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ORIGINAL ARTICLE

Stigma and attention-deficit/hyperactivity disorder: negative perceptions and anger emotional reactions mediate the link between active symptoms and social distance

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Abstract
This study aimed to understand the contributions of active ADHD symptoms and the diagnostic label of ADHD in yielding negative attitudes and social distance ratings. Using Amazon's Mechanical Turk ($n = 305$), respondents were assigned to read a vignette about: (a) a typically developing child, (b) a child with active ADHD symptoms and (c) a child with active ADHD symptoms + diagnostic label. Participants were then asked to answer questions about their beliefs and feelings about the child in the vignette. The active ADHD symptom condition predicted higher levels of social distance, and this link was mediated by negative and animalistic adjective ratings, and by angry emotions felt by the participants after reading the vignettes. Our findings suggest that ADHD symptoms drive negative views and social distance and that an ADHD label may serve as a protective factor to help people overcome biases related to childhood ADHD. ADHD symptom literacy and contact with children with varying levels of ADHD symptoms may be an important target to help reduce negative attitudes.

Keywords ADHD · Stigma · Social distance

Introduction

Stigma, defined as an attribute or characteristic that conveys a social identity that is devalued in a particular social context (Goffman 1963), has been identified as a primary concern in the field of mental health (Hinshaw and Cicchetti 2000). In particular, people with psychiatric disorders are amongst the most stigmatized groups today (Harris and Fiske 2006; Hinshaw 2007).

Corrigan and Watson (2002) proposed that people with mental illness are impacted by both the symptoms and disabilities that result from their illness, but they also have to withstand public stigma. Public stigma, or the reactions from the general public, is characterized by stereotypes, prejudice, and discrimination. For example, stereotypes include negative *beliefs* about people with mental illness (i.e. dangerous, stupid), while prejudicial attitudes involve agreement with stereotypes that yield negative *emotional reactions* (i.e. fear and anger). Lastly, prejudice leads to *behavioural reactions*, and in most cases, it leads to discrimination and social distancing (Corrigan and Watson 2002).

Longitudinal studies have shown that negative attitudes towards those with mental illnesses can start as early as during playschool (Weiss 1994) and endure into adulthood (Green et al. 1987; Weiss 1994). Such negative attitudes are often associated, in turn, with rejection and greater social distance from mental illness sufferers (Corrigan et al. 2005). Harris and Fiske (2006) suggest that one motivation behind these stigmatizing responses may be a reduction in the perceived humanity of psychiatric patients. In other words, people with psychiatric disorders are often dehumanized and tend to be associated with animal-like words (e.g. wild, beast). Associating animal characteristics with members of another group often increases perceived dangerousness of them, eliciting fear and anxiety in the perceivers, and in turn, promotes social rejection (Martinez et al. 2011), forestalls empathy, and even makes violent or hostile behaviours towards these members seem acceptable (Bandura 2002; Castano and Giner-Sorolla 2006).

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Despite the increase in knowledge regarding mental illnesses, a meta-analysis of changes in public attitudes during the last 20 years revealed that attitudes towards people with mental illness have not significantly improved (Schomerus et al. 2012). Many of those who suffer from mental illnesses often internalize the societal attitudes and display negative feelings about themselves (i.e. internalized or self-stigma; see Crocker 2003; Martinez et al. 2011; Masuch et al. 2018), which discourages them from seeking treatment and increases the rate of premature treatment termination (Sirey et al. 2001). In adults with attention-deficit/hyperactivity disorder (ADHD), internalized stigma has also been correlated with psychological distress, low self-esteem, functional impairment, and quality of life (Masuch et al. 2018). As a result, stigma and discrimination have been the most significant obstacles to mental health care and to improvement of quality of life for people suffering from mental illnesses (Bharadwaj et al. 2017; Sartorius 1998). In this paper, we focus specifically on the stigma associated with ADHD. Given that many parents and patients avoid seeking care out of fear of bearing the label of ADHD, we examine the contributions of labelling versus behaviour in negative attitudes towards children.

ADHD and stigma

Children with ADHD, a common neurodevelopmental disorder, may be uniquely vulnerable to mental illness stigma (Lebowitz 2016; Mueller et al. 2012). Individuals with ADHD experience aberrant and impairing levels of inattention and hyperactivity/impulsivity that affect various areas of functioning, including peer relationships, academic achievement, and family relationships. ADHD is a common childhood disorder that has a worldwide prevalence of 7% (Thomas et al. 2015), and studies suggest that 70–80% will continue to meet criteria in adolescence and 50–70% will continue to display symptoms that meet the diagnostic criteria in adulthood (Barkley et al. 2002; Faraone et al. 2006). Research indicates that those with ADHD endure a lifetime of stigma (Canu et al. 2008; Mueller et al. 2006).

A review on stigma and ADHD found that adults desire the greatest social distance from children with a diagnosis of ADHD, as compared to other illnesses like depression and asthma (Martin et al. 2007). Similar patterns of social distance and stigmatizing views towards children with ADHD emerge among parents of children with ADHD (Harpur et al. 2008), teachers (Eisenberg and Schneider 2007), and peers (Singh et al. 2010; Law et al. 2007). Research has also shown that children with ADHD internalize the negative views and prejudices that others have for them, which might suggest self-stigma (Wiener et al. 2012). Despite the strong evidence suggesting that ADHD is associated with public stigma, it is unknown what in particular about ADHD elicits such stigmatizing attitudes.

For example, in a sample of college students, stigma was associated with the behaviours of ADHD in a fictitious partner, but not the label (Thompson and Lefler 2016). A similar pattern emerged among a group of 120 children; the majority of participants held negative attitudes towards the child in a vignette displaying ADHD symptoms, with no additional effect on the child with the ADHD diagnosis (Law et al. 2007). Other studies showed that ADHD symptoms and more specifically externalized and norm-violating behaviours are potential sources of stigma and rejection (Koro-Ljungberg and Bussing 2009; Walker et al. 2008). These behaviours are perceived as childish, socially inappropriate, and violent/antisocial (Canu and Carlson 2003; Stroes et al. 2003). On the other hand, other studies have suggested that the diagnostic label elicits more stigma (Angermeyer and Matschinger 2003; Phelan and Basow 2007), while others report that the ADHD diagnostic label only leads to a small increase in stigma (Ohan et al. 2013). Still, some studies have found that independent of diagnostic label, children with ADHD symptoms or with the label are stereotyped by their same aged peers as "careless, lonely, crazy and stupid" (Law et al. 2007). Unfortunately, these stereotypes about ADHD are often accompanied by angry emotional reactions (O'Driscoll et al. 2012). Given the heterogeneity of results, it remains unclear to what extent stigma is driven by active ADHD symptoms versus the presence of a diagnostic label, and what emotional reactions are elicited.

The current study

The primary aim of this study was to address whether children with ADHD are stigmatized because of their expressed behaviour (active symptoms) or because of the diagnostic label that they hold. We assessed stigma via ratings of desired social distance reported by participants. The secondary aim of this study was to examine key mediators of such relationships. In particular, we focused on three key measures of negative attitudes: (1) perceived warmth and competence (i.e. positive and negative adjectives), which have been proposed to be fundamental dimensions of social perception (Fiske et al. 2007); (2) dehumanization (i.e. humanistic and animalistic adjectives; Viki et al. 2006); and (3) emotional reactions. For this study, we focused on reported anger reactions, given that previous studies have found that anger has been linked to ADHD (O'Driscoll et al. 2012), and with greater social distance (see Angermeyer and Matschinger 2003).

Method

Participants and procedure

Using Amazon's Mechanical Turk (MTurk) online platform, we recruited a total of 305 participants from the USA (51% male; 74.1% European/European American; age range 18–67, $M_{age} = 36.22$, $SD_{age} = 10.87$) to complete a 20-min survey (average completion time = 13.70 min). The majority of the participants (52.1%) reported knowing someone with ADHD, and 7.2% disclosed that they had an ADHD diagnosis themselves (see Table 1 for more sample descriptions). No significant differences for knowing someone with ADHD and for being diagnosed with ADHD emerged across conditions. For each of the three experimental groups (described below) of the study, 102, 101, and 102 participants were assigned, respectively.

Participants were informed that they would be answering questions pertaining to their thoughts, feelings, and perceptions of others. Upon giving consent to participate in the study, all participants were first asked some general demographic questions before being given instructions to "imagine meeting a boy named Anthony" and "rate [their] impressions of him" for the purpose of helping the researchers understand the impression formation process. Participants were then randomly assigned to one of the three experimental conditions. For Condition 1 (baseline condition), participants read a "Barnum" description consisting of general, broadly applicable information (see Mendoza-Denton 1999). For Condition 2, common symptoms of inattention and hyperactivity/impulsivity from the Diagnostic Statistical Manual (DSM-5; American Psychiatric Association 2013) were described. Lastly, Condition 3 included the same description as Condition 2 plus the ADHD diagnostic label. The three conditions differed in presentation of vignette descriptions of the boy, Anthony, as follows:

Condition 1: neutral description

Anthony is 12 years old, weighs 109 lb., and is 5′1′. He lives in Albany with his parents and little sister, and has two pets. Anthony enjoys eating pizza and playing with friends during lunch recess. At times, he is affable and sociable, but at other times he would rather be alone. He gets average grades and is interested in history.

Condition 2: behavioural descriptions of ADHD

Anthony is 12 years old, weighs 109 lb., and is 5′1′. He lives in Albany with his parents and little sister, and has two pets. Anthony enjoys eating pizza and playing with friends during lunch recess. Anthony is consistently disrupting the class environment by fidgeting in his seat at random intervals, speaking out of turn multiple times during a 50-min class, getting distracted by his surroundings constantly; in general, Anthony has a hard time making friends, circulates around the room and up and down the rows to see what other students are doing, the students appear to be annoyed by him,

Table 1 Descriptive group characteristics

Variable	%
Place of birth	
USA	95.1
North America (other than USA)	1
Europe	1.6
Asia	2
Other	.3
Gender	
Male	51
Female	49
Age	
18–25	16.7
26–33	30.2
34–41	27.5
42–49	10.8
50+	14.8
Ethnicity	
European/European American	74.1
African/African American	9.5
Latino	3
East Asian/Asian American	9.2
Native American	2
Other	2.3
Education	
Didn't finish H.S.	.7
H.S. Grad/GED	42.6
College graduate	49.2
Postgraduate degree	7.5
Political views	
Very liberal (1)	17
Moderate (2–6)	73
Conservative (7)	5
Religiosity	
Not at all (1)	44
In-between (2–6)	50
Extremely (7)	6
Objective status	
Low (1–3)	37
Middle (4–6)	53
High (7–9)	10
Know someone with ADHD	52.1
Have an ADHD diagnosis	7.2

and he disrupts the flow of the lecture or activity the class was participating in.

Condition 3: behavioural descriptions of ADHD and the diagnostic label

Anthony is 12 years old, weighs 109 lb., and is 5′1′. He lives in Albany with his parents and little sister, and has two pets. Anthony enjoys eating pizza and playing with friends during lunch recess. Anthony was recently referred by his teacher to the school psychologist because he is consistently disrupting the class environment by fidgeting in his seat at random intervals, speaking out of turn multiple times during a 50-min class, getting distracted by his surroundings constantly; in general, Anthony has a hard time making friends, circulates around the room and up and down the rows to see what other students are doing, the students appear to be annoyed by him, and he disrupts the flow of the lecture or activity the class was participating in. Results from the school psychologist show that Anthony meets the criteria for an attention-deficit/hyperactivity disorder (ADHD) diagnosis, a common childhood disorder.

After reading the vignette, participants were asked to report on their emotional reactions, attitudes, and perceptions towards the person they read about, described in detail in the next section. Then they were thanked and compensated $2 for their participation.

Measures

Attitudes (Fiske et al. 2002, 2007)

To assess positive and negative attitudes, participants indicated how much they considered both positive adjectives (i.e. *intelligent, warm, good natured, sociable, reliable, honest, happy, tolerant, responsible*; $\alpha = 0.89$) and negative adjectives (i.e. *clumsy, impulsive, foolish, moody, pessimistic, dominating*; $\alpha = 0.73$) to describe the person in the vignette on a 7-point scale, from 1 (*not at all*) to 7 (*extremely*). Participants were also asked to rate human-related words (i.e. *person, citizen, human*; $\alpha = 0.73$) and non-human-related words (i.e. *wild, animal, beast, pet, untamed*; $\alpha = 0.72$) with the person described in the vignette on a 7-point scale from 1 (*not at all*) to 7 (*extremely*) (Viki et al. 2006).

Emotional reactions (Angermeyer and Matschinger 2003; O'Driscoll et al. 2012)

Participant's reactions of anger were assessed after reading about the person described in the vignette. Guided by previous studies (Impett et al. 2012; Srivastava et al. 2009), anger was assessed with a single item consisting of a synonym cluster (*angry, irritable, mad; M* = 2.01, SD = 1.42*)* on a 7-point scale from 1 (*none at all*) to 7 (*extremely*).

Social distance

Social distance was measured by Gureje et al. (2005) modified version of the Social Distance Scale developed from the World Psychiatric Association (2001) Programme to Reduce Stigma and Discrimination of Schizophrenia. This has been regarded as one of the most widely used measures for assessing public stigma and prejudice (Wark and Galliher 2007). Social distance questions asked how willing participants would be to: (1) move next door to the person depicted in the vignette; (2) spend an evening socializing with the person; (3) make friends with the person; (4) start working closely with the person; and (5) have the person become part of the family, on a scale from 1 (*definitely yes*) to 5 (*definitely not*). In the main text, results are presented using an average composite ($\alpha = .93$), so that scores could range from 1 (low social distance) to 5 (high social distance). Thus, higher scores were suggestive of a desire for greater social distance (i.e. higher stigma).

Covariates

We included several participant background variables as covariates: age, gender, ethnicity, level of education (self, father, and mother), liberal versus conservative, religion, and objective status. In particular, previous studies have found that desire for social distance and negative attitudes for those with a mental illness was moderated by sex (Canu et al. 2008), age, and level of education (Crisp et al. 2005).

Data analytic plan

All statistical analyses were performed with SPSS, version 24 (IBM Corp. 2016). First, preliminary analyses included examination of missing data and outliers and to assess for group differences across all key sociodemographic variables.

The second primary analysis involved examination of the proportion of participants who were in the control, active ADHD symptoms, and active ADHD symptoms + diagnostic label conditions. Third, we computed a series of ANOVAs and Chi-squared tests comparing these groups according to their scores on the variables of interest.

Furthermore, to test multiple mediators, we used the bootstrapping procedure described by Shrout and Bolger (2002) and Preacher and Hayes (2008). Testing simultaneous mediators distinguishes the effect of each mediator in the model, without the biases of parameter estimates (Preacher and Hayes 2008). The bootstrapping procedure is a statistical simulation that is used to generate an empirically derived representation of the sampling distribution

of the indirect effect (Hayes 2013, p. 106). After sampling those cases with replacement, a point estimate of the indirect effect (a-prime × b-prime) is determined for the sample and repeated 10,000 times. We formed 95% bias-corrected and accelerated confidence intervals based upon the distribution of these effects and inferred statistical significance, if this interval did not contain 0 (see Preacher and Hayes 2008; Shrout and Bolger 2002).

Results

No statistically significant condition differences emerged from any of the participants' sociodemographic variables, suggesting that all three conditions were comparable across age, gender, ethnicity, level of education, religiosity, political views, and objective status. Table 2 presents mean values and standard deviations for each variable of interest, across the entire sample and within the three conditions. Mean comparison tests were conducted for participants across the three conditions, also presented in Table 2. The condition with the active ADHD symptoms had significantly higher mean scores for negative adjectives ($M = 4.14$, SD = .99, $F = 45.36$, $p < .001$), animalistic adjectives ($M = 2.69$, SD = 1.05, $F = 22.25$, $p < .001$), social distance scores ($M = 2.80$, SD = 1.06, $F = 3.11$, $p = .046$), and reports of anger ($M = 2.29$, SD = 1.60, $F = 3.52$, $p = .031$).

Across conditions, significant correlations revealed that more negative attitudes were linked with higher social distance scores (see Table 3). These correlations seem to be particularly true for the active ADHD symptoms condition, suggesting that more negative attitudes might be related to the stigma associated with children that display active symptoms of ADHD. In addition, no significant relationships emerged between the sociodemographic variables and outcomes of interest. Therefore, they were not included in our mediation models as covariates.

For mediational analyses, we conducted three different mediation models, one per mediator of interest.

Table 3 Correlations between mediators and social distance scores across conditions

Variable	Condition 1 Neutral $N = 102$	Condition 2 Active symptoms $N = 101$	Condition 3 Active symptoms + label $N = 102$
Positive adjectives	$r = .223$*	$r = -.593$**	$r = -.476$**
Negative adjectives	$r = -.301$*	$r = .466$**	$r = .491$**
Animalistic adjectives	$r = .183$ *(ns)*	$r = .432$**	$r = .286$*
Emotion reports of anger	$r = .146$ *(ns)*	$r = .578$**	$r = .234$*

**$p < .001$

*$p < .05$

Negative adjectives mediator (see Fig. 1)

The active symptoms condition was rated as .5473 units (a_1) more negatively than control, and the active symptoms + ADHD label condition was perceived as .3971 units (a_2) more negatively than the control condition. Furthermore, holding condition constant, those who had more negative perceptions, via higher negative adjectives ratings towards Anthony, also had higher ratings of social distance ($b = .4237$). Relative to control condition, those assigned to the active symptoms condition had attitudes towards Anthony that were .2318 units (relative indirect effect) more negative, which in turn increased their social distance scores. Similarly, participants in the active symptoms + ADHD label condition had attitudes towards Anthony that were .1682 units more negative, which in turn resulted in more social distance. Adjusting for group differences in negative attitudes, those who were exposed to the active symptoms condition reported social distance scores that were .0934 units lower than those who were exposed to the control condition (relative direct effect), and those who were in the active symptoms + ADHD label condition had social distance scores

Table 2 Group differences across adjectives, emotion reactions, and social distance scores

Variable	Entire sample $N = 305$ M (SD)	Neutral $N = 102$ M (SD)	Active symptoms $N = 101$ M (SD)	Active symptoms + label $N = 102$ M (SD)	F-statistic	*P* value
Positive adjectives	4.64 (.98)	5.33 (.71)	4.14 (.95)	4.43 (.85)	56.355	.000
Negative adjectives	3.58 (1.08)	2.87 (1.04)	4.11 (.99)	3.77 (.83)	45.364	.000
Humanistic adjectives	6.55 (.68)	6.53 (.66)	6.59 (.59)	6.55 (.78)	.196	*ns*
Animalistic adjectives	2.27 (1.07)	1.76 (1.01)	2.69 (1.05)	2.36 (.94)	22.251	.000
Emotion reports of anger	2.01 (1.42)	1.76 (1.28)	2.29 (1.60)	1.99 (1.32)	3.518	.031
Social distance score	2.62 (1.11)	2.42 (1.06)	2.80 (1.06)	2.66 (1.17)	3.111	.046

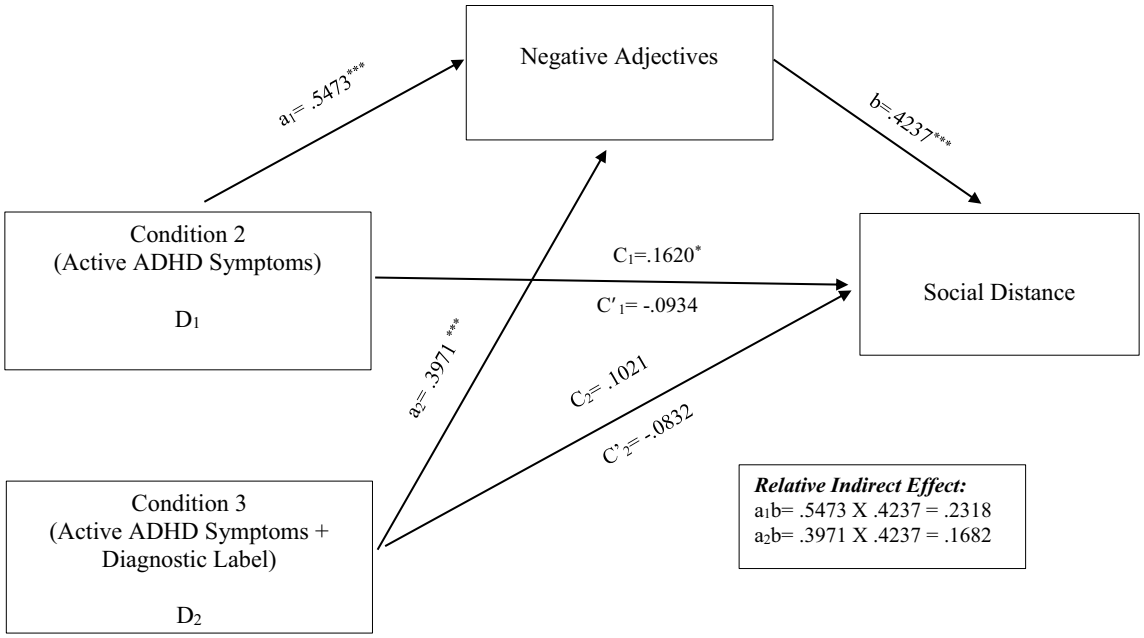

Fig. 1 The relationship between Condition 2 (i.e. active ADHD symptoms) and social distance was partially mediated by negative adjectives people associated with Anthony. ***$p < .001$; **$p < .01$; *$p < .05$

that were .0832 units lower than the control condition. These relative direct effects denoted with C' were not significant, as expected in a partial mediation model.

Animalistic adjectives mediator (see Fig. 2)

The active symptoms condition was rated as .4078 units (a_1) more animalistic than control, and the active symptoms + ADHD label condition was perceived as .2624 units

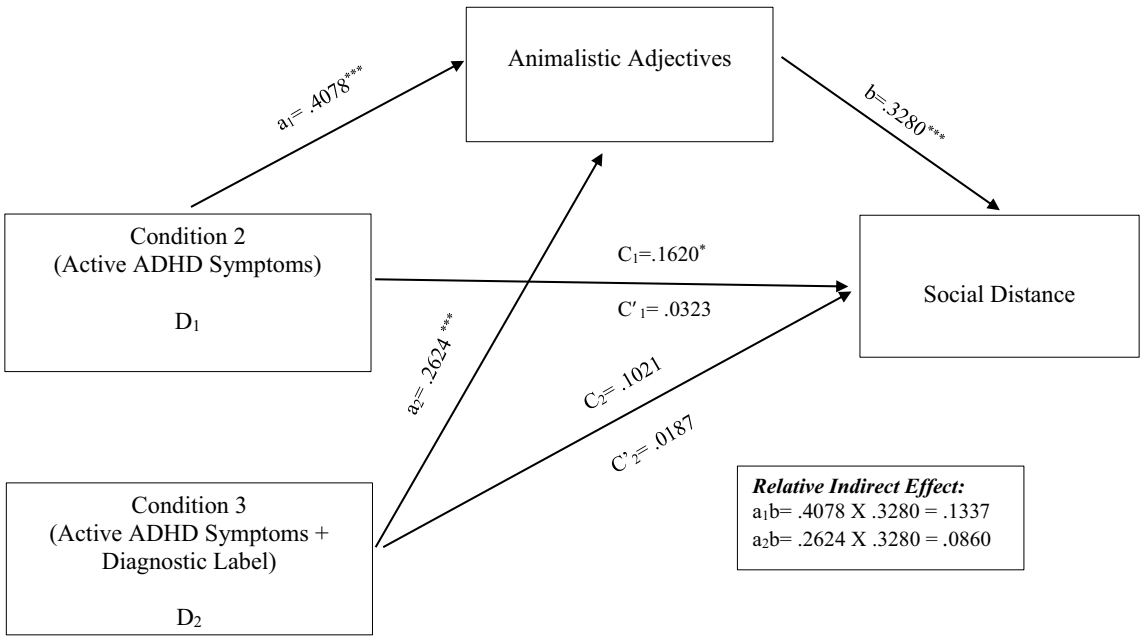

Fig. 2 The relationship between Condition 2 (i.e. active ADHD symptoms) and social distance was partially mediated by ascribed animalistic adjectives participants associated with Anthony. ***$p < .001$; **$p < .01$; *$p < .05$

(a_2) more animalistic than the control condition. Furthermore, holding condition constant, those who had more negative perceptions, via higher animalistic adjectives ratings towards Anthony, also had higher ratings of social distance ($b = .3280$). Relative to control condition, those assigned to the active symptoms condition had attitudes towards Anthony that were .1337 units (relative indirect effect) more negative, which in turn increased their social distance scores. Similarly, participants in the active symptoms + ADHD label condition had attitudes towards Anthony that were .0860 units more negative, which in turn resulted in more social distance. Adjusting for group differences in negative attitudes, those who were exposed to the active symptoms condition reported social distance scores that were .0323 units higher than those who were exposed to the control condition (relative direct effect) and those who were in the active symptoms + ADHD label condition had social distance scores that were .0187 units higher that the control condition. These relative direct effects denoted with C' were not significant, as expected in a partial mediation model.

Angry emotions mediator (see Fig. 3)

Participants that were in the active symptoms condition reported feeling .1735 units (a_1) angrier than those reading vignettes in the control condition, and those reading the vignettes in the active symptoms + ADHD label condition reported feeling .0751 units (a_2) angrier than the control condition, but this was not significant. Furthermore, holding condition constant, those who reported feeling angrier after reading the vignette about Anthony, also had higher ratings of social distance ($b = .3447$). Relative to control condition, those assigned to the active symptoms condition had angry feelings towards Anthony that were .0598 units (relative indirect effect) higher, which in turn increased their social distance scores. Similarly, participants in the active symptoms + ADHD label condition had angrier feelings towards Anthony that were .0258 higher, which in turn resulted in more social distance. Adjusting for group differences in negative attitudes, those who were exposed to the active symptoms condition reported social distance scores that were .1045 units higher than those who were exposed to the control condition (relative direct effect) and those who were in the active symptoms + ADHD label condition had social distance scores that were .0772 units higher that the control condition. These relative direct effects denoted with C' were not significant, as expected in a partial mediation model.

Discussion

In the present study, we compared reactions from participants after they were randomly assigned to receive one of the three descriptions of a young boy who may: (1) appear to be an average child, (2) display behavioural symptoms of ADHD, or (3) display behavioural symptoms and has a diagnosis of ADHD. Consistent with findings from Law et al. (2007), we found that those who received only the

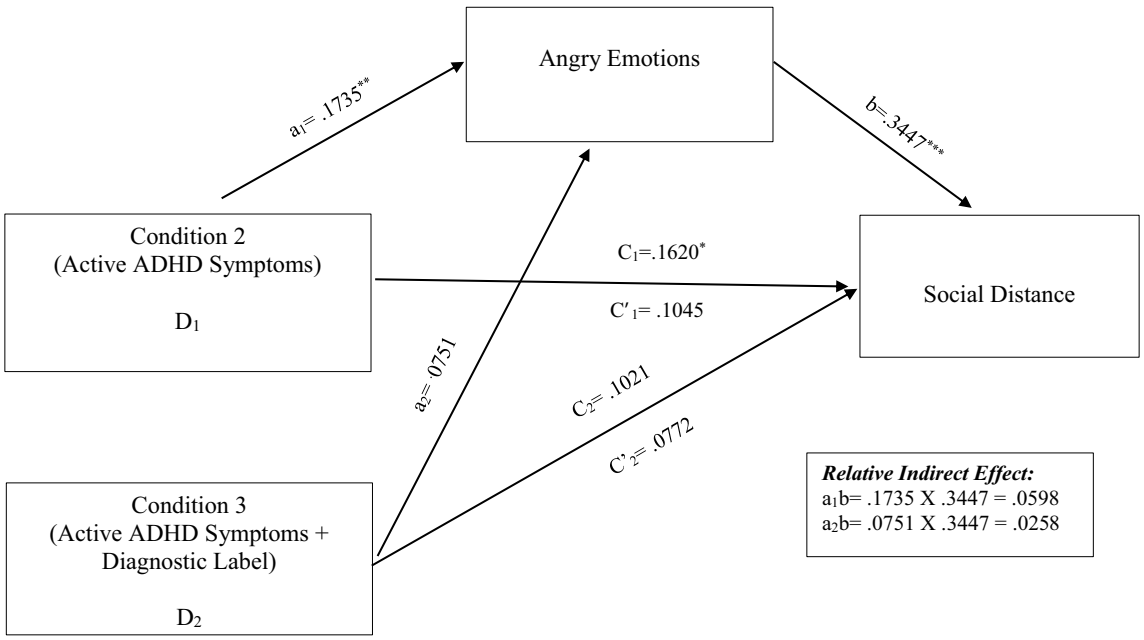

Fig. 3 The relationship between Condition 2 (i.e. active ADHD symptoms) and social distance was partially mediated by how angry (mad, irritated) people felt when thinking about Anthony. ***$p < .001$; **$p < .01$; *$p < .05$

behavioural descriptions but not the diagnostic label showed significantly more stigmatizing attitudes against Anthony, which was reflected by their desire to keep a greater social distance from him while associating him with more animalistic and other negative adjectives. This finding suggests that having an ADHD label actually served as a protective factor that helped participants overcome biases related to childhood ADHD. In addition, results from our mediation analyses suggested that the greater preferred social distance may have resulted from the negative and animalistic characteristics associated with him as well as the anger evoked by the behaviours of the boy. Consistent with previous research in social cognition (Fiske et al. 2002, 2007), this study suggests that when people had less warmth and more negative perceptions about Anthony, these attitudes made them less willing to interact with him and include him in their own social groups, shown by the greater desire for social distance.

Our findings build upon recent studies on the associations between receiving psychiatric labels and being ascribed human or animalistic characteristics. Specifically, studies showing that in comparison with someone who has a physical illness, someone labelled as having a mental illness provokes more social rejection against them because they would be perceived as more dangerous and animal-like (Martinez et al. 2011). However, when an individual was given a specific diagnostic label (rather than a general label of having a mental illness), this person was viewed as possessing more humanity than someone who had a specific diagnosis of physical illness, which in turn decreased social rejection (Martinez et al. 2011). In our study, participants who were informed that the boy displaying certain aberrant behaviours had a diagnosis of ADHD showed less negative attitudes towards him, associated him with less animalistic adjectives, and were more willing to have closer social interactions with him (i.e. less social distance). This suggests that a diagnostic label, rather than stigmatizing, may reduce negative views and create more understanding for individuals who have a psychiatric condition. This result may be especially encouraging for parents whose child may have a chronic psychiatric condition such as ADHD. One key factor that determines whether a child will receive mental health services is the attitudes of his or her parents. However, parents can highly stigmatize children who have a psychiatric condition (Ohan et al. 2013) and may think that receiving a diagnostic label would worsen the situation (i.e. internalized stigma); as a consequence, many children may never receive the adequate assessment and treatment they need. Given that past findings show that a diagnostic label does not significantly contribute to additional stigma (Ohan et al. 2013) or, as our results show, help others understand a child's otherwise seemingly out-of-norm behaviours, the benefits of receiving mental health services may significantly outweigh concerns over the stigmatizing effects of a psychiatric diagnosis.

Some limitations of this study should be noted when interpreting the results. First, the experimental conditions did not vary the age, gender or ethnicity of the target. The results thus may not generalize for girls and children from all ethnic groups. However, the name Anthony was chosen based on past research, showing that there were no priming ethnicity effects based on the name itself (Okonofua and Eberhardt 2015). The gender of the child may also have an impact on the results, as previous studies have found unique links between a mother's perceived stigma in the presence of ADHD symptoms, but only for mothers of boys with ADHD (Charbonnier et al. 2018). Although ADHD is traditionally thought to be a condition predominantly more common in boys, there is ample research showing that girls and adults are also affected (Hinshaw 2002; Hinshaw et al. 2006; Hinshaw et al. 2012), and perceptions for girls having ADHD may also differ from that for boys (Biederman et al. 2005; Millenet et al. 2018; Wiener et al. 2012; Williamson and Johnston 2015). Future studies should investigate whether the labelling effect on ADHD can be generalized to girls, adults, and individuals from various ethnic and cultural groups. Second, this study has only used subjective self-report to measure participants' attitudes towards the protagonist in the vignette. It is possible that, with increasing publicity of mental health in society, reporting positive attitudes towards mental illnesses stems from participants' sought for socially desirability. Future studies may benefit from examining influence of psychiatric labels on implicit attitudes or actual behavioural changes. Last, this study relied on MTurk as the only source of study sample. Future studies should replicate these findings in other samples to further ensure generalizability of the results to the US population. Despite these limitations, taken together, our findings highlight the need for more research aimed at developing a better understanding of what strategies can change attitudes and perceptions towards children with ADHD. In addition to reducing stigma, the public should be better informed in that diagnostic labels may not be as stigmatizing as previously thought, and the benefits from seeking professional help could significantly outweigh the feared social consequences. At the individual level, both knowledge about ADHD and cultivating contact with others with ADHD are promising targets that can not only reduce stigma, but potentially improve attitudes towards those that suffer from ADHD (Bussing and Mehta 2013).

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the insti-

tutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Informed consent Informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this article.

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