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Developing the Implicit Relational Assessment Procedure (IRAP) as a Measure of Bias
Towards Pupils with Attention Deficit Hyperactivity Disorder (ADHD)

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Abstract

Negative attitudes toward Attention Deficit Hyperactivity Disorder (ADHD) can lead to delays in help-seeking, negative self-image, social isolation, social rejection, and treatment barriers. The aim of the current research was to extend the research literature on ADHD by using a measure of implicit cognition to complement existing questionnaire/self-report data. Study 1 used a behavioural implicit measure known as the Implicit Relational Assessment Procedure (IRAP) and three explicit measures to investigate stigmatising attitudes towards pupils with ADHD. Participants were mainstream primary school teachers ($n=16$) and trainee primary school teachers ($n=14$). Overall, statistical analysis of IRAP data showed participants' results from Study 1 did not demonstrate negative relational bias toward ADHD pupils for teachers or trainee teachers (e.g., participants did not respond faster in affirming typically-developing/positive relations compared to ADHD/positive relations). Correlational tests using Pearson's r were implemented to determine if there were any implicit-explicit associations demonstrated; results showed two statistically significant effects i.e. typically-developing/positive trial-type correlated with the emotional exhaustion subscale on Maslach Burn-Out Inventory-Educator's Survey (MBI-ES) for the qualified teacher group and typically-developing/negative trial-type correlated with the stress subscale on the Depression Anxiety Stress Scale (DASS) for the trainee teacher group. Study 2 was a partial replication of Study 1 with a convenience sample of adults ($n=41$). The rationale was that there was no implicit stigma shown in Study 1 because the participants were highly qualified and familiar with individuals with ADHD and thus failed to show the expected relational bias. The IRAP was used as before and results showed a pro-typically-developing relational bias however, combined pro-ADHD and anti-ADHD relational biases in the ADHD trial-blocks. Results are discussed with regard to further implicit investigation in the area.

CHAPTER 1
GENERAL INTRODUCTION

Developing the Implicit Relational Assessment Procedure as a Measure of Bias towards
Pupils with Attention Deficit Hyperactivity Disorder

Literature Review

Stigma persists in all domains of mental health and in general terms occurs when an attribute, marker, or abnormality is identified in an individual and considered deviant from the majority of a given social group (Jones, Hastorf, Marcus, Miller, & Scott, 1984; Link, Yang, Phelan, & Collins, 2004). This can serve to discredit individuals causing discriminative behaviour and the separation of groups within society (Jones et al., 1984; Link, Cullen, Struening, Shrout, & Dohrenwend, 1989; Locke, 2010; Stier & Hinshaw, 2007). Research into the stigmatisation of mental health disorders has shown that “labels” are used as social designation and have negative, harmful effects on diagnosed individuals (Link & Phelan, 2001). Labels refer to the connections made between an individual and some undesirable characteristic(s) and their pernicious effects can go beyond the burden of the psychological suffering experienced by that individual (Link & Phelan, 2001). Consequentially, the related evaluations that labels carry, frequently result in the manifestation of stigmatisation, negative stereotypes, prejudice, and discrimination (Corrigan, 2004).

Discriminative behaviour is defined in the social psychology literature as negative actions directed at individuals based on their membership to a particular group (Franzoi, 2003; Williams, Neighbors, & Jackson, 2003). Discrimination represents one of three constructs that underlie stigma. The other two are stereotypes and prejudice (Corrigan & Watson, 2002). Stereotypes per se are not considered negative within social psychology (Corrigan & Penn, 2015). On the contrary, it is accepted that most members of a social group generate impressions of individuals based on collectively agreed upon beliefs that can facilitate effective categorisation of groups in society (Corrigan & Penn, 2015). Stereotypes only become negative when prejudice or negative attitudes are directed at an individual based

on their membership to a particular group (Franzoi, 2003). These three major constructs of social psychology are interlinked and have negative consequences for a given social group.

Stigma. Empirical research has found that stigma can occur and persist in three distinct ways (1); public-stigma relates to the prejudicial beliefs and discriminative behaviour of a population expressed towards individuals that are based on poorly justified perceptions about intrinsic characteristics or behavioural or physical attributes (Corrigan & Penn, 2015; Mueller, Fuermaier, Koerts, & Tucha, 2012), (2); self-stigma relates to an individual accepting or internalising the prejudice that was directed at them (Mueller, et al., 2012), and (3); courtesy-stigma relates to discrediting family members or other persons based on their affiliation with the stigmatised individual (Kellison, Bussing, Bell, & Garvan, 2010); Koro-Ljungberg & Bussing, 2009).

In a study by Mikami, Chong, Saporito and Na (2015), researchers employed a cross-sectional design and several self-report measures to examine the extent of courtesy-stigma within families of sixty-three children with a diagnosis of Attention Deficit Hyperactivity Disorder (ADHD). The study found that a higher rate of self-reported courtesy-stigma in parents was related to greater observed negative parenting towards their ADHD diagnosed child (Mikami et al., 2015). Researchers suggest that public misconceptions about ADHD such as symptoms resulting from “bad parenting” or inappropriate diet may have ramifications for parent-child relationships as well as serve for poor social functioning in the child (Canu, Newman, Morrow & Pope, 2007; Mikami et al., 2015; Sciotto, Terjesen, & Bender, 2000). Thus, assessing parents’ awareness of internalising negative judgements is critical as such stigmatising beliefs have shown to negatively impact on family life (Mikami et al., 2015).

In all facets of society, separation of its members as a result of stigma can have harmful effects. Specifically, for mental health consumers it can create barriers to treatment,

delays in help-seeking, exacerbation of stress and cause of treatment termination (Kellison, et al., 2011). Gajria et al. (2014) systematically reviewed ninety-one original studies and thirty-six expert opinion articles related to the discontinuation of pharmacological treatment among individuals with ADHD. The study found that main causes for non-adherence to ADHD medication were due to ineffective symptom control, dosing inconvenience and social stigma. Importantly, from a psychological perspective, this study indicates the significance of social stigma as an influencing factor that can cause individuals' to discontinue their treatment regimes. This in turn can impede on the management of problematic symptoms such as inattention and hyperactivity resulting in symptom escalation over time (Gajria et al., 2014).

Within the area of Special Educational Needs (SEN), conditions such as Autism Spectrum Disorder (ASD) (e.g., Kinnear, Link, Ballan, & Fischbach, 2015), dyslexia (e.g., Morris & Turnbull, 2006), physical disabilities (e.g., Read, Morton & Ryan 2015) and Emotional Behavioural Disorders (EBD) (e.g., Mann & Heflinger, 2016) have demonstrated similar vulnerabilities to the negative impacts of stigma. Thus, investigating these areas and the evaluations made towards diagnosed individuals has become of major importance to social psychologists.

Attention Deficit Hyperactivity Disorder. One category of SEN that has seen a growth in empirical research examining stigma is that of ADHD. Attention Deficit Hyperactivity Disorder is a condition most commonly diagnosed in child populations and characterised by symptoms of inattention and/or hyperactivity and impulsiveness that present in two or more settings e.g., home or school (American Psychiatric Association [APA], 2007). It has been reported that ADHD affects 3% to 6% of school-aged children worldwide and 2% to 6% of adults (Canu et al., 2007; Hawi, et al., 2000). However, given the large prevalence rates it is surprising that empirical research has shown lack of knowledge related to what ADHD is and how it can be treated (Bekle, 2004; Vereb & DiPerna, 2004). To

illustrate, on-going debates concerning the etiology of ADHD has divided opinions as to whether the disorder is biological in nature, caused by individuals themselves or as a result of environmental factors such as lack of discipline in parenting or excessive sugar consumption (Lee, 2014; Bekle, 2004). Further, scepticism relates to the efficacy and stigmatisation of ADHD medication (Gajria et al., 2014; Gwernan-Jones et al., 2016) and negative attributes associated with the disorder. For instance, Mueller and colleagues (2012) found that possible causes of negative attitudes towards ADHD are due to perceived dangerousness and violence of these individuals. Research literature suggests that common beliefs about ADHD refer to negative behaviours or attributes that characterise the disorder such as troublesome, disruptive and displays of anti-social behaviour (Lee, 2014; Honkasilta, Vehmas, & Vehkakoski, 2016; Mueller et al., 2012; Wiener et al., 2012). These evaluations impact negatively on ADHD sufferers and can manifest in the development of self-stigma (Mueller et al., 2012), poor social interactions at home (Mikami et al., 2015) and at school (Canu, et al., 2007).

In addition, research into self-fulfilling prophecies has shown this can occur in classroom settings and impede on a students' performance at school (Jussim & Harber, 2005). It has been found that teachers who hold low expectations of a student based on incorrect pre-conceptions related to ethnicity or a formal mental health diagnosis can result in that student performing at level that is congruent with others low expectations of them (Bell, Long, Garvan, & Bussing, 2011; Jussim & Harber, 2005; van den Bergh, Dennessen, Hornstra, Voeten, & Holland, 2010). This shows how teachers' negative attitudes can result in poorer academic performance and achievement for students at school (Jussim & Harber, 2005).

Empirical ADHD research to date has emphasised these issues as pertinent and has resulted in the development of a number of explicit ADHD measures to assess public

knowledge surrounding ADHD as well as stigmatising attitudes associated with the disorder. Direct measurement procedures such as the Knowledge of Attention Deficit Disorders Scale (KADDS; Sciotto et al., 2000), the Knowledge and Beliefs Questionnaire (Kos, Richdale, & Jackson, 2004), and the Knowledge about Attention Deficit Disorder Questionnaire (West, Taylor, Houghton, & Hudyma, 2005) were designed to assess knowledge and conceptions about ADHD and have demonstrated widespread use within ADHD research.

In one study, Sciotto et al. (2000) employed the KADDS with an elementary school teacher population ($n=149$) and found that teachers were more informed about symptoms and diagnosis of ADHD than they were about treatment and general knowledge about the disorder (e.g., prevalence rates). According to Sciotto et al. (2000), years' experience, exposure to the diagnosed population and teacher self-efficacy rates were positively related to ADHD knowledge. These results show that direct measures can target gaps in knowledge pertaining to a particular social group and can be useful in gleaning information about where these gaps in knowledge lie. It further, highlights a possible need for an increase in ADHD specific professional training courses for teachers in order to improve their knowledge and awareness about ADHD etiology, prevalence and treatment interventions.

Furthermore, since the 1980s research examining the effects of negative attitudes toward children and adults with ADHD has begun to emerge and found that peer rejection is pervasive in work and academic settings (Canu et al., 2007), can have damaging effects on relationships (e.g. Sandler et al., 1993), as well as lead to social isolation (Norvilitis, Scime, & Lee, 2002). These studies have predominantly examined ADHD related stigma using direct methods such as focus groups, interviews and self-report questionnaires.

In a national study carried out by Coleman, Walker, Lee, Friesen, and Squire (2009), authors assessed children's stigmatising responses ($n=1,091$) towards vignettes depicting peers with depression, ADHD or asthma. Results indicated that stigmatising causal beliefs are

present in children and can relate to social distance. Researchers report that the most commonly held causal beliefs were related to substance abuse and parenting, with stronger beliefs pertaining in the depression condition compared to more modest beliefs in the ADHD condition (Coleman et al., 2009). This is surprising as the popular view in Western culture holds that depression is neurological and related to a “chemical imbalance” in the brain, and therefore behaviours occur as a result of biological factors (Coleman et al., 2009; Deacon & Baird, 2009). However, participants in this study related causal beliefs of depression and ADHD to environmental factors such as poor parenting and substance abuse (Coleman et al., 2009).

Of all three conditions depression was found to be the most heavily stigmatised followed by ADHD and then asthma (Coleman et al., 2009). Interestingly, results demonstrated that one in four participants believe that children diagnosed with ADHD and depression were to blame for their condition, a view point that may exacerbate self-stigma in diagnosed individuals as they internalise negative evaluations made towards them (Coleman et al., 2009). These results also indicate the impact of the wider verbal community on children as they internalise dominant discourses (e.g., Mikami et al., 2015; Sciotto et al., 2000) that suggest parenting has a role to play in the etiology of ADHD. Coleman et al. (2009) noted cultural comparisons regarding ethnicity and cultural factors and found modest evidence that groups show differences in responding e.g., Asian children endorsed genetic explanations more than Hispanic children.

A cross-cultural study conducted by Sciotto et al. (2000), aimed to investigate teachers' ($n=2,307$) knowledge about ADHD in nine countries (Czech Republic, Germany, Greece, Iraq, the Republic of Korea, Saudi Arabia, South Africa, United States and Vietnam) and found variability in knowledge and misconceptions about the disorder. This is not surprising as one could argue on *a priori* grounds that variation in international differences

are inevitable based on opinions related to diagnostic practices and treatment interventions that differ cross-culturally (Sciutto et al., 2000). For example, North America heavily endorses pharmacotherapy over other psychosocial interventions such as behaviour management, whereas in Europe the latter is preferred over the former (Swanson et al., 2006). As an aside, these views might reflect the open-marketing policy in the U.S. (and New Zealand) that allows drug advertising to take place directly to the consumer (Gilbody, Wilson, Watt, 2005; Goldacre, 2013). Thus, increasing public exposure to media campaigns put forward by the pharmaceutical industry that relate biological factors to psychological problems thus instil a discourse that ADHD is biological and treatable using medical intervention. Additionally, Sciutto et al. (2000) demonstrated that prior ADHD specific training and exposure was associated with higher levels of knowledge across most of the countries studied, emphasising the role of ADHD specific professional training on reducing stigma.

Another cross-cultural study conducted by Lee (2014) utilised several self-report measures to examine the beliefs of U.S. teachers ($n=235$) and South Korean teachers ($n=144$) towards symptoms of ADHD and intentions to refer students to mental health professionals. Findings indicated a gap in educational policies between the two countries in that American teachers were more likely to refer students with ADHD compared to South Korean teachers (Lee, 2014). This highlights the role of cultural factors in identifying differences in referral behaviours among teachers (Lee, 2014). On speculation, the findings by Sciutto et al. (2000), i.e., experience and exposure facilitate lower rates of ADHD stigma may serve to inform the high rates of referrals that were evident in the U.S. teacher sample. It could be argued that U.S. teachers are more exposed to media and discourse surrounding mental health issues due to open market policies and therefore have more experience with ADHD populations thus evident in referral rates that are higher in U.S. teachers compared to South Korean teachers.

These studies demonstrate that international variability related to attitudes, knowledge and opinions about ADHD is pertinent and can only serve to reinforce uncertainty within the general public about what ADHD is, how it can be treated and how individuals are affected by ADHD stigma associated with the disorder. Furthermore, Corrigan (2004) argued that perceived stigma associated with diagnostic labels can lower self-esteem and decrease social interaction opportunities for ADHD diagnosed individuals which may result in long-lasting damaging effects on an individual's personal and social development (Canu et al., 2007; Corrigan, 2004; Kellison, et al., 2010).

In an Irish context, there has already been some movement towards addressing stigmatisation in SEN with legislation recognising that negative implications of a diagnosis can impede an individuals' ability to participate and benefit from education (Education of Persons with Special Educational Needs Act (2004), Section 1, pp. 6). Thus, to facilitate these needs the National Council for Special Education (NCSE) developed an *Inclusive Framework of Education* with the goal of providing schools with guidance about what "good practice" entails to aid effective integration of diagnosed individuals into mainstream educational settings. The rationale behind this process was seen as a way of addressing the diversity in learner needs, removing barriers from education and enabling each learner to benefit from their attendance at school (NCSE, 2010). In effect, the establishment of inclusive programmes in education was prompted not only by the need to address academic ability and diversity but also as an attempt to counter the negative effects associated with stigmatisation and SEN.

In 2010, Kellison et al. examined the psychometric properties of a questionnaire designed to assess stigma associated with ADHD known as the ADHD Stigma Questionnaire (ASQ). This measure has been supported to be administered with ADHD affected and non-affected individuals and provides a general stigma factor that is indicative of stigma

perceptions towards ADHD (Kellison et al., 2010). The ASQ was employed in a study by Bell et al. (2011) to examine stigma perceptions in a teacher sample ($n=268$) towards students with ADHD. Results supported initial hypothesis that those teachers who held SEN qualifications would produce high stigma ratings indicating high stigma perceptions. Put differently, higher scores on the ASQ reflected teachers views about the *experiences* of their students with ADHD and not their beliefs about the disorder per se (Bell et al., 2011). Thus, SEN teachers were more accepting and sensitive towards the experiences of an ADHD population than their non-certified counterparts. Results also showed that years of teaching experience did not impact on stigma perception ratings as teachers without SEN certification had lower stigma perception scores than SEN certified participants (Bell et al., 2011). These empirical research findings are consistent with previous studies that suggest specialised professional training and exposure with a target population can improve knowledge and influence explicit beliefs relating to ADHD (Bell et al., 2011; Jerome, Gordon, & Hustler, 1994).

In sum, research surrounding ADHD purports that akin to other mental health disorders this condition bears similar damaging effects that may inhibit an individual's learning and development as well as lead to negative treatment outcomes and self-evaluations (Pruett & Chan, 2006). Explicit research literature described thus far sheds light on various aspects of ADHD that can negatively impact on an individuals' life such as the effects of negative attitudes on an individuals' self-esteem, the impacts of stigma on family members as well as the cultural factors that mitigate international differences in referral and treatment interventions. However, one major shortcoming of this research is its reliance on direct measurement procedures which are subject to well-documented limitations e.g., introspection and self-presentation bias (see Hughes, Barnes-Holmes, & DeHouwer, 2011; Holtgraves, 2004; Stier & Hinshaw, 2007). Thus, it could be argued that explicit research could benefit

from the additional application of indirect procedures to enhance psychological theorising about ways in which attitudes towards ADHD can be understood, predicted and influenced. The field of social psychology is generally concerned with societal judgments and perceptions toward its members with research aims emphasising the development of theoretical and procedural tools to address these issues. One such area that has seen a growth in these advancements is within the study of attitudes.

Attitudes. In 1935, Gordon Allport declared attitudes as the most indispensable concept within social psychology and eighty years on, the study of attitudes still commands considerable research attention. Early research in the field saw several theories of attitude formation and change emerge such as attitude development through mere exposure (Zajonc, 1968), classical conditioning (Staats and Staats, 1958), reinforcement and punishment (Bohner & Dickel, 2011), self-perception theory (Bem, 1972; Chaiken & Baldwin, 1981) and numerous efforts to define attitudes and determine their role in human behaviour (Strack, Martin, & Stepper, 1988; Duclos et al., 1989).

Historically, definitions have failed to recognise the conscious operation of attitudes and there was little mention or concern regarding the possible unconscious nature of attitude constructs (Greenwald & Banaji, 1995). In recent decades, attitude research has predominantly stemmed from the cognitive tradition focusing on “mental mechanisms” such as memory, mental representations and processes that are said to underlie attitude constructs. This perspective remains pervasive in psychological theorising within the study of attitudes and has influenced a body of research regarding the “mental” (as opposed to “functional”) processes that are said to be at the core of attitude constructs. A well-known approach that is heavily entrenched in this view point is that of associationism. The Implicit Association Test (IAT) is one technique that has emerged from this perspective and will be discussed later in the chapter.

Explicit Attitudes. Widespread use of direct measurement procedures such as questionnaires, interviews and focus groups have been traditionally employed to explore deliberate, evaluative judgments, called explicit attitudes (Hughes et al., 2011). These are considered practical and efficient research tools for collecting large amounts of data from large participant samples. For example, Fuermaier et al., (2012) utilised a measure of stigmatisation towards adults with ADHD with a large sample of participants ($n=1261$) and results revealed specific dimensions of stigma related to adult ADHD such as the Misuse of Medication, Consequences of Diagnostic Disclosure, Etiology among others. Authors' suggest that these findings highlight specific aspects of ADHD stigma that may serve to orient researchers to further investigation. Thus, a major advantage of using direct measures is conveyed by their ability to glean large amounts of data from big samples to reveal important aspects of a domain of interest. These measures have also shown well-established predictability in areas such as political and consumer preferences and clinical phenomena (Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Murphy, MacCarthaigh & Barnes-Holmes, 2014).

Nonetheless, direct techniques have been heavily criticised as they are susceptible to a number of biases. First, as Nisbett and DeCamp Wilson (1977) pointed out, verbal reports rely on the technique of introspection. This has been shown time and again to be prone to error as individuals have limited ability to accurately report on their "inner" mental states or experiences (Hughes et al., 2011; Nisbett & DeCamp Wilson, 1977). The reflective nature of introspection is said to undermine the validity of direct measures and questions the strength of what they can tell us about human behaviour. Second, direct measures and verbal reports may often be contaminated by extraneous factors such as social desirability (Link & Cullen, 1983) and self-presentation bias (Stier & Hinshaw, 2007). Self-presentation bias refers to an individual's ability to conceal their privately held evaluations to concord with researcher

expectations and/or social norms (Hughes et al., 2011). These limitations combined with flawed introspection have threatened the validity of direct measures and what they can tell us about human behaviour and have resulted in the development of implicit alternatives.

Implicit Attitudes. In response to limitations that are inherent in explicit measures, research in the late 1980s and early 1990s turned toward understanding internal or private psychological attributes (e.g., attitudes, stereotypes and personality traits) and developing tools to measure them (DeHouwer, Teige-Mocigemba, Spruyt, & Moors, 2009). The result has been a surge in conceptual and methodological research surrounding implicit measures.

From the cognitive tradition, sophistication in these technologies has led to their widespread use within social psychology and their adoption to a number of other domains such as health psychology (e.g., Wiers, van Woerden, Smulders & deJong, 2002), clinical psychology (e.g., Gamar, Segal, Sagrati, & Kennedy, 2001), consumer psychology (e.g., Maison, Greenwald, & Bruin, 2004), and forensic psychology (e.g., Brown, Gray, & Snowden, 2009). According to Hughes, et al. (2011), implicit attitudes are defined by the following properties: immediate, non-declarative, and automatic evaluations. One of the most widely cited definitions of this concept was stated by Greenwald and Banaji (1995):

“Implicit attitudes are introspectively unidentified (or inaccurately identified) traces of past experiences that mediate favourable or unfavourable feeling, thought, or action toward social objects” (pp. 8).

The development of an increasing number of implicit measures within the field of social psychology prompted DeHouwer (2006) to provide a set of criteria that an ideal implicit measure should meet in order for it be concluded as implicit. The criteria are as follows: (1); participants must be unaware of what is being measured, (2); participants should not have conscious access to the to-be-measured attitude, and (3); participants have little control of the measurement outcome (Barnes-Holmes, Murtagh, Barnes-Holmes, & Stewart,

2010b). DeHouwer et al. (2009) stated that an implicit measure is an outcome measure that is causally produced by the measured attribute in the absence of participant awareness, certain goals, substantial time or cognitive resources. Empirical correlational and experimental research has provided information related to whether implicit or indirect procedures capture the to-be-measured attributes and have in turn provided a level of validity for the effects found in such measures (DeHouwer et al., 2009). One of the most popular and well-documented implicit measures in the literature is the Implicit Association Test (IAT).

The Implicit Association Test. A growing number of associative procedures have been developed in recent decades to measure implicit attitudes, such as the Go/No-go Association Task (GNAT; Nosek & Banaji, 2001), the Extrinsic Affective Simon Task (EAST; DeHouwer, 2003), the evaluative priming task (Fazio, Jackson, Dunton, & Williams, 1995) and the currently most commonly used and well-established response latency procedure, the IAT (Greenwald, McGhee, & Schwartz, 1998). These measures have facilitated the study of implicit attitudes, an area of cognition that has demonstrated difficult accessibility on explicit measures.

There have been literally hundreds of reported studies demonstrating the utility of the IAT across a variety of socially sensitive areas such as racism (e.g., Greenwald et al., 1998), homophobia (e.g., Banse, Seise, & Zerbes, 2001) and gender stereotypes (e.g., Rudman & Glick, 2001). The IAT is a computerised latency-based response procedure that measures implicit beliefs pertaining to a particular domain. The IAT presupposes that the stronger concepts are associated in memory the easier they are to categorise relative to concepts that are weakly associated in memory (Murphy et al., 2014). For example, in a seminal study, Greenwald et al. (1998) utilised the IAT to measure automatic associations between target categories (flowers and insects) and positively or negatively valenced words. Based on the strength of association researchers hypothesised that participants should respond faster to

concepts that are associated or consistent in memory (i.e., flowers-positive and insects-negative) relative to those that are not associated or inconsistent in memory (i.e., flowers-negative and insects-positive) (Barnes-Holmes, et al., 2010b). This predication or IAT effect was found to be accurate and has been replicated across multiple domains (see Nosek, Greenwald, & Banaji, 2006, for review).

To illustrate further, Egloff and Schmukle (2002) carried out an anxiety IAT to assess the strength of automatic associations between the concept Self versus Others and the attribute Anxiety versus Calmness in order to assess the self-concept of anxiety. In the first critical block of trials, combined target (e.g., Me) and attribute (e.g., Anxiety) categories appeared on the top left side of the screen and combined target (e.g., Others) and attribute (e.g., Calmness) categories appeared on the top right side of the screen (Egloff & Schmukle, 2002). Participants had to categorise stimulus words as they appeared in succession in the centre of the screen by pressing the left or right key that was assigned to the top left combined stimuli (Me+Anxiety) or the top right combined stimuli (Others+Calmness), respectively (Egloff & Schmukle, 2002). In the second critical block of trials, attribute stimuli were reversed, and Me+Calmness appeared on the top left side of the computer screen and Others+Anxiety appeared on the top right side of the computer screen, corresponding with left and right key presses, respectively (Egloff & Schmukle, 2002).

According to researchers, the relative ease of sorting word stimuli e.g., self with anxiety compared to self with calmness was inferred to indicate the implicit self-concept of anxiety (Egloff & Schmukle, 2002). In this way, the IAT can only provide “an index of associations that are assumed to be involved in certain beliefs and thus indirect evidence for the presence of certain beliefs.” (DeHouwer, 2002, pp.117-118). In other words, the IAT does not measure beliefs or individual concepts per se, nor was it intended to do so, it only

provides the relative strength of associations from one concept (e.g., Self+Anxiety) to another (e.g., Others+Calmness) (Cullen, Barnes-Holmes & Barnes-Holmes, & Stewart, 2009).

The cognitive or mechanistic approach to measuring so-called implicit cognition has been adapted by associative researchers to assess attitudes to racial stereotyping (Greenwald et al., 1998; Dovidio, Kawakami, & Gaertner, 2001), social anxiety (deJong, 2002), depression (Gemar et al. 2001) as well as animal phobias (Teachman & Woody, 2003).

More recently, Teachman, Gregg and Woody (2001) developed a fear-based IAT to assess strength of automatic associations of students who were fearful of snakes ($n=30$) or fearful of spiders ($n=37$). Participants were required to complete four IAT tasks and classify pictures of snakes and spiders with positive or negative descriptive words. Results found that all four IAT tasks discriminated between groups based on their implicit fear associations (Teachman et al., 2001). Thus, based on these results Teachman et al. (2001) infer the role that associations in memory play when discriminating between two groups of animal phobic individuals (DeHouwer, 2002).

A variation of the IAT, called the Disability Attitude Implicit Association Test (DA-IAT) was developed by Pruett and Chan (2006), to examine its validity in assessing implicit group disability attitudes of rehabilitation counselling students ($n=223$). DA-IAT scores were contrasted with responses obtained on a number of explicit measures. In general, the study found the DA-IAT to be a useful measure of implicit attitudes toward people with disabilities with confounding variables such as social desirability not appearing to have an impact on DA-IAT scores (Pruett & Chan, 2006). Results also found no relationship between DA-IAT scores and attitudes towards disabilities using the Attitude Toward Disability Scale (ATDS; Pruett & Chan, 2006). This further indicates a difference between implicit and explicit outcome measures and what they can tell us about human behaviour; namely that the indirect or unconscious nature of attitude constructs can be detected by implicit measures and the

direct or conscious nature of attitudes can be detected by explicit measures (Pruett & Chan, 2006). Like the IAT, from which it was derived, the DA-IAT posits that stimulus associations between two concepts in memory reveal implicit cognition.

Taken together, the IAT has provided the mechanistic researcher with an indirect measure of implicit cognition based on the assumption that mental constructs influence behavioural outcomes (Hughes, Barnes-Holmes & Vahey, 2012). Hughes et al. (2012), argue that the presentation of stimuli on a given IAT, and the required categorisation of those stimuli by research participants can only provide an inference about how stimuli are associated in memory. Thus, a procedural limitation inherent in the IAT is that behavioural outcomes are inferred based on hypothetical constructs and may give a distorted view about what mediates between the assumed construct and the behavioural outcome (Hughes et al., 2012).

Moreover, Hughes et al. (2012) suggest that these behavioural outcomes may also be influenced by a number of other properties that are unrelated to the attribute of interest. For example, the cognitive ability of individuals taking part in a study has shown to impact on IAT outcomes and other indirect measures. According to Teige-Mocigemba, Klauer and Sherman (2010), the association between cognitive ability and response speed has been well documented in the research literature. For example, Hummert, Garstka, O'Brien, Greenwald and Mellott (2002) specifically examined age differences in a study assessing implicit social cognitions. Three groups of participants were recruited; group one consisted of thirty-six "young adults", group two consisted of thirty-eight "young-old adults" and group three consisted of forty "old adults". Over all, the study found smaller IAT effects in young participants relative to older participants providing empirical evidence that cognitive skills such as ability to respond quickly can impact on IAT outcomes (Hummert et al., 2002).

Other confounding factors related to participant characteristics have also shown to limit overall responding on an IAT such as racial differences (e.g., Nosek, Banaji, & Greenwald, 2002), knowledge and experience (e.g., Schwartz, O'Neal Chambliss, Brownell, Blair, & Billington, 2003; van den Bergh et al., 2010) as well as levels of psychopathology (Teachman et al., 2001).

For instance, Schwartz et al. (2003) sought to determine if personal characteristics would influence the attitudes of health professionals specialising in obesity ($n=389$) towards weight/shape bias on direct and indirect measures. Overall, results found that participants displayed a pro-thin, anti-fat bias as measured by the IAT and identified certain characteristics as predictive in lowering implicit and explicit bias, such as being male, weighing more, having friends who are obese, among others (Schwartz et al., 2003). This study indicates pervasive stigma associated with obesity, even among professionals who specialise in the field (Schwartz et al., 2003) and highlights the role of personal characteristics in behavioural outcomes. Thus, researchers should consider these factors when analysing outcomes on indirect measures as they have shown to impact on their effects. On balance, explicit measures are also subject to similar influences of characteristics on outcomes. For example, Lee (2014) demonstrated the role of cultural factors and Sciotto et al. (2000) and Bell et al. (2011) demonstrated the influence of participants experience and exposure with an ADHD population.

The development of implicit measures such as the IAT has provided further insight into factors that influence outcomes on direct and indirect measures as well as their potential for predicting behaviour in clinically focused samples (Schwartz et al., 2003; Teachman et al., 2001; Teachman & Woody, 2003).

Limitations of the Implicit Association Test. DeHouwer (2002) identified several limitations in the IAT as a measure of implicit attitudes. Firstly, he argued that beliefs involve

more than simple associations as measured on the IAT. On the contrary, they involve increasingly complex structures and concepts that cannot be accounted for in the associative approach. For instance, the belief “I am a bad person” implies a *special type of association* between the concept “self” and the concept “bad” (DeHouwer, 2002, pp. 117-118). Thus, the directional associations between beliefs cannot be captured in an IAT (e.g., whether negative bias toward overweight individuals is comprised of a pro-slim or an anti-fat bias, or of some combination of both; Ritzert et al., 2016). Nor can more complex structures of beliefs such as “if I do not perform well on a task, then I am an inferior person” (DeHouwer, 2002, pp. 117-118). This latter statement involves several concepts in an even more complex structure to that of “I am a bad person”. In other words, the IAT can only provide indirect evidence for the presence of certain beliefs (Barnes-Holmes et al., 2006). Secondly, DeHouwer et al. (2009) suggests that IAT effects are also sensitive to the manipulation of extraneous variables such as a participants’ ability to control IAT outcomes. In addition, DeHouwer et al. (2009) noted that other attributes that are not directly targeted in an IAT can limit the overall quality of its effects.

To illustrate, a study by Kim (2003) sought to investigate whether participants could produce faked IAT outcomes by utilising different faking strategies in two separate IAT experiments. Experiment one employed two IATs (e.g., a Flowers vs. Insects IAT and a Musical Instruments vs. Weapons IAT) with two groups of participants: (1); a Faking group ($n=32$) who received explicit instructions to respond to Insect and Weapon stimuli more favourably than Flower and Musical Instrument stimuli, and (2); a Control group ($n=32$) who received basic IAT instructions (Kim, 2003). Results indicated that participants could not voluntarily control IAT outcomes using a strategy of suppressing attitudes towards flowers in favour of attitudes towards insects nor could they suppress attitudes towards musical instruments in favour of attitudes towards weapons (Kim, 2003). To follow-up, experiment

two employed more socially sensitive stimuli and developed a racial IAT in order to assess participants' implicit attitudes towards White vs. Black names (Kim, 2003). Seventy-two participants were randomly assigned to three groups: (1); a Faking/No strategy group ($n=24$) identical to experiment one, (2); a Faking/Strategy group ($n=24$) in which explicit instructions were provided on how to fake the IAT i.e., respond slower during consistent relative to inconsistent blocks, and (3); a Control group ($n=24$) who received basic IAT instructions (Kim, 2003). Kim (2003), demonstrated that only when provided with instructions on how to fake an IAT (e.g., go slowly during consistent blocks) could participants' display a faked implicit bias (Kim, 2003). Overall results found that when explicitly instructed on how to do so, participants' could reverse IAT outcomes in the Faking/Strategy group by deliberately slowing down response latencies during association-consistent relative to association-inconsistent conditions (Kim, 2003; see also Fiedler and Bluemke, 2005 for a further demonstration of IAT fake-ability).

Finally, the IAT can be described as relativistic in nature, such that IAT effects such as racial bias are interpreted on the basis of faster responding to affirm black-negative relative to affirming white-negative, which is less than direct or absolute. Taken together, IAT outcomes are inferred based on relative responding and are limited in what they can tell us about human behaviour. A meta-analysis examining the validity of the IAT as a measure of implicit attitudes has demonstrated mixed findings; some correlational studies indicate that IAT effects can, at least to some extent, capture psychological attributes such as attitudes; while others show conflicting results (e.g., see Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005).

The IAT was developed as an alternative to direct measures such as questionnaires and interviews and has facilitated a substantial body of research into the area of so-called implicit cognition. According to Barnes-Holmes et al. (2006), if researchers' assume that

psychological attributes such as attitudes are represented by associations in memory then an associative measure such as the IAT is an ideal procedure to use. On the other hand, non-associative procedures are appropriate if researchers believe that relations among stimuli or events are central to understanding human cognition. Functional researchers have developed a behavioural methodology to tap into implicit social cognition, known as the Implicit Relational Assessment Procedure (IRAP).

The Implicit Relational Assessment Procedure. An alternative to the IAT and one that appears to circumvent its limitations is the Implicit Relational Assessment Procedure (IRAP; Barnes-Holmes et al., 2006). Like the IAT, the IRAP is a computerised, latency-based response procedure that asks participants to respond to stimuli in ways that are consistent or inconsistent with their pre-experimentally established verbal relations (Hughes, et al., 2011; Power, Barnes-Holmes, & Barnes-Holmes, 2009).

In a basic IRAP, participants are exposed to eight blocks of twenty-four trials (two practice blocks, followed by six test blocks). Within each block, twelve target stimuli are presented in random order with the constraint that each word is presented twice, once in the presence of each of the two label stimuli. These four stimuli (i.e., label stimuli, target stimuli and two response options) appear simultaneously on the computer screen and remain until a participant chooses one of the response options, by pressing an appropriate response key. To complete the IRAP, participants must meet a set mastery criteria in response accuracy (e.g., no less than 80%) and response latency (e.g., no more than 2000 ms), in order to proceed from practice to test blocks.

To illustrate, in a study conducted by Barnes-Holmes et al. (2006), researchers utilised the IRAP and a number of explicit measures to assess attitudes towards autism of three groups of participants. Participants with six months to six years experience ($n=16$), participants with under six months experience ($n=12$) and participants with no experience

($n=16$) took part in the study. The IRAP presented one of two label stimuli (e.g., Autistic Spectrum Disorder or Normally Developing) with one of six positively or negatively valenced target stimuli (e.g., Pleasant or Unpleasant) and two specific relational response options (e.g., Similar/Opposite). The IRAP hypothesises that responding should be faster in history-consistent (Normally Developing-Pleasant-Similar) compared to history-inconsistent blocks (e.g., Autistic Spectrum Disorder-Pleasant-Similar). Based on Greenwald et al. (1998), consistent and inconsistent categorisation, participants are required to respond quickly and accurately in a manner that is consistent or inconsistent with their learning history (Nicholson & Barnes-Holmes, 2012).

The IRAP differs radically from the IAT in that relational responding as opposed to associations in memory underlie its basic assumption, thus can be described as purely functional in nature (Hughes et al., 2011; Hughes et al., 2012). Functional researchers have developed the IRAP to explore the automatic ways in which people respond to stimuli that are presented in their environment with the goal of understanding, predicting and influencing human behaviour (Hughes et al., 2012). Unlike the IAT, the IRAP targets four sets of stimulus relations at different levels of complexity and therefore provides a more nuanced assessment of biases under scrutiny (Cullen et al., 2009; Hughes et al., 2012; Ritzert et al., 2016).

To illustrate, in a study by Roddy, Stewart and Barnes-Holmes (2011), researchers employed the IRAP to assess weight/shape bias of a group of Irish university students ($n=64$). On each trial during the IRAP, one target stimulus was presented (e.g., picture of average or over-weight person) along with one evaluative/label stimulus (e.g., Good or Bad) and two response options (e.g., Similar or Opposite). Participants were expected to respond with relative ease on consistent (e.g., fat-bad-similar, fat-good-opposite, thin-bad-opposite, thin-good-similar) versus inconsistent (e.g., fat-bad-opposite, fat-good-similar, thin-bad-similar,

thin-good-opposite) blocks. This type of responding is said to cohere with participants' pre-experimentally established learning history, thus reveal strength of relational bias indicative of pro-thin/anti-fat responding (Ritzert et al., 2016). Overall, researchers found that participants held a pro-thin bias but no anti-fat relational bias on the IRAP and concluded that implicit weight/shape evaluative responding may be due to a positive bias towards thinness rather than negative bias towards fatness (Ritzert et al., 2016; Roddy et al., 2011).

As previously found in the IAT, IRAP studies have also demonstrated influences of participant characteristics on implicit responding. For example, Kelly and Barnes-Holmes (2015) directly compared two groups; a clinical group of participants trained in Applied Behaviour Analysis (ABA) and working in a special education setting ($n=15$) and a school-based group of qualified primary school teachers working in a mainstream primary school ($n=15$). The IRAP was employed as a behavioural measure of so-called implicit cognition along with two self-report measures. Researchers sought to explore whether variations in teaching experience and training would impact on responding towards treatment acceptability (Kelly and Barnes-Holmes, 2015). Results found that the ABA teacher group displayed more pro-reinforcement and anti-punishment relational biases than the mainstream teacher group with explicit measures indicating that both groups showed pro-reinforcement and anti-punishment biases (Kelly and Barnes-Holmes, 2015). This study provides empirical evidence that disparities can emerge across participant groups when examining evaluations towards reinforcement and punishment procedures based on teacher experience and qualifications (Kelly and Barnes-Holmes, 2015).

Furthermore, in earlier studies, Barnes-Holmes et al. (2006), Kelly and Barnes-Holmes (2013), and Scanlon and Barnes-Holmes (2013) developed IRAPs to assess implicit beliefs of teacher samples towards various categories of SEN. All studies demonstrated differences on behavioural outcomes between participant groups based on level of

experience. This further emphasises the influence of teacher experience when analysing direct and indirect measures. In sum, implicit research on attitudes considers how factors related to participant characteristics can influence behavioural outcomes on implicit measures with variables such as level of experience and qualifications having effects on responding (Kelly & Barnes-Holmes, 2015).

In line with previous research carried out by Kim (2003) that aimed to assess participants' ability to control IAT outcomes, McKenna, Barnes-Holmes and Stewart (2007), tested the fake-ability of the IRAP. In their study, researchers presented two IRAPs to three groups of research participants. The first group comprised of a No Faking/Control group ($n=12$), the second group comprised of a Faking/No Strategy group ($n=12$) and the third group comprised of Faking/Strategy group ($n=12$). In the latter two groups, participants were provided with explicit instructions on how to fake an IRAP. Participants in the Faking/Strategy group received additional information such as deliberately slow down on history-consistent blocks relative to history-inconsistent blocks (McKenna et al., 2007). Results were in contrast to those found in Kim (2003) and Fielder and Bluemke (2005) in that participants' showed limited ability to fake the IRAP and reverse behavioural outcomes. Hence, the IRAP can be concluded as implicit as it meets one of the three criteria that set out by DeHouwer (2009), i.e., participants had little control of the measurement outcome (McKenna et al., 2007). According to McKenna et al. (2007) these results provide further validity for the IRAP as an implicit measure of socially sensitive attitudes and beliefs due to participants' inability to control behavioural outcomes.

Functional Contextualism. The IRAP has provided functional researchers with a method to assess private or internal beliefs that pertain to a particular social group based on the assumption that stimulus relations underlie implicit cognition as opposed to hypothetical mental constructs (Hughes et al., 2012). This method is based on a branch of behaviourism

known as Contextual Behavioural Science (CBS), which in turn was founded in a philosophy of science, called functional contextualism (Hughes et al., 2012). Unlike the mechanistic tradition that uses *a priori* assumptions i.e., pre-existing associations in memory are causal in generating behaviour, and “behaviour-as-proxy” i.e., the presence of associations are used to explain behavioural outcomes and vice versa, the functional contextual scientist omits locating behavioural outcomes in the mind and rather defines behaviour as an “act-in-context” (Hayes, 1993; Hughes et al., 2012; Pepper, 1942). Linked to the pragmatic truth criterion, the root metaphor of act-in-context is defined as “on-going and occurs within and in response to a current historical context” (Hughes et al., 2012, pp. 22). Thus, the contextual scientist can view psychological events as occurring in and interacting with some context (Hayes, Barnes-Holmes & Wilson, 2012).

In the past, methodological behaviourists such as Watson (1913) only focused on observable, external events and the role of internal or unobservable, private events were considered to be beyond the realm of scientific enquiry (Cooper, Heron, & Heward, 2007). Contemporary functional researchers, however, view behaviour as occurring on a continuum from behaviours that occur externally (e.g., walking, driving a car, etc.) to behaviours that occur internally (e.g., thinking, feeling, etc.), (Hughes et al., 2012). Given that behaviour occurs in space and time, this approach allows functional researchers to directly predict and influence the factors that control behaviour with precision, scope and depth by implementing some of the basic principles of behavioural science such as reinforcement and punishment (Hayes et al., 2012; Hughes et al., 2012).

Conversely, assuming that cognition is fundamentally associative and treating hypothetical constructs as a requirement for a behavioural outcome provides a distorted view that can impede a scientists’ ability to predict and influence behaviours of interest such as implicit cognition (Hughes et al., 2012). The assumptions of functional contextualism,

outlined above (e.g., relational, pragmatic, act-in-context), are at the core of a modern account of human language and cognition, known as Relational Frame Theory. This theory has guided functional researchers in an endeavour to explore implicit cognition from a purely functional approach which has witnessed considerable growth in recent decades (Hughes et al., 2012). Pursuing the strength of relational responses (as opposed to strength of associations) that underlie psychological events has shifted the dominant intellectual tradition of mechanism towards a new framework developed by a group of researchers' examining RFT and its application within implicit cognition (Hughes et al., 2012).

Relational Frame Theory. The IRAP as a behavioural measure of implicit cognition emerged through modern accounts of behaviour-analytic approaches such as the phenomenon of stimulus equivalence (Sidman & Tailby, 1982; Watt, Keenan, Barnes, & Cairns, 1991) and Relational Frame Theory (RFT; see Hayes, Barnes-Holmes & Roche, 2001). Since evidence for the concept of stimulus equivalence was reported by Sidman in 1971, the methodology has been called on time and again to support behaviour-analytic accounts of human language and cognition (Grey & Barnes, 1996). The equivalence relational model involves training an individual in a small number of discrimination tasks (e.g., a matching-to-sample procedure) which gives rise to a host of other relations that were not directly taught, prompted or had no prior history of reinforcement. Put simply, Sidman (1971) discovered that training human organisms in two relations allows them to form complex relational networks. Relational Frame Theory argues that while non-human animals are limited in direct learning of stimulus relations (see Hayes, 1989; Sidman & Tailby, 1982), humans have a unique capacity to learn to relate stimuli without prior history of learning or reinforcement (Hughes et al., 2012).

According to Hughes et al. (2012), arbitrarily applicable relational responding refers to humans' ability to derive new stimuli, in an untrained manner and to relate stimuli bi-directionally. At its core, three features underlie arbitrarily applicable relational responding or

derived stimulus relations as follows: (1); mutual entailment, (2); combinatorial entailment, (3); transformation of stimulus functions (see Dougher, Augustson, Markham, Greenway, & Wulfert, 1994; Hughes et al., 2012), with two further properties that include the *complexity* of stimulus relations and how much they have been previously *derived* in the past (Hughes et al., 2012). Both of these latter properties are said to be arranged on a continuum of low to high relational complexity and derivation and account for the variability in relational responses emitted on the IRAP (Hughes et al., 2012).

The emergence of novel behaviour displayed in humans has shown to be salient within the study of social attitudes. The stimulus equivalence model as well as other psychological phenomena (e.g., metaphor, analogy and rule-following), underpins the basic assumption in RFT i.e., human language and cognition is relational (Barnes-Holmes, et al., 2006; Stewart & Barnes-Holmes, 2004; Hughes et al., 2012). In line with this approach, the IRAP hypothesises that rapid responding to stimuli that are history-consistent or history-inconsistent with established natural verbal relations can reveal an individuals' implicit beliefs (Scanlon, McEnteggart, Barnes-Holmes, & Barnes-Holmes 2014). Growing empirical evidence supporting the IRAP has provided researchers with a non-associative, directional, behavioural measure of implicit cognition. The IRAP has been ubiquitously adapted to explore many areas of implicit stereotyping such as attitudes to autism (e.g., Barnes-Holmes et al., 2006; Kelly & Barnes-Holmes, 2013), attractiveness bias (e.g., Murphy et al., 2014), racism (e.g., Barnes-Holmes, Murphy, Barnes-Holmes, Stewart, 2010a), attitudes of meat-eaters and vegetarians (e.g., Barnes-Holmes et al., 2010b) as well as in the study of more complex human behaviours such as psychopathology (e.g., Hussey, Barnes-Holmes, Barnes-Holmes, 2015). Thus, there is much IRAP research to date in support of the assumption that stimulus relations are involved in implicit social cognition.

In a given IRAP, specific trial-types are developed to target stimulus relations (Hughes et al., 2012). To illustrate, in Roddy et al. (2011) stimulus relations were separated into four distinct trial-types: *fat-bad*, *fat-good*, *thin-bad*, *thin-good*. This approach provides a level of nuanced responding that reflects whether relational bias towards overweight individuals is comprised of a pro-slim or an anti-fat bias, or of some combination of both (Cullen et al., 2009).

Relational Frame Theory has provided the concept of derived stimulus relations and other properties such as complexity and derivation to equip functional researchers with the tools necessary to employ the IRAP as well as interpret its outcomes from a functional perspective. Therefore, based on the empirically validated framework of RFT that underlies the IRAP, the current work sought to employ this methodology to assess strength of relational responding of groups of participants towards ADHD.

The First Implicit Relational Assessment Procedure Study. The first IRAP study conducted by Power et al. (2009) examined implicit beliefs of sixteen Irish participants' preferences towards four groups (Irish, Scottish, American and African). The extent to which they found each of these groups likable was measured using explicit measures and an IRAP was employed to assess their implicit attitudes (Power, et al., 2009). The study demonstrated that participants showed a preference for Irish over Scottish and American over African and divergence in responses obtained on explicit Likert scale measures relative to IRAP responses. A second experiment was also conducted to assess the attitudes of sixteen Irish-American participants and demonstrated similar findings as well as a divergence in scores on explicit and implicit measures.

Relational Elaboration and Coherence Model. A model that offers an explanation for the divergence in implicit-explicit scores lies within the framework of RFT and is known as the Relational Elaboration and Coherence (REC) model. This approach suggests that the

basis under which implicit attitudes operate are brief and immediate relational responses (BIRRs), when an individual is required to respond rapidly or under time constraints (Hughes et al., 2011). In contrast, explicit responses are gleaned from extended and elaborated relational responding (EERRs) or considered reactions to stimuli, without the addition of time constraints. These concepts refer to time as a central postulate in distinguishing between BIRRs and EERRs. Hughes et al., (2012) opens up this model to further properties of complexity and derivation when explaining effects maintained on direct and indirect measures. It is important to note that these properties may differ with regard to their level of complexity or degree of derivation depending on individuals' learning history which was established through prior operant or respondent learning, discrimination and stimulus generalisation (Hughes et al., 2012).

Thus, according to Hughes et al. (2011), functional researchers argue that the divergence in behavioural effects captured on direct and indirect measures reflects the pattern of relational responding. This responding can be brief and immediate, as in the case of implicit procedures or extended and considered as demonstrated on explicit procedures and always occurs within a context and as a function of differing levels of complexity and derivation (Hughes et al., 2011; Hughes et al., 2012).

Unlike the IAT, the IRAP is a non-associative procedure that provides information on the directionality of the bias under scrutiny. The IRAP aims to target stimulus relations thus it can account for more complex relational networks that cannot be captured within an associative approach (Cullen et al., 2009; DeHouwer, 2002).

The Implicit Relational Assessment Procedure and Special Educational Needs.

In studies conducted by Barnes-Holmes et al., (2006), Kelly and Barnes-Holmes (2013) and Scanlon and Barnes-Holmes (2013), researchers demonstrated the utility of the IRAP as an implicit measure of social attitudes towards various categories of SEN.

First, in a preliminary study, Barnes-Holmes et al., (2006), examined the implicit attitudes of three groups of participants towards autism. Participants with six months to six years experience ($n=16$), participants with under six months experience ($n=12$), and participants with no experience ($n=16$) took part in the study. Researchers hypothesised that more experienced professionals would have more positive attitudes on explicit measures than those with less or no relevant experience and that this difference would be absent on an implicit measure, namely the IRAP (Barnes-Holmes et al., 2006). As predicted, all groups demonstrated implicit biases on the IRAP indicating a positive bias towards the sample stimuli “Normally Developing” versus “Autistic Spectrum Disorder” (Barnes-Holmes et al., 2006). In addition, the study found no statistically significant differences among the three groups in terms of differences between history-consistent versus history-inconsistent responding (Barnes-Holmes et al., 2006). Data also demonstrated a divergence in implicit and explicit measures, i.e., questionnaire data yielded significant differences among the groups but IRAP data did not (Barnes-Holmes et al., 2006). This study demonstrated that grouping participants based on level of experience working with individuals with ASD may serve to tease apart differences in IRAP performance as well as serve as a comparison to results found on explicit measures. It also supports the IRAP as a useful measure of attitudes towards ASD and its efficacy for development in other areas of SEN.

Second, Kelly and Barnes-Holmes, (2013), aimed to pursue this early research in a replication study assessing the attitudes of two groups of participants towards pupils with autism (e.g., tutors qualified in ABA; $n=16$, and mainstream teachers; $n=16$). Researchers employed the IRAP as a measure of implicit social cognition towards ASD and a number of explicit measures. For instance, to measure participants’ explicit attitudes toward ASD the Attitudes to Autism Scale was used, to measure participants’ professional burn-out ratings in an educational setting the Maslach Burn-Out Inventory (MBI) was used, and to measure

general psychopathology for each participant the Depression Anxiety Stress Scale (DASS) was used (Kelly & Barnes-Holmes, 2013). Lovibond and Lovibond (1995) and Crawford and Henry (2003) have reported good reliability and adequate validity in the DASS and Maslach, Jackson and Schwab (1996) have demonstrated good reliability in the MBI. Results from the study were consistent with findings on the Barnes-Holmes et al. (2006) study, in that all participants showed a negative relational bias towards autism compared to normally developing children. The IRAP also predicted correlations with increased levels of self-reported psychopathology and professional burn-out for ABA tutors. For instance, the Autism-Negative trial-type correlated with overall DASS, DASS depression and DASS stress subscales and the MBI depersonalization subscale, amongst others (Kelly & Barnes-Holmes, 2013) These findings suggest that the IRAP may provide an indicator for professional burn-out among individuals working in the field of special needs.

In a third study, research carried out by Scanlon & Barnes-Holmes (2013), aimed to investigate the effectiveness of a two-fold intervention package (i.e., behaviour and stress-management interventions) to support teachers at post-primary school level with the successful inclusion of pupils with Emotional and Behavioural Difficulties (EBD) in mainstream classrooms. The study comprised of an implicit measure (e.g., the IRAP) and several explicit measures including MBI and DASS to investigate the attitudes of secondary school teachers ($n=25$) and teachers in training ($n=20$) towards pupils with EBD at pre-intervention and post-intervention. Pre-intervention IRAP results indicated a negative relational bias towards EBD relative to typically-developing children in both teachers and teachers in training with an increase in implicit positivity towards EBD pupils at post-intervention, as measured by the IRAP.

To conclude, Scanlon and Barnes-Holmes (2013) suggest that variables such as level of experience and number of pupils with SEN per classroom may influence teachers' implicit

attitudes towards EBD and highlight the importance for future research in these areas.

According to authors, negative attitudes may harness feelings of inadequacy within individuals as well as have a negative impact on teacher-pupil interactions. Thus, successful inclusion depends not only on relevant skills training but also on teachers' implicit attitudes towards individuals with EBD (Scanlon & Barnes-Holmes, 2013).

These studies have demonstrated the utility of the IRAP as a measure of implicit attitudes towards various categories of SEN. More specifically, Scanlon and Barnes-Holmes (2013) provide a link between an intervention package and a change in attitudes as measured by the IRAP and Kelly and Barnes-Holmes (2013) demonstrate a relationship between increased levels of self-reported psychopathology and professional burn-out in ASD tutors.

Taken together, these studies show that negative attitudes towards SEN are prevalent in teacher groups and behavioural interventions are one way of reducing negative beliefs pertaining towards a given group (e.g., Scanlon & Barnes-Holmes, 2013). This has a practical application relevant in society as reducing negative attitudes could facilitate greater inclusion of SEN in mainstream settings. In light of these findings, the current research employed the IRAP across two studies to assess relational bias towards ADHD in three groups of research participants.

The Current Thesis. The current thesis was developed as a conceptual replication of the Kelly and Barnes-Holmes (2013) study and consisted of two experiments that utilise the IRAP as a behavioural measure of implicit cognition and a number of self-report measures. In Study 1, an ADHD IRAP was developed to explore implicit attitudes of qualified teachers ($n=16$) and trainee teachers ($n=14$) towards pupils with ADHD versus typically-developing pupils.

It has been reported that ADHD diagnosed individuals suffer from low self-esteem and social isolation as a result of negative attitudes towards them (Norvilitis et al., 2002) and

other studies have shown that ADHD specific training and exposure may influence stigmatising attitudes toward this population in teacher samples (Lee, 2014; Sciotto et al., 2000). Explicit research has provided insight into some of the negative consequences associated with an ADHD diagnosis. However, they are subject to well-documented limitations due to their susceptibility to self-presentation bias and introspection (Hughes et al., 2011; Holtgraves, 2004). In order to determine the implicit nature of social stigma, indirect alternatives were developed. To date no studies have explored the implicit beliefs or attitudes towards ADHD. Thus, a primary aim of Study 1 was to address this gap in the literature relating to an absence of implicit studies investigating ADHD stigma.

Study 1 sought to investigate the implicit beliefs of two participant groups (qualified and trainee teachers) towards pupils with ADHD, with the expectation that the former group would show reduced stigma towards ADHD on an explicit measure but these differences would be absent on the IRAP. It was hypothesised that because primary school teachers are more likely to come in contact with ADHD pupils in their work setting, they might display less perceived stigma towards this group compared to their less experienced counterparts. A further aim was to compare implicit-explicit measures to examine whether level of experience had an impact on responding (Scanlon and Barnes-Holmes, 2013). The explicit measures chosen for the current study were the ASQ, DASS and MBI-Educator's Survey. The rationale for selecting the two non-attitude questionnaires (i.e., DASS and MBI-ES) was based on implicit-explicit correlational findings reported in other studies; for example, in Kelly and Barnes-Holmes (2013) the IRAP predicted correlations with increased levels of self-reported psychopathology and professional burn-out in special needs tutors. The ASQ was also employed due to good reported reliability, internal consistency and construct validity when assessing perceived stigma in ADHD affected and non-affected individuals (Bell et al., 2011; Kellison et al., 2010).

The purpose of the study was to extend ADHD research literature by examining the relational biases of two groups of teaching professionals using an implicit measure, namely the IRAP and three explicit measures (ASQ, DASS, and MBI-ES).

Study 2, was a partial replication of Study 1, with the exception that participants comprised of a general population/convenience sample and the MBI-ES was removed as it was not deemed relevant to this particular cohort of participants. Thus, in Study 2, the IRAP and two explicit measures (e.g., ASQ and DASS) were employed to further assess attitudes or beliefs pertaining to an ADHD pupil population.

CHAPTER 2

STUDY 1

Study 1

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most prominent psychiatric conditions in child populations and can lead to a myriad of pernicious effects including delays in help seeking, negative self-image, social isolation, social rejection, and treatment barriers (Canu et al., 2007; Kellison, et al., 2010, Mangiona, Walcott & Landau, 2004). Empirical research to date has largely focused on explicit self-report data to determine the extent of public beliefs and attitudes towards ADHD. For example, Canu et al. (2007) used various social appraisal measures and found that undergraduate students ($n=257$) exhibited negative attitudes towards peers with ADHD compared to peers without ADHD. A study by Bell et al. (2010) demonstrated that teachers with SEN certification held higher stigma perceptions related to their students' experiences of ADHD stigma compared to non-certified teachers. Other studies have emphasised negative effects associated with of self-stigma, public-stigma, and courtesy-stigma (Kellison et al., 2010) and highlighted a need to address these issues within society.

However, explicit research that asks people to self-report on what they think are the variables that affect their behaviour has shown to have significant limitations e.g., self-presentation bias and introspection (see Holtgraves, 2004; Hughes et al., 2011). For this reason, implicit measures were developed to circumvent limitations inherent in explicit measures and extend research into stigmatising beliefs and attitudes.

The IRAP is one common behavioural measure of implicit social cognition that was developed as a way of measuring internal psychological attributes such as attitudes and stereotypes (DeHouwer et al., 2009). Although the IRAP has been used in other related areas of SEN e.g., teachers attitudes towards ASD (Kelly & Barnes-Holmes, 2013), and attitudes towards EBD (Scanlon & Barnes-Holmes, 2013), no published work has utilised the IRAP to examine attitudes towards ADHD. Therefore, Study 1 sought to develop the IRAP as a

measure of implicit social cognition towards ADHD with two groups of qualified ($n=16$) and trainee ($n=14$) teachers.

The rationale for employing a teacher sample in Study 1 was to expand on research literature that suggests level of experience can influence responding on direct and indirect measures. To illustrate, there have some studies that report disparities between participant groups on behavioural outcomes on the IRAP. For example, Barnes-Holmes et al., (2006) showed that three groups with varying levels of experience working with children with ASD differed on IRAP performance, with other studies reporting similar findings (e.g., Kelly & Barnes-Holmes, 2013; Kelly & Barnes-Holmes, 2015; Scanlon & Barnes-Holmes).

Simply put, the IRAP requires individuals to demonstrate the verbal relations that their history has built up and contrasts these responses with those found on explicit measures (Scanlon et al., 2014). Thus, it was hypothesised that disparities would emerge between the two teacher groups based on different histories of relating ADHD pupils with negative rather than positive words and Normal pupils with positive rather than negative words. It was also hypothesised that qualified teachers would be more explicitly positive towards ADHD due to a higher level of professional development training than trainee teachers but this bias would be absent on the IRAP.

The current study employed the IRAP using six positive target stimuli (e.g., predictable, calm, good, cooperative, safe, intelligent), six negative target stimuli (e.g., unpredictable, aggressive, bold, disruptive, dangerous, stupid), two label stimuli, (e.g., ADHD Pupil or Normal Pupil) and two response options (e.g., True and False). Target stimuli were chosen based on research surrounding prejudicial attitudes towards ADHD by groups in society and relate to beliefs about deficits in emotional regulatory abilities (Mangiona et al., 2004) and problem behaviours that are disruptive, impulsive or inattentive (Canu et al., 2007; Sandler et al., 1993; Zentall, Cassidy & Javorsky, 2001). Target stimuli

aimed to reflect the language used in this research in order to capture implicit stigma associated with ADHD. With regard to label stimuli selection, the phrase “Normal Pupils” was chosen over “Typically-Developing Pupils” due to discussions with an expert in the field who recommended that phrasing stimuli in this way would ensure the IRAP was more salient and closer to the natural language of the participants.

The explicit measures employed were the ASQ, DASS, and MBI-ES. These measures have shown good validity and reliability in previous studies (Bell et al., 2011; Kellison et al., 2010; Lovibond & Lovibond, 1995; Crawford & Henry, 2003) and were deemed relevant to the current cohort of teaching professionals to measure levels of perceived stigma towards ADHD (e.g., ASQ), general psychopathology (e.g., DASS) and professional burn-out (e.g., MBI-ES). Furthermore, Kelly and Barnes-Holmes (2013) employed two of these non-attitudinal measures with two groups of teaching professionals (e.g., ABA tutors and mainstream teachers) and found interesting correlations in the ABA teacher group i.e., a relationship between a negative bias towards autism and DASS depression and overall MBI. Authors concluded that the IRAP may provide an indicator of professional burn-out among individuals working in the field of special needs (Kelly and Barnes-Holmes, 2013).

Study 1 aimed to investigate stigma towards ADHD with two groups of qualified primary school teachers ($n=16$) and trainee primary school teachers ($n=16$). The hypotheses were as follows: (1); that qualified teachers would respond more positively towards ADHD than trainee teachers on explicit measures (2); this divergence would be absent on the IRAP (3); contrasting results would appear on implicit and explicit measures. The rationale for these hypotheses was threefold. Firstly, it was believed that both groups would have some interaction with or knowledge about ADHD and therefore could harbour strong beliefs towards this population. Secondly, as children spend a large proportion of their time in school it was considered appropriate to assess the attitudes of teachers towards a pupil population

who are diagnosed with ADHD. Finally, it was thought that in line with Barnes-Holmes (2006), controlling specifically for level of experience may predict less stigma towards ADHD on explicit measures but these would be absent on an implicit measure, namely the IRAP.

Methodology

Participants

A total of 35 participants (30 females and 5 males) were recruited for the current study. Data from 5 participants were excluded because they failed to meet the predetermined mastery criteria of 80% accuracy and under 2000ms latency on the IRAP programme. Of the remaining 30 participants, 16 were fully qualified primary school teachers (referred to as qualified teachers hereafter) recruited through direct contact with mainstream primary schools in Dublin, and 14 were students in the process of obtaining a teaching qualification (referred to as trainee teachers hereafter) recruited through the Froebel Department at Maynooth University. The qualified teachers (12 female, 4 male) ranged in age from 27 to 38 years ($M = 31.98$) and ranged in experience from 3-15 years teaching in a mainstream primary school. The trainee teachers (13 female, 1 male) ranged in age from 19 to 22 years ($M = 19.28$) and ranged in experience from 3-10 weeks working in a placement setting of a mainstream primary school.

Setting

For the qualified teacher group all aspects of the study were conducted in a quiet classroom in each participant's school. For the trainee teacher group all aspects of the study were conducted in an Experimental Cubicle at the Department of Psychology at Maynooth University. All participation was on an individual and voluntary basis with the experimenter only interacting with participants during instructional phases of the IRAP. Otherwise, the experimenter remained seated outside the classroom or the cubicle.

Apparatus and materials

The IRAP. The IRAP was based on the 2012 version IRAP programme and all elements of the procedure were conducted on a Dell laptop computer with a Pentium 4

processor. The basic program controls the presentation of all stimuli and records all participant responses.

Explicit measures. The current study consisted of three explicit measures as follows:

The Attention Deficit Hyperactivity Disorder (ADHD) Stigma Questionnaire (ASQ) is a 26-item ASQ that was adapted from the 40-item HIV Stigma Scale, which was previously designed by Berger, Ferrans, & Lashley (2001). The ASQ consists of 26 statements (e.g. “People with ADHD work hard to keep it a secret”) that are worded in the third person so the focus is aimed toward perceptions of public stigma about ADHD rather than personal experiences with the disorder per se (Kellison et al., 2010, see Appendix 3). Participants are required to rate each stigma item on a 4-point Likert scale (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree). Results from Kellison et al. (2010) and Bell et al. (2011) support the use of a general stigma factor which are marked out of a possible scoring range of 52 to 104 with higher scores indicating higher stigma perceptions (Kellison et al., 2010).

The Depression Anxiety Stress Scale (DASS) 21 measures distress along three axes of depression, anxiety and stress (Antony, Bieling, Cox, Enns, & Swinson, 1998, see Appendix 4). The measure comprised of 21 statements, with seven statements of depression, anxiety and stress per axis. Examples of these axes were as follows: “I felt that I had nothing to look forward to”, “I found it hard to wind down” and “I was aware of dryness in my mouth”, respectively. Participants responded to each statement, as it applied to them in the last week, on a 4-point scale that ranged from 0 = did not apply to me at all to 3 = applied to me very much, or most of the time. An overall score was calculated for each axis. Scores on each axis ranged from 0 to 21. The maximum score was doubled for the abbreviated version therefore each axis contained a minimum score of 0 and a maximum score of 42. In each axis

scores range from Normal to Extremely Severe with the Extremely Severe scores ranging from >28. A total DASS score was also calculated and marked out of 126.

The Maslach Burnout Inventory-Educator's Survey (MBI-ES) is a 22-item adaptation of the MBI that was intended to measure burnout syndrome in a wide range of service workers (Maslach & Jackson, 1981). The MBI and MBI-ES both measure aspects of burnout along three subscales of emotional exhaustion, depersonalization, and personal accomplishment (Maslach & Jackson, 1981; Maslach, Jackson, & Schwab, 1996, see Appendix 5). However, the MBI-ES is specifically aimed towards individuals who work in a school setting (e.g. "I deal very effectively with the problems of my students") (Kelly & Barnes-Holmes, 2013). The measure comprised of 22 statements, with seven statements of emotional exhaustion, and depersonalization and eight statements of personal accomplishment per axis. Examples of these axes were as follows: "I feel emotionally drained from my work", "I feel fatigued when I get up in the morning and have to face another day on the job" and "I feel very energetic", respectively. Participants responded to each statement indicating how often they felt that way, on a 4-point scale that ranged from 0=Never to 3=Every Day. An overall score was calculated for each axis. Possible scores on the emotional exhaustion, and depersonalization axis ranged from 0 to 42 with higher scores indicating greater burnout. Scores on the personal accomplishment axis ranged from 0 to 48 with higher scores indicating greater personal accomplishment in their work setting.

Ethical issues. A research proposal was submitted for ethical approval to the Departmental Ethics Sub Committee at Maynooth University and approved (9th of November 2015). All aspects of the research adhered strictly to current guidelines for research, as stipulated by the Psychological Society of Ireland (PSI) and Behavior Analyst Certification Board (BACB) codes of ethics. Key ethical considerations of informed consent, voluntariness, data confidentiality and debriefing were addressed as follows: (i) prior to

participation, each participant was briefed about the nature of the study and written consent was obtained (see Appendix 1); (ii) participants could withdraw from the study at any point (iii) participation and data were kept confidential and no identifying information was represented on the data; (iv) all participants were debriefed after their participation about the purpose of the study, informed that their performance would not be interpreted as a psychological outcome, and provided with supervisors contact details. Participants were required to have normal or corrected-to-normal vision and to be fluent English speakers.

Procedure

Participants completed the study in a single session that lasted approximately 45 minutes and consisted of two stages.

Stage 1: Implicit Relational Assessment Procedure. When completing the IRAP, participants were required to respond in accordance with two responding rules (Rule A “Please respond as if ADHD Pupils are negative and Normal Pupils are positive” or Rule B “Please respond as if ADHD Pupils are positive and Normal Pupils are negative”) which were provided before each block of trials. The rules and stimulus arrangements for the IRAP are presented in Table 1.

Each block contained 24 trials and a single trial presented one of two label stimuli, for example, ADHD Pupil or Normal Pupil appeared on the top centre of the screen with one of six positive (e.g., Calm) or six negative target stimuli (e.g., Bold) underneath it. Two response options (e.g., True and False) also appeared at the bottom left and bottom right corners of the screen. Within each block, twelve attribute stimuli were presented in random order with the constraint that each word was presented twice, once in the presence of each of the two label stimuli. These four stimuli (i.e., label stimulus, target stimulus and two response options) appeared simultaneously on the computer screen and remained until a participant choose one of the response options, by pressing an appropriate response key. The letter “D”

corresponded with the bottom left corner response and the letter “K” corresponded with the right corner response. All other keys were disabled. The response options True and False remained constant throughout the trials. Participants were asked to rest their index fingers on each of these keys for the duration of the task. During the IRAP, participants were required to respond quickly and accurately on a number of trial-blocks in which correct responding was consistent with rule A (e.g., ADHD Pupil-Bold-True/ADHD Pupil-Calm-False/ Normal Pupil-Bold-False/Normal Pupil-Calm-True), and on an equal number of trial-blocks in which correct responding was consistent with rule B (e.g., ADHD Pupil-Bold-False/ADHD Pupil-Calm-True/Normal Pupil-Bold-True/ Normal Pupil-Calm-False).

Table 1.

Rules and Stimulus Arrangements for the IRAP

Rule A	
Please respond as if ADHD Pupils are negative and Normal Pupils are positive	
Rule B	
Please respond as if ADHD Pupils are positive and Normal Pupils are negative	
Label 1	Label 2
“ADHD Pupil”	“Normal Pupil”
Target 1: Negative	Target 2: Positive
Unpredictable	Predictable
Aggressive	Calm
Bold	Good
Disruptive	Cooperative
Dangerous	Safe
Stupid	Intelligent
Response Option 1	Response Option 2
True	False

The IRAP consisted of a minimum of two practice blocks, one for consistent trials and one for inconsistent trials, (see consistent and inconsistent responding below) and a

maximum of six practice blocks (three consistent and three inconsistent). In order to proceed to test blocks, participants had to complete two practice blocks with a performance criteria higher than 80% and faster, on average, than 2000 ms. The test blocks consisted of six blocks (three consistent and three inconsistent trials). Hence, a minimum of eight blocks were presented while the maximum was twelve. If, however, participants did not reach the training criteria after the maximum number of practice blocks, then the programme ended and their participation terminated.

During *history-consistent* blocks, correct responding involved relating the label stimuli ADHD Pupil to negative target stimuli (e.g., Disruptive) and relating the label stimuli Normal Pupil to positive target stimuli (e.g., Co-operative). Correct responding in consistent blocks involved a positive bias towards Normal Pupils and a negative bias towards ADHD Pupils. For example, correct responding in the first block was designed to be history-consistent with a pro-normal and an anti-ADHD relational bias and responses were as follows: Normal Pupil-Calm-True; ADHD Pupil-Calm-False; Normal Pupil-Bold-False; ADHD Pupil-Bold-True. Examples of the four trial-types for the ADHD IRAP are presented in Figure 1.

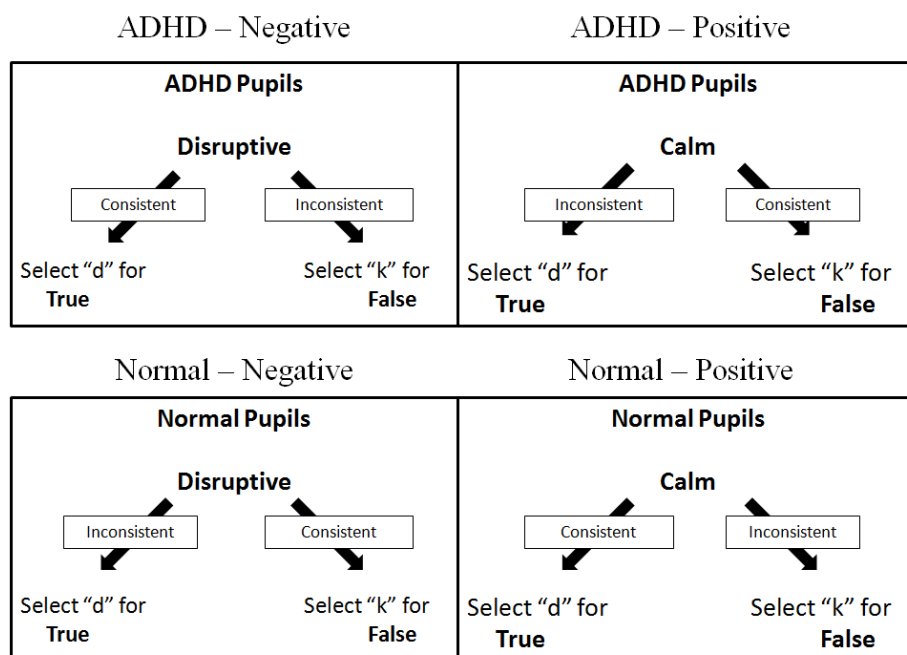


Figure 1: Examples of the four trial types for the ADHD IRAP.

In *history-inconsistent* blocks responding requirements were reversed. For example, in the second block responding alternated and correct responses were as follows: ADHD Pupil-Calm-True; Normal Pupil-Calm-False; ADHD Pupil-Bold-False; Normal Pupil-Bold-True. The IRAP as a procedure compares the speed in which participants respond according each rule and assesses subtle reaction time biases (Hussey, Thompson, McEntegart, Barnes-Holmes, & Barnes-Holmes, 2015). These biases are said to reflect the implicit attitudes of participants (DeHouwer & Moors, 2010).

No feedback appeared for correct responding on any trial. If a correct response was made the screen cleared and an interval of 400 ms. would precede the next trial. Incorrect responses signalled a red X to appear on the screen below the target word and remain there until the correct response was made. At the end of each trial-block participants received on-screen feedback which included their mean response accuracy and latency on that block. If participants were unsuccessful at meeting the predefined criteria after the third practice block a message appeared on the screen that stated the experiment was over, they were thanked for

their participation and debriefed. However, if participants reached the criteria on two consecutive practice blocks (one consistent and one inconsistent) a message would appear stating that the previous correct and incorrect responses would be reversed and test blocks would commence in alternating sequence. The completion of the six test blocks, irrespective of performance, marked the end of the experiment. Finally, participants were thanked for their participation and debriefed.

Stage 2: Explicit measures. Upon completing Stage 1 (i.e., the IRAP) participants were required to complete three printed questionnaires (i.e., ASQ, DASS, MBI-ES in that order) as post-experimental assessments of stigmatisation, current personal distress and professional burn-out.

Results

A total of 30 participants completed Study 1. Descriptive data for the two groups, qualified teachers and trainee teachers, are presented in Table 2.

Table 2.

Descriptive Data Summary

<hr/>					
<u>Total N</u>			30		
<u>Qualified Teachers</u>			<u>Trainee Teachers</u>		
N			16		
Female			Male		
12			4		
Age Range			SD		
12			31.98		
			3.64		
N			14		
Female			Male		
13			1		
Age Range			Mean Age		
4			19.28		
			1.38		
<hr/>					

Implicit Relational Assessment Procedure Data Analysis

The *D*-score is a difference in responding between Consistent and Inconsistent trial-blocks; higher scores in a positive direction indicate more rapid responding on trial-types that are stereotype consistent. Conversely, negative scores indicate that participant responding more rapidly affirmed Inconsistent trial-type relations. *D*-scores are transformed into D_{IRAP} -scores to compare responding on all four trial-types (Scanlon & Barnes-Holmes, 2013).

Response latencies were the primary data in the IRAP. These were recorded in milliseconds (ms.) commencing from the beginning of each trial-type to the point at which a participant emits a correct response. Response latencies were transformed to *D*-scores based on the *D* algorithm (derived from a similar IAT-based algorithm by Greenwald, Nosek, & Banaji, 2003; Barnes-Holmes, Barnes-Holmes, Stewart, & Boles, 2010) and transformation minimised likely variations in the speed of responding (Barnes-Holmes et al., 2010b). The

transformation was conducted according to the following steps: 1. Only response latency data from test blocks were used. 2. Latencies >10,000 ms. were removed. 3. Data containing 10%+ of test trial-types with latencies <300 ms. was removed. 4. Twelve standard deviations for the four trial-types were calculated for each test block (four from Blocks 1 and 2, four from Blocks 3 and 4, and four from Blocks 5 and 6). 5. Twenty-four mean latencies were calculated for the four trial-types in each test block. 6. Difference scores for each trial-type were calculated for each pair of test blocks. This involved subtracting the mean latency of the Consistent block from the mean latency of the corresponding Inconsistent block. 7. Each difference score was divided by its corresponding standard deviation from Step 4. This generated 12 *D*-scores (one per trial-type per pair of test blocks). 8. Four overall trial-type *D*-scores were calculated. This involved averaging the three scores for each trial-type across the three pairs of test blocks.

The foregoing data transformation results in positive mean *D*-scores that represent stereotype consistent responding (i.e., ADHD-Negative-True; ADHD-Positive-False; Normal-Negative-False; Normal-Positive-True); and negative mean *D*-scores that indicate stereotype inconsistent responding (i.e., ADHD-Negative-False; ADHD-Positive-True; Normal-Negative-True; Normal-Positive-False). For each group (qualified and trainee teachers), the average or mean *D*-scores and standard deviations were calculated across each of the four IRAP trial-types. Data are summarised in Table 4.

Table 4.*IRAP Data Summary – Means and Standard Deviations of D-scores*

<u>IRAP trial-types</u>	<u>Qualified Teachers</u>		<u>Trainee Teachers</u>	
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>
ADHD-negative	-.16	.47	.01	.42
ADHD-positive	-.08	.48	-.29*	.41
Normal-negative	.16	.48	.1	.53
Normal-positive	.27*	.42	.08	.42

Significant effects for one sample t-tests are denoted by asterisks ($p < 0.01$).

The four mean *D*-scores for each IRAP trial-type, plus standard error bars, are presented in Figure 2. Visual analysis of the graph shows that in the *Normal* trial-blocks, both groups responded in a stereotype consistent manner, (i.e., participants more rapidly affirmed Normal-Positive compared to Normal-Negative relations). In the *ADHD* trial-blocks, qualified teachers responded in a stereotype inconsistent manner, (i.e., participants more rapidly affirmed ADHD-Positive relations compared to ADHD-Negative relations). The trainee teachers however, showed a weak stereotype consistent relational bias for the ADHD-Negative trial-type, and a strong stereotype inconsistent relational bias for the ADHD-Positive trial-type.

One-sample t-tests were conducted for each group to determine whether trial-type *D*-scores across participant groups were statistically significantly different from zero. Results showed that for qualified teachers, the Normal-Positive trial-type was significant ($t = -2.678$, $df = 13$, $p = 0.19$). To this extent, qualified teachers showed a Pro-Stereotype bias, however there was no statistically significant implicit anti-ADHD bias shown for qualified teachers. For trainee teachers, the ADHD-Positive trial-type was significant ($t = 2.605$, $df = 15$, $p = .020$). Thus, trainee teachers more rapidly affirmed ADHD-Positive relations compared to ADHD-Negative relations showing an Anti-Stereotype relational bias. No other trial-types

showed a statistically significant difference from zero (qualified teachers: ADHD-Negative $p = .189$, ADHD-Positive $p = .516$, Normal-Negative $p = .208$; trainee teachers: ADHD-Negative $p = .918$, Normal-Negative $p = .482$, Normal-Positive $p = .475$).

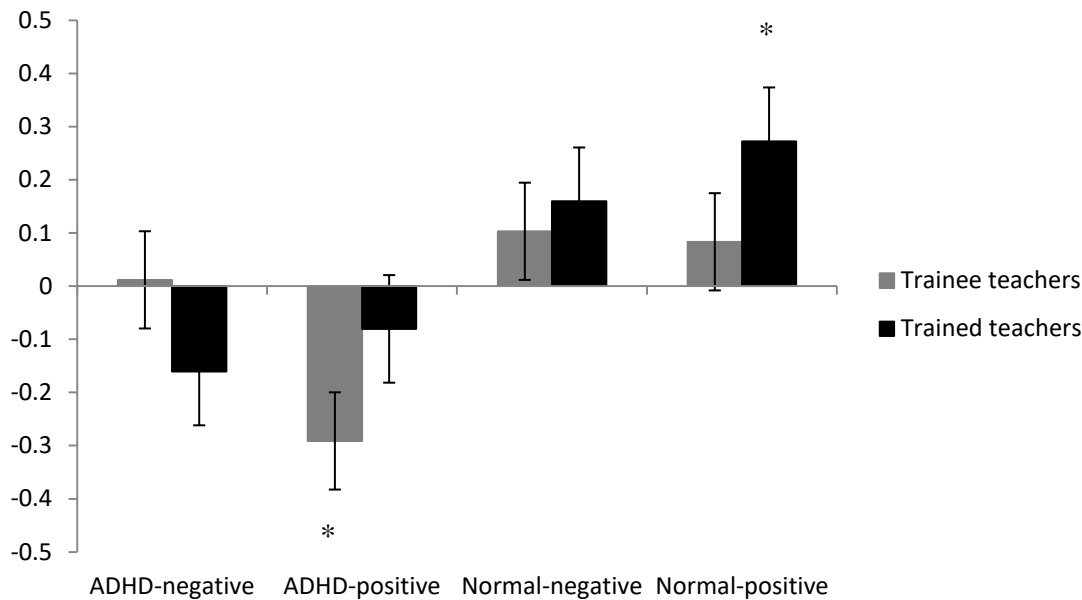


Figure 2. Mean D -scores for IRAP trial-types with standard error bars for qualified and trainee teachers. Zero indicates no implicit preference. Positive D -scores denote stereotype consistent responding (i.e., Normal-Positive, ADHD-Negative). Negative D -scores denote stereotype inconsistent responding (i.e., Normal-Negative, ADHD-Positive). Significant effects for one sample t-tests are denoted by an asterisks ($*p < .05$).

For the purposes of statistical analysis and in order to facilitate direct comparisons across trial-types, the ADHD trial-type D -scores were inverted (i.e., multiply by -1) in line with recommendations outlined by Hussey et al. (2015), see Figure 3.

A 2x4 repeated measures analysis of variance (ANOVA) was conducted to examine differences between the teacher groups across the four trial-types. Teacher type (qualified versus trainee) was the between-participant variable and trial-type (ADHD-Negative, ADHD-Positive, Normal-Negative, Normal-Positive) was the within-participant variable. There was no significant main effect for trial-type, Wilks Lambda = .95, $F(3, 26) = .45$, $p = .72$. There was no significant main effect for teacher type Wilks Lambda = .85, $F(3, 26) = 1.53$, $p = .23$.

ASSESSING IMPLICIT ATTITUDES TOWARDS ADHD

Additionally, there were no significant interaction effects between teacher type and trial-type,

$F(1) = .52, p = .47$.

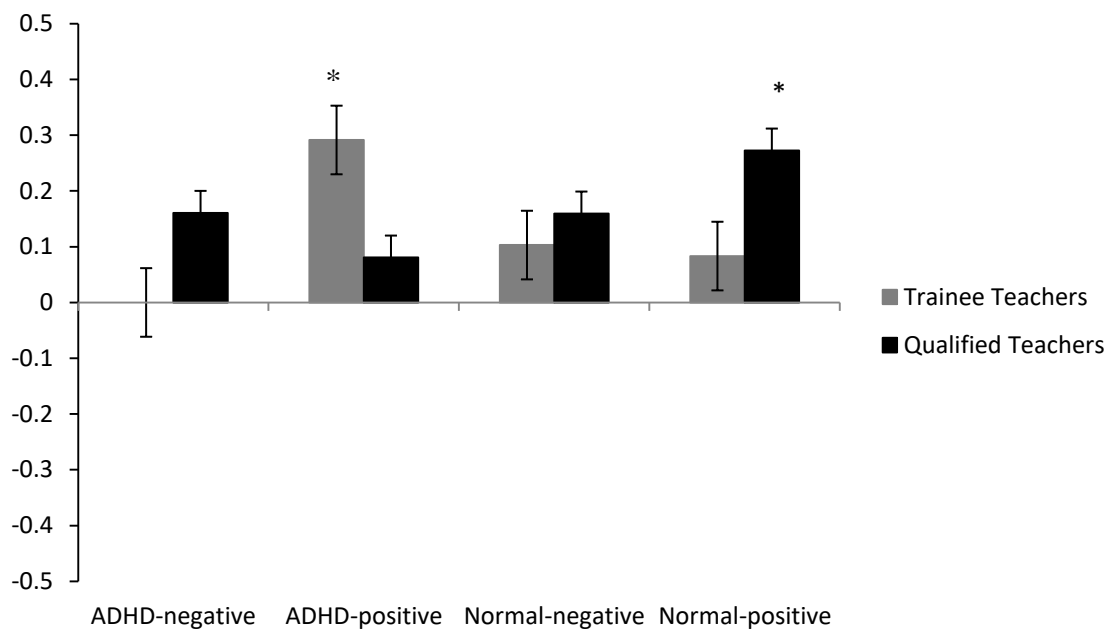


Figure 3. Mean *D*-scores for IRAP trial-types with standard error bars for qualified and trainee teachers. The two *ADHD* trial-types were inverted for the purposes of statistical analysis.

Explicit measure data. For each group, the means and standard deviations (SD) were calculated across each of the explicit measures. Data for the ASQ, overall DASS, three DASS subscales and MBI-ES subscales are summarised in Table 3.

Table 3.*Explicit Data Summary-Means and SDs*

<u>Explicit Measures</u>	Qualified Teachers		Trainee Teachers	
	<u>Mean</u>	<u>SD</u>	<u>Mean</u>	<u>SD</u>
ASQ	64.81	4.75	70.64	6.94
Overall DASS	17.50	16.20	32.07	21.40
DASS subscales				
Depression	3.75	4.18	9.14	8.2
Anxiety	4.12	6.63	9.57	7.1
Stress	9.62	8.26	13.85	9.0
MBI-ES subscales				
Emotional Exhaustion	9.31	4.12	13.00	6.63
Depersonalization	6.93	3.17	9.57	5.27
Personal Accomplishment	33.75	7.46	32.07	5.10

*Note. Maximum scores are: ASQ total=104; DASS total=126; DASS depression=42; DASS anxiety=42; DASS stress=42; MBI-ES emotional exhaustion and depersonalization=42 and MBI-ES personal accomplishment=48.

The data in Table 3 show that the trainee teacher group had higher stigma perceptions towards ADHD than the qualified teacher group. An independent samples *t*-test was conducted to compare the ASQ scores for qualified and trainee teachers. There was a statistically significant difference between the two groups $t(28) = 2.71, p = .011$. Overall, scores on the DASS remained relatively low for both groups, not meeting clinical significance for high levels of distress (clinically significant = score >28). An independent samples *t*-test was conducted to compare overall DASS scores between qualified and trainee teachers. There was a significant difference between the two groups, $t(28) = 2.19, p = .037$. Mean subscale scores on the DASS indicated higher levels of anxiety and depression in the trainee teacher group compared to the qualified teacher group. An independent samples *t*-test found significant differences between the two groups on the depression subscale; $t(28) =$

2.30, $p = .029$, and on the anxiety subscale $t(28) = 2.15$, $p = .040$. Thus, data indicated that the trainee teachers had higher ratings of anxiety and depression than qualified teachers. No significant differences were found between groups on the DASS stress subscale ($p = .19$). Responding on the MBI-ES revealed low levels of emotional exhaustion and depersonalisation and high levels of personal accomplishment for both groups. An independent samples t -test found no significant differences between the groups in scores for emotional exhaustion ($p = .07$), depersonalization ($p = 0.10$) or personal accomplishment ($p = .49$).

Implicit and Explicit Correlations.

A 24 factor correlation matrix was calculated to explore possible relationships between the four IRAP trial-types and explicit measures. Preliminary analysis confirmed that the data did not violate assumptions of normality or linearity. Results from Pearson's correlational analysis showed that for the qualified teacher group, there were statistically significant positive correlations between the Normal-Positive and MBI-ES emotional exhaustion subscale, ADHD-Positive and ADHD-Negative trial-types, the ADHD-Positive and Normal-Negative trial types and DASS anxiety and DASS depression subscales (see Table 5).

In the trainee teacher group, a negative correlation was found between the Normal-Negative trial-type and DASS stress (see Table 6). Other statistically significant positive correlations were found between the Normal-positive and Normal-negative trial-types, the DASS anxiety and DASS stress subscales, MBI-ES emotional exhaustion and DASS depression; MBI-ES depersonalization and DASS anxiety and MBI-ES depersonalization and overall DASS (see Table 6).

Table 5.

Correlations between IRAP trial-types and explicit measures for qualified teachers

Qualified Teachers – Table of Correlations

	1	2	3	4	5	6	7	8	9	10
1.ADHD-negative	-	.510*	-	-	-	-	-	-	-	-
2.ADHD-positive	.510*	-	.515*	-	-	-	-	-	-	-
3.Normal-negative	-	.515*	-	-	-	-	-	-	-	-
4.Normal-positive	-	-	-	-	-	-	-	-	.646**	-
5.Overall DASS	-	-	-	-	-	.894**	.752**	.880**	-	-
6.Depression	-	-	-	-	.894**	-	.558*	.775*	-	-
7.Anxiety	-	-	-	-	.752**	.558*	-	-	-	-
8.Stress	-	-	-	-	.880**	.775*	-	-	-	-
9.Emotional exhaustion	-	-	-	.646**	-	-	-	-	-	.664**
10.Depersonalization	-	-	-	-	-	-	-	-	.664**	-

Correlation is significant at the * $p < .05$ level (two-tailed) ** $p < .01$ level (two-tailed). Values represent Pearson's R correlations between implicit and explicit measures.

Table 6.

Correlations between IRAP trial-types and explicit measures for trainee teachers

Trainee Teachers - Table of Correlations

	1	2	3	4	5	6	7	8
1. Normal-negative	-	.580*	-	-	-	-.586*	-	-
2. Normal-positive	.580*	-	-	-	-	-	-	-
3. Overall DASS	-	-	-	.907**	.839**	.870**	-	.584*
4. Depression	-	-	.907**	-	.698**	.677**	.554*	-
5. Anxiety	-	-	.839**	.698**	-	.551*	-	.603*
6. Stress	-.586*	-	.870**	.677**	.551*	-	-	-
7. Emotional exhaustion	-	-	-	.554*	-	-	-	.928**
8. Depersonalization	-	-	.584*	-	.603*	-	.928**	-

Correlation is significant at the * $p < .05$ level (two-tailed) ** $p < .01$ level (two-tailed). Values represent Pearson's R correlations between implicit and explicit measures.

Results Summary

Results for implicit tests using the IRAP 4 trial-type methodology aimed to parse out if participant evaluations were pro-normal or anti-ADHD, or if the data might show some combination of both. IRAP data for qualified teacher participants ($n=16$) showed stereotype-consistent responding when affirming Normal-Positive compared to Normal-Negative relations, and IRAP D -scores for this trial-type were statistically significant from zero. There was no anti-ADHD bias shown for qualified teachers, and there was no other statistically significant bias shown for these participants.

The IRAP data for trainee teachers showed an implicit bias when affirming ADHD-Positive relations and this anti-Stereotype responding was shown to be statistically significant from zero. There was no implicit pro-Normal or anti-ADHD bias shown for trainee teachers. The results of an ANOVA showed there was no significant main effect for group nor any significant interaction effects between teacher type and trial-type.

Results from explicit measures indicated statistically significant differences between the two teacher groups on the ASQ, overall DASS, and on DASS anxiety and depression subscales. On these self-report scales, trainee teacher responding showed statistically significant higher ratings of stigma perceptions towards ADHD, increased ratings of general distress, depression and anxiety, compared to their qualified teacher counterparts.

When tested, implicit-explicit data for the trainee teachers showed that a higher score on the Normal-Negative IRAP trial-type was associated with a higher DASS stress score. Correlation tests with implicit-explicit data for the qualified teachers showed that a higher score on the Normal-Positive trial-type was associated with more emotional exhaustion. No additional correlations were identified in implicit-explicit data for either group when tested.

Discussion

Results from IRAP analysis indicated the expected Stereotype-Consistent responding for qualified teachers in the Normal-Positive trial-type. This was the only trial-type that reached statistical significance, demonstrating a pro-Normal relational bias for this group. In the ADHD-Positive trial-type, results were somewhat unexpected for the trainee teacher group in that participants demonstrated Stereotype-Inconsistent responding on this trial-type. This was the only trial-type that reached statistical significance, demonstrating a pro-ADHD relational bias for the trainee teacher group. In sum, an expected pro-Normal relational bias was found for the qualified teachers in the Normal-Positive trial-type however, an unexpected pro-ADHD relational bias was found for trainee teachers in the ADHD-Positive trial-type.

The IRAP findings in the current study contradict explicit research that suggests substantial stigma associated with ADHD i.e., neither group displayed strong anti-ADHD relational biases (Bell et al., 2010; Canu, et al., 2007; Kellison, et al., 2010). Although there was no main effect or interaction effect for teacher type or teacher type by trial-type (i.e., indicating that there were no significant differences between the two teacher groups), the qualified teachers showed a significant pro-Normal relational bias while the trainee teachers showed a significant pro-ADHD relational bias. The lack of negative implicit relational bias depicted by qualified teachers towards ADHD pupils might be explained by the high level of training received by teachers in the area of SEN. To elaborate, there has been a huge shift in governmental efforts to include children with SEN in mainstream classroom settings and also to address the impact of stigma associated with these diagnoses in schools (NCSE). This has resulted in professional development courses provided to teachers as well as additional classroom support e.g., Special Needs Assistants to mediate pupils' challenging behaviours. Conversely, it might also be the case that teachers do not have as strong a relational history associated with ADHD as they do with other categories of SEN e.g., ASD (Barnes-Holmes et

al., 2006; Kelly & Barnes-Holmes, 2013). Moreover, there is some evidence to suggest that ADHD is not viewed as negatively as other mental health disorder such as depression (Coleman et al., 2009).

On the other hand, trainee teachers significant pro-ADHD relational bias may be due to a lack of direct experience with an ADHD pupil population thus may be unaware of the difficulties they present in the classroom. Furthermore qualified teachers significant pro-Normal relational bias may be due to their extensive history and experience of relating Normal pupils with positive attributes, as they require less intensive resources than pupils with attention deficits in the classroom.

Taken together, these results indicate that stigmatising implicit attitudes towards ADHD might not be as evident in these groups as compared to a general population/convenience sample of participants. In contrast there may be insufficient information surrounding ADHD within the public domain. For example, research has shown that attitudes are less favourable towards ADHD compared to non-diagnosed controls (Canu et al., 2007) and substantial stigma surrounding ADHD medication and negative attributes associated with the disorder (Honkasilta et al., 2006; Mueller et al., 2012). These issues have divided opinions related to causal beliefs associated with ADHD and treatment efficacy (Lee, 2014; Bekle, 2004).

Results on explicit measures showed a divergence in group scores across the ASQ; the trainee teacher group revealed higher stigma perceptions towards ADHD than the qualified teacher group. This is in contrast with previous implicit research demonstrating more experienced individuals display more positive attitudes on explicit measures than those with less or no experience (Barnes-Holmes et al., 2006). Thus, trainee teachers displayed a pro-ADHD relational bias on the IRAP and high stigma perceptions of ADHD on the ASQ. From a RFT perspective, implicit results reveal a well-practiced history of relating ADHD

positively and is indicative of a pro-ADHD relational bias. Furthermore, this group displayed more accepting explicit attitudes towards ADHD on the ASQ than qualified teachers.

Recall that the ASQ does not target participants' attitudes towards pupils with ADHD it only focuses on the *experiences* of those individuals. To illustrate, questions are phrased in the third person such as "People with ADHD work hard to keep it a secret" or "A person with ADHD feels that they are bad because of it". Thus, agreeing with these statements denote higher scores on the ASQ, indicating higher stigma perceptions towards ADHD and accepting attitudes towards the disorder.

It is important to note that overall both groups showed high stigma perceptions on the ASQ but trainees were statistically higher than qualified teachers. It could also be the case that based on statements put forward by the ASQ participants wished to respond in a socially desirable way. For example, it is more favourable to be perceived as empathetic and understanding towards the difficult experiences of individuals diagnosed with ADHD than to suggest that they are in some way to blame for their disorder (Coleman et al., 2009).

According to the REC model, the IRAP captures brief and immediate relational responses whereas the explicit measures capture more controlled and considered reactions to stimuli without the addition of time pressure (Hughes et al., 2011). Thus, the IRAP may be more accurate in reflecting a true picture of attitudes towards ADHD than the ASQ. Although any conclusions at this point are tentative, it may be the case that the IRAP is a more sensitive and direct measure compared to the explicit measure used in the current study (Cullen et al., 2009).

Another aspect that may have influenced responses on implicit and explicit measures was the age of participant samples. In the qualified teacher group the mean age of participants was thirty-two whereas in the trainee teacher group the mean age of participants was nineteen. It is reasonable to suggest that participant age and experience level might have

mitigated a divergence in implicit-explicit responding as age has shown to influence behavioural outcomes on other indirect measures (Hummert et al., 2002).

Results from the overall DASS, DASS depression and anxiety subscales showed that compared to qualified teachers, trainee teachers had significantly higher ratings of overall personal distress, depression and anxiety. This may reflect mental health concerns that are prevalent in University students associated with perceived social pressure to excel in academic performance and achievement (Bayram & Bilgel, 2008). The current research shows that this may not be a lasting effect, since qualified teachers did not reveal the same high levels of personal distress as the trainee teacher group. Further research is required to examine effects of high levels of personal distress in a student teacher population and contrast these with a control group. The implementation of a stress-management package could be an effective way to assist students with struggles they face at University while meeting demands of third level education (see Scanlon & Barnes-Holmes, 2013).

Correlational analysis using Pearson's r , revealed that there was a significant positive correlation between the Normal-Positive trial-type and the MBI-ES emotional exhaustion subscale for the qualified teacher group. In other words, qualified teachers were more pro-Normal when levels of exhaustion were higher. This supports the earlier suggestion that less resources are required for Normal pupils relative to ADHD pupils, thus they are not seen as demanding on teachers' time and resources as pupils with an ADHD diagnosis.

There was also a negative correlation between the Normal-Negative trial-type and DASS stress for the trainee teachers. Recall that within the DASS, higher scores indicate higher scores of personal distress. Thus, this correlation demonstrates that as stress scores went down, positive relational bias towards Normal pupils went up. In other words, the less stressed participants were the more positive they were about Normal pupils. Perhaps the less stressed they were the more positive they were over all. Unusual implicit-explicit correlations

are common on IRAP studies as measures generally diverge due to differing focus that are not directly relatable (Sabin, Nosek, Greenwald, & Rivara, 2009).

There has been no implicit research to date, examining public attitudes of stigma related to ADHD, thus as a follow-up to Study 1 as well as to address this gap in the research literature, Study 2 aimed to assess ADHD stigma in a general population/convenience sample of participants. An identical IRAP was employed in Study 2 along with two explicit measures (ASQ, DASS) to examine the implicit and explicit attitudes of a convenience sample ($n=41$) that comprised of participants from the general population ($n=39$) and University students ($n=12$) who had no prior teacher training or experience.

CHAPTER 3

STUDY 2

Study 2

Research has shown that negative effects associated with stigma and ADHD can persist in different ways within society. For example, the development of courtesy-stigma has shown to have damaging effects on family members or persons affiliated with stigmatised individuals (Kellison et al., 2010) and result in poor parent-child interactions (Mikami et al., 2015). Given that children spend a large proportion of their time in school e.g., 21 hours per week in the U.S. (Hofferth & Sandberg, 2001), it was important to determine whether educators in primary schools held such negative attitudes. The results of Study 1 support prior research that suggests level of education and experience may mitigate stigma towards certain vulnerable populations (Barnes-Holmes et al., 2006; Scanlon & Barnes-Holmes, 2013). However, no anti-ADHD relational biases were demonstrated in either of the two participant groups of teaching professionals towards ADHD pupils.

Similar to Study 1, Study 2 also aimed to address a gap in the research literature related to an absence of implicit research assessing ADHD stigma. Study 1 constituted the first attempt to measure ADHD stigma using the IRAP, thus, one could not conclude that the absence of negative relational bias was due to teacher training per se, as the implicit attitudes of those in the general population was not assessed. Perhaps most adults hold a positive relational bias towards normality rather than a negative relational bias towards ADHD, or indeed some combination of both. As previously outlined, much of the research to-date employs explicit measures which are subject to well-documented limitations associated with self-reporting (e.g., socially desirable responding; Holtgraves, 2004). Thus, in order to further investigate implicit stigma associated with ADHD, Study 2 employed the IRAP to examine the attitudes of a convenience sample of adults ($n=41$) towards individuals with ADHD.

An identical IRAP was employed in Study 2 as used in Study 1 along with two explicit measures (e.g., ASQ and DASS). The MBI-ES was removed as it was not deemed

relevant to the current cohort of non-teaching individuals. The primary research aim was to follow-up on findings from Study 1 as well as to further investigate whether a general population/convenience sample of participants would reveal strong implicit relational bias towards ADHD.

The hypotheses for Study 2 were as follows: (1); participants would indicate higher stigma perceptions towards ADHD as measured by the ASQ, (2); this bias would be absent on the IRAP e.g., participants would have faster mean response latencies during history-consistent compared to history-inconsistent trials, and (3); there would be a divergence in implicit-explicit responding.

The rationale for these hypotheses was twofold. Firstly, it was believed that a general population sample may harbour a history of relating ADHD with negative attributes due to prevalent negative evaluations associated with diagnostic labels (Link & Phelan, 2001). Secondly, because no anti-ADHD relational biases were evident in Study 1, it was considered appropriate to follow-up on these findings with a general population/convenience sample to determine whether level of experience or training may have mitigated behavioural outcomes on the IRAP.

Methodology

Participants

A total of 53 participants (42 females and 11 males) were recruited for the current study. Data from 12 participants were excluded because they failed to meet the predetermined mastery criteria of 80% accuracy and under 2000ms latency on the IRAP programme. Of the remaining 41 participants, 34 were females and 7 were males and ranged in age from 18 to 35 ($M=24.85$). Participants were recruited from a convenience sample of adults from the greater Dublin area ($n=39$), and Maynooth University students ($n=12$) who had no prior teacher training or experience with an ADHD pupil population. All participant volunteers were briefed as to the general nature of the experiment and informed consent was obtained (see Appendix 2).

Setting

All aspects of the study were conducted in an Experimental Cubicle at the Department of Psychology at Maynooth University and participation was on an individual and voluntary basis with the experimenter only interacting with participants during instructional phases of the IRAP. Otherwise, the experimenter remained seated outside the cubicle.

Apparatus and Materials

The IRAP used in Study 2 was identical to that employed in Study 1. All elements of the IRAP were presented and recorded on the Dell laptop computer with a Pentium 4 processor. Participants were required to complete the IRAP which controls the presentation of all stimuli and records all participant responses. Participants were required to complete two explicit measures, one related to stigma perceptions towards ADHD (ASQ) and one related to general psychopathology (DASS).

Procedure

Participants completed the study in a single session that lasted approximately 40 minutes and consisted of two stages.

Stage 1: Implicit Relational Assessment Procedure. First participants completed the IRAP which was identical to that employed in Study 1.

Stage 2: Explicit measures. Upon completing the IRAP, participants were required to complete two printed questionnaires, the ASQ and the DASS, in that order. These measures assessed levels of ADHD stigma perceptions and current levels of personal distress, respectively. When the study was complete, participants were debriefed and thanked for their participation.

Results

A total of 41 participants completed Study 2. Descriptive data are presented in Table 7.

Table 7.

Descriptive Data Summary

Descriptive Statistics			
Total N	41		
Females	34		
Males	7		
Age	17 (Age Range)	24.85 (Mean)	4.60 (SD)
Level of Education	39 (adults from the general population)	12 (University students)	

Implicit Relational Assessment Procedure Data Analysis

The same steps were conducted to complete the *D* algorithm transformation as in Study 1. As before, the data transformation resulted in positive mean *D*-scores that represented Stereotype-Consistent responding (i.e., ADHD-Negative; Normal-Positive); and negative mean *D*-scores that represented the reverse (i.e., ADHD-Positive; Normal-Negative). The average or mean *D*-scores and standard deviations were calculated across each of the four IRAP trial-types. Data are summarised in Table 9.

Table 8*IRAP Data Summary-Means and SDs of D-scores*

IRAP trial-types	Mean	SD
ADHD-negative	.155*	.296
ADHD-positive	-.197*	.353
Normal-negative	.232*	.338
Normal-positive	.332*	.374

Significant effects for one sample t-tests are denoted by asterisks ($p < 0.01$).

The four mean *D*-scores for each IRAP trial-type, plus standard error bars, are presented in Figure 5. The graph shows that for the “Normal” trial-types, participants responded in a Stereotype-Consistent manner (i.e., participants more rapidly affirmed Normal-Positive versus Normal-Negative relations). For the “ADHD” trial-types, participants responded in a Stereotype-Consistent and Stereotype-Inconsistent manner (i.e., participants affirmed both ADHD-Positive and ADHD-Negative relations). One-sample t-tests were conducted to determine whether trial-type scores were significantly different from zero. Results showed that all scores proved to be significant [ADHD-Negative $t(40) = 3.35$, $p = .00$; ADHD-Positive $t(40) = -3.56$, $p = .00$; Normal-Negative $t(40) = 4.39$, $p = .00$; Normal-Positive $t(40) = 5.69$, $p = .00$], see Figure 5.

ASSESSING IMPLICIT ATTITUDES TOWARDS ADHD

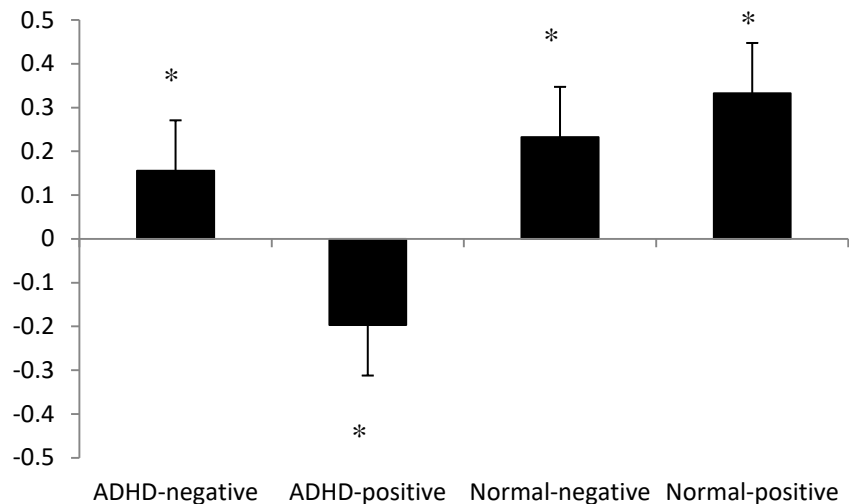


Figure 5. Mean *D*-scores for IRAP trial-types with standard error bars. Zero indicates no implicit preference. Positive *D*-scores denote stereotype consistent responding (i.e., Normal-Positive, ADHD-Negative). Negative *D*-scores denote stereotype inconsistent responding (i.e., Normal-Negative, ADHD-Positive). Significant effects for one sample t-tests are denoted by an asterisks ($*p < .05$).

For the purposes of statistical analysis and in order to facilitate direct comparisons across trial-types, the ADHD trial-type *D*-scores were inverted (i.e. multiply by -1) in line with recommendations outlined by Hussey et al. (2015), see Figure 6. A one-way repeated measures ANOVA was conducted to examine differences across the four trial-types. There was a significant main effect for trial-type, Wilks' Lambda = .43, $F(3, 38)=16.53$, $p = .0001$, multivariate partial eta squared = .56. Post-hoc pairwise comparisons were conducted to examine the main effect for trial-type. There were significant differences between ADHD-Negative and ADHD-Positive $p = .00$; ADHD-Negative and Normal-Negative $p = .00$; ADHD-Negative and Normal-Positive $p = .00$; and Normal-Negative and Normal-Positive $p = .44$. Differences between the remaining trial-types were not significant (ADHD-Positive and Normal-Negative, $p= 1.00$; ADHD-Positive and Normal-Positive, $p = .72$).

ASSESSING IMPLICIT ATTITUDES TOWARDS ADHD

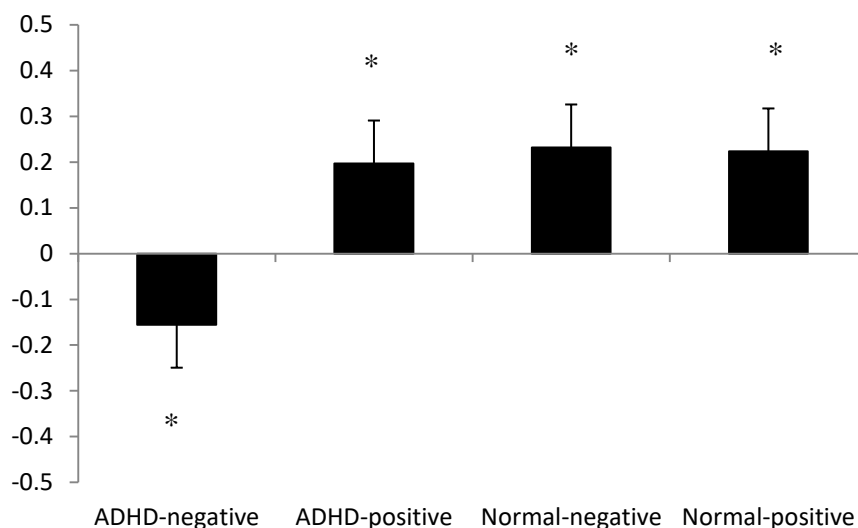


Figure 6. Mean *D*-scores for IRAP trial-types with standard error bars. The two *ADHD* trial-types are inverted for the purposes of statistical analysis. Zero indicates no implicit preference. Positive *D*-scores denote a positive bias towards Normal and ADHD, and negative *D*-scores denote a negative bias towards Normal and ADHD.

Explicit measure data. The means and standard deviations (SD) were calculated for participant responses on each of the explicit measures. Data for the ASQ, overall DASS and three DASS subscales are summarised in Table 9.

Table 9.

Explicit Data Summary-Means and SDs

Explicit Measures	Mean	SD
ASQ	63.12	10.07
Overall DASS	14.75	11.00
DASS subscales		
Depression	3.97	4.18
Anxiety	3.82	4.29
Stress	7.07	4.59

*Note. Maximum scores are: ASQ total=104; DASS total=126; DASS depression=42; DASS anxiety=42; DASS stress=42.

The data in Table 8 show that participants had high stigma perceptions towards ADHD (ASQ max. score = 104). The overall DASS score was low, not meeting clinical significance for high levels of distress (clinically significant = score >28). The DASS subscales scores were also low, indicating low levels of depression, anxiety and stress in this participant group.

Implicit and Explicit Correlations.

Each of the four IRAP trial-types were entered into a correlation matrix with each of the explicit measures resulting in the comparison of 18 factors. Preliminary analysis confirmed that the data did not violate assumptions of normality or linearity. Results from Pearson's correlational analysis showed no statistically significant correlations between trial-type scores and scores on the explicit measures (all p 's > 0.05). There were statistically significant positive correlations between the Normal-Negative and Normal-Positive trial-types ($p > 0.01$) and between the overall DASS and its subscale scores (all p 's > 0.01). See Table 10.

Table 10.

Correlations between IRAP trial-types and explicit measures

Table of Correlations						
	1	2	3	4	5	6
1.Normal-negative	-	.524**	-	-	-	-
2.Normal-positive	.524**	-	-	-	-	-
3.Overall DASS	-	-	-	.815**	.815**	.856**
4.Depression	-	-	.815**	-	-	-
5.Anxiety	-	-	.815**	-	-	-
6.Stress	-	-	.856**	-	-	-

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

Results Summary

Statistical analysis in the current study used the IRAP 4 trial-type methodology to determine if participant evaluations were pro-Normal or anti-ADHD, or if the data might show some combination of both. The IRAP data showed that participants ($n=41$) responded with a statistically significant pro-Normal relational bias on both the Normal-Positive and Normal-Negative trial-types. Interestingly, for the ADHD trial-types, participants responded with statistically significant pro-ADHD and anti-ADHD relational biases.

The results of an ANOVA showed a significant main effect for trial-type, with differences indicating that participants were significantly more Normal-Positive than Normal-Negative; significantly more ADHD-Negative than Normal-Negative; and that participants were both pro- and anti-ADHD. Results from explicit measures indicated high levels of stigma perceptions towards ADHD as measured by the ASQ and low ratings of overall DASS, DASS anxiety, DASS depression and DASS stress. Correlational analysis of implicit-explicit measures demonstrates that the IRAP scores and explicit measures did not differ significantly.

Discussion

Results from IRAP analysis indicate that participants responded in a manner that was Stereotype-Consistent with a pro-Normal relational bias on the *Normal* trial-blocks. However, in the *ADHD* trial-blocks, results were somewhat unexpected i.e., participants responded in both a Stereotype-Consistent and Stereotype-Inconsistent manner. Thus, participants showed a pro-ADHD relational bias on the ADHD-Positive trial-type and anti-ADHD relational bias on the ADHD-Negative trial-type. All four IRAP trial-types reached statistical significance compared to zero. There was a main effect for trial-type and significant differences were found between some of the trial-types e.g., participants were significantly more Normal-Positive than Normal-Negative; significantly more ADHD-Negative than Normal-Negative; and participants were both pro- and anti-ADHD.

These IRAP findings reveal that stigma surrounding ADHD is not as straightforward as explicit research depicts, that is participants can reveal both pro- and anti- relational biases toward a given target group. One of the main features of the IRAP is to separate responses at trial-type level in order to reveal subtle nuances in relational responding that may go undetected using explicit methods or alternate implicit measures (e.g., the IAT). In this study, participants' demonstrated strong, well-practiced history-consistent responding towards normality as well as history-consistent and history-inconsistent responding towards ADHD (Ritzert et al., 2016). This is not a novel finding as previous research has shown similar results. To illustrate, in a study by Ritzert et al. (2016), unexpected relational biases towards body weight/shape were revealed in a sample of undergraduate students ($n=75$). Results demonstrated a *self-thin-attractive* relational bias as well as an unexpected *self-fat-attractive* relational bias (Ritzert et al., 2016). Authors suggest that a positive relational bias towards Self and thinness as opposed to a negative relational bias towards Self and fatness may underlie evaluations made toward body image on implicit responding (Ritzert et al., 2016;

Roddy et al., 2011). This may serve to inform results found in the current study as participants responded positively towards normality as well as positively and negatively towards ADHD. It might also be the case that implicit stereotyping towards ADHD is not as potent as other areas of prejudicial attitudes towards race (Barnes-Holmes et al., 2010a) and areas of psychopathology (Hussey et al., 2015). For example, Barnes-Holmes et al. (2010a) found that participants ($n=19$) demonstrated racial stereotyping on the IRAP congruent with a history of relating positive words with White label stimuli and negative words with Black label stimuli. Thus, perhaps there are conflicting histories at play when participants are required to relate positive and negative target stimuli with the label stimuli ADHD pupil that does not occur when asked to relate the same stimuli with the label stimuli Normal pupil. Hence, an advantage of employing the IRAP was in its ability to assess strength of relational responses across four separate trial-types.

Similar to Study 1, results on explicit measures showed high stigma perceptions towards ADHD. This is not surprising as explicit measures have well-established limitations associated with socially desirable responding that can distort outcomes on these measures. For example, extended and elaborated relational responding may serve to reveal higher rates of stigma perceptions towards ADHD and conceal more privately held beliefs about the disorder. Thus, the IRAP can be seen as more sensitive as it showed nuanced responding across the four trial-types and a divergence in responses between implicit and explicit measures. In other words, high stigma perceptions were found on the ASQ but conflicting and pro- and anti-ADHD relational biases were found on the IRAP.

Current diagnostic practice set out by DSM, characterise ADHD by symptoms of inattention, hyperactivity and impulsiveness. This emphasises the negative attributes and deficits of an individual with ADHD. Thus, may be reflected in the Stereotype-Consistent responding during the ADHD-Negative trial-type (i.e., ADHD-Negative-True). On the other

hand, it may be the case that due to a lack of knowledge and exposure to an ADHD population participants demonstrated Stereotype-Inconsistent responding in the ADHD-Positive trial-type (i.e., ADHD-Positive-True). A history of relating ADHD with positive as well as ADHD with negative evaluative words is in line with evidence that purports evaluative responding may be due to a positive bias towards normality rather than negative bias to ADHD (Ritzert et al., 2016; Roddy et al., 2009; Roddy et al., 2011). Furthermore, previous research that has shown a lack of public knowledge surrounding ADHD, thus participants in the current study were uncertain about what the disorder is, how it can be treated and how people are affected by it (Bekle, 2004; Vereb & DiPerna, 2004). Hence, reflected by pro- and anti-ADHD relational biases. These matters as well as other issues related to procedural constructs on the IRAP will be discussed in the next chapter.

Results from the overall DASS, DASS depression and anxiety subscales showed low ratings of personal distress and there were no implicit-explicit correlations found in Study 2.

CHAPTER 4
GENERAL DISCUSSION

General Discussion

The current research aimed to address a gap in the literature related to an absence of implicit studies investigating stigma towards ADHD. The IRAP is a behavioural methodology that aims to tap into implicit social cognition recognising that internal events can be accessed in a functional-analytic way. According to Hughes, et al. (2011), these internal events occur when an individual is required to respond rapidly or under time constraints with responses influenced by properties such as *complexity* and *derivation* that characterise behavioural outcomes (Hughes et al., 2012).

The current Studies (1 and 2) employed identical IRAPs to examine the implicit attitudinal biases of three groups of participants towards ADHD pupils. The rationale for using the IRAP was due to its grounding in an empirically tested framework of RFT which has provided a basis in which to explore so-called implicit cognition. Based on a growing body of research, the IRAP has demonstrated utility in a number of domains including weight/shape relational bias (e.g., Roddy et al., 2009; Roddy et al., 2011; Ritzert et al., 2016), ageism (Cullen et al., 2009), and attitudes towards BDSM (Stockwell, Walker, & Eshleman, 2010). The rationale for developing the IRAP to assess ADHD stigma was seen as a way of complementing explicit research that suggests a myriad of negative effects associated with the disorder.

For instance, the manifestation of negative attitudes and beliefs towards ADHD has shown to persist in concepts such as self-stigma, public-stigma and courtesy-stigma (Kellison et al., 2010). These have demonstrated negative implications for diagnosed individuals through social isolation (Norvilitis et al., 2002) and self-fulfilling prophecies (Jussim & Harber, 2005) as well as to negatively impact on family life (Mikami et al., 2015). Furthermore, explicit research has found that people with ADHD are believed to be more

violent, dangerous, troublesome, disruptive and anti-social than people without ADHD (Lee, 2014; Honkasilta et al., 2016; Mueller et al., 2012; Wiener et al., 2012).

These are pertinent issues for children attending school as they internalise negative evaluations made towards them and act in a way that is consistent with perceived low expectations from their teachers or peers (Jussim & Harber, 2005). Furthermore, non-adherence to treatment and treatment termination have been linked to social stigma and are growing concerns for mental health professionals working with an ADHD population (Gajria et al., 2014). Therefore, it is important for social psychologists to investigate the nature of attitudes in order to make conceptual and methodological advancements to address stigma related issues.

Although there has been explicit research examining the nature of teachers' attitudes towards ADHD (Bell et al., 2011; Canu et al., 2007) there has been no studies exploring the so-called implicit nature of these attitudes. From the functional contextual tradition, some studies have focused on socially sensitive areas related to attitudes to autism (e.g., Barnes-Holmes et al., 2006; Kelly & Barnes-Holmes, 2013) and attitudes to EBD (e.g., Scanlon & Barnes-Holmes, 2013). These studies have specifically employed teacher samples and found negative implicit biases towards particular target groups and suggest that level of experience can influence effects obtained on implicit and explicit measures (Barnes-Holmes, et al., 2006; Scanlon & Barnes-Holmes, 2013). The current work aimed to pursue this line of research and investigate teachers' implicit attitudes towards ADHD.

At the time of writing, the present studies were the first to explore implicit relational bias towards ADHD and aimed to facilitate a deeper understanding about the strength of these biases among three groups of research participants. Study 1 set out to explore the IRAPs sensitivity towards ADHD in two groups of qualified primary school teachers ($n=16$) and trainee primary school teachers ($n=14$).

As Study 1 constituted the first attempt to assess implicit ADHD stigma only general predictions were made. In line with previous IRAP work carried out in the field of SEN (e.g., Barnes-Holmes et al., 2006; Kelly & Barnes-Holmes, 2013), it was hypothesised that during history-consistent blocks, participants would demonstrate strong verbal histories of relating ADHD pupils with negative words (e.g., disruptive and aggressive) and relating Normal pupils with positive words (e.g., calm and co-operative). In other words, it was reasonable to assume, based on previous research (e.g., Barnes-Holmes, et al., 2010a) that shorter response latencies would be evident during history-consistent relative to history-inconsistent blocks of trials. A further aim was to examine if disparities would emerge based on years' experience on implicit and explicit responding (Barnes-Holmes et al., 2006; Kelly & Barnes-Holmes, 2015). Thus, it was hypothesised that more experienced teachers would display a higher score of stigma perceptions on the ASQ compared to less experienced teachers but this difference would remain absent on the IRAP.

In sum, Study 1 aimed to investigate implicit stereotyping towards ADHD using the IRAP as a behavioural measure of implicit social cognition and three explicit measures of social cognition (ASQ, DASS, and MBI-ES). Furthermore, consistent with previous IRAP work the hypotheses for Study 1 were as follows: (1); qualified teachers would exhibit less stigmatising explicit attitudes towards ADHD pupils than trainee teachers, (2); these differences would be absent on the IRAP, and (3); there would be a divergence in implicit-explicit responding.

Results for implicit tests using the IRAP four trial-type methodology aimed to parse out whether negative relational bias towards ADHD were pro-Normal, anti-ADHD, or of some combination of both (Cullen et al., 2009). Overall, on IRAP performance, statistically significant results were found in the Normal-Positive trial-type for the qualified teachers indicating a positive relational bias towards Normal pupils but no anti-ADHD relational bias

was detected in this group. Conversely, performance on the IRAP for trainee teachers showed a statistically significant positive relational bias towards ADHD pupils on the ADHD-Positive trial-type but no pro-Normal relational bias was detected in this group. Thus, responding for qualified teachers showed Stereotype-Consistent responding in the Normal-Positive trial-type and Stereotype-Inconsistent responding in the trainee teacher group during the ADHD-Positive trial-type.

The findings in the trainee teacher group were somewhat unintuitive due to explicit research one may not expect participants to demonstrate a strong verbal history of relating positive target stimuli with ADHD. This might reflect a lack of experience and exposure of these participants with an ADHD population in the classroom compared to qualified teachers. For instance, trainee teachers might not be aware of the prototypical behaviours associated with an ADHD diagnosis (e.g., Pisecco, Huzinec, & Curtis, 2001). Furthermore, the qualified teachers' pro-Normal relational bias might be due to their extensive history and experience of relating Normal pupils with positive attributes, as they require less intensive classroom resources than pupils with attention deficits.

Although other trial-types were non-significant it is interesting to note that trainee teachers tended to respond in a manner that was Stereotype-Consistent on the remaining three IRAP trial-types and qualified teachers tended to respond in a manner that was Stereotype-Consistent in the *Normal* blocks and Stereotype-Inconsistent in the *ADHD* blocks. On speculation, this could reflect a distinction between the two groups on implicit responding (albeit not reaching statistical significance), i.e., qualified teachers were pro-Normal and pro-ADHD whereas trainee teachers were pro-Normal and showed a combination of both pro- and anti-ADHD.

A pro-Normal relational bias in the qualified teacher sample demonstrates a pre-established learning history that is consistent with Normal-Positive whereas a pro-ADHD

relational bias demonstrates a pre-established learning history that is inconsistent with ADHD-Positive (Nicholson & Barnes-Holmes, 2012). This could reflect qualified teachers high level of education received at University, frequent professional development training courses and exposure with an ADHD population in their work settings. Furthermore, levels of diversity in educational settings have grown exponentially over time, particularly with the inclusion of students with various disorders in mainstream classrooms including ASD, EBD and ADHD. In addition, classrooms have become more culturally diverse in Ireland. Given that teachers spend a great deal of their time working with children with a range of diverse needs, it is heartening that they do not reveal anti-ADHD relational bias when faced with a myriad of teaching challenges on a daily basis.

On the other hand, pro- and anti-ADHD relational bias demonstrated in the trainee teacher group could reflect current explicit research that suggests a lack of public knowledge about what ADHD is and how it can be treated (Bekle, 2004; Lee, 2014; Vereb & DiPerna, 2004). Thus, based on conflicting histories of relating ADHD positively and negatively trainee teachers did not respond in a way that was Stereotype-Consistent in the ADHD blocks of trials, revealed by in their combination of both pro- and anti-ADHD relational responding. This interpretation is purely speculative due to the limited number of significant findings in Study 1. However, it is reasonable to suggest that had sample sizes been larger and stronger effects obtained then results could support work by Roddy et al., (2011) and Ritzert et al., (2016) that demonstrate that like weight/shape bias, ADHD relational bias might be comprised of a pro-Normal rather than an anti-ADHD relational bias.

The mean ages of participants in Study 1 may be considered a confounding factor as the qualified teacher group (M=32) were older than the trainee teacher group (M=19). Thus, age of participants may have influenced responding on the IRAP and may be important to consider when analysing outcomes on direct and indirect measures (Hummert et al., 2002).

Based on statistical findings in Study 1, it was difficult to conclude, whether relational biases were influenced by such variables as years' of teaching experience, professional training, exposure to an ADHD population or due to some other extraneous variables. Thus, Study 2 aimed to address these issues and examine implicit attitudes of a general population/convenience sample ($n=41$) who had no prior teacher training or experience with ADHD. Study 2 employed an identical IRAP to Study 1 along with two explicit measures of ADHD stigma (e.g., ASQ) and psychopathology (e.g., DASS). It was predicted that this cohort would display high stigma perceptions towards ADHD on the ASQ but that this bias would be absent on the IRAP. In addition, it was hypothesised that participants would display a pro-Normal and anti-ADHD relational bias such that responding would be faster during history-consistent blocks of trials compared to history-inconsistent blocks of trials.

Results on IRAP performance revealed that participants' responded in a Stereotype-Consistent manner in the *Normal* trial-blocks and a Stereotype-Consistent and Inconsistent manner on the *ADHD* trial-blocks, with all four IRAP trial-types reaching statistical significance compared to zero. This is in noticeable contrast to Study 1, as it shows a well-practiced history of relating Normal with positive stimuli but shows a history of relating ADHD with positive and negative stimuli. This may, in part, be accounted for within the framework of RFT that suggests responding occurs on a continuum of high to low complexity and derivation (see Hughes et al., 2012).

These results provide further support for the IRAPs four trial-type methodology and the level of nuanced responding that it provides. Furthermore, findings in Study 2 are in line with current research investigating attitudes towards body image (e.g., Roddy et al., 2011). According to Ritzert et al. (2016) a positive bias towards thinness rather than negative bias to fatness may underlie implicit weight/shape bias. For instance, intuitively, one could expect that participants would display a pro-thin and an anti-fat relational bias due to explicit

research that suggests most people have a well-established verbal history of negatively relating self and others with being fat (Ritzert et al., 2016). However, findings revealed outcomes that were in contrast with this assumption i.e., participants were displayed a pro-self-thin relational bias as well as a pro-self-fat relational bias (Ritzert et al., 2016; Roddy et al., 2011). Thus, the results from Study 2 may reflect a relational bias that is comprised of pro-Normal rather than anti-ADHD relational bias.

In addition, explicit studies show that international differences are prevalent with regard to treatment and interventions for ADHD as well as discrepancies within diagnostic practices (Swanson et al., 2006). The IRAP can be said to reflect the impact the wider verbal community (including its discourses and media) has on participants' responding to stimuli on the IRAP (Finn, Barnes-Holmes, Hussey, & Graddy, 2016). Given that the current work was the first to assess ADHD stigma using an Irish sample, results might reflect a common verbal history prevalent in the wider Irish community that an ADHD relational bias is made up of pro-Normal rather than anti-ADHD relational bias. Although any conclusions made are tentative, it may be compelling to compare these results with a U.S. participant sample that are more exposed to media campaigns due to direct-to-consumer advertising that surrounds mental health. Thus, cultural differences may emerge with the U.S. sample displaying a different learning history related to ADHD.

Hypothetically speaking, the IRAP performance of trainee teachers in Study 1 could reflect the behavioural outcomes of the convenience sample in Study 2. Perhaps, these two groups of research participants have common characteristics e.g., proximity in age (trainee teachers, $M=19$; convenience sample, $M=24$), as well as limited experience and training with an ADHD population. Hence, they may have similar learning histories of implicit relational bias towards ADHD. That is, both groups displayed pro-Normal relational bias and a combination of pro- and anti-ADHD relational bias (albeit not reaching statistical

significance in three out of four trial-types in the trainee teacher group). It may be the case that the trainee teachers and the convenience sample in Study 2 are not as aware of the problems associated with ADHD in the classroom as qualified teachers.

The data from the current study are preliminary in many respects and aimed to explore the nature of implicit biases towards ADHD. Small sample size and the use of convenience sampling means that results should be interpreted tentatively and limits their generalisability to the public domain. For example, it would be beneficial to employ a random sample (as opposed to a convenience sample) as it would be more representative of public attitudes. This type of sampling is preferable for scientific research as results are more representative and therefore generalisable to the public domain. A future study could control for these limitations and use higher participant numbers and random sampling methods to address technical issues.

Results from explicit measures in Study 1 indicated statistically significant differences between the two teacher groups on the ASQ, overall DASS and DASS anxiety and DASS depression subscales. Explicit data revealed that trainee teachers showed higher stigma perceptions towards ADHD as measured by the ASQ and higher ratings of personal distress, depression and anxiety as measured by the DASS. This is not in keeping with previous research that has shown more experienced individuals display lower ratings of stigma on explicit measures (e.g., Barnes-Holmes et al., 2006). For example, Barnes-Holmes et al. (2006) found that less experienced teachers showed higher explicit stigma towards ASD than those with more experience, whereas results from Study 1 depicted the reverse i.e., participants with less experience responded more positively towards the experiences of individuals with ADHD than their more experienced counterparts.

A possible explanation for this may be due to the fact that Barnes-Holmes et al. (2006), as well as other studies (e.g., Kelly and Barnes-Holmes, 2013; Kelly & Barnes-

Holmes, 2015), used participant samples who specialised in ASD therefore demonstrated lower stigma ratings relative to participants who were not specifically trained in ASD. It is likely that neither group in Study 1 had prior ADHD specific training as most professional development courses in Ireland focus on aspects of SEN such as ASD and in some respects ADHD can be said to “go under the radar”. Other explicit data has supported the finding that certification (as opposed to years’ experience) influences explicit responses (Bell et al., 2011). Thus, a future study could employ a sample of participants with ADHD specific training to account for the role of certification in implicit and explicit responding.

Recall that the ASQ measures experiences about ADHD and not beliefs about the disorder per se. For example, the style of questioning put forward on the ASQ asks participants to respond to statements that are written in the third person e.g. “People with ADHD are treated like outcasts” or “People with ADHD worry that others may judge them when they find out they have ADHD”. Thus, responding more favourably towards ADHD and agreeing with these statements shows that participants were empathetic towards the *experiences* of ADHD diagnosed individuals. To illustrate further, agreeing that people with ADHD worry about telling others would suggest a level of empathy towards ADHD and is indicative of a high score on the ASQ. On the other hand, high scores may also reflect socially appropriate responding as participants wish to conceal privately held beliefs in order to be perceived in a positive light or concord with researcher expectations (Holtgraves, 2004; Hughes et al., 2011). This highlights a well-documented limitation inherent in explicit measures i.e., explicit assessment procedures may not measure what they intend and are often limited by social desirability factors.

On balance, it is important to note that although the qualified teacher group showed less stigma perceptions towards ADHD than the trainee teacher group, both groups were largely positive towards the experiences of ADHD diagnosed individuals.

In sum, the trainee teacher group demonstrated increased ratings on the ASQ indicative of high stigma perceptions towards ADHD. Also in keeping with these outcomes, trainee teachers demonstrated a pro-ADHD relational bias on the IRAP. On the other hand, qualified teachers demonstrated high ratings of stigma perceptions towards ADHD but no anti- or pro-ADHD bias on the IRAP. Explicit data from Study 2 showed that the convenience sample displayed high ratings of stigma perceptions towards ADHD and conflicting pro- and anti- ADHD relational bias on implicit measure outcomes.

These findings raise the question as to whether the prevalence of stigma associated with ADHD is as strong in Irish samples as stigma associated with other categories of SEN. For example, Scanlon and Barnes-Holmes (2006) found that pre-intervention IRAP results indicated a negative bias towards EBD relative to typically-developing children in secondary school and trainee teacher samples. Thus, perhaps EBD is viewed more negatively and is associated with a stronger learning history due to its characteristics of emotional and behavioural problems. Furthermore, EBD may be viewed as more socially problematic in classroom settings relative to an ADHD diagnosis with further explicit research demonstrating ADHD is not perceived as negatively as other areas of mental health e.g., depression (Coleman et al., 2009). Thus, it could be the case that participants' relational biases towards ADHD are not strong or potent enough as demonstrated on previous IRAP studies towards racial stereotyping (Barnes-Holmes et al., 2010a) and areas of psychopathology (Hussey et al., 2015). Thus, there may be an absence of attitudinal bias towards ADHD, at least in the qualified teacher sample resulting in public uncertainty about what ADHD is and how it can be treated.

Findings from the current studies (1 and 2) may reflect a lack of knowledge about ADHD within participant groups, therefore future studies could employ additional knowledge based questionnaires (e.g., KADDS; Scituito et al., 2000) to determine the level of participant

knowledge related to ADHD, prior to conducting the IRAP. Furthermore, additional ADHD stigma questionnaires could be employed to examine stigmatising attitudes towards ADHD as well as the ADHD stigma questionnaire.

Results from the overall DASS, DASS depression and anxiety subscales showed that compared to qualified teachers, trainee teachers had significantly higher ratings of overall personal distress, depression and anxiety. As stated previously, this might reflect mental health concerns prevalent in University students associated with perceived social pressure to excel in academic performance and achievement (Bayram & Bilgel, 2008). The current research shows that this might not be a lasting effect as qualified teachers did not reveal high levels of personal distress on DASS outcomes. Further research is required to examine effects of high levels of personal distress in a student teacher sample and contrast these with a control group. Furthermore, the implementation of a stress-management package could be an effective way to assist students with the struggles they face at University while meeting demands of third level education (see Scanlon & Barnes-Holmes, 2013).

In Study 1, there was one implicit-explicit correlation found for each group. For the qualified teacher group a significant positive correlation was found between the Normal-Positive trial-type and the MBI-ES emotional exhaustion subscale, suggesting that qualified teachers were more pro-Normal when levels of exhaustion were higher. This supports the point of view that less resources are required for Normal pupils compared to ADHD pupils in the classroom as they may not be as demanding on teachers' time. There was also a negative correlation between the Normal-Negative trial-type and DASS stress in the trainee teacher group. This correlation demonstrates that as stress scores went down, positive relational bias towards Normal pupils went up. In other words, the less stressed trainee teachers were the more positive they were about Normal pupils. These unusual implicit-explicit correlations are

commonly found in IRAP studies as the IRAP and explicit measures generally diverge due to differing focuses that are not directly relatable (Sabin et al., 2009).

These studies aimed to tease apart differences in IRAP performance as well as serve as a comparison for results found on explicit measures. Study 1 revealed pro-Normal relational biases in the qualified teacher group and a pro-ADHD relational bias in the trainee teacher group. While participants in Study 2 revealed a pro-Normal relational bias in the Normal blocks and a combination of pro- and anti-ADHD relational biases in the ADHD blocks. Taken together, future studies could employ larger samples who are aged-matched, utilise random sampling techniques as well as additional questionnaires to provide further insight into implicit beliefs about ADHD.

Procedural constructs. Target stimuli were selected for the current IRAP based on research that has shown substantial stigmatisation associated with ADHD and were gleaned from explicit research that suggests prevalent beliefs pertaining to deficits in emotional regulatory abilities (Mangiona Walcott, & Landau, 2004) and challenging behaviours (Canu et al., 2007; Sandler et al., 1993; Zentall et al., 2001). Yet, it could be argued that the chosen target stimuli did not capture subtleties that underlie prejudice towards ADHD. Revising target stimuli in a future ADHD IRAP and using words closer to the natural language of the target group could reveal biases that the present IRAP did not. Additionally, employing vignettes when designing future studies could serve to “prime” participants about prototypic behaviours that are common in ADHD diagnosed children (Bast & Barnes-Holmes, 2015). Thus, facilitate a greater understanding about how these difficulties can persist in a classroom setting.

For example, Bast and Barnes-Holmes (2015) demonstrated how positive and negative priming can affect IRAP performance. The study compared two groups e.g., a “Negative Priming Group” ($n=43$) and a “Positive Priming Group” ($n=38$). The former group

were asked to write down at least three positive experiences from their past and then complete two IRAPs and a number of explicit measures and the latter group were asked to write down at least three negative experiences from their past and then complete the same two IRAPs and explicit measures (Bast and Barnes-Holmes, 2015). The IRAPs were developed to target feelings versus outcomes related to succeeding and failing (Bast and Barnes-Holmes, 2015). Results indicated that positive and negative priming affected outcomes on the IRAPs. Thus, authors conclude that it might be useful for future studies to include priming tasks within their experimental design (Bast and Barnes-Holmes, 2015). Employing vignettes in future ADHD studies might serve to “prime” participants prior to IRAP exposure and determine whether asking participants to consider prototypic ADHD behaviours would dramatically effect behavioural outcomes.

Alternatively, a future study may consider employing pictures as target stimuli to examine ADHD relational bias. For example, other IRAP studies have employed pictorial IRAPs in areas such as attractiveness bias (Murphy et al., 2015), disgust sensitivity in Obsessive-Compulsive tendencies (Nicholson & Barnes-Holmes, 2012) and body weight/shape bias (Roddy et al., 2009; 2011). Many researchers suggest pictures are more perceptual than words for implicit testing research hence, can be more effective in capturing biases that word stimuli cannot (Henson, Price, Rugg, Turner, & Friston, 2002). Thus, considering a pictorial ADHD IRAP design in future studies might be beneficial in uncovering implicit attitudes towards ADHD. For example, using previously developed vignettes as a guide, researchers could employ images of pupils engaged in problem behaviours that are prototypic of ADHD in a classroom setting (e.g., being disruptive) versus pupils who are not engaged in this behaviour (i.e., focused on academic activities) (Coleman et al., 2009). This may be more compelling in revealing implicit attitudes towards ADHD

then utilising word stimuli. Further investigation is warranted into this area to determine if implicit attitudes are evident using alternate stimuli e.g., picture IRAP or vignettes.

A variable that has shown to influence behavioural outcomes on the IRAP are the types of rules employed at the initial phase of the procedure (Finn et al., 2016). These instructions have shown to effect participant responses to stimuli as they appear on the IRAP (Finn et al., 2016). Finn et al. (2016) employed three separate experiments to assess the extent to which rules e.g., specific versus general would impact on the strength of relational responding measured by a Shapes-and-Colours IRAP. According to Finn et al. (2016) providing detailed rules that specify aspects of a relational network during an IRAP can impact on behavioural outcomes and may in part account for unpredicted IRAP effects in the ADHD trial-types across the two studies. Therefore, future studies would address how rules are displayed prior to conducting studies as they can influence IRAP effects dramatically (Finn et al., 2016).

Overall, the IRAP used in the current research identified mixed findings. In Study 1 a pro-Normal relational bias was evident in the qualified teacher group and a pro-ADHD relational bias was evident in the trainee teacher group. In Study 2, a pro-Normal and a combination of pro- and anti-ADHD relational bias was demonstrated in a general population/convenience sample. Results on explicit measures showed high rates of stigma perceptions in all participant groups which indicates positive explicit attitudes towards experiences of ADHD and also highlights a divergence in implicit-explicit responding.

Priming Effects. Recent debate in the social psychology literature centred on priming effects highlights the influence that “primes” have on attitudes and behaviour (Bower, 2012). Primes are unnoticed cues that effect aspects of lab experiments and have become a well-established phenomenon regarded by many researchers in the field social psychology (Bower, 2012). Bower (2012) argues that participants recruited for psychology experiments make

assumptions related to what the study is about and how they are expected to behave. This makes it extremely difficult to study social behaviour without the confounding priming effects and unintended signals produced by the researcher (Bower, 2012). The current study may have encountered such shortfalls related to participant-researcher interactions that were unintended but may have affected participant's performance on the IRAP.

Conclusions and Future Directions

The current IRAP was developed to measure implicit attitudes towards ADHD and to contrast these findings with those found on explicit measures. Overall, qualified and trainee teachers did not appear to reveal statistically significant, negative, relational bias towards ADHD. On the contrary, trainee teachers revealed a pro-ADHD relational bias and qualified teachers revealed a pro-Normal relational bias. Possible explanations for this type of responding in the qualified teacher group may include high levels of University education and professional training and exposure with an ADHD population. Whereas a lack of direct experience and knowledge of problems associated with ADHD may reflect pro-ADHD responding in the trainee teacher group. In Study 2, a participant group that comprised of a convenience sample of adults with no prior teaching experience or training demonstrated pro-Normal, pro-ADHD and anti-ADHD relational biases. It was suggested that conflicting results found in Studies 1 and 2 suggest that ADHD bias may be comprised of pro-Normal rather than anti-ADHD relational bias.

To further investigate the concept of ADHD relational bias future studies could employ two separate IRAPs (e.g., depression and EBD IRAPs) to compare how participants respond when relating target stimuli with other categories of childhood mental health disorders. Furthermore, investigating the attitudes of a secondary school teacher sample might reveal different learning histories relative to those of a primary school teacher sample. Employing a pictorial IRAP, using a randomised sampling method, and increased overall

participant numbers may enhance future analysis into the nature of implicit attitudes towards ADHD.

Investigating ADHD stigma within society is pertinent as there are many negative consequences associated with the disorder such as social isolation, barriers to treatment, delays in help seeking, and the manifestation of self-stigma, public-stigma and courtesy-stigma (Canu et al., 2007; Kellison et al., 2010). Hence, determining the extent of implicit bias towards ADHD and developing behavioural interventions to reduce negative beliefs could be seen as ways of addressing stigma related issues within society (e.g., Scanlon & Barnes-Holmes, 2013). This has a practical application relevant in society as reducing negative attitudes could facilitate greater inclusion of SEN in mainstream settings as well as promote enhanced public perceptions of the disorder.

ADHD is a commonplace diagnosis with high prevalence rates in children and adolescents, therefore it is important that researchers address issues related to stigma in order to minimise negative impacts on diagnosed individuals. For instance, employing intervention packages such as a stress-management intervention (see Scanlon & Barnes-Holmes, 2013), could impact attitudinal change. The role of the social psychologist is salient in this, as researchers work to develop effective assessment methods to better understand biases under scrutiny. This may in turn provide fundamental insights into attitude constructs aiding the successful implementation of integration practices, creating support programmes for families as well health benefits related to professional burn-out and psychopathology in teachers and the general public.

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Appendix 1
Consent for Research Participants

I, the undersigned, understand and give my consent to the following:

- ___ The experiment will last approximately forty-five minutes
- ___ I will be required to take part in 2 phases of the experiment involving a computerised task and filling in three questionnaires
- ___ I am free to terminate my participation at any time and may withdraw the data obtained at conclusion of my participation
- ___ I understand that I participate under my own volition and that no monetary remuneration will result from participation
- ___ I understand that my data will be anonymised at the outset; that data obtained will be used only for the purpose of research and analysed at a group rather than individual level; data will be kept in strict confidentiality in accordance with Data Protection Acts
- ___ Data obtained from this research will be collated and form part of Roisin Gallagher's doctoral thesis and the results may be included in other publications
- ___ I understand that the study has been approved by the relevant ethics committee at Maynooth University and abides by The Psychological Society Code of Ethics and the Behaviour Analyst Certification Board Code of Ethics
- ___ I have read and understood this form in full

I have received this information in an understandable way and all my questions have been answered.

Please print and sign your name below if you are willing to participate in the study.

Name (In block capitals): _____

Signature: _____

Date: _____

If during your participation in this study you feel the information and guidelines that you were given have been neglected or disregarded in any way, or if you are unhappy about the process, please contact the Secretary of Maynooth University Ethics Committee at research.ethics@nuim.ie or +353 1 708 6019. Please be assured that your concerns will be dealt with in a sensitive manner.

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Appendix 2
Consent for Research Participants

I, the undersigned, understand and give my consent to the following:

- ___ The experiment will last approximately forty minutes
- ___ I will be required to take part in 2 phases of the experiment involving a computerised task and filling in two questionnaires
- ___ I am free to terminate my participation at any time and may withdraw the data obtained at conclusion of my participation
- ___ I understand that I participate under my own volition and that no monetary remuneration will result from participation
- ___ I understand that my data will be anonymised at the outset; that data obtained will be used only for the purpose of research and analysed at a group rather than individual level; data will be kept in strict confidentiality in accordance with Data Protection Acts
- ___ Data obtained from this research will be collated and form part of Roisin Gallagher's doctoral thesis and the results may be included in other publications
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- ___ I have read and understood this form in full

I have received this information in an understandable way and all my questions have been answered.

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Appendix 3

For most of the questions, just circle the letters that go with your answer. There are no right or wrong answers, we would just like your opinions. This set of questions asks about some of the experiences, feelings and opinions people with ADHD might have and how they are treated. Please do your best to answer each question. For each item circle your answer: strongly disagree (SD), disagree (D), agree (A) or strongly agree (SA).

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. People who have ADHD feel guilty about it	SD	D	A	SA
2. People's attitudes about ADHD may make persons with ADHD feel worse about themselves	SD	D	A	SA
3. Someone who has ADHD would think it is risky to tell others about it	SD	D	A	SA
4. People with ADHD lose their jobs when their employers find out	SD	D	A	SA
5. People with ADHD work hard to keep it a secret	SD	D	A	SA
6. Someone with ADHD feel they aren't as good a person because they have ADHD	SD	D	A	SA
7. People with ADHD are treated like outcasts	SD	D	A	SA
8. People with ADHD feel damaged because of it	SD	D	A	SA
9. After learning they have ADHD, a person may feel set apart and isolated from the rest of the world	SD	D	A	SA
10. Most people think that a person with ADHD is damaged	SD	D	A	SA
11. A person with ADHD feels that they are bad because of it	SD	D	A	SA
12. Most people with ADHD are rejected when others find out	SD	D	A	SA
13. People who have ADHD are very careful about who they tell	SD	D	A	SA
14. Some people who learn of another person having ADHD grow distant	SD	D	A	SA
15. After learning they have ADHD, people worry about others discriminating against them	SD	D	A	SA
16. Most people are uncomfortable around someone with ADHD	SD	D	A	SA
17. People with ADHD worry that others may judge them when they find out they have ADHD	SD	D	A	SA
18. People with ADHD regret having told some people that they have ADHD	SD	D	A	SA
19. As a rule, people with ADHD feel that telling others that they have ADHD is a mistake	SD	D	A	SA
20. People don't want someone with ADHD around their children once they know that person has ADHD	SD	D	A	SA
21. Some people act as though it's the person's fault that they have ADHD	SD	D	A	SA
22. People with ADHD have lost friends by telling them that they have ADHD	SD	D	A	SA
23. People with ADHD have told others close to them to keep The fact that they have ADHD a secret	SD	D	A	SA

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24. The good points of people with ADHD tend to be ignored	SD	D	A	SA
25. People seem afraid of a person with ADHD once they learn they have ADHD	SD	D	A	SA
26. When people learn that someone has ADHD, they look for flaws in their character	SD	D	A	SA

Appendix 4

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement. The rating scale is as follows:

0 Did not apply to me at all,

1 Applied to me to some degree, or some of the time

2 Applied to me to a considerable degree, or a good part of time

3 Applied to me very much, or most of the time

1. I found it hard to wind down	0	1	2	3
2. I was aware of dryness of my mouth	0	1	2	3
3. I couldn't seem to experience any positive feeling at all	0	1	2	3
4. I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5. I found it difficult to work up the initiative to do things	0	1	2	3
6. I tended to over-react to situations	0	1	2	3
7. I experienced trembling (e.g., in the hands)	0	1	2	3
8. I felt that I was using a lot of nervous energy	0	1	2	3
9. I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10. I felt that I had nothing to look forward to	0	1	2	3
11. I found it difficult to relax	0	1	2	3
12. I found myself getting agitated	0	1	2	3
13. I felt down-hearted and blue	0	1	2	3
14. I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15. I felt I was close to panic	0	1	2	3
16. I was unable to become enthusiastic about anything	0	1	2	3
17. I felt I wasn't worth much as a person	0	1	2	3
18. I felt that I was rather touchy	0	1	2	3
19. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)	0	1	2	3
20. I felt scared without any good reason	0	1	2	3
21. I felt that life was meaningless	0	1	2	3

Appendix 5

Educator's Survey

How Often:	0	1	2	3	4	5	6
	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day

How Often**0 - 6**

1. _____ I feel emotionally drained from my work.
2. _____ I feel used up at the end of the workday.
3. _____ I feel fatigued when I get up in the morning and have to face another day on the job.
4. _____ I can easily understand how my students feel about things.
5. _____ I feel I treat some students as if they were impersonal objects
6. _____ Working with people all day is really a strain on me.
7. _____ I deal very effectively with the problems of my students.
8. _____ I feel burned out from my work.
9. _____ I feel I'm positively influencing other people's lives through my work.
10. _____ I've become more callous toward people since I took this job.
11. _____ I worry that this job is hardening me emotionally.
12. _____ I feel very energetic.
13. _____ I feel frustrated by my job.
14. _____ I feel I'm working too hard on my job.
15. _____ I don't really care what happens to some students.
16. _____ working with people directly puts too much stress on me.
17. _____ I can easily create a relaxed atmosphere with my students.
18. _____ I feel exhilarated after working closely with my students.
19. _____ I have accomplished many worthwhile things in this job.
20. _____ I feel like I'm at the end of my rope.
21. _____ In my work, I deal with emotional problems very calmly.
22. _____ I feel students blame me for some of their problems.