
1993.89	*104.06*	1876.83	*83.34*	2089.33	*143.00*	2533.00	*118.93*	1815.94	*86.98*	1857.61	*91.73*	1631.94	*57.12*	2076.39	*250.92*
1546.06	*124.91*	1490.39	*140.04*	1572.00	*128.69*	1997.33	*292.24*	1595.44	*100.21*	1716.94	*220.44*	1653.56	*170.54*	2318.56	*145.36*
2214.28	*211.16*	2165.83	*248.88*	2648.50	*132.47*	2764.67	*48.58*	2267.39	*92.07*	2044.22	*366.20*	2131.17	*272.31*	2460.89	*505.16*
1395.28	*165.92*	1304.94	*101.04*	1531.17	*95.24*	1590.61	*81.23*	1473.06	*38.54*	1194.56	*97.74*	1781.61	*105.88*	1470.00	*53.81*
1762.17	*181.58*	1560.78	*146.40*	1975.72	*300.68*	2046.89	*234.86*	1816.11	*141.89*	1640.61	*107.32*	1619.83	*187.88*	1859.39	*264.14*
2640.72	*159.49*	1967.11	*130.76*	2790.83	*368.60*	2428.89	*226.14*	2024.28	*20.86*	2077.28	*81.18*	2314.28	*57.71*	1899.11	*328.32*
1634.61	*241.54*	1647.61	*227.69*	1609.39	*165.93*	1652.78	*193.57*	2207.61	*340.45*	1441.78	*85.83*	2113.67	*401.81*	1499.22	*103.34*
1783.83	*173.66*	2039.83	*567.48*	1742.17	*121.34*	2139.26	*309.65*	1808.22	*151.49*	1822.94	*306.47*	2095.50	*269.25*	2042.44	*97.99*
2515.67	*280.29*	2312.44	*138.68*	2368.06	*247.74*	1971.39	*158.15*	2009.50	*142.21*	1843.78	*140.34*	1790.94	*117.21*	2558.22	*180.68*
1865.50	*163.17*	2481.78	*217.95*	2484.33	*148.47*	2497.39	*283.08*	1664.06	*71.09*	2032.11	*169.83*	1903.72	*292.75*	1980.89	*63.14*

GLB Participants

1960.94	*108.00*	2073.67	*173.40*	2498.33	*268.80*	2266.44	*245.63*	2350.61	*254.08*	2276.89	*350.34*	3038.22	*530.40*	2315.11	*291.67*
2347.17	*246.32*	2260.50	*126.35*	2367.11	*297.62*	1975.72	*129.44*	2365.39	*28.05*	1616.28	*73.22*	2105.83	*91.65*	1839.33	*132.65*
1686.56	*192.46*	1865.50	*231.28*	1869.72	*126.40*	1768.22	*177.87*	1744.83	*261.47*	1685.78	*239.44*	1961.67	*96.65*	1720.50	*202.25*
2199.29	*284.19*	2147.11	*245.19*	2326.06	*83.33*	2617.78	*331.06*	1992.39	*374.77*	2020.11	*211.07*	2216.83	*41.07*	2404.28	*211.22*

1775.28	*102.57*	1946.56	*175.64*	2121.00	*150.41*	2742.72	*286.51*	2333.61	*417.62*	1677.30	*98.08*	2071.56	*200.67*	1980.64	*187.57*
2770.83	*100.53*	2784.67	*100.59*	2534.72	*144.47*	2707.61	*238.51*	2032.89	*130.82*	2024.33	*102.25*	2581.50	*223.23*	2902.78	*63.51*
2172.67	*403.52*	1970.44	*145.74*	2072.94	*62.48*	2177.94	*176.51*	2065.94	*129.39*	2079.00	*303.37*	1873.28	*110.49*	2070.28	*126.46*
2291.56	*208.43*	2633.78	*275.16*	2687.44	*292.40*	2809.83	*44.56*	2870.67	*137.50*	2298.67	*320.82*	2689.33	*76.00*	2544.28	*344.43*
2827.22	*190.25*	2426.28	*94.22*	2134.50	*135.10*	2906.33	*110.89*	2091.06	*110.60*	2135.44	*120.14*	2327.33	*72.06*	2162.39	*265.43*
1349.83	*121.83*	1336.78	*69.46*	1356.78	*70.68*	1516.56	*168.93*	1310.83	*63.90*	1149.33	*100.66*	1170.11	*79.63*	1291.67	*48.26*
1614.56	*88.40*	1516.89	*144.25*	1690.50	*70.24*	1549.56	*151.80*	1636.28	*42.15*	1254.89	*73.18*	1431.39	*76.27*	1504.39	*68.38*
1596.39	*91.66*	1896.28	*233.91*	1944.89	*139.86*	1700.61	*42.03*	1545.17	*125.53*	1450.17	*202.71*	1885.50	*88.29*	2298.11	*165.74*
1796.67	*129.92*	1733.56	*46.94*	1914.83	*98.00*	1737.78	*432.44*	1903.56	*124.98*	1772.67	*328.61*	1857.56	*129.67*	1873.33	*209.96*
1944.44	*94.26*	1877.56	*146.01*	1937.44	*72.89*	1798.61	*20.40*	1486.22	*113.82*	1841.22	*259.01*	1912.39	*70.81*	1888.94	*83.14*
1983.44	*156.00*	2013.83	*204.18*	2220.50	*170.58*	2301.17	*177.66*	1848.94	*172.05*	2123.17	*171.85*	2047.89	*138.83*	2068.61	*121.62*
1503.50	*112.44*	1493.83	*132.34*	1857.72	*74.49*	1565.17	*31.66*	1358.33	*190.94*	1161.39	*20.30*	1545.28	*125.53*	1358.44	*138.78*
2244.89	*60.80*	3076.39	*303.76*	2695.17	*249.62*	3197.58	*172.60*	2470.61	*153.39*	2069.41	*114.74*	2450.50	*82.72*	2364.56	*376.12*
2117.06	*88.73*	1944.39	*269.31*	2163.11	*634.61*	2489.67	*443.00*	1927.06	*172.44*	1629.44	*128.90*	2223.06	*235.55*	2382.78	*142.82*
2096.28	*97.85*	2252.61	*250.37*	1862.67	*231.84*	2726.50	*206.84*	2078.00	*358.07*	1837.78	*33.37*	2209.28	*68.24*	2232.56	*187.98*
1821.17	*239.75*	2135.39	*88.15*	2302.11	*187.46*	2309.06	*171.14*	2126.72	*462.48*	2387.22	*428.91*	1973.11	*302.35*	2545.06	*633.97*
1485.50	*159.32*	1787.17	*43.63*	2129.67	*262.36*	2204.72	*387.84*	1887.17	*122.32*	1872.61	*267.29*	1880.89	*14.67*	2092.22	*533.48*
2183.17	*295.66*	2208.33	*258.19*	2364.56	*283.53*	2210.11	*75.40*	1825.56	*86.47*	2004.39	*250.44*	2020.89	*222.15*	2089.39	*251.53*

APPENDIX D

Raw Mean Latencies and Standard Errors for the Four Trial-Types for Pro-Straight and Pro-Gay Blocks, for EH, NEH and GLB Groups

EH Participants

Straight Positive				Straight Negative				Gay Negative				Gay Positive			
Consistent		Inconsistent		Consistent		Inconsistent		Consistent		Inconsistent		Consistent		Inconsistent	
Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*
1407.22	89.24	1999.94	235.79	1968.72	193.58	1826.39	219.50	1712.83	29.57	1534.72	125.59	1796.94	113.39	1887.94	276.05
1277.78	80.00	1397.56	52.67	1385.39	71.87	1566.94	195.66	1303.78	56.46	1210.00	103.03	1340.11	146.77	1478.50	97.32
1407.06	91.81	1469.56	144.17	1717.00	102.68	2118.17	95.63	1508.67	168.57	1318.39	177.57	1593.67	95.73	1874.22	107.81
989.61	42.05	1422.78	187.27	1129.33	21.95	1422.89	62.89	1099.56	48.40	1192.67	96.38	1279.61	87.82	1325.50	128.05
1422.61	54.92	1920.00	253.49	1586.94	14.72	1932.39	176.80	1820.44	140.46	1803.89	122.40	1822.89	132.70	1569.60	116.15
1441.72	64.81	1513.94	66.18	1653.67	112.67	1644.00	69.63	1433.17	38.28	1526.17	53.50	1492.89	97.51	1515.78	110.51
1443.61	188.37	1447.89	52.20	1455.56	37.71	1487.94	85.11	1260.50	55.63	1334.89	105.01	1336.83	85.98	1374.06	105.61
1362.83	63.27	1526.89	122.57	1637.94	156.46	1795.17	156.72	1795.17	24.28	1202.33	55.21	1543.39	40.06	1493.83	92.50
1146.11	33.17	1651.89	26.48	1595.61	89.77	1867.78	160.33	1472.22	205.30	1357.50	16.96	1346.89	35.70	1523.94	82.36
1451.44	127.13	1504.94	90.86	1594.50	220.01	1904.50	198.01	1465.22	65.35	1486.17	17.11	1510.44	75.40	1666.56	183.23
1085.83	72.59	1251.06	22.44	1422.72	136.01	1519.17	170.63	1207.44	38.84	1215.28	9.09	1368.00	115.00	1281.28	69.89
.83	52.04	1525.33	203.12	1362.83	105.75	1768.33	266.34	1429.56	82.00	1449.56	285.56	1442.89	35.90	1505.17	221.62
1192.67	49.68	1383.50	33.38	1250.11	55.61	1277.83	95.10	1144.06	29.38	1067.78	54.13	1172.78	43.67	1251.72	96.45
1416.72	102.83	1278.61	137.22	1591.11	116.30	1487.06	86.00	1316.11	11.38	1276.83	35.12	1530.39	95.50	1407.00	64.04
1368.94	59.79	1515.56	47.26	1560.00	195.30	1729.94	175.25	1318.39	54.08	1575.39	97.74	1402.83	89.35	1604.22	71.18
1324.17	9.86	1461.67	124.25	1406.78	17.53	1635.61	109.36	1375.44	96.38	1486.67	119.95	1348.17	120.76	1483.17	116.26
1083.22	88.87	1376.00	45.82	1169.39	52.70	1563.00	194.59	1138.28	57.85	1231.89	39.11	1094.83	66.55	1372.56	59.26
1356.94	22.48	1426.00	33.87	1600.67	180.58	2002.22	57.85	1269.72	40.13	1887.22	556.44	1692.33	61.26	1541.72	82.81

NEH Participants

1480.94	35.13	1640.56	75.55	1777.06	6.03	1576.33	60.38	1482.61	105.80	1479.06	156.36	1579.00	104.07	1578.94	36.74
1395.17	111.10	1594.67	120.94	1845.44	307.64	1691.17	24.77	1436.50	82.96	1302.28	82.45	1413.06	25.88	1520.00	253.37
1310.67	53.81	1638.17	120.56	1606.00	38.29	1448.00	22.20	1388.89	57.48	1285.67	78.27	1441.06	67.78	1366.28	22.06
1318.50	67.76	1410.56	25.80	1346.28	58.01	1429.61	52.64	1349.00	76.30	1267.50	33.77	1357.61	13.66	1207.44	57.02
1492.22	63.93	1506.94	80.06	1578.17	133.13	1578.17	108.08	1399.44	45.58	1326.44	43.63	1480.89	101.51	1385.39	30.87
1144.94	48.10	1484.22	95.26	1343.67	100.08	1629.50	200.26	1311.67	109.06	1272.50	126.64	1550.28	117.36	1368.00	94.75
1419.28	145.34	1346.28	47.37	1473.22	115.75	1500.17	115.40	1352.44	76.72	1367.11	51.00	1262.11	93.05	1476.67	57.09
1229.11	57.66	1368.06	118.07	1323.72	99.19	1446.22	35.58	1210.11	58.64	1078.00	8.48	1447.06	109.16	1325.50	17.78
1317.72	65.41	1438.39	198.56	1500.00	155.57	1739.56	27.37	1608.50	48.16	1606.11	86.89	1440.11	75.86	1410.67	21.27
1614.61	86.92	1787.61	35.27	1830.39	83.86	1746.44	121.41	1722.33	81.45	1838.17	294.64	294.64	104.82	1839.83	307.37
952.11	21.13	1050.33	58.34	1106.00	75.35	1071.83	31.49	1009.72	80.14	894.11	17.03	1102.28	68.47	1163.11	125.51
1565.11	133.22	1394.22	30.76	1445.33	56.32	1552.94	97.01	1384.56	29.31	1237.83	49.83	1439.94	79.12	1438.33	41.08
1289.17	15.25	1529.44	102.64	1427.94	114.30	1516.33	86.06	1326.39	42.85	1244.89	78.57	1244.72	48.70	1368.06	59.54
1145.78	33.82	1503.39	132.98	1530.28	106.10	1532.11	148.29	1442.72	54.88	1279.44	170.01	1447.78	29.59	1508.67	123.19
1769.94	127.43	1987.94	294.43	1936.72	43.60	1779.50	118.43	1341.17	11.39	1309.78	254.36	1578.83	115.37	1539.89	12.52
1461.83	177.58	1525.22	5.60	1460.11	80.14	1549.50	59.29	1436.00	107.32	1303.06	91.80	1566.83	184.14	1329.89	66.33
1290.78	30.95	1405.39	25.22	1427.11	92.91	1577.28	9.78	1382.00	46.02	1570.44	281.71	1259.56	40.12	1413.06	129.82
1331.17	15.97	1729.89	50.77	1642.50	135.59	1833.89	160.26	1614.44	61.49	1477.78	24.33	1405.11	131.16	1891.89	119.15
1630.00	22.76	1268.78	18.14	1381.50	74.43	1405.61	60.83	1657.11	204.32	1272.39	23.88	1564.39	86.79	1461.17	2.50

1284.61	136.54	1296.72	53.92	1539.94	53.30	1553.78	136.63	1298.67	198.28	1231.06	90.66	1313.44	44.52	1262.17	73.85
1784.78	201.24	1619.06	79.08	1644.28	45.34	2056.44	257.57	1462.56	48.65	1643.22	90.61	2228.28	430.47	1761.22	93.93
1475.94	107.74	1755.22	165.69	1576.28	42.46	1550.44	104.89	1532.22	117.05	1447.83	73.90	1578.94	67.01	1470.50	100.75
1383.22	115.63	1410.17	26.90	1578.28	70.64	1461.28	166.08	1521.06	25.99	1276.67	31.62	1367.72	72.82	1520.06	211.91
1453.89	71.58	1535.67	19.51	1564.17	35.19	1648.44	136.84	1841.94	198.96	1527.83	52.37	1473.94	108.16	1506.89	38.25
1239.56	57.78	1422.78	75.22	1369.78	133.40	1474.78	71.31	1467.94	183.97	1191.94	32.20	1493.22	152.52	1370.61	36.30
1241.89	29.46	1486.33	66.51	1537.50	159.89	1920.50	299.56	1451.67	139.19	1198.72	44.42	1598.22	178.58	1320.11	20.00

GLB Participants

1236.17	66.25	1177.11	39.30	1460.83	100.47	1351.50	94.50	1154.56	55.65	1337.67	200.97	1177.72	59.52	1302.78	123.90
1491.33	67.75	1577.22	126.32	1472.17	92.20	1533.00	77.60	1444.44	79.65	1328.17	92.39	1584.22	88.69	1633.78	79.20
1851.50	69.29	1613.61	83.00	1737.83	84.22	1615.67	102.32	1340.44	47.82	1439.33	118.25	1637.94	62.99	1438.39	95.05
1321.28	49.39	1108.50	93.31	1480.94	160.90	1285.61	118.16	1479.22	71.09	1070.33	41.79	1377.44	87.16	1293.28	36.32
1526.17	41.82	1514.72	76.65	1356.83	16.70	1738.72	103.15	1379.33	47.87	1407.17	54.38	1540.61	23.08	1466.89	55.49
1575.50	244.33	1663.89	145.56	1969.50	201.80	1821.28	28.81	1476.61	60.16	1440.22	83.65	1470.72	89.42	1414.17	70.97
1872.50	112.80	1782.06	84.47	1620.89	68.15	1747.33	220.74	1539.89	26.27	1782.00	193.85	1737.83	122.41	1551.06	62.09
1759.92	70.27	1779.22	31.76	2024.06	47.74	1985.00	202.46	1882.67	359.11	1666.28	153.00	1921.72	133.06	1940.50	153.20
1726.89	123.46	1584.56	66.40	1862.33	114.03	1687.44	22.73	1604.39	69.51	1526.56	88.40	1577.89	125.56	1533.72	169.60
1330.11	97.67	1395.67	103.16	1417.50	51.61	1526.94	60.12	1671.00	239.92	1554.50	99.59	1544.28	69.92	1655.39	180.24
1291.00	54.53	1494.67	93.52	1545.06	52.01	1587.61	73.43	1412.39	33.71	1363.56	61.65	1461.00	102.42	1353.17	56.33
1816.50	320.33	1637.06	32.35	1568.67	30.82	2179.67	193.53	1510.56	27.12	1578.11	66.18	1420.56	44.32	1431.72	79.64
1199.78	80.08	1198.89	34.20	1537.33	174.36	1259.56	89.18	1289.06	141.64	1038.17	56.03	1279.56	80.31	1235.28	117.41
1409.06	172.55	2096.89	249.37	1673.11	63.28	2059.06	296.56	1982.83	187.91	1786.00	259.83	1971.83	54.45	2078.67	304.03
1224.06	68.48	1270.89	93.52	1353.33	94.86	1323.94	20.02	1129.28	60.37	1051.28	12.99	1333.28	14.55	1239.50	92.48
1460.22	93.26	1614.50	80.62	1327.22	30.87	1887.00	181.13	1196.33	9.67	1427.11	109.74	1625.61	80.64	1693.44	81.90
1789.94	130.79	1718.67	34.06	1692.61	156.25	1989.44	154.93	1836.00	72.95	1748.22	16.54	1700.50	42.81	1578.89	87.37
1395.00	88.83	1611.72	134.13	1720.44	116.97	1950.39	413.53	1496.44	35.44	1207.67	37.54	1491.33	12.76	1324.61	89.70
1216.89	88.31	1336.00	117.36	1452.33	95.68	1651.89	67.60	1270.06	84.74	1072.11	69.79	1330.61	49.77	1251.67	91.53
1341.11	34.08	1505.89	89.76	1394.11	26.31	1539.94	21.05	1311.44	26.21	1246.50	51.13	1489.61	40.46	1431.44	151.23
1336.28	62.17	1678.00	30.48	1667.94	131.63	1566.06	35.95	1373.17	22.05	1391.56	43.98	1516.11	69.34	1387.17	27.26
1044.28	71.95	1288.56	15.06	1211.17	173.33	1511.11	99.21	1109.94	83.58	943.67	71.63	1375.78	35.07	1338.06	45.79

APPENDIX E

Raw Mean Latencies and Standard Errors for the Four Trial-Types for Pro-Straight and Pro-Gay Blocks, for Single (SL) and Multiple (ML) IRAP Groups

SL IRAP Group

Straight Positive				Straight Negative				Gay Negative				Gay Positive			
Consistent		Inconsistent		Consistent		Inconsistent		Consistent		Inconsistent		Consistent		Inconsistent	
Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*
1144.89	97.31	1608.56	140.65	1536.56	236.30	1696.44	181.01	1347.11	208.53	1634.56	132.13	1470.39	200.85	1805.61	113.20
1242.28	63.91	1450.67	50.62	1480.00	142.16	1533.89	201.42	1298.67	93.62	1312.56	8.90	1362.11	112.07	1286.56	40.82
1275.89	51.84	1221.44	25.55	1276.94	158.76	1423.67	78.16	1131.83	131.12	1154.61	22.96	1329.11	46.97	1188.22	68.81
1247.56	126.54	1950.56	103.09	1604.33	129.28	1869.06	63.59	1377.78	46.96	1422.67	96.98	1701.44	41.06	1622.44	53.60
1312.44	66.47	1421.17	60.91	1705.83	204.81	1622.39	252.38	1354.17	33.41	1356.06	173.09	1476.56	164.57	1553.94	73.67
1337.78	57.13	1610.28	200.30	1454.72	97.85	1515.56	96.65	1365.39	109.78	1330.78	161.06	1662.28	89.05	1530.44	138.32
1283.94	6.57	1288.22	78.19	1299.44	78.11	1214.33	13.94	1397.61	97.23	1035.50	14.00	1216.17	54.83	1330.78	58.62
933.06	47.35	1070.33	46.65	1208.33	139.15	1254.33	175.76	943.56	70.47	914.06	35.58	1042.44	9.21	1180.50	122.83
1285.61	16.19	1385.44	71.62	1773.56	46.93	1579.00	97.00	1469.72	85.22	1312.56	52.76	1557.28	133.29	1481.83	14.79
1453.83	116.95	1605.94	39.69	1564.17	178.72	1698.83	48.88	1470.44	49.75	1391.56	92.06	1699.00	80.40	1646.56	51.86
1118.22	43.16	1387.17	154.60	1332.61	173.92	1223.06	55.84	1398.39	60.66	1319.56	169.76	1183.22	16.69	1294.39	32.22
1163.11	37.06	1395.67	77.89	1352.67	42.33	1520.89	67.58	1357.72	87.00	1169.33	109.81	1322.94	11.95	1240.39	85.06

ML IRAP Group

1360.28	85.71	1671.00	115.53	1665.67	226.37	1741.22	153.29	1389.78	84.33	1787.22	114.30	1431.44	36.08	1727.44	16.54
1396.50	50.59	1796.00	43.55	1362.67	45.30	1868.89	17.23	1591.11	109.15	1375.83	60.91	1307.50	70.51	1540.78	64.67
1259.61	49.59	1873.22	75.11	1631.94	202.83	1931.44	38.07	1769.06	81.44	1599.78	71.65	1658.78	41.89	1820.44	91.14
1657.00	469.68	1641.61	32.50	1490.50	79.02	2112.06	160.84	1540.89	90.59	1327.33	143.91	1987.83	80.53	1640.56	94.00
1212.67	50.37	1754.39	73.43	1239.67	70.43	1863.72	150.17	1475.78	146.79	1467.11	83.51	1409.56	87.81	1769.28	80.29
1436.72	119.85	1906.17	13.89	1825.44	118.50	1957.39	112.37	1761.44	89.05	1639.00	57.93	1605.11	170.25	1693.56	91.68
1217.89	15.38	1750.22	135.30	1340.33	47.59	1728.22	97.63	1263.06	49.91	1466.33	240.04	1319.44	94.07	1592.78	164.52
1451.44	96.87	1695.22	31.93	1654.67	32.75	1922.72	90.16	1367.28	163.12	1458.28	70.50	1442.89	151.13	1703.00	110.85
1273.39	86.49	1571.00	58.04	1421.06	95.28	1804.61	114.09	1155.50	40.22	1279.33	55.35	1341.11	76.10	1636.11	91.16

APPENDIX F

Cognitive Failures Questionnaire
(CFQ; Broadbent, Cooper, FitzGerald & Parkes, 1982)

The following questions are about minor mistakes which everyone makes from time to time, but some of which happen more often than others. We want to know how often these things have happened to you in the last six months. Please circle the appropriate number.

	Very often	Quite often	Occasio-nally	Very rarely	Never
Do you read something and find you haven't been thinking about it and must read it again?	4	3	2	1	0
Do you find you forget why you went from one part of the house to the other?	4	3	2	1	0
Do you fail to notice signposts on the road?	4	3	2	1	0
Do you find you confuse right and left when giving directions?	4	3	2	1	0
Do you bump into people?	4	3	2	1	0
Do you find you forget whether you've turned off a light or a fire or locked the door?	4	3	2	1	0
Do you fail to listen to people's names when you are meeting them?	4	3	2	1	0
Do you say something and realise afterwards that it might be taken as insulting?	4	3	2	1	0
Do you fail to hear people speaking to you when you are doing something else?	4	3	2	1	0
Do you lose your temper and regret it?	4	3	2	1	0
Do you leave important letters unanswered for days?	4	3	2	1	0
Do you find you forget which way to turn on a road you know well but rarely use?	4	3	2	1	0
Do you fail to see what you want in a supermarket (although it's there)?	4	3	2	1	0

	Very often	Quite often	Occasio-nally	Very rarely	Never
Do you find yourself suddenly wondering whether you've used a word correctly?	4	3	2	1	0
Do you have trouble making up your mind?	4	3	2	1	0
Do you find you forget appointments?	4	3	2	1	0
Do you forget where you put something like a newspaper or a book?	4	3	2	1	0
Do you find you accidentally throw away the thing you want and keep what you meant to throw away as in the example of throwing away the matchbox and putting the used match in your pocket?	4	3	2	1	0
Do you daydream when you ought to be listening to something?	4	3	2	1	0
Do you find you forget people's names?	4	3	2	1	0
Do you start doing one thing at home and get distracted into doing something else (unintentionally)?	4	3	2	1	0
Do you find you can't quite remember something although it's 'on the tip of your tongue'?	4	3	2	1	0
Do you find you forget what you came to the shops to buy?	4	3	2	1	0
Do you drop things?	4	3	2	1	0
Do you find you can't think of anything to say?	4	3	2	1	0

APPENDIX G

Marlow-Crowne Social Desirability Scale – Short Form-C (MCSD-SF-C; Reynolds, 1982)

Listed below are a number of statements concerning personal attitudes and traits.
Read each item and decide how it pertains to you.

Please respond either TRUE (T) or FALSE (F) to each item.

Indicate your response by circling the appropriate letter next to the item.
Be sure to answer all items.

	(TRUE) (FALSE)
1. It is sometimes hard for me to go on with my work if I am not encouraged.	T F
2. I sometimes feel resentful when I don't get my way.	T F
3. On a few occasions, I have given up doing something because I thought too little of my ability.	T F
4. There have been times when I felt like rebelling against people in authority even though I knew they were right.	T F
5. No matter who I'm talking to, I'm always a good listener.	T F
6. There have been occasions when I took advantage of someone.	T F
7. I'm always willing to admit it when I make a mistake.	T F
8. I sometimes try to get even rather than forgive and forget.	T F
9. I am always courteous, even to people who are disagreeable.	T F
10. I have never been irked when people expressed ideas very different from my own.	T F
11. There have been times when I was quite jealous of the good fortune of others.	T F
12. I am sometimes irritated by people who ask favours of me.	T F
13. I have never deliberately said something that hurt someone's feelings.	T F

APPENDIX H

Semantic Differential Scales

The following is a Semantic Differential Scale,

Your task is to mark with an 'X' the position on the scale (as shown in the example below) which you feel is most applicable.

EXAMPLE

Swan

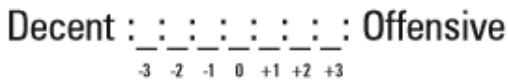
Beautiful : _ : X : _ : _ : _ : _ : _ : Ugly

-3 -2 -1 0 +1 +2 +3

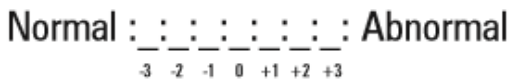
If you have any questions please ask now.

If not, please turn the page and start immediately.

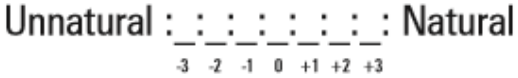
Gay People



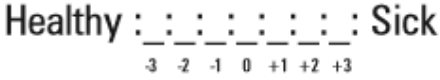
Straight People



Straight People



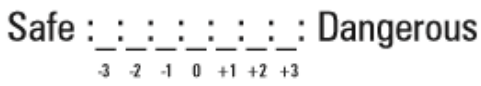
Gay People



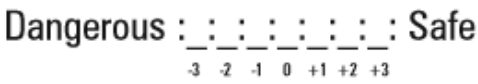
Gay People

Unacceptable :_:_:_:_:_:_:_: Acceptable
-3 -2 -1 0 +1 +2 +3

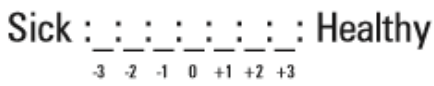
Straight People



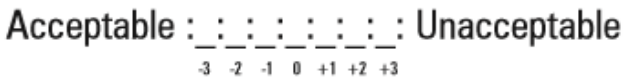
Gay People



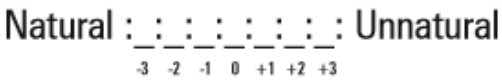
Straight People



Straight People



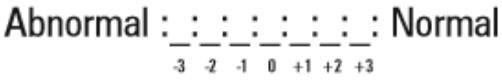
Gay People



Straight People

Offensive :_:_:_:_:_:_:_: Decent
-3 -2 -1 0 +1 +2 +3

Gay People



Thank You!

Please ensure that you have answered all questions.

APPENDIX I

Feeling Thermometers

These next questions are about some of the different groups in Ireland.

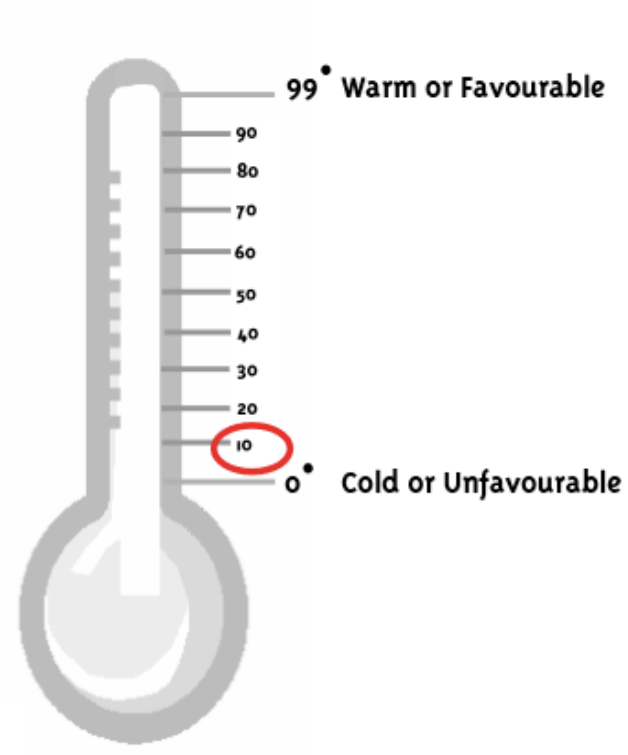
Please read the name of the group and rate the group on the thermometer that runs from zero (0) to ninety nine (99). The higher the number, the warmer or more favourable you feel toward that group. The lower the number, the colder or less favourable you feel. If you feel neither warm nor cold toward them, rate that group a fifty (50).

THE FEELING THERMOMETER

The feeling thermometer measures how you feel about people and things.

Example

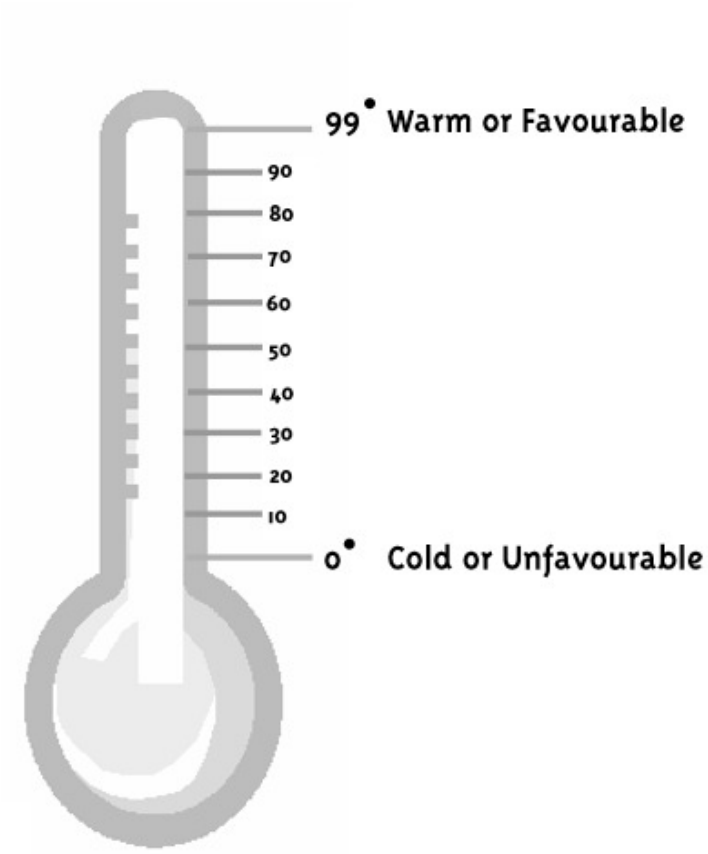
For example, let's say this is how you feel about ***exams.***



In this example, you feel extremely negative about exams.

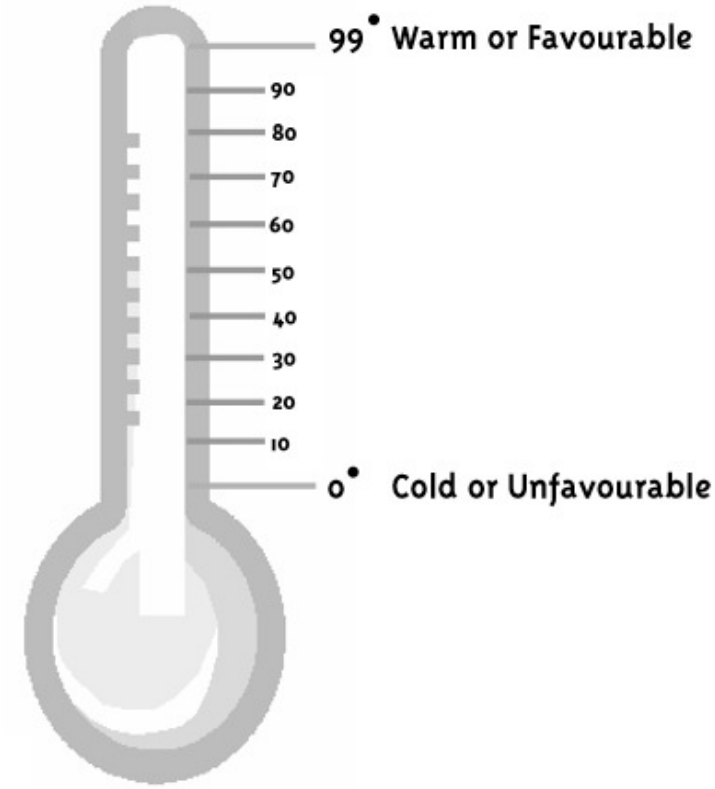
Please use a pencil or pen to encircle the position that you feel most applies, on the feeling thermometer

Please rate how you feel about *"Straight People":*



Please use a pencil or pen to encircle the position that you feel most applies, on the feeling thermometer

Please rate how you feel about *"Gay People"*:



Thank You

Please ensure that you have answered all questions.

APPENDIX J

Modern Homonegativity Scale (MHS-G; Morrison, Kenny & Harrington, 2005)

Please read each of the following statements and rate them according to how accurately they describe your attitudes and beliefs. Please respond honestly and answer every question according to the rating scale below.

1----------2----------3----------4----------5
Strongly Disagree Undecided Agree Strongly
Disagree Agree

____ 1. Many gay men use their sexual orientation so that they can obtain special privileges.

____ 2. Gay men seem to focus on the ways in which they differ from heterosexuals and ignore
the ways in which they are the same.

____ 3. Gay men do NOT have all the rights they need.*

____ 4. The notion of universities providing students with undergraduate degrees in Gay and Lesbian studies is ridiculous.

____ 5. Celebrations such as "gay pride day" are ridiculous because they assume an individual's sexual orientation should constitute a source of pride.

____ 6. Gay men should stop shoving their lifestyle down other people's throats.

____ 7. Gay men should stop complaining about the way they are treated in society and simply get on with their lives.

____ 8. Gay men have become far too confrontational in their demand for equal rights.

____ 9. In today's tough economic times, tax payers' money should not be used to support
gay organizations.

____ 10. If gay men want to be treated like everyone else then they need to stop making such a fuss about their sexuality or culture.

APPENDIX J

Modern Homonegativity Scale (MHS-L; Morrison, Kenny & Harrington, 2005)

1----------2----------3----------4----------5
Strongly Disagree Undecided Agree Strongly
Disagree Agree

____ 11. Many lesbian women use their sexual orientation so that they can obtain special privileges.

____ 12. Lesbian women seem to focus on the ways in which they differ from heterosexuals and ignore the ways in which they are the same.

____ 13. Lesbian women do NOT have all the rights they need.*

____ 14. The notion of universities providing students with undergraduate degrees in Gay and Lesbian studies is ridiculous.

____ 15. Celebrations such as "gay pride day" are ridiculous because they assume an individual's sexual orientation should constitute a source of pride.

____ 16. Lesbian women should stop shoving their lifestyle down other people's throats.

____ 17. Lesbian women should stop complaining about the way they are treated in society
and simply get on with their lives.

____ 18. Lesbian women have become far too confrontational in their demand for equal rights.

____ 19. In today's tough economic times, tax payers' money should not be used to support
lesbian organizations.

____ 20. If lesbian women want to be treated like everyone else then they need to stop making such a fuss about their sexuality or culture.

APPENDIX K

Motivation to Control Prejudiced Reactions Scale (Plant & Devine, 1998)

ADAPTED FOR ASSESSING MOTIVATION TO CONTROL HOMONEGATIVE REACTIONS

Instructions: The following questions concern various reasons or motivations people might have for trying to respond in non-prejudiced ways toward Gay people. Some of the reasons reflect internal-personal motivations whereas others reflect more external-social motivations. Of course, people may be motivated for both internal and external reasons; we want to emphasize that neither type of motivation is by definition better than the other. In addition, we want to be clear that we are not evaluating you or your individual responses. All your responses will be completely confidential. We are simply trying to get an idea of the types of motivations that people in general have for responding in non-prejudiced ways. If we are to learn anything useful, it is important that you respond to each of the questions openly and honestly. Please give your response according to the scale below.

Please read each of the following statements and rate them as honestly as you can. Answer every question according to the rating scale below.

1----------2----------3----------4----------5----------6----------7----------8----------9
Strongly Disagree **Strongly Agree**

____ 1. Because of today's PC (politically correct) standards I try to appear non-prejudiced toward Gay people.

____ 2. I attempt to act in non-prejudiced ways toward Gay people because it is personally important to me.

____ 3. Being non-prejudiced toward Gay people is important to my self-concept.

____ 4. I try to hide any negative thoughts about Gay people in order to avoid negative reactions from others.

____ 5. If I acted prejudiced toward Gay people, I would be concerned that others would be angry with me.

____ 6. Because of my personal values, I believe that using stereotypes about Gay people is wrong.

____ 7. I attempt to appear non-prejudiced toward Gay people in order to avoid disapproval from others.

____ 8. According to my personal values, using stereotypes about Gay people is OK. *

____ 9. I try to act non-prejudiced toward Gay people because of pressure from others.

10. I am personally motivated by my beliefs to be non-prejudiced toward Gay people.

APPENDIX L

Klein Sexual Orientation Grid (KSOG; Klein, Sepekoff, & Wolf, 1985)

Insert the '<u>number</u>' that most applies to you, (from: Scale for A to E & Scale for F & G) for <u>each question</u> for '<u>past</u>,' '<u>present</u>,' and '<u>Ideal</u>.'

		Past *(Your entire Life up until a year ago)*	**Present** *(The last twelve months)*	**Ideal** *(If you could order your life any way you wanted, what would it be like?)*
(A)	**Sexual Attraction** *(to whom are you sexually attracted?)*	_____	_____	_____
(B)	**Sexual Behaviour** *(with whom do you actually have sex?)*	_____	_____	_____
(C)	**Sexual Fantasies** *(who do you fantasize about?)*	_____	_____	_____
(D)	**Emotional Preference** *(who do you feel more drawn to or close to emotionally?)**	_____	_____	_____
(E)	**Social Preference** *(with whom do you like to socialize?)**	_____	_____	_____
(F)	**Heterosexual/Homosexual Lifestyle** *(in which community do you prefer to spend your time? In which do you feel most comfortable?)*	_____	_____	_____
(G)	**Self Identification** *(how do you label or identify yourself?)*	_____	_____	_____

<u>Scale for A to E</u>

1. = Other sex only
2. = Other sex mostly
3. = Other sex somewhat more
4. = Both sexes equally
5. = Same sex somewhat more
6. = Same sex mostly
7. = Same sex only

<u>Scale for F and G</u>

1. = Heterosexual only
2. = Heterosexual mostly
3. = Heterosexual somewhat more
4. = Hetero/gay-Lesb. equally
5. = Gay-Lesb. somewhat more
6. = Gay-Lesb. mostly
7. = Gay-Lesb. only

APPENDIX M

WILLINGNESS TO HELP GAY RIGHTS

THIS IS ENTIRELY OPTIONAL

PETITION

Since the legalization of 'homosexuality' in Ireland in 1993, there has been considerable improvement in the lives of lesbian women and gay men. Despite this improvement, however, lesbian women and gay men are still subjected to inequality with respect to laws governing marriage, employment, adoption, and so on. We must join together to demand equality for ALL Irish citizens, regardless of their sexual orientation. Sign this petition to tell the Irish Government to stop treating people unequally.

Dear Taoiseach,

Discrimination on the basis of sexual orientation should be eliminated from Irish legislation completely. I call upon you to end homonegativity through a thorough review of the Irish Statute book.

Name (BLOCK CAPITALS):_____

Signed: _____ Date_____

WILLINGNESS TO HELP GAY RIGHTS

THIS IS ENTIRELY OPTIONAL

Please answer the following questions.

1. Would you be willing to be contacted by other gay rights organisations regarding signing further petitions and/or to receive further information?

Yes ☐ No ☐

2. Would you be willing to participate in a public demonstration in aid of gay rights?

Yes ☐ No ☐

3. Would you be willing to be interviewed on radio to provide views in support of the campaign?

Yes ☐ No ☐

4. Would you be willing to be interviewed on television to provide views in support of the campaign?

Yes ☐ No ☐

5. If you have answered 'yes' to any of the above questions and are willing to be contacted in this regard, please provide your details in the space below.

PLEASE ONLY PROVIDE THE DETAILS BELOW IF YOU ARE <u>COMPLETELY COMFORTABLE</u> DOING SO.

Name:_____

Address:_____

_____

_____

Telephone:_____ email: _____

APPENDIX N

Attitudes Toward Same-Sex Marriage (ATSM; Pearl & Paz-Galupo, 2007)

1----------2----------3----------4----------5
Strongly Disagree **Strongly Agree**

_____ Same-sex marriage undermines the meaning of the traditional family.

_____ Two loving same-sex parents can provide the same quality of parenting and guidance as a man and a woman.

_____ A primary purpose of marriage is to provide stability in a loving relationship. Same-sex partners should have this legal right available to them.

_____ The recognition of same-sex marriage poses a threat to society because public schools will be forced to teach that homosexuality is normal.

_____ Marital protections, such as social security and health care benefits should be available to same-sex partners.

_____ Same-sex marriage will strengthen the morals of society by supporting equality.

_____ I support individuals who are not heterosexual seeking marriage rights.

_____ Because more people will have the benefits of marriage, family will be strengthened by the recognition of same-sex marriages.

_____ Men and women naturally complement one another, therefore a union between two men or two women should not be recognised in marriage.

_____ The legalization of same-sex marriage is an important step toward the acceptance of individuals who are not heterosexual.

_____ A primary purpose of marriage is to raise children, therefore only a man and a woman should be married.

_____ Same-sex marriage ensures equal rights for all relationships regardless of sexual orientation.

_____ The legalization of same-sex marriage will lead to unnecessary financial burdens, such as social security and health care benefits.

_____ The legalization of same-sex marriage will jeopardize religious freedom.

_____ Individuals should be free to enter into marriage with another same-sex consenting adult because God created all people and does not make mistakes.

_____ Same-sex marriage will lead to the moral decay of society.

_____ I oppose the legalization of same-sex marriage.

APPENDIX O

Attitudes Toward Lesbian and Gay Men Scale (ATL: Herek, 1988).

Below you will find a series of statements. Please indicate the degree to which you agree or disagree with each statement by circling the number that most describes your response. Please respond to each item.

1. Lesbians just can't fit into our society.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

2. A woman's homosexuality should not be a cause for job discrimination in any situation.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

3. Female homosexuality is detrimental to society because it breaks down the natural divisions between the sexes.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

4. State laws regulating private, consenting lesbian behavior should be loosened.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

5. Female homosexuality is a sin.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

6. The growing number of lesbians indicates a decline in North American morals.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

7. Female homosexuality in itself is no problem, but what society makes of it can be a problem.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

8 . Female homosexuality is a threat to many of our basic social institutions.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

9. Female homosexuality is an inferior form of sexuality.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

10. Lesbians are sick.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

APPENDIX O

Attitudes Toward Lesbian and Gay Men Scale (ATG: Herek, 1988).

11. Male homosexual couples should be allowed to adopt children the same as heterosexual couples.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

12. I think male homosexuals are disgusting.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

13. Male homosexuals should not be allowed to teach school.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

14. Male homosexuality is a perversion.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

15. Just as in other species, male homosexuality is a natural expression of sexuality in human men.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

16. If a man has homosexual feelings, he should do everything he can to overcome them.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

17. I would not be too upset if I learned that my son were a homosexual.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

18. Homosexual behavior between two men is just plain wrong.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

19. The idea of male homosexual marriages seems ridiculous to me.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

20. Male homosexuality is merely a different kind of lifestyle that should not be condemned.

1 2 3 4 5 6 7 8 9
strongly agree strongly disagree

APPENDIX P

Sample page from the practice and test booklets

BRIAN DOWLING

A
Irish fashion designer and Presenter of RTE's 'Off the rails'

B
Television presenter and first gay winner of British reality TV show 'Big Brother'

☐

A or B?

APPENDIX Q

Answer page from the practice booklet

CORRECT ANSWER

B

Television Presenter and first gay winner of British reality TV show 'Big Brother'.

DID YOU KNOW THIS PERSON WAS HOMOSEXUAL? _____

APPENDIX R
Consent Form

PARTICIPANT:

I …… consent to participate in an experimental psychology study being run by Claire Cullen and supervised by Professor Dermot Barnes-Holmes in the Department of Psychology, National University of Ireland, Maynooth (Tel: +353 1 708 4765).

I understand and consent to the following:

- There are no known risks associated with this experimental procedure.
- The experiment will not last longer than 2 hours on any given day.
- The experiment involves some terms of a sexual nature.
- All data from the study will be treated confidentially.
- The data will be stored in a locked cabinet in the Department of Psychology
- The data will be retained for a minimum of five years.
- An alphanumeric code (e.g., S1CFE) will be entered into the IRAP program to protect your identity. This alphanumeric code will also be used on all explicit measures to protect your identity.
- Your data is available to you at your discretion
- The data collected as part of this study will be collated and form part of Claire Cullen's doctoral thesis and the results may be included in other publications.
- I am free to terminate my participation in the study at any time and may withdraw the data obtained from my participation, if I so wish, up to the time of publication.
- I understand that this experiment *cannot* be considered a form of treatment for any disorder.
- I have also been informed that my attitudes may change or remain the same following the experiment.
- Results from this research work will not be used deceptively or without your consent.

- If during my participation in the study I feel the information and guidelines I have been given are neglected or disregarded in anyway, or if I am unhappy about the process I may contact the Secretary of the National University of Ireland Maynooth Ethics Committee at pgdean@nuim.ie or 01 708 6018.
- I have been assured that my concerns will be dealt with in a sensitive manner.
- I have received this information in an understandable way.
- All my questions at this stage have been answered.

Please print and sign your name below if you are willing to abide fully by the above stated conditions.

Name:
_____

(Please print in block capitals)

Signature:
_____

Date: _____

EXPERIMENTER:
I, Claire Cullen, as primary experimenter, accept full responsibility for the care of all experimental participants and I confirm that all the necessary safety precautions have been taken.

Signature of experimenter: _____ Date: _____

Claire Cullen

c/o Department of Psychology, NUI Maynooth

claire.cullen@NUIM.ie