Beliefs of Autistic People's Pain Sensitivity and Implications

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A Dissertation presented to the Graduate Faculty
Of the University of Virginia in Candidacy for the Degree of
Doctor of Philosophy

Department of Psychology
University of Virginia
May 2024

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Abstract

Beliefs of how much pain individuals feel vary by social groups, and represent stereotypes of these groups. Pain stereotypes are informed by perceptions of members of social groups, such as their toughness or emotionality. In three papers (total $N = 1123$), we investigated stereotypes about autistic people's pain and perceptions of autistic people informing these stereotypes. In Paper 1, autistic and non-autistic participants believed that an autistic adult target would feel more pain in several physically painful scenarios involving mild injuries, and socially painful scenarios involving emotionally and interpersonally hurtful situations. We hypothesized that beliefs of autistic people's hypersensitivity to pain may signal that autistic people are perceived to be vulnerable and infantilized, and examined non-autistic people's infantilizing perceptions of autistic people. In Paper 2, non-autistic participants demonstrated attitudes suggesting that they perceive autistic people in infantilizing ways. Specifically, participants rated an autistic adult target to be as sensitive to pain as autistic and non-autistic child targets, granted less decisional authority to an autistic adult target than to a non-autistic adult target, and expressed more pity for an autistic adult target than a non-autistic adult target. However, in Paper 3, non-autistic participants' perceptions of an autistic adult target were inconsistent with an infantilization account. Specifically, participants did not rate an autistic adult to be more emotional than a non-autistic adult, or less agentic than a non-autistic adult. Our findings suggest that autistic adults may be infantilized in some ways by being perceived as vulnerable and being granted less decisional authority, but are not perceived as being child-like in all ways, such as in terms of their emotionality and agency.

Keywords: Autism, ableism, stereotypes, pain judgments, infantilization

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Acknowledgements

This dissertation would not exist if not for the immense support I have received from so many quarters, including all my mentors, the participants in my studies, my friends, and my family. It has truly taken several small villages to get me to this point, and any attempt to name everyone to whom I am indebted must inevitably come up short, but of course, there are a few people I must mention.

Firstly, to Vikram, thank you so much for taking a chance on me and accepting me in your lab. I would never have imagined that my PhD journey would end up meaning so much to me as it ultimately did. I am amazed at what a rewarding learning experience it has been and even after two hundred pages, I am a little sorry it is coming to an end. I continue to be inspired by your ethical orientation to research, your commitment to your students and to the community you study, and your thoughtfulness in all aspects of research and teaching. Over the past three years, you have given me exactly the right kind of support and challenge at the exact time I needed it, and for that I am very, very grateful. Thank you for being such an amazing role model.

Thank you to my dissertation committee members, Drs. Amrisha Vaish, Sophie Trawalter, and Elizabeth Barnes. I have benefitted immensely from your perspectives and insights, and have thoroughly enjoyed our conversations. Thank you also to Angel, who gave me an opportunity to come to UVA and was very gracious and supportive during a particularly challenging time. I learned a lot from you, and I am grateful for the same.

A huge thank you also to my lab friends, Andrew, Kayden, and Zoë, for being such supportive, thoughtful, and fun friends, and for being such patient, insightful and enthusiastic colleagues. I will miss our office and our white board very much when I leave. Thank you also to

Chelsea, Skye, Tnsae, and Choa for being such fantastic research assistants and making work such a pleasure.

To Dermina, Eren, Ian, Jess, and Sierra, thank you for the numerous conversations, zoom calls, coffee breaks, walks, and meals. You all continue to inspire me through your dedication to teaching and research, and through being such wonderful influences on everyone in your life. To Christof, Melissa, Sue, Daniel, Bao, Grace, and Mona, thank you for being such supportive friends, for reminding me from time to time that I have courage, for introducing me to new hobbies, and for feeding me many many times. Thank you to Apoorva and Mridula for regular check-ins and making sure I never felt alone. Thank you also to my cats, Cracker and Jack, for always being there and for reminding me to take breaks.

Finally, to my parents and my sister, I could never have done this without you. It is difficult to find the right words to explain how much you inspire me every day with your kindness, courage, and unquestioning support. I have drawn strength from you and missed you in equal measure during my time here, and I feel confident that you know this already.

Introduction

As a stigmatized minority group, autistic people face several disadvantages, including social exclusion and low acceptance (e.g., Bottema-Beutel et al., 2018; Campbell et al., 2004) and resultant poor mental health (e.g., Botha & Frost, 2020). Understanding how autistic people are perceived is important for improving social integration and life outcomes for autistic people. However, one challenge associated with this task is that perceptions and beliefs about autistic people are diverse; sometimes they even contradict each other. In this introduction, I suggest that studying beliefs about autistic people's pain can reveal a common stereotype and broad perceptions of autistic people. First, drawing on the examples of other disadvantaged groups like Black people and low-SES people, I explain how pain beliefs about a social group often represent a stereotype of that group, expose perceptions of that group, and can have implications for how members of these groups are treated. Second, I review studies which reveal perceptions of targets' vulnerability, resilience, or moral status by investigating beliefs about these targets' pain. Third, I draw on findings on pain beliefs of target groups and target individuals to surmise what people might believe about autistic people's pain, and what such beliefs would imply for how autistic people may be perceived and treated. I end by introducing the questions examined in the three papers that comprise this dissertation.

Autism is a neurodevelopmental condition characterized by differences in social interaction and ways of acting on and reacting to the world. This is a value-neutral description of autism, where autism is seen as a "mere-difference" from a non-autistic neurotype. However, autism is commonly described in terms of deficits (e.g., American Psychiatric Association, 2023). For example, autistic people have been described as mind-blind (e.g., Baron-Cohen, 1990), socially unmotivated (Chevallier et al., 2012; Grelotti et al., 2002), lacking in executive

function abilities (e.g., Hill, 2004), lacking in imagination (Craig & Baron-Cohen, 1999), and lacking a sense of humor (Wu et al., 2014). When asked to define autism, a majority of autism researchers used stigmatizing or dehumanizing language to describe autistic people's characteristics and behavior (Botha & Cage, 2022). By presenting a one-sided view of autism, such deficit-based accounts hinder constructive enquiry and comprehensive understanding of autistic people's experiences (Dinishak, 2016; Jaswal et al., 2016). In addition, these accounts have also been criticized for encouraging unfavorable perceptions of autistic people, thereby exacerbating the challenges faced by autistic people (Prizant & Field-Meyers, 2015).

Given that deficit-based descriptions of autism abound, it is not surprising that autistic people as a group face significant stigma (e.g., Botha & Frost, 2020; Campbell et al., 2004; Cage et al., 2018, 2019; Gillespie-Lynch et al., 2015; Kim et al., 2024). Non-autistic children rate autistic children negatively and indicate lower willingness to interact with them than with non-autistic children (Campbell et al., 2004). Behavioral interventionists who work with autistic children are faster to associate negative valence words like "difficult" and "sad" with autistic children than with non-autistic children (Kelly & Barnes-Holmes, 2012). Non-autistic children believe that autistic children do not experience human emotions like sympathy or have human personality traits like friendliness or nervousness to the same extent as non-autistic children (Corbett et al., 2024). Similarly, autistic adults are denied human traits by non-autistic adults (Cage et al., 2019; Kim et al., 2024). Non-autistic college students are more willing to accept exclusion of autistic college students from classrooms and social interactions than exclusion of students with other disabilities (Bottema-Beutel et al., 2018). Autistic adults report being infantilized by non-autistic peers (e.g., Srinivasan, 2023). Consequences of such stigma can be dire: Autistic people who feel stigmatized and unaccepted by society are likely to experience

poor mental health, including anxiety and depression (Botha & Frost, 2020; Cage et al., 2018), even suicidality (Cassidy et al., 2020).

Therefore, to improve social integration and life outcomes for autistic people, it is important to challenge people's negative perceptions of autistic people. Knowledge of what people believe about autism can help to predict and challenge such perceptions. Widely shared generalized beliefs, or stereotypes, exist about several social groups, including disabled people (e.g., Fiske et al., 2002; Nario-Redmond et al., 2019). Even when an individual does not endorse these beliefs, knowing about them can influence what information they attend to and remember about a social group. Hence, the mere existence of stereotypes about a social group can bias perceptions, emotions, and actions towards that group (Nario-Redmond, 2020).

By definition, stereotypes are generalized beliefs which are held or known across a wide section of society, including by high status and low status groups, and outgroup and ingroup members (Dovidio et al., 2010). However, one challenge in identifying widespread stereotypes about autistic people is that beliefs about autistic people vary tremendously, and may sometimes even contradict each other. For example, consistently with scientific claims that autistic people are socially unmotivated (Chevallier et al., 2012), adult focus group participants erroneously believed that autistic people are uninterested in social relationships, are introverted, are unable to notice social rejection, and do not like to be touched (John et al., 2018). However, in other research investigating stereotypes of disabled people, autistic people were believed to be moderately friendly and warm (Canton et al., 2022), even more so than people without disabilities (Rohmer & Louvet, 2011). A belief that a group is socially uninterested seems inconsistent with a belief that the same group is relatively warm and friendly. As another example, research also suggests that autistic people are believed to have low intelligence and

capability compared to people with some other disabilities, like blind and deaf individuals (e.g., Canton et al., 2022), and compared to nondisabled individuals (Rohmer & Louvet, 2011). Yet research also suggests that autistic people are believed to have special talents (John et al., 2018), and to have above-average intelligence (Jensen et al., 2016).

It is possible that people with different intensities and types of connection with autistic individuals hold different beliefs about autism. For example, someone who interacts with autistic coworkers at their workplace on a daily basis may be more likely to believe that autistic people are highly competent than someone who provides services and interventions to autistic people. Similarly, people who are exposed to narratives about autistic people's social isolation may believe that autistic people lack social motivation, while those without knowledge of these accounts may be less likely to hold such a belief (e.g., Billington, 2010). In view of the multiple ways in which autism may manifest and the various roles in which one may encounter autistic people, perhaps it is inevitable that beliefs about autistic people should be diverse. And yet, broad-based simplistic generalized beliefs (i.e., stereotypes) exist about several social groups even among individuals with varying levels of familiarity with these groups (Dovidio et al., 2010). Moreover, by influencing the type of information that people attend to and remember about social groups, these stereotypes have the potential to influence how members of social group are treated (Nario-Redmond, 2020). The task of identifying and examining possible stereotypes merits our attention because of the power they have to influence perceptions and behavioral intentions towards social groups (Dovidio et al., 2010).

Therefore, identifying widespread stereotypes about autistic people, examining the perceptions that underlie these beliefs, and identifying any consequent behavioral intentions towards autistic people are worthwhile goals. In the next section, I review research

demonstrating that one robust stereotype about social groups is beliefs about the pain experienced by members of these social groups. Moreover, these stereotypes reveal how these social groups are perceived and how they are treated. I draw on this research to suggest that studying beliefs about autistic people's pain can be one way of uncovering informative stereotypes about autism.

Pain beliefs about social groups

Beliefs about how much pain a target individual feels vary systematically by this individual's social group (Wandner et al., 2012). For example, in the context of US society, Black people are believed to feel less pain than White people (Hoffman et al., 2016; Hoffman & Trawalter, 2016; Trawalter et at., 2012); low-socioeconomic status (SES) individuals are believed to feel less pain than high-SES individuals (Summers et al., 2021, 2023); women are believed to feel more pain than men (Paganini et al., 2023); and older adults are believed to feel more pain than younger adults (Wandner et al., 2012). Importantly, beliefs about pain sensitivity of group members are quite widespread, endorsed by outgroup as well as ingroup members, and therefore represent stereotypes rather than a belief held only by selective social groups, like an outgroup bias. Although this dissertation will mostly focus on physical pain, such systematic beliefs exist for social pain experienced by group members as well (e.g., Deska et al., 2020). Further, pain beliefs often signal popular perceptions of what capacities the group is believed to possess. For example, the groups believed to be highly sensitive to pain may also be believed to be over-emotional (e.g., Paganini et al., 2023). Finally, group-based pain beliefs often have significant implications for the level of care and support members of a group receive.

Pain beliefs represent stereotypes about social groups

Pain beliefs are particularly well described for the racial group of Black people in the context of US society (e.g., Dore et al., 2018; Mende-Siedlecki et al., 2019; Hoffman et al. 2016; Trawalter et al., 2012; Waytz et al., 2015). In a seminal study, Trawalter et al. (2012) showed participants photographs of target individuals who were Black or White, and asked them to rate how much pain these targets would experience in several mildly painful scenarios, like getting hit in the head by a stray frisbee or having chapped lips. Black and White participants gave lower pain ratings to adult Black targets than to adult White targets. In multiple studies, health care professionals showed the same bias, giving lower ratings for Black targets' pain than to White targets' pain (Druckman et al., 2018; Hoffman et al., 2016; Trawalter et al., 2012). The stereotype that Black individuals feel less pain than White individuals is applied to Black targets of all ages. Adults of varying racial backgrounds believe that five-year old Black children would feel less pain than five-year old White children on the same scenarios involving physical injuries (Summers et al., 2024). By the age of 10 years, children consistently estimate that a Black child target would feel less pain than a White child target in physical injury scenarios such as banging one's toe on a chair or burning one's tongue on hot food (Dore et al., 2014, 2018).

White and Black adult participants also attribute less social pain to Black adult targets than to White adult targets. When asked to rate how much pain a given target would feel in emotionally or interpersonally distressing situations like their family pet dying or strangers laughing at their haircut, adult participants gave lower rating to the social pain of Black targets than that of White targets (Deska et al., 2020). In summary, participants of widely varying ages and racial backgrounds believe that Black targets of widely varying ages are less sensitive to physical pain than White targets. A similar bias exists about Black people's social pain, although it is less extensively researched.

Beliefs about pain of low-SES individuals are similar in some respects to beliefs about the pain of Black individuals. In line with the pattern that pain of people belonging to disadvantaged groups is discounted, low-SES target individuals are given lower pain ratings on physical injury scenarios than high-SES targets. Low- and High-SES participants estimated that adult targets described as holding low-income jobs or living in low-resource neighborhoods would feel less pain than targets described as holding high-income jobs or living in high-resource neighborhoods (Summers et al., 2021). Parallelling the finding that adults believe that Black children feel less pain than White children (Summers et al., 2024), adult participants gave lower estimates for the physical pain of low-SES child targets described as being from low-income households and attending public schools than for the pain of than high-SES child targets described as being from high-income households and attending private schools (Summers et al., 2021).

Notably, however, children's beliefs of low-SES individuals' pain are different from their beliefs about Black individuals' pain. While by the age of ten years children believe that Black children feel less pain than White children (Dore et al., 2014, 2018), they believe that low-SES children and adults feel more pain than high-SES children and adults (Shu et al., 2023). In other words, while people hold similar stereotypes about Black targets' pain sensitivity in childhood and adulthood, contrasting beliefs about low-SES targets' pain sensitivity are held in childhood and adulthood (we return to this point later in the discussion of perceptions underlying group-based pain beliefs). Beliefs of Black targets and low-SES targets' pain also differ in the domain of social pain. Black targets are believed to feel less social pain than more privileged White targets (Deska et al., 2020), but low-SES targets are believed to feel more social pain than more privileged high-SES targets (Johnson et al., 2023).

While the examples of Black people in the context of race and low-SES people in the context of wealth suggest that pain of disadvantaged groups is discounted, beliefs about women's pain do not conform to this pattern. Although compared to men, women comprise a more disadvantaged group, women are believed to feel more pain than men (Paganini et al., 2023; Wandner et al., 2012).

Of course, the categories of race and SES are not mutually exclusive but overlapping: A Black individual may also be a low-SES individual. It is theoretically possible that different identities of targets could have interactive effects on beliefs about targets' pain. For example, people may believe that low-SES and high-SES Black targets feel relatively low but similar levels of pain, while low-SES White targets feel much lower levels of pain than high-SES White targets. However, Summers et al. (2021) found that information about target race and target SES influences target pain beliefs in an additive manner. Black targets were overall rated as less sensitive to pain than White targets. Within race groups, low-SES Black and White targets are believed to be less sensitive to pain than high-SES Black and White targets respectively. The difference between the pain ratings given to low-SES Black and White targets is of a similar magnitude to the difference between the pain ratings given to high-SES Black and White targets.

Similar additive (i.e., non-interactive) effects on pain beliefs have been found for target gender and other group identities. Women are generally expected to feel more pain than men (e.g., Paganini et al., 2023; Wandner et al., 2012); Black female targets are believed to feel more pain than Black male targets (Summers et al., 2024); and low-SES female targets are believed to feel more pain than high-SES female targets (Summers et al., 2021). Although pain stereotypes for different groups can overlap (as they do for Black people and low-SES people, who are both

believed to feel low levels of pain), these group identities influence pain beliefs independently. It is possible that for these groups, different underlying perceptions inform pain beliefs.

In summary, robust group-based pain sensitivity stereotypes exist, particularly for the racial group of Black people (compared to White people), for low-SES people (compared to high-SES people), and for women (compared to men). These group identities seem to have independent and noninteractive effects on pain beliefs. As I will review in the next section, these beliefs are informed by underlying perceptions about the members of these groups, chiefly related to their experience of hardship and toughness.

Perceptions of social groups underlying pain beliefs

Beliefs of Black and low-SES people's low sensitivity to pain are systematically correlated with beliefs of the hardship they have faced. While hardship can have a range of different meanings, including unexpected misfortunes unrelated to social status, in the context of pain judgments research, hardship indicates relative lack of privilege signifying low status. Individuals with high levels of privilege are not expected to face much life hardship, and individuals who have faced significant privilege are believed to have lower status. In addition, there is a documented cultural belief that experience of hardship leads one to develop toughness (Hoffman & Trawalter, 2016). Therefore, targets who are believed to have faced high hardship are also believed to have toughened up.

In line with the perception that Black targets have lower status in society, Black targets are believed to have experienced more life hardship than White targets. In line with the belief that hardship begets toughness, Black targets are believed to be inured to pain due to their hardship more than White targets (Trawalter et al., 2012). When Black target characters are described as high-status individuals who have faced little hardship, they are believed to feel more

pain (Hoffman & Trawalter, 2016; Trawalter et al., 2012). In line with the perception that people who are tough feel less pain, those who more strongly endorse the stereotype that Black people have "superhuman" capabilities like supernatural strength or speed, attribute lower pain sensitivity to Black people (Waytz et al., 2015). Similarly, low-SES adults are believed to be less sensitive to pain to the extent that they are perceived to have faced great hardship (Summers et al., 2021). Similarly to adult targets, even child targets from less privileged racial and SES groups are believed to have experienced more hardship than child targets from more privileged groups, and participants' perceptions of the child targets' hardship mediate beliefs about targets' pain (Summers et al., 2023, 2024).

While adults' beliefs about Black targets' pain sensitivity are robustly predicted by their beliefs about these targets' life hardship, children's beliefs about Black targets' pain sensitivity are independent of their beliefs about these targets' life hardship. At the age of ten years, children too believe Black child targets to have faced greater life hardship than White child targets, and that Black child targets feel less pain than White child targets, but their perceptions of targets' hardship are unrelated to their perceptions of the targets' pain (Dore et al., 2018). Similarly, even when low-SES targets are described in terms of their relative resource poverty than high-SES targets (which should imply hardship and disadvantage), children do not believe that low-SES targets feel less pain than high-SES targets. This suggests that the idea that "hardship toughens" does not influence pain beliefs until later in life. Beliefs about pain sensitivity and hardship may develop independently and become linked later. Although studies reported in this dissertation do not examine children's judgments of autistic people's pain, knowing about how pain beliefs develop from childhood can be useful for understanding the correlates and implications of pain judgments.

Beliefs of target hardship also mediate the differences in adult participants' attribution of social pain to Black and White adult targets. Black targets are believed to feel less social pain than White target to the extent that they are perceived to have faced more life hardship than White targets (Deska et al., 2020). However, although low-SES targets are similarly believed to have faced more hardship than high-SES targets (Summers et al., 2021), low-SES targets are believed to feel *more* social pain than high-SES targets (Johnson et al., 2023). This pattern of findings suggests that hardship perceptions do not inform social pain beliefs for all groups (or at least they do not do so in the same way).

Johnson et al. (2023) suggest that social pain belief may be explained by another perception of a target group: Their warmth. Since low-SES people are believed to be relatively warm and friendly (e.g., Fiske et al., 2002), they may evoke greater empathic concern, leading people to be sensitive to their emotional distress. Consistent with this prediction, high empathic concern for targets was associated with higher pain ratings for targets, mediating the difference in the pain ratings given to high- and low-SES targets (Johnson et al., 2023).

As is clear from the observation that women are believed to feel more pain than men, not all subordinate groups are believed to feel less pain than more privileged groups. Beliefs about women's expression of pain are associated with perceptions that women are highly emotional (Paganini et al., 2022). Specifically, emotions denoting vulnerability, such as fear and sadness, are more highly associated with women than with men (Fabes & Martin, 1991; Kelly & Hutson-Comeaux, 1999). It is likely, therefore, that beliefs about women's pain are associated with their perceived tendency to experience emotions and sensations more intensely than men.

These examples show that people's beliefs about pain experienced by group members are underpinned by their perceptions of these group members' experienced hardship, toughness, or

emotionality. In addition, people's appraisals of how warm and friendly members of a certain group are can influence their feelings of empathic concern about these groups, and thereby influence their estimates of the group members' pain. As I will next explain, pain beliefs of social groups, informed by these underlying perceptions, also have downstream consequences for how members of these groups are treated in different contexts.

Pain beliefs inform behavioral intentions towards social groups

Pain care is one obvious area where pain beliefs about social groups have implications for the members of these groups. In line with the stereotype that Black people feel less pain than White people, Black people receive much lower dosage of palliative medication than White patients with the same medical conditions, in diverse medical settings including emergency rooms, nursing homes, post-operative care and outpatient clinics (Bonham, 2001; Green et al., 2003). As described earlier, healthcare professionals, including resident doctors and nurses, believe that Black people feel less pain than White people (Druckman et al., 2018; Hoffman et al., 2016). Hoffman et al. (2016) investigated the direct link between beliefs about Black people's pain sensitivity and the palliative care they are offered. They found that the medical practitioners who attributed lower pain sensitivity to Black people also prescribed lower doses of analgesics for hypothetical Black patients. Adults believe Black child targets are less sensitive to pain than White child targets, and recommend less intensive pain treatments to targets who they believe feel less pain (Summers et al., 2024).

Similar effects have also been found for pain care recommendations for low-SES targets, who are believed to be less sensitive to pain compared to high-SES targets. To the extent that people believe low-SES target characters feel less pain, the less palliative care they recommend for these individuals (Summers et al., 2021). Lower recommendations of palliative care are also

made for low-SES child targets compared to high-SES child targets. Again, these recommendations are informed by beliefs that low-SES child targets feel less pain than high-SES child targets (Summers et al., 2023).

As the cases of Black and low-SES targets show, the consequences of discounting or underestimating the pain of social groups can be dire. This may lead one to expect that when people believe that a social group feels relatively high levels of pain, members of this group are given adequate pain treatment. Importantly, however, the experience of women seeking pain care demonstrates that this is not necessarily true. As mentioned earlier, women are believed to feel more pain than men (e.g., Paganini et al., 2023). At the same time, they are also given *less* palliative care than men for the same complaints (Dusenbery, 2018; Hoffmann & Tarzian, 2001; Samulowitz et al., 2018). One reason for this is related to stereotypes about women's emotionality. People who believe that women are emotional and likely to dramatize situations also believe that women tend to express more pain than they feel (Paganini et al., 2023). Women may be given inadequate pain care due to a general expectation that they are likely to exaggerate their pain. In a similar argument, Dusenbery (2018) suggests that a perception that women are unreliable reporters of their pain may result in a "trust gap" between healthcare providers and women patients, leading to a pain care deficit for women patients.

As physical pain beliefs have implications for pain care, social pain beliefs have implications for the social support recommended for targets. In alignment with the belief that Black people feel less social pain than White people, people recommend less intensive coping resources like support from friends and family, or formal support from mental health professionals, for Black individuals than White individuals in socially and emotionally distressing situations (Deska et al., 2020). On the other hand, in line with their belief that low-

SES targets feel more social pain than high-SES targets, people recommend more coping resources for low-SES targets than for high-SES targets (Johnson et al., 2023).

Pain beliefs and person perception

So far, I have reviewed research showing that beliefs of target individuals' pain vary systematically by information about these targets' social groups. In many cases, these beliefs are underpinned by perceptions of specific characteristics of these target group members, such as their toughness or overall emotionality. In other cases, these beliefs are informed by participants' feelings towards the target groups (like empathic concern), which in turn are influenced by their perceptions of characteristics of these target group members (like warmth). Social psychology research has revealed two other perceptions of target individuals which inform beliefs about individuals' pain: their vulnerability and the extent to which they are dehumanized by others.

Gray et al. (2007) have argued that people believe that target entities (including humans) have two broad classes of capacities: Capacities for experience and capacities for agency. A target's perceived capacity for experience includes people's perceptions of that target's capacity to feel bodily sensations and emotions like pleasure, joy, pain, hunger, sadness, etc. Targets who are believed to be capable of such bodily experience are also thought to be capable of having good and bad experiences, and to be acted on by others in a way that can lead to good and bad experiences. That is, they are perceived as being capable of experiencing positive outcomes when helped, and experiencing negative outcomes when harmed.

Pain beliefs are particularly sensitive gauges of perceptions of vulnerability, since targets who are believed to be highly capable of feeling pain are believed to be worthy of protection, indicating that they are perceived to be vulnerable (Gray et al., 2007). For example, when

participants were presented with pairs of target characters and were asked to choose the target they would find it more difficult to harm, they were more likely to select the target who they believed was more capable of feeling pain (e.g., a child, rather than an adult).

Although conceptually, there is a difference in one's capacity to feel pain and the intensity of pain one may feel, both have been used as indicators of vulnerability (e.g., Gray & Wegener, 2009, Studies 1a and 1b). For example, targets who are perceived as less human-like and more object-like are believed to feel less pain than targets perceived as more human-like and less object-like, suggesting that targets believed to feel more pain tend to be those perceived to be at risk of harm (Morris et al., 2018). When an adult or a child was described as having an injury from a shard of glass cutting into their leg, the child was rated as feeling more pain than an adult, indicating that targets typically considered to be more vulnerable are believed to feel more pain than targets typically considered to be less vulnerable (Gray & Wegener, 2009). When asked to distribute pain-causing tablets among several targets, participants allocate the least pain to targets considered vulnerable, such as an orphan or a rape victim, and most pain to targets considered less vulnerable, such as serial killers or professionals (Gray & Wegener, 2009). Thus, entities who are perceived as more vulnerable are also believed to need protection more. This suggests that people's beliefs of how much pain a target individual feels signal their perceptions of that target's vulnerability and moral status (i.e., how much protection that target should have).

While beliefs that a target feels high levels of pain may signal that they are perceived to be vulnerable and therefore to deserve protection, it is important to remember that attributions of high pain sensitivity (signifying vulnerability) are not an entirely positive attribution. As seen from the experience of Black and Low-SES targets, pain beliefs also signal perceptions of toughness: The tougher a target is perceived to be, the less pain they are believed to feel

(Hoffman & Trawalter, 2016; Summers et al., 2021). Similarly, targets who are believed to be highly agentic, or highly capable of bringing about good and bad outcomes in the world, are believed to be less sensitive to pain than targets who are believed to be less agentic (Gray & Wegener, 2009). It is also possible that targets who are believed to feel a lot of pain are perceived as weaker or as less capable of dealing with challenges and bringing about a change in the world.

These studies suggest that pain beliefs may signal not only perceptions of a target's vulnerability, but also perceptions of their ability to cope with the potentially harmful situation leading to pain. That is, a target who is believed to feel high levels of pain in a given situation may be perceived as someone less able to cope with the challenges inherent in the situation or someone less able to regulate their responses to the situation. Indeed, the experience of pain is often associated with emotional dysregulation, and the capacity to self-regulate emotions is proposed as a key variable distinguishing those who suffer keenly from pain from those who suffer less (Hamilton et al., 2004). Those who are believed to be highly sensitive to pain are also often believed to require support with emotion regulation. For example, children are believed to be highly sensitive to pain (e.g., Gray & Wegener, 2009) and are also thought to require support from parental figures in regulating their emotions (e.g., Eisenberg et al., 1998). Older children are believed to be better at suppressing the expression of emotions than younger children, which suggests that emotion self-regulation capacities are believed to improve with age (Fabes & Martin, 1990). It is possible, therefore, that people's beliefs of how much pain a given target is likely to feel are also influenced by how well they believe the target is able to cope with painful situations. This also suggests the possibility that those believed to be highly sensitive to pain would be believed to lack emotion regulation or coping skills, and may be believed to be highly sensitive to emotional states like anger and frustration.

Pain beliefs about a target individual can also signal potential dehumanization of that target individual. For example, when human targets are portrayed in an objectifying manner, participants believe them to be less sensitive to pain. In a study investigating whether objectifying portrayals of target individuals lowers attributions of pain sensitivity to those targets, participants who were shown sexualized and non-sexualized images of both men and women gave more "pain tablets" to the sexualized targets to induce the same amount of pain, suggesting that these targets were perceived as less sensitive to pain (Loughnan et al., 2010). When a picture of a woman with photoshop-perfect appearance was presented to participants with the description that she was a "fashion model," she was perceived as more object-like than human-like, i.e., she was believed to possess human characteristics like emotionality and curiosity to a lower extent than other women presented as a "porn star" or a "graduate student." Further, the dehumanized target was rated as being less sensitive to pain (Morris et al., 2018).

These studies suggest that when people discount some human characteristics of target entities, they also judge them as being less sensitive to pain. Target pain ratings can thus signal whether the target is dehumanized by the raters. However, it is important to note that only a specific type of dehumanization results in denial of pain to targets. Targets who are mechanistically dehumanized – that is, who are denied characteristics essential to human nature, like warmth, responsiveness, and openness – are also believed to be less sensitive to pain. Another type of dehumanization, animalistic dehumanization, involves denying targets characteristics unique to human beings which are believed to set humans apart from other animals, such as civility and refinement. Targets who are animalistically dehumanized are believed to be sensitive to pain (Haslam, 2006).

Together, research on perceptions of group members and individuals demonstrates that several perceived characteristics of the individual can inform beliefs of how much pain that individual feels, including their perceived experience of hardship, toughness, vulnerability, and level of humanness. It also demonstrates that pain beliefs informed by such perceptions can influence how these individuals are treated in several contexts. Pain beliefs can influence an individual's level of pain care, social support, or protection from harm. In the next section, I will describe the relevance of such perceptions and consequences for autistic people.

Possibilities and potential implications of pain stereotypes of autistic people

The research reviewed above shows that pain beliefs vary systematically by social groups, and are informed by how members of these groups are perceived. As also reviewed above, autistic people comprise one social group facing significant stigma (e.g., Botha & Frost, 2020; Gillespie-Lynch et al., 2015). Studying stereotypes about autistic people's pain may help us illuminate perceptions of autistic people. Here, I articulate a few possibilities of how people might perceive autistic people and how these perceptions might inform beliefs about autistic people's pain.

Firstly, as a low-status social group like Black people and low-SES people, it is possible that autistic people will be perceived as having significant life hardship. If autistic people are believed to have faced more life hardship than non-autistic people, they may be believed to be toughened up due to this hardship (like Black people in the context of race and low-SES people in the context of wealth; Summers et al., 2021; Trawalter et al., 2012), and may be correspondingly believed to feel less pain than non-autistic people.

There are two additional reasons for hypothesizing that autistic people will be believed to feel less pain than non-autistic people. Firstly, in influential sources about autism, autistic people

are described as showing “apparent indifference to pain/temperature” (APA, 2022), an “obliviousness to pain” (Wing, 1996, p. 52), and an ability to “tolerate extremes of pain, hunger, and temperature without complaint” (Frith, 1989, p. 41). A second weaker reason is that autistic people are dehumanized by non-autistic people (Cage et al., 2019; Corbett et al., 2024), and dehumanization has sometimes been linked to discounting of pain (e.g., Morris et al., 2018). However, in these investigations of dehumanization, participants usually believe that autistic people lack human qualities of refinement (i.e., “Human Uniqueness” qualities like imagination, self-control, industriousness, etc.), but possess human emotional and biological dispositions (i.e., “Human Nature” qualities like warmth, openness, curiosity, etc.). Usually, it is the latter group of “Human Nature” qualities which are associated with pain beliefs (Haslam, 2006). Hence, those who dehumanize autistic people by denying them human qualities of refinement may not believe that autistic people are less sensitive to pain than other targets who are not dehumanized in this way. Regardless, perceptions that autistic people are toughened by their experience of hardship and authoritative claims of autistic people’s hyposensitivity to pain may together lead to a belief that autistic people are insensitive to pain.

However, another possibility is that pain sensitivity beliefs of autistic people are not organized in the same way as pain sensitivity beliefs of other disadvantaged groups, because autistic people are perceived differently than members of other disadvantaged groups. For example, Black people are perceived to have extraordinary levels of strength (Waytz et al., 2015). In contrast, one common stereotype about disabled people is that they are relatively weak and helpless (Nario-Redmond, 2010). If beliefs that someone is relatively insensitive to pain index assumptions that they are tough (e.g., Summers et al., 2021), individuals typically considered weak would be believed to be more sensitive to pain than individuals typically

perceived as stronger. This would mean that autistic people are believed to feel more pain than non-autistic people, even if they are perceived as a low-status and high-hardship group.

Another reason for believing that autistic people may be rated as highly sensitive to pain is that autistic people may be infantilized in popular perception. Autism is predominantly described as a childhood condition in most easily accessible portrayals of autism (e.g., Akhtar et al., 2022). This may result in autistic people of all ages being perceived as child-like, and therefore, vulnerable. As reviewed earlier, entities perceived as vulnerable are believed to be highly sensitive to pain. If people perceive all autistic people as child-like and vulnerable, they may believe that autistic people feel more pain than non-autistic people.

Questions about autistic people's pain beliefs are not merely theoretical, and may help illuminate challenges faced by autistic people. As referred to earlier in my discussion of implications of pain beliefs, an obvious area of relevance is pain care. In fact, getting adequate pain care in healthcare settings is of great concern for autistic people. For example, autistic people report having difficulty communicating their experience of pain using the specific language and tools utilized in the healthcare setting for this purpose (Dern & Sappok, 2016; Kalingel-Levi et al., 2022). Challenges with proprioception can also contribute to autistic people's difficulties in expressing their pain and requesting the kind of help they need. Crucially, some autistic people report not being believed when they express their pain, and feeling discouraged from seeking further help when they experience such misunderstanding or disbelief (e.g., Kalingel-Levi et al., 2022; Kraemer, 2021). Consequences of not receiving pain care in a timely manner can be adverse, including aggravation of life-threatening conditions like cancer. A stereotype that autistic people are hyposensitive to pain may pinpoint one reason for inadequate pain care received by autistic people: Perhaps people believe autistic people can stand the pain

and do not need much palliative care. A stereotype that autistic people are hypersensitive to pain may suggest another reason: Perhaps people believe that autistic people are overemotional, or child-like, and unreliable reporters of their own pain. As mentioned earlier, this is a perception associated with women, who are also believed to be highly emotional and reactive, and are perceived to exaggerate their pain reports (e.g., Paganini et al., 2023).

Also important is what pain beliefs might reveal about broad perceptions of autistic people. A belief that autistic people feel less pain than non-autistic people may signal that autistic people are dehumanized, and that people perceive them as being less human than other people. Such a perception would leave autistic people vulnerable to harms such as social exclusion and insufficient support. A belief that autistic people feel more pain than non-autistic people may signal that autistic people are perceived as vulnerable and potentially infantilized. While a perception of vulnerability may mean that autistic people are likely to be protected from harm, infantilization would mean that autistic adults are not given as much respect as non-autistic adults. Their capabilities may be underestimated, and they may receive inadequate support in contexts of adulthood like independent living and employment (e.g., Stevenson et al., 2011).

Finally, while preparing to interrogate people's beliefs about autistic people's pain, it is important to take note of autistic people's actual experience of pain: Do autistic people in fact feel pain more or less intensely than other people? In brief, experimental work measuring autistic and non-autistic individuals' thresholds of pain detection and physiological pain responses suggests that autistic people do not consistently feel either more or less pain than non-autistic people, although autistic people's experience of pain is more heterogeneous than that of non-autistic people (Moore, 2015; Zhang et al., 2021).

Findings of autistic people's pain sensitivity vary significantly across studies. A meta-analysis of differences in pain detection thresholds showed no overall difference in autistic and non-autistic people's pain sensitivity, and suggested that pain sensitivity may vary by factors like pain modality and age of participants (Zhang et al., 2021). Complicating this picture further, even studies comparing autistic and non-autistic people's pain thresholds in the same modality have yielded discrepant findings: Yasuda et al. (2016) found that autistic and non-autistic participants did not differ in the thresholds at which they found heat and cold painful. In addition, different methods within the same studies have sometimes led to contradictory findings. Yasuda et al. (2016) found that autistic and non-autistic participants did not differ in pain detection thresholds for experimentally induced pain, but autistic participants reported feeling less pain than non-autistic participants. In contrast, Hoffman et al. (2022) showed that compared to non-autistic participants, autistic participants were hypersensitive (and not hyposensitive) to heat-based pain, detecting pain at lower thresholds than non-autistic participants and showing higher reactivity to heat-based pain stimuli. Different measures of pain sensitivity within a single study can yield different findings. For example, Tordjman et al. (2009) found that autistic children outwardly reacted less intensely than non-autistic children during a venipuncture procedure, indicating hyposensitivity to pain, but had increased heart rate and plasma β-endorphin levels following the same procedure, indicating possible hypersensitivity to pain. These conflicting claims about autistic people's hypo- and hyper-sensitivity to pain suggest that a bias in pain beliefs in either direction – that autistic people are hypo- or hyper-sensitive to pain—would not accurately reflect reality. Nevertheless, beliefs of autistic people's pain sensitivity may influence how autistic people are treated, and deserve our attention.

Research goal

In this introduction, I have argued that perceptions of autistic people may be understood by studying beliefs about how much pain autistic people feel. The papers in this dissertation address these goals. Paper 1 investigates whether there is a pain stereotype for the group of autistic people. The studies in this paper involved asking autistic and non-autistic people to rate how much physical and social pain an autistic or a non-autistic target would feel in different scenarios. These studies revealed that autistic people are believed to be more sensitive to pain than non-autistic people. One potential explanation of these findings, as discussed above, is that autistic people are infantilized in popular perception. To investigate this possibility, in Paper 2, I investigated non-autistic adults' infantilizing perceptions of autistic adults. The studies in this paper examined whether non-autistic participants would show the same beliefs about pain sensitivity and decisional autonomy about autistic adult targets that would be appropriate of children, but not adults. In Paper 3 I examined non-autistic people's perceptions of autistic adults' emotionality and capacity of agency as additional indicators of whether autistic people are infantilized. I also examined if perceptions of autistic people's agency may be a potential driver of pain beliefs of autistic people. Together, the studies in this dissertation document a stereotype about autistic people, articulate some boundary conditions of this stereotype, and explore perceptions which may inform this stereotype.

Paper 1:

Autistic People are Believed to Feel More Pain than Non-Autistic People

Abstract

Members of some marginalized groups are erroneously considered relatively insensitive to pain, an assumption that seems to reflect beliefs that they have been toughened up by the hardship they have endured. Autistic people represent a marginalized group, and some clinical accounts erroneously suggest that they, too, are relatively insensitive to pain. In two pre-registered studies involving college students and Prolific workers in the U.S. ($N = 287$), we found that both autistic and non-autistic participants believed that an autistic target had experienced more hardship than a non-autistic target and (unexpectedly) would feel more pain than the non-autistic target or themselves. We speculate that our findings may reflect that autistic people are infantilized, viewed as vulnerable and as lacking the agency to toughen up from life hardship.

Keywords: *Autism, pain judgments, ableism, stereotypes*

Introduction

Autism is a lifelong neurodevelopmental condition characterized by differences in social communication and restricted and repetitive patterns of behavior (American Psychiatric Association [APA], 2022). Around 2.2% of U.S. adults are autistic (Dietz et al., 2020). As members of a stigmatized minority, autistic people face significant challenges (Botha & Frost, 2020; Kapp et al., 2013; Mandell, 2013), including in healthcare settings (Mason et al., 2019). One specific challenge often cited by autistic people involves accessing adequate pain care (e.g., Dern & Sappok, 2016; Kalingel-Levi et al., 2022; Shaw et al., 2023). Autistic people report that their disclosures of pain are often dismissed (Kalingel-Levi et al., 2022; Shaw et al., 2023), leading to fractures that went untreated and cancers that were not detected in a timely manner (Kraemer, 2021). One factor that may contribute to autistic people's difficulty in accessing appropriate health and pain care–and the focus of the studies reported here–could be unfounded stereotypes about their sensitivity to pain.

There is a great deal of variability in how autistic people experience physical pain. In canonical clinical literature, autistic people are regularly described as having an "apparent indifference to pain/temperature" (APA, 2022), "an obliviousness to pain" (Wing, 1996, p. 52), and as able to "tolerate extremes of pain" (Frith, 1989, p. 41). These clinical reports of hyposensitivity are consistent with some autistic self-reports (e.g., Kalingel-Levi et al., 2022) and with some parent and caregiver reports that autistic individuals under their care show low reactivity to pain (e.g., Militerni et al., 2000; Moore, 2015). At the same time, some autistic people report hypersensitivity to pain (e.g., Kalingel-Levi et al., 2022), and there is some experimental work consistent with these reports (e.g., Hoffman et al., 2022). One feature of autism that may contribute to the variability in experiences of pain could be that many autistic

people have painful co-occurring conditions, like epilepsy and gastrointestinal disorders (e.g., Bursch et al., 2004; Coury, 2010). Importantly for purposes of the current work, there appears to be no basis for believing that autistic people as a group experience more or less physical pain than non-autistic people (for a meta-analysis, see Zhang et al., 2021). Nevertheless, people may have beliefs about how much pain autistic people feel, which may contribute to autistic people's challenges in accessing adequate health and pain care.

One source of beliefs about how much physical pain autistic people experience could be generalizations based on the autistic people that someone knows. Depending on whether the autistic people they know are hypo- or hypersensitive, someone might assume that other autistic people share the same level of sensitivity. But past work investigating beliefs about pain in members of other marginalized groups suggests another important factor that may contribute to beliefs about autistic people's experience of pain. Specifically, beliefs that autistic people have experienced more life hardship than non-autistic people may lead participants to believe that autistic people are hyposensitive to pain.

Seminal work by Trawalter et al. (2012) showed that both Black and White participants estimated that Black targets had experienced more life hardship than White targets and would feel less pain than White targets in scenarios like getting a papercut or walking on hot sand. In that study, hardship ratings mediated participants' beliefs about pain, and experimental manipulations of a target's hardship affected participants' estimates of their pain. Further, participants seemed to believe that experiencing life hardship can "toughen" someone up, inuring them to pain (Hoffman & Trawalter, 2016). Summers et al. (2021) similarly found that both low- and high-SES participants estimated that low-SES targets had experienced more hardship and would feel less pain than high-SES targets. The consequences of these erroneous beliefs about

hyposensitivity to pain are serious: Healthcare providers who thought Black people experienced less pain also prescribed lower doses of analgesics for hypothetical Black patients (Hoffman et al., 2016), and medical professionals believed that low-SES targets required lower doses of pain medication (Summers et al., 2021).

Our focus so far has been on physical pain, but members of disadvantaged groups are sometimes also believed to feel less social pain (but see Johnson et al., 2023). For example, Deska et al. (2020) asked participants how emotionally distressed Black and White targets would be if, for example, a pet died or strangers laughed at their haircut. Consistent with the work on physical pain just described (Trawalter et al., 2012), participants expected Black targets to feel less social pain than White targets. Importantly, and as in the work on physical pain, hardship ratings mediated participants' beliefs about Black targets' sensitivity to social pain.

In the two studies here, we investigated how life hardship ratings were related to estimates of the pain sensitivity of autistic targets. We expected that autistic people would be thought to have experienced more life hardship than non-autistic people, and accordingly and in line with the past work on race and class, would be believed to feel less physical and social pain than non-autistic people. To foreshadow our results, although autistic targets were estimated to have experienced more life hardship, they were consistently estimated to feel *more* physical and social pain.

We report all manipulations, measures, and exclusions in these studies. The instruments, data, codebook, and analysis scripts for all studies are available at https://osf.io/uv8gk/?view_only=7133e335fe8c44a38066eabb4e068592.

Table 2.1
Deviations from Pre-Registered Analyses

Study	Analysis	Pre-registered	Reported	Reason for discrepancy
Study 1	Power analysis to calculate sample size	**Sample size of 80 would be sufficient**, planned to recruit 80 per sample (college students and Prolific workers).	Power analysis indicated that a sample **size of 75 is needed, rounded up and aimed to recruit 80 in each group**.	Rounded up after conducting our power analysis, did not mention this in the pre-registration
Study 1	Analyzing target hardship ratings	Linear model with **8 total predictor variables**	Linear regression with **1 predictor.** Preregistered and reported models yielded the same findings.	Eliminated covariates to align with best practices
Study 1	Analyzing target pain ratings	Linear model with **8 total predictor variables**	Linear model with **4 predictors.** Preregistered and reported models yielded the same findings.	Eliminated covariates to align with best practices
Study 2	Power analysis to calculate sample size	**A-priori power analysis** calculations showed required sample size of 108, planned to recruit 128	**Sensitivity analysis** showing that sample size of 128 participants would be sufficient	An error in a-priori power analysis, which assumed 4 measurements per participant when in reality 2 measurements per participant were obtained
Study 2	Analyzing self-hardship ratings	Not registered	**Linear model** with three predictors	Analysis was found to be relevant after running the study
Study 2	Analyzing target hardship ratings	Not registered	**Linear model** with three predictors	Analysis was found to be relevant after running the study
Study 2	Analyzing target pain ratings	2x2x2 ANCOVA with **5 covariates**	Mixed-effects linear model with three fixed effects and interactions (2x2x2), and **one covariate.** Preregistered and reported models yielded the same findings.	Removed covariates to align with best practices
Study 2	Analyzing autistic participants' pain ratings	**2x2 ANOVA**	**t-tests**	Direct comparison of pain ratings
Overall	Internal meta-analyses of target pain ratings	Not registered	**Meta-analyses** of physical and social pain ratings	Relevant for demonstrating effect across studies

Study 1

We asked college students and Prolific workers in the U.S. to estimate how much hardship an autistic or non-autistic target had faced and how much pain the target would feel in physically or socially painful scenarios. Studies S1a, S1b, and S2 in the Supplemental Materials preceded Study 1 and involved different samples and slightly different methodology. But the pattern of results was the same as the pattern reported here. (A meta-analysis including the studies reported in the main text and those in the Supplemental Materials is reported below.)

Study 1 was pre-registered at https://osf.io/q3zsk/?view_only=a267911d65f24689830c18408507ae31. Table 2.1 shows deviations from the pre-registered analyses.

Method

Participants

Our primary interest was the effect of target neurotype on pain ratings. An a priori sample size calculation using G*Power (Faul et al., 2007) showed that 75 participants would be required to achieve .95 power to detect a minimum medium-sized effect of $f^2 = 0.18$ (the effect size obtained in Supplemental Study S2) for one predictor variable in a multiple regression. We chose to recruit 80 participants in the college sample and 80 U.S.-based Prolific workers (www.prolific.co) to achieve a balanced design with 20 participants in each of four conditions in each sample. (Our goal was not to compare the college and Prolific samples, but to investigate whether both would show the same effect.) We ended up with 79 college students and 80 Prolific workers. Demographics are shown in Table 2.2. College students received course credit; Prolific workers were paid $1.50 for participating. Data from four additional college students were excluded because they failed attention (2) or manipulation checks (2). Data from four additional Prolific workers were excluded because they failed a manipulation (1) or a bots check (3).

Table 2.2
Participant Demographics

Study details	Sample	Condition	Gender	Age
Study 1 (December 2021)	**College students**[a] 54% White, 32% Asian, 11% Black, 1% mixed race; 4% Hispanic / Latinx, 95% not Hispanic / Latinx	AT, PP (n = 19)	13 F, 6 M	18.6 (0.84)
		AT, SP (n = 20)	13 F, 6 M	19.2 (1.04)
		NT, PP (n = 20)	9 F, 11 M	19.2 (0.95)
		NT, SP (n = 20)	14 F, 5 M, 1 NB	19.0 (0.65)
	Prolific workers[a] 69% White, 13% Asian, 3% Black, 1% American Indian or Alaska Native, 9% mixed race; 13% Hispanic / Latinx, 86% not Hispanic / Latinx	AT, PP (n = 20)	15 F, 5 M	31.6 (12.7)
		AT, SP (n = 20)	14 F, 6 M	34.5 (12.7)
		NT, PP (n = 20)	15 F, 4 M, 1 NB	28.6 (8.8)
		NT, SP (n = 20)	14 F, 4 M, 1 NB, 1 TM	28.4 (8.19)
Study 2 (August 2022)	**Autistic participants**[b] 78% White, 1% Asian, 5% Black, 8% mixed race; 11% Hispanic/ Latinx, 83% not Hispanic / Latinx	AT (n = 32)	6 F, 18 M, 7 NB, 1 TF	31.8 (9.22)
		NT (n = 32)	12 F, 15 M, 3 NB, 2 TM	33.0 (12.3)
	Non-autistic participants[b] 81% White, 6% Asian, 3% Black, 1% American Indian or Alaska Native, 5% mixed race; 6% Hispanic / Latinx; 94% not Hispanic / Latinx	AT (n = 32)	21 F, 11 M	40.4 (15.7)
		NT (n = 32)	21 F, 11 M	36.4 (14.2)

Note. Figures in parentheses indicate SDs. Condition: AT = Autistic Target, NT = Non-autistic target, PP = Physical Pain, SP = Social Pain. Gender: F = female, M = male, NB = non-binary, TF = transgender female, TM = transgender male.

[a] In Study 2, college students were younger than Prolific workers, $F(1,157) = 91.92$, $p < .001$. [b] In Study 3, autistic participants were younger than non-autistic participants, $F(1,126) = 6.90$, $p = .010$. There were no other significant differences within studies in age or gender by sample or by condition.

Table 2.3
Instruments used in Studies 1 and 2

Instrument	Number of items	Example item	Scale	Internal consistency [95% CI in brackets]			
				Study 1		Study 2	
				College students	Prolific workers	Autistic participants	Non-autistic participants
Physical pain sensitivity rating scale (Trawalter et al., 2012)	18	"You [Target] get[s] your [their] fingers caught in the car door"	1 (not painful) – 4 (extremely painful)	α = .84 [.76, .89]	α = .90 [.84, .93]	α = .87 [.83, .90]	α = .90 [.86, .93]
Social pain sensitivity rating scale (Deska et al., 2020)	10	"Strangers laugh at your [target's] haircut"	1 (not painful) – 4 (extremely painful)	α = .66 [.55, .74]	α = .83 [.77, .88]	α = .81 [.76, .85]	α = .82 [.76, .86]
Hardship beliefs scale (Trawalter et al., 2012)	4	"How much hardship do you think you [the target] have faced?"	1 (none at all) – 5 (extreme)	α = .75 [.67, .81]	α = .71 [.63, .78]	α = .70 [.63, .76]	α = .73 [.64, .80]
Social Distance Scale (Gillespie-Lynch et al., 2019; Kim et al., 2022)	11 for College students, 8 for Prolific workers	"I would be willing to move next door to someone who is autistic"	1 (strongly disagree) – 5 (strongly agree)	α = .91 [.87, .93]	α = .95 [.91, .96]	—	—
Social Desirability Scale - 17 (Stöber, 2001)	16	“When I have made a promise, I keep it; no ifs, ands or buts”	0 (False), 1 (True)	α = .69 [.58, .77]	α = .77 [.68, .83]	—	—
Level of contact report (Gardiner & Iarocci, 2014) [a]	12	"I have observed autistic persons on a frequent basis."	Yes / No	NA	NA	NA	NA
Quality of contact scale (Gardiner & Iarocci, 2014)	6	"Overall I have had positive interactions with autistic people."	1 (Disagree very strongly) – 9 (Agree very strongly)	α = .85 [.77, .90])	α = .95 [.91, .97]	α = .86 [.76, .91]	α = .93 [.89, .95]

RAADS-14 (Eriksson et al., 2013)	14	"Some ordinary textures that do not bother others feel very offensive when they touch my skin."	3 (True now and when I was young) / 2 (True only now) / 1 (True only when I was young) / 0 (Never true)	—	—	α = 0.85 [.78, .89]	α = .85 [.77, .90]

Note. Dashes indicate that the measurement instrument was not used in that specific study. Instruments are available at: https://osf.io/uv8gk/?view_only=7133e335fe8c44a38066eabb4e068592.

[a] The highest Level of Contact that could be reported was "I am autistic." In Study 1, no participant reported being autistic. In Study 2, all participants in the autistic sample reported that they were autistic and no participant in the non-autistic sample reported that they were autistic.

Procedure

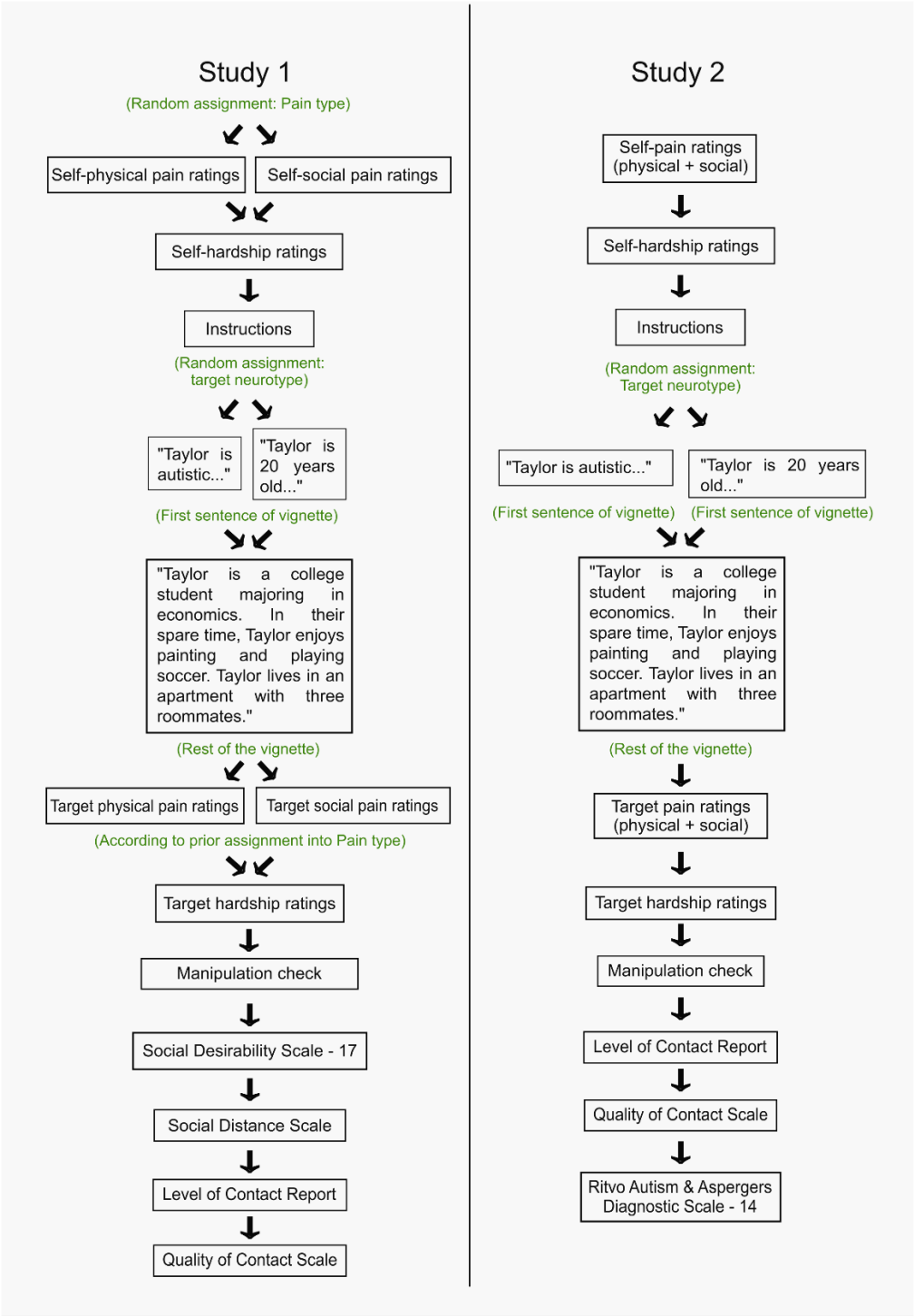
Participants completed the study online via Qualtrics (Qualtrics, Provo, UT). Figure 1 provides an overview of the procedure, and Table 2.3 provides details about all instruments, including sample items. Participants in each sample were randomly assigned to the physical or social pain condition. Depending on condition, they rated how much pain they would feel in 18 physically painful scenarios taken from Trawalter et al. (2012) (e.g., getting hit in the head by a frisbee, walking on burning sand) or 10 socially painful scenarios taken from Deska et al. (2012) (e.g., a family pet dying, a friend moving across the country). Following the protocol used in those earlier studies, ratings were made using a 4-point scale ranging from "not painful" to "extremely painful." Participants next read four questions asking about the amount of hardship they had experienced (e.g., "how hard do you think your life has been?") and responded on a 5-point scale, from "not at all" to "extremely."

The instructions then explained, "We are interested in how people rate the pain of others." Participants within each pain condition were randomly assigned to read a vignette introducing an autistic target or a vignette introducing a 20-year-old target:

> *"Taylor is autistic [or Taylor is 20 years old]. Taylor is a college student majoring in economics. In their spare time, Taylor enjoys painting and playing soccer. Taylor lives in an apartment with three roommates."*

The vignette remained visible as participants responded to the same physical or social pain scenarios and hardship questions they had seen earlier, but this time with reference to Taylor. Participants completed the remaining individual differences measures described in Table 2.3, as well as a manipulation check question (see Supplemental Materials).

Figure 2.1
Outline of Procedure in Studies 1 and 2



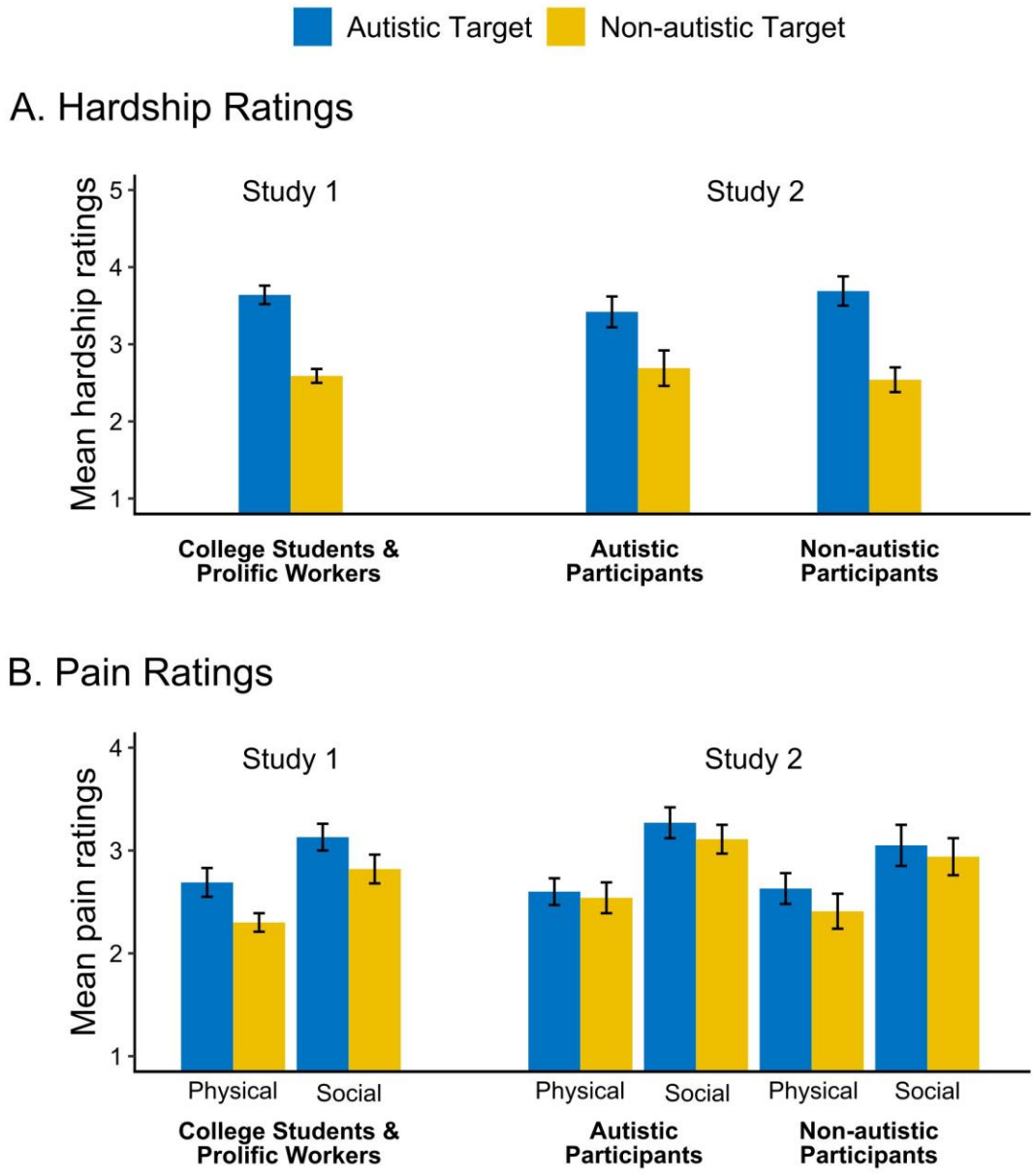
Results

Analyses were conducted using R (version 4.0.2; R Core Team, 2021) via the RStudio interface (Posit Team, 2023). Descriptive statistics for all variables are reported in Table S1 and correlations between measured variables are in Table S2 in the Supplemental Materials.

Hardship

As expected and as shown in Figure 2.2A, participants rated the autistic target as having experienced more hardship than the non-autistic target. A linear regression model predicting target hardship ratings from target neurotype was significant, $F(1,157) = 194.2$, $p < .001$, adjusted $R^2 = .55$. The autistic target received significantly higher hardship ratings than the non-autistic target, $\beta = .74$ [.61, .83], $t = 13.93$, $p < .001$. This effect remained significant in an additional (preregistered) multiple regression model that controlled for sample, participants' self-hardship ratings, gender, age, and the individual differences measures described in Table 2.3 (see Table S6 in Supplemental Materials).

Figure 2.2
Mean Hardship and Pain Ratings in Studies 1 and 2



Note. Error bars represent 95% CIs of the mean.

Physical and Social Pain

We first conducted separate analyses on the pain rating data collected from college students and Prolific workers. The model results were the same, so we collapsed across sample and analyzed target pain ratings in a single model.[1] As Figure 2.2B shows and unexpectedly, participants estimated that the autistic target would experience *more* physical and *more* social pain than the non-autistic target. We constructed a linear model predicting target pain ratings from target neurotype, pain type, and the interaction between target neurotype and pain type. We controlled for participants' self-pain ratings because they are a known predictor of target pain ratings (Trawalter et al., 2012). As Table 2.4 shows, the autistic target was given significantly higher pain estimates than the non-autistic target, and participants who gave higher self-pain ratings also indicated that the target they were assigned experienced more pain. Participants assigned to the social pain condition gave the target higher pain ratings than participants assigned to the physical pain condition. These effects were significant even in an additional (preregistered) multiple regression model controlling for sample, participants' gender, age, and the individual differences measures described in Table 2.3 (see Table S7 in Supplemental Materials).

[1] We additionally ran a model that included the three-way interaction between pain type, target neurotype, and sample. The three-way interaction was not significant, $\beta = .02$, $p = .662$. The two-way interactions between pain type and sample ($\beta = .02$, $p = .728$) and target neurotype and sample ($\beta = .03$, $p = .613$) were also not significant.

Table 2.4
Multiple Regression Predicting Target Pain Ratings (Study 1)

Predictor	β	*SE*	95% CI	*t*	*p*	f^2
Target neurotype [a]	**.29**	**.06**	**[.18, .40]**	**5.30**	**< .001**	**0.18**
Self-pain ratings	**.51**	**.07**	**[.37, .64]**	**7.58**	**< .001**	**0.37**
Pain type [b]	**.20**	**.07**	**[.07, .33]**	**3.04**	**.003**	**0.06**
Target neurotype x Pain type	-.07	.06	[-.18, .04]	-1.25	.256	0.01

F (4, 154) = 49.27, p < .001
Multiple R^2 = .53
Adjusted R^2 = .52

Note. Pain ratings were z-standardized to get standardized coefficients.
[a] Target neurotype was coded such that -1 = Non-autistic target and 1 = Autistic target; [b] Pain type was coded such that -1 = Physical pain and 1 = Social pain.

Target hardship ratings did not mediate the relation between target neurotype and target pain ratings (see Table S3 in Supplemental Materials).

Discussion

Study 1 was motivated by some scientific and clinical accounts suggesting that autistic people are hyposensitive to pain (e.g., APA, 2022; Frith, 1989) and by experimental findings showing that the pain of members of some disadvantaged groups is discounted because of the life hardship they are believed to have experienced (e.g., Trawalter et al., 2012; Summers et al., 2021). Consistent with our expectations, the autistic target was rated as having experienced more hardship than the non-autistic target. But contrary to our expectations, they were also estimated to experience *more* pain than the non-autistic target. Hardship ratings did not mediate the relation between target neurotype and target pain ratings.

Before considering possible explanations for this unexpected finding, we first report on a study designed to address a limitation of Study 1–namely, that it involved only non-autistic participants. In the research that inspired the current work, both Black and White participants estimated the pain of Black targets as lower than White targets (Deska et al., 2020; Trawalter et al., 2012), and both low and high-SES participants estimated the physical pain of low-SES targets as lower than high-SES targets (Summers et al., 2021). The authors of the work on race and SES explained these results by suggesting that the belief that Black or low-SES people experience less pain is a shared cultural stereotype (mediated by how much hardship they are believed to have experienced) rather than an outgroup bias. To investigate whether the belief that autistic people are more sensitive to pain than non-autistic people reflects a cultural stereotype shared by autistic people or an outgroup bias shown by non-autistic people, we replicated Study 1 and included a sample of autistic participants.

Study 2

In Study 2, we investigated whether autistic participants, like non-autistic participants, believe that autistic people are more sensitive to pain than non-autistic people. Including autistic participants allowed us to address two additional questions. First, we asked whether autistic participants expect to feel more pain in the pain scenarios, on average, than non-autistic participants. If they do, this could reflect actual hypersensitivity to pain (e.g., Hoffman et al., 2022), internalized cultural expectations about autistic people's hypersensitivity to pain that we documented in Study 1, or both (for a similar consideration of women's reports of pain, see Wise et al., 2002). The current study will not allow us to disambiguate these possibilities, but it will at least allow us to document how similar self-pain ratings are, on average, between the two participant neurotypes.

Second, we compared autistic participants' self-pain ratings with their ratings of how much pain they expected the autistic target to feel. One possibility is that self-ratings will be similar to their ratings of the autistic target. However, there is some research suggesting that members of minoritized groups often believe that other members of the group face more discrimination and challenges than they do personally (Taylor et al., 1990). For example, in Deska et al.'s (2020) study on race and social pain estimates, Black participants' self-pain ratings were higher than the pain ratings they gave to the Black target. Thus, it is possible that autistic participants' self-ratings of pain will be lower than ratings they give to the autistic target.

In addition to including both autistic and non-autistic participants, another difference from Study 1 was that participants gave both physical and social pain ratings (rather than one or the other) for themselves and for an autistic or non-autistic target. Study 2 was preregistered at https://osf.io/tdc6g/?view_only=0e449e6d3f224dc795a83f76a0c98abd. Table 2.1 shows deviations from the pre-registered analyses.

Method

Participants

Per our pre-registration, we collected data from 128 participants (64 autistic and 64 non-autistic). During the review process, we realized that the power analysis that led us to 128 participants should have been based on two (rather than four) measurements. A post-hoc sensitivity analysis showed that our sample of 128 participants was sufficient to detect a medium-sized difference ($f = 0.23$) in self-pain ratings between autistic and non-autistic participants with a power of 0.85 and an alpha of 0.05. Another sensitivity analysis showed that 128 participants was sufficient to detect whether autistic and non-autistic participants' ratings of the autistic or non-autistic targets' pain differed with a power of 0.80 and alpha of 0.05 of a

medium effect size ($f = 0.26$), similar to the effect size associated with target neurotype in Study 1. Table 2.2 shows participant demographics.

Autistic participants were U.S.-based Prolific workers who had (in the Prolific platform) reported receiving "a formal clinical diagnosis of autism spectrum disorder, made by a psychiatrist, psychologist, or other qualified medical specialist" either as an adult or as a child. Non-autistic participants were U.S.-based Prolific workers who had not reported receiving a formal diagnosis of ASD. As will be described below, participants provided two additional pieces of data that made us confident in the diagnostic status provided via Prolific.

Autistic participants were paid $10, and non-autistic participants were paid $3. We paid autistic participants a higher amount to incentivize their participation. We replaced five participants who failed the bots check (2) or the manipulation check (3).

Procedure

As shown in Figure 2.1, autistic and non-autistic participants first completed both the physical and social pain ratings for themselves. Half the participants in each sample completed physical self-pain ratings first and half completed the social self-pain ratings first. Then participants completed hardship ratings for themselves. Next, participants provided both physical and social pain ratings to their assigned target (in the same order they had given their self-ratings), and then reported on their level and quality of contact with autism (Gardiner & Iarocci, 2014). Finally, participants completed the Ritvo Autism and Asperger Diagnostic Scale 14 (RAADS-14) (Eriksson et al., 2013), a widely used self-report instrument for autism screening (see Table 2.3). Participants additionally completed two exploratory measures to inform future work, not shown in Figure 2.1 and which will not be discussed here: a scale indicating how much

they believed their assigned target should make decisions independently and open-ended questions about their pain experiences.

Results

Descriptive statistics for all variables and correlations between them are reported in Tables S4 and S5, respectively, in the Supplemental Materials.

Confirmation of Autism Diagnosis

As expected, autistic participants scored higher on the RAADS-14 than the non-autistic participants, indicating that they possessed more autistic-like characteristics (M_{autistic} = 28.83, SD = 9.62, vs. $M_{\text{non-autistic}}$ = 10.63, SD = 9.19), $F(1,125) = 119.32$, $p < .001$. Additionally, all 64 autistic participants indicated on the Level of Contact report (Gardiner & Iarocci, 2014) that they were autistic; none of the 64 non-autistic participants did so. These findings, along with the diagnostic status information participants provided to Prolific, make us confident that we had a sample of autistic participants and a sample of non-autistic participants.

Self-Hardship and Self-Pain Ratings

A multiple linear regression predicting self-hardship ratings from participant neurotype, target neurotype, and order revealed one significant predictor. As Table 2.5 shows, autistic participants gave themselves higher hardship ratings (M = 3.22, SD = 0.77) than the non-autistic participants gave themselves (M = 2.88, SD = 0.67).

Table 2.5
Multiple Regression Predicting Self-Hardship Ratings (Study 2)

Predictor	β	*SE*	95% CI	*t*	*p*	f^2
Participant neurotype[a]	**.24**	**.09**	**[.06, .41]**	**2.71**	**.008**	**0.06**
Target neurotype[b]	.07	.09	[-.10, .24]	0.82	.412	0.01
Order[c]	-.04	.09	[-.22, .13]	-0.52	.605	0.00
$F(3,124) = 2.77$, $p = .045$						
Multiple $R^2 = .06$						
Adjusted $R^2 = .04$						

Note. Hardship ratings were z-standardized to get standardized coefficients. [a] Participant neurotype was coded such that -1 = Non-autistic participants, 1 = Autistic participants. [b] Target neurotype was coded such that -1 = Non-autistic target, 1 = Autistic target. [c] Order was coded such that -1 = Physical pain scenarios were seen first, 1 = Social pain scenarios were seen first.

Analyzing self-pain ratings required accounting for the fact that each participant rated themselves on both physical and social pain scenarios. We constructed a mixed-effects model using the *lme4* package in R (Bates et al., 2015). We predicted self-pain ratings from participant neurotype, pain type, and the interaction between participant neurotype and pain type. We included an interaction between participant neurotype and pain type in this model because we were interested in whether autistic and non-autistic participants varied in their self-pain ratings in either of the two pain types.

As Table 2.6 shows, the only significant effect was of pain type: Both autistic and non-autistic participants rated the amount of pain they would feel as higher in the social scenarios ($M = 2.76$, $SD = 0.43$) than the physical scenarios ($M = 2.40$, $SD = 0.39$).

Table 2.6
Mixed-Effects Model Predicting Self-Pain Ratings (Study 2)

Predictor	β	*SE*	95% CI	*t*	*p*	Semi-partial R^2
Fixed effects						
Participant Neurotype[a]	.08	.07	[-.09, .17]	0.56	.576	.00
Pain type[b]	**.40**	**.05**	**[.31, .49]**	**8.51**	**< .001**	**.16**
Participant Neurotype x Pain type	.01	.05	[-.08, .10]	0.16	.870	.00
Random Effects						
Residual variance (σ^2)	.56					
Participant-level variance of self-pain ratings	.29					
ICC	.35					
N	128					
Kenward-Rogers $F(3, 170.87) = 24.14$, $p < .001$						
Marginal $R^2 = .16$						
Conditional $R^2 = .45$						
RLRT for Random effects = 16.12, $p < .001$						

Note. Self-pain ratings were z-standardized to get standardized coefficients. Semi-partial R^2 for each fixed effect were calculated based on Nakagawa and Schielzeth (2013), and show the proportion of variance explained by each fixed effect adjusted for other predictors. Significance level for random effects were calculated using Restricted Likelihood Ratio Test based on Crainiceanu and Ruppert (2013).
[a] Participant neurotype was coded as -1 = Non-autistic, 1 = Autistic; [b] Pain type was coded as -1 = Physical pain, 1 = Social pain.

Target Hardship and Pain Ratings

We analyzed target hardship ratings by constructing a multiple linear regression predicting target hardship ratings from target neurotype, participant neurotype, and the interaction between target and participant neurotype. As Figure 2.2A and Table 2.7 show, both autistic and non-autistic participants gave higher hardship ratings to the autistic target than the non-autistic target (autistic participants: $t(60.83) = 4.73$, $p < .001$, $d = 1.18$, 95% CI [0.7, 1.76]; non-autistic participants: $t(60.89) = 9.15$, $p < .001$, $d = 2.29$, 95% CI [1.71, 3.02]). Participant neurotype did not predict target hardship ratings. However, the interaction between participant

and target neurotype did predict target hardship ratings: The difference between the amount of hardship the autistic and non-autistic targets were thought to have experienced was greater among the non-autistic participants than the autistic participants. This finding is consistent with other research suggesting that non-disabled people may believe that disabled people's lives are more difficult than disabled people believe their lives to be (Nario-Redmond, 2020).

Table 2.7
Multiple Regression Predicting Target Hardship Ratings (Study 2)

Predictor	β	*SE*	95% CI	*t*	*p*	f^2
Target neurotype[a]	**.64**	**.07**	**[.50, .77]**	**9.43**	**< .001**	**0.72**
Participant neurotype[b]	-.04	.07	[-.17, .09]	0.59	.558	0.00
Target neurotype x Participant neurotype	**-.14**	**.07**	**[-.27, -.01]**	**-2.07**	**.040**	**0.03**
$F(3, 124) = 31.17$, $p < .001$						
Multiple $R^2 = .43$						
Adjusted $R^2 = .42$						

Note. Target hardship ratings were z-standardized to get standardized coefficients. [a] Target neurotype was coded such that -1 = Non-autistic target, 1 = Autistic target. [b] Participant neurotype was coded such that -1 = Non-autistic participants, 1 = Autistic participants.

Turning to target pain ratings, as Figure 2.2B shows, both the autistic and the non-autistic participants estimated the autistic target would experience more physical and social pain than the non-autistic target, replicating Study 1. We analyzed these data using a mixed-effects model that included as predictors target neurotype, pain type, participant neurotype, the interactions between these three variables, and self-pain ratings. As Table 2.8 shows, there were three significant predictors: Target neurotype (autistic targets were rated as experiencing more pain than non-autistic targets), pain type (social pain ratings were higher than physical pain ratings), and self-pain ratings (the higher the self-pain ratings, the higher the target pain ratings). Participant neurotype was not a significant predictor, and none of the interactions were significant: Autistic

and non-autistic participants did not differ in how much more pain they estimated the autistic vs. non-autistic target would feel.

Table 2.8
Mixed-Effects Model Predicting Target Pain Ratings (Study 2)

Predictor	β	SE	95% CI	*t*	*p*	Semi-partial R^2
Fixed effects						
Target neurotype[a]	**.12**	**0.05**	**[.02, .22]**	**2.38**	**.019**	**.03**
Pain type[b]	**.28**	**0.04**	**[.20, .35]**	**7.42**	**< .001**	**.12**
Participant neurotype[c]	.09	0.05	[-.01, .19]	1.73	.088	.02
Target neurotype x Pain type	-.03	0.03	[-.09, .03]	-0.9	.370	.00
Participant Neurotypex Target neurotype	.01	0.05	[-.09, .10]	0.10	.919	.00
Participant Neurotype x Pain type	.06	0.03	[.00, .13]	1.93	.056	.01
Participant Neurotype x Target neurotype x Pain type	.01	0.03	[-.05, .07]	0.28	.783	.00
Self-pain ratings	**.58**	**.05**	**[.49, .67]**	**12.59**	**< .001**	**.38**
Random Effects						
Residual variance (σ^2)	.27					
Participant-level variance of target pain ratings	.20					
ICC	.42					
N	128					

Kenward-Rogers F (8, 204.26) = 51.87, $p < .001$
Marginal $R^2 = .55$
Conditional $R^2 = .74$

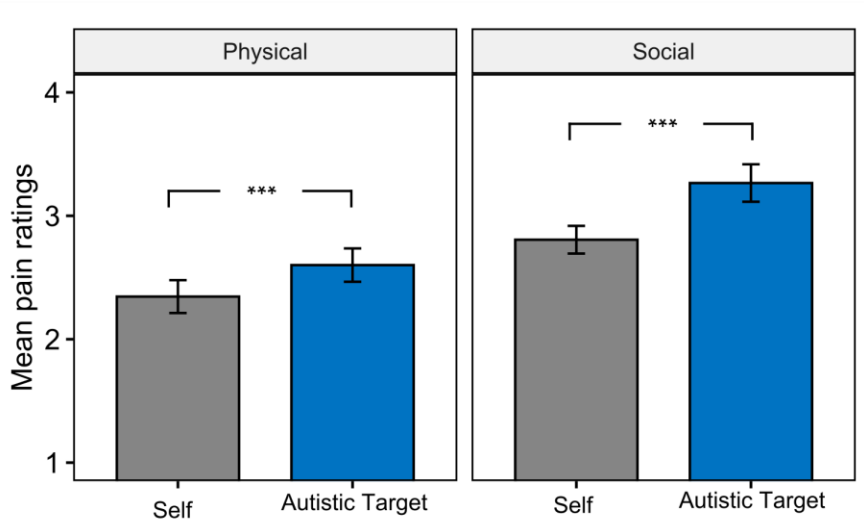
RLRT for random effects = 24.24, $p < .001$

Note. Target and self-pain ratings were z-standardized to get standardized coefficients. Semi-partial R^2 for each fixed effect were calculated based on Nakagawa and Schielzeth (2013), and show the proportion of variance explained by each fixed effect adjusted for other predictors. Significance level for random effects were calculated using Restricted Likelihood Ratio Test based on Crainiceanu and Ruppert (2013).
[a] Target neurotype was coded as -1 = Non-autistic target, 1 = Autistic target; [b] Pain type was coded as -1 = Physical pain, 1 = Social pain; [c] Participant neurotype was coded as -1 = Non-autistic, 1 = Autistic.

Comparing Autistic Participants' Self and Autistic Target Ratings

For the autistic participants assigned to evaluate the autistic target, we investigated how closely their self-pain ratings matched the pain ratings they gave to the autistic target. As Figure 2.3 shows, autistic participants estimated the autistic target would experience more physical pain than they would experience, $t(31) = 4.17$, $p < .001$, $d = 0.68$, 95% CI [0.17–1.20], and more social pain than they would experience, $t(31) = 7.20$, $p < .001$, $d = 1.21$, 95% CI [0.77–1.65].

Figure 2.3
Autistic Participants' Self-Pain vs. Autistic Target Pain Ratings in Study 2



Note. Error bars represent 95% CIs of the mean.
*** $p < .001$

Discussion

There were two primary findings from Study 2. First, both autistic and non-autistic participants estimated that an autistic target would feel more physical and social pain than a non-autistic target. This suggests that the higher pain ratings non-autistic participants gave to the autistic compared to non-autistic target in Study 1 were not solely the result of outgroup bias. Instead, they may reflect a stereotype about autistic people that is shared among autistic and non-

autistic people. Second, autistic participants expected they would feel the same amount of pain in our pain scenarios as non-autistic participants expected to feel (but see Hoffman et al., 2022), and autistic participants expected the autistic target would feel more pain than they expected to feel.

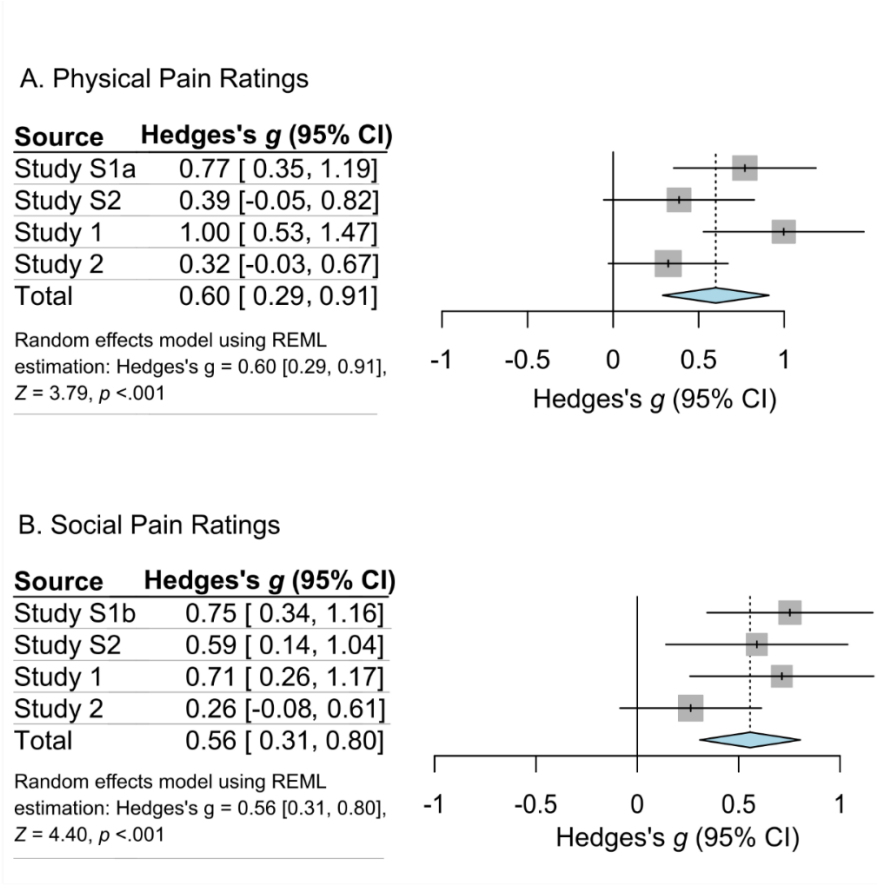
At first glance, this pattern of findings may seem puzzling. If autistic participants share the stereotype that autistic people are more sensitive to pain than non-autistic people, why didn't they apply the stereotype to themselves? One explanation may derive from personal/group discrimination discrepancy: As noted earlier, marginalized groups sometimes expect that other members of their group are more affected by, for example, circumstances or discrimination than they are (e.g., Deska et al., 2020; Taylor et al., 1990). Perhaps the autistic participants in Study 2 believed that the stereotypes that attach to autistic people generally are less applicable to themselves.

Internal Meta-Analyses

Because of space constraints, three additional studies investigating whether non-autistic people believe that an autistic target would experience more pain than a non-autistic target are reported in the Supplemental Materials (Studies S1a, S1b, and S2). We used the *meta* package in R (Balduzzi et al., 2019) to conduct two meta-analyses using data from all five studies to investigate the size of the difference between participant estimates of the autistic and non-autistic target's pain. Estimates of Hedges's *g* were calculated using means and standard deviations obtained in the studies, and hence differ in some instances from the effect sizes reported in the main text, which are derived from different linear regression models that control for other predictors.

As Figure 2.4 shows, the meta-analysis on ratings of physical and social pain yielded medium effect sizes (*p*s < .001). Note that the 95% confidence intervals for Hedges's *g* estimates for physical and social pain in Study 2 overlap with 0, suggesting that differences between pain ratings of the autistic and non-autistic targets were not significant in that study. However, as reported in Table 8, the difference in target pain ratings was significant in a mixed-effects model collapsing across pain types and accounting for participants' self-pain ratings. Controlling for self-pain ratings (which was not possible in the meta-analysis) may be important for detecting biases in expectations of other targets' pain, especially when (as in the case of autistic people), these pain expectations are heterogeneous (e.g., Kalingel-Levi et al., 2021).

Figure 2.4
Meta-Analysis of the Effect of Target Neurotype on Physical and Social Pain Judgments



General Discussion

Motivated by past studies investigating the relationship between ratings of hardship and estimates of pain for Black targets and low-SES targets (e.g., Summers et al. 2021; Trawalter et al., 2012), we began this line of work expecting participants would rate an autistic target as having experienced more hardship than a non-autistic target and therefore less pain. Our expectations with regard to hardship ratings were borne out, but participants in the studies reported here consistently estimated that an autistic target would feel *more* pain, on average, than a non-autistic target. They did so regardless of whether the pain was physical or social, and the same pattern was evident whether the participants were autistic or non-autistic, or college students or Prolific workers. Thus, one important contribution of the current studies is the finding that members of a group that is thought to have experienced significant life hardship are not always assumed to be "toughened up" as a result, or inured to the experience of pain.

What explains these robust but unexpected findings? Perhaps participants gave higher pain ratings to the autistic than non-autistic target because they knew autistic people who are hypersensitive to environmental stimuli (e.g., lights, sounds) or had been exposed to media portrayals of them (e.g., Julia in *Sesame Street* [Sesame Street, 2017] or Sam in the Netflix series *Atypical* [Rashid et al., 2017]). Or perhaps participants gave higher pain ratings to the autistic than the non-autistic target because they were aware that autistic people can have painful co-occurring conditions (e.g., Baeza-Velasco et al., 2018). Although familiarity with autistic hypersensitivity to environmental stimuli or painful co-occurring conditions could contribute to participants' higher estimates of the autistic target's physical pain, it is not clear how it would explain their higher estimates of the target's social pain. Indeed, high social pain estimates for the

autistic target are difficult to reconcile in light of pervasive (and erroneous; see Jaswal & Akhtar, 2019) claims about autistic people's social indifference (e.g., Chevallier et al., 2012).

It is possible that the higher pain ratings given to the autistic target reflected participants' sensitivity to a group they believed to be physically and emotionally vulnerable. It is also possible that the higher pain ratings reflected not just sensitivity to a vulnerable group, but the infantilization of that group. According to mind perception research, children are believed not just to be more sensitive to emotions and sensations (including pain) but also less agentic (i.e., less responsible and less self-directed) than adults (Gray et al., 2007). Most autistic people are adults (Dietz et al., 2020), but autism is primarily described as a condition of childhood and is most often discussed in reference to children (e.g., Akhtar et al., 2022). Thus, it is possible that participants viewed the autistic target as both more vulnerable and less agentic than the non-autistic target.

The current studies were not designed to distinguish between the sensitivity and infantilization explanations. But one piece of evidence consistent with infantilization comes from our finding that the autistic target was rated as experiencing both more hardship and more pain. If autistic adults are viewed as childlike (as not just vulnerable but also lacking in agency), they may be seen as lacking the capacity to toughen up from life hardship. This contrasts with beliefs about Black people, who typically are not viewed as vulnerable or child-like–indeed, Black children are subject to adultification (Goff et al., 2014)—and who are believed to toughen up as a result of life hardship (Trawalter et al., 2012). Future work will be needed to investigate whether higher pain estimates given to autistic people (by both autistic and non-autistic participants) are related to sensitivity or infantilization.

The relatively high pain estimates given to the autistic target could have positive or negative consequences for their pain care. On the positive side, it might motivate adequate pain treatment (e.g., Cuddy et al., 2007). But on the negative side, the high pain estimates given to the autistic target might not translate into treatment that delivers pain relief if their pain reports are not believed. For example, even though there is a stereotype that women are more sensitive than men to pain and even though women are more likely than men to report pain, women's pain is more likely to go undertreated than men's (Dusenbery, 2018; Lloyd et al., 2020). One proposed explanation is healthcare providers' belief that women are not credible reporters of their pain, that their hypersensitivity leads them to complain even when it is not warranted (Hoffmann & Tarzian, 2001). Perceptions of women's oversensitivity to pain may signal a "trust gap" between the medical establishment and women patients (Dusenbery, 2018). If such a trust gap exists in the case of autistic patients as well (e.g., Li & Koenig, 2019; Shaw et al., 2023)–that is, if they are perceived to be unreliable reporters of their pain–it may lead to their pain reports being dismissed. It is also possible that autistic people's reports about their pain will be misattributed by healthcare providers to "autism" rather than to their true (and treatable) cause (Shaw et al., 2023).

The findings reported here should be interpreted in light of a number of limitations. First, in our studies, the autistic target was explicitly identified as autistic. However, when a perceiver does not know that the individual in pain is autistic, other factors like the individual's race, gender, facial expressions, and context will influence how the pain is perceived and treated (e.g., Mende-Siedlecki et al., 2019). Even if people generally believe that autistic people are hypersensitive to pain, how their pain is acknowledged in real-life contexts may not reflect that belief. Indeed, as noted in the Introduction, autistic people routinely describe having their

experience of pain discounted (e.g., Kraemer et al., 2021). Second, our targets were of a particular type: They were described as college students (with gender and race unspecified). As just noted, a number of factors contribute to estimates of others' pain. Future work should investigate how target neurotype interacts with, for example, race, gender, age, and level of support needs in estimates of pain.

Third, although the inclusion of Prolific workers extends the generalizability of our findings beyond the college sample, future work should include samples from other demographics as well. Indeed, our autistic sample (recruited from Prolific) presumably consisted of individuals who had the skills to complete the online study independently; autistic people with higher support needs may respond differently from those represented here. Finally, we did not investigate pain judgments of targets belonging to other vulnerable (or possibly infantilized) groups (e.g., other disabled people, the elderly, homeless people, etc.). Therefore, we cannot know whether the effects documented here are specific to beliefs about autistic people.

In conclusion, both autistic and non-autistic people in the U.S. believe that autistic people are more sensitive to physical and social pain than non-autistic people. Future work will investigate the underpinnings of this bias and its implications for autistic people's wellbeing and dignity.

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Paper 2:

Non-autistic Adults Infantilize Autistic Adults

Abstract

Disabled adults report being infantilized by other people, an experience they describe as demeaning and isolating. Since autism is predominantly described as a childhood condition, autistic adults may be especially vulnerable to infantilization. In three pre-registered studies, we investigated whether the amount of pain, autonomy, and pity non-autistic adults ascribed to an autistic adult were consistent with infantilization. In Study 1, participants (N = 99) rated an autistic adult's sensitivity to pain similarly to how they rated a child's sensitivity, and higher than they rated a non-autistic adult's sensitivity. In Study 2, participants (N = 120) were more likely to indicate that important decisions about a college student's life should be made by their parents if the student was identified as autistic than if they were not identified as autistic. In Study 3, participants (N = 214) reported feeling more pity–an emotion that can be associated with infantilization–for an autistic adult than a non-autistic adult. These infantilizing attitudes may contribute to challenges faced by autistic people in attaining optimal self-determination and being provided with the opportunities to participate in society in ways they would like to.

Keywords: *Autism, pain judgments, infantilization, ableism, stereotypes*

Introduction

Disabled people are subject to infantilization in a variety of contexts, including interpersonal interactions (e.g., Gouvier et al., 1994), disability policies (e.g., Whelan, 2021), charity fundraising campaigns (e.g., Cole & Johnson, 2014), and popular media (e.g., Stevenson et al., 2011). Autistic adults, too, are subject to infantilization. For example, people sometimes use baby talk while talking to autistic adults (e.g., Srinivasan, 2023), withhold important information from autistic people with the assumption that they will not be able to handle it (Stout, n.d.), and do not consult them on matters integral to their wellbeing (e.g., Loftis, 2021; Whelan, 2021). In the three studies reported here, we investigated non-autistic adults' infantilizing beliefs about autistic adults.

Although autism is a lifelong condition, it is most often described in reference to children. Stevenson et al. (2011) found that public facing content about autism predominantly portrayed it as a condition of childhood: Photographs of autistic people on websites of parent-run organizations were more likely to feature autistic children than autistic adults; autism charities overwhelmingly described autism using terms like "child" or "children;" and news articles about autism were far more likely to be about autistic children than autistic adults. When fiction books, television series and films featured autistic characters at all, these characters tended to be children rather than adults. A decade later, Akhtar et al. (2022) found that the gap between portrayals of autistic children and adults on autism organization websites and fiction books had diminished, and news stories and television shows were found to feature autistic children and adults in about equal proportions. However, autistic adults are still described in infantilizing ways. For example, Akhtar et al. (2022) note that news stories may position an autistic adult as someone's child, and thus privilege non-autistic parent perspectives over autistic adult

perspectives. Such infantilizing portrayals may place autistic adults at an especially high risk of being infantilized by others compared to non-autistic adults.

The experience of disabled people (including autistic people) shows that non-disabled people act towards disabled people in ways that infantilize them. For example, sometimes, they use high-pitched speech and simplified vocabulary when speaking with disabled adults, much as if they would while talking to a child (Liesener & Mills, 1999). They praise disabled adults for doing perfectly ordinary adult-like things, like buying groceries, and they sometimes provide unsolicited and unwanted assistance to disabled people, acting as if they know the best course of action for them (Nario-Redmond et al., 2019).

Infantilizing attitudes towards the disabled can be implicit rather than explicit. For example, Robey et al. (2006) administered tasks of implicit and explicit infantilizing attitudes towards disability to professionals who cared for children and adults with developmental disabilities. Explicitly, participants did not rate words relating to disability (e.g., “handicap”) as childlike. However, on an implicit association test, they were faster to categorize words into infantilization-consistent categories (i.e., “disabled and child” and “non-disabled and adult”), than in infantilization-inconsistent categories (i.e., “disabled and adult” and “non-disabled and child”). Taken together, these results suggest that implicit tasks may be better calibrated to detect people’s infantilizing attitudes towards the disabled than explicit tasks.

At the same time that disabled adults are infantilized, they are also pitied by non-disabled adults (Nario-Redmond et al., 2019). Pity is a part and parcel of a paternalistic form of ableism, which is a combination of positive and negative motives. For example, paternalistic ableism may involve a willingness to protect and help disabled people, but an unwillingness to respect their decisions (Nario-Redmond et al., 2019). This pattern of active help (e.g., protection) and passive

harm (e.g., unwillingness to support) towards a target is consistent with pity for the target (Cuddy et al., 2007).

Epstein et al. (2023) conducted a large multi-national study asking participants about infantilization they faced in their lives and found that some social groups including disabled people, the elderly, and women are particularly likely to face infantilization. Infantilization was conceptualized as restrictions faced by the individual in several aspects of their life, including activities, social relationships, and medical treatment. In the sample, these kinds of infantilizing experiences were associated with poor mental health, low levels of personal and professional success, and low perceived control over one's life (Epstein et al., 2023). Infantilization also renders the adult targets of infantilization irrelevant in contexts of adulthood, like employment or sexual health, and thus excludes them from opportunities and services (Stevenson et al., 2011).

It is thus not surprising that autistic adults have explicitly condemned non-autistic people's behaviors which infantilize them. For example, Srinivasan (2023) notes that infantilization detracts from the dignity of autistic adults by revealing and reinforcing society's low expectations of autistic people. Chasteen (2016) and Loftis (2021) point out that infantilization excludes autistic people from decisions about important aspects of their lives. For example, Loftis (2021) describes her experiences during medical procedures of being categorized as a child instead of adult, and of medical personnel questioning her capability of providing consent. Autistic adults are often assumed to require permanent guardianship, which detracts from their rights to live independently and make autonomous decisions (Moss, 2023). Being legally allowed to decide where and how they want to live is often an uphill battle for autistic adults (Dorman, 2023). Understanding non-autistic people's infantilizing attitudes towards

autistic people could help ameliorate such attitudes, thus improving the quality of support for autistic adults.

While autistic people report being infantilized in several contexts, to our knowledge, there are no experimental studies investigating non-autistic people's infantilizing attitudes towards autistic people. In the studies reported here, we investigated non-autistic adult participants' infantilization of autistic adults by probing their beliefs about autistic adults' vulnerability (Study 1) and decision-making autonomy (Study 2), as well as their feelings of pity towards autistic adults (Study 3).

Study 1

In Study 1, we investigated non-autistic adults' beliefs about autistic adults' vulnerability, using pain as a proxy for vulnerability. Vulnerability is a quality strongly associated with children. They are perceived as having relatively low physical strength and immature social and cognitive abilities–characteristics that place them at risk of making dangerous and inappropriate decisions, and acting in dangerous and inappropriate ways (Hewitt-Taylor & Heaslip, 2012). Thus, children are quintessential moral patients; they are perceived as likely to come to harm and worthy of protection (e.g., Gray et al., 2007). Adults usually endorse children's rights to nurturance and protection, suggesting that children are perceived as needing and deserving protection (Peens & Luow, 2000). Indeed, safeguarding children is a priority in healthcare and social services settings (Hewitt-Taylor & Heaslip, 2012).

Central to the idea of vulnerability is the perception that the vulnerable person faces a threat, danger, or risk of harm (Hewitt-Taylor & Heaslip, 2012). That is, an individual perceived to be vulnerable is expected to be hurt in a risky and challenging situation. One way to measure perceptions about how much a target is at risk of harm (i.e., vulnerable) is to ask observers how

much pain the target would feel in painful scenarios (e.g., Gray & Wegener, 2009). For example, consistent with the idea that children are perceived to be more vulnerable than adults, participants tend to indicate that children would feel more pain than adults if they were cut by a piece of glass (Gray & Wegener, 2009).

Basargekar et al. (2024) found that both autistic and non-autistic adults rated autistic adult targets as experiencing more pain than non-autistic adult targets in a variety of scenarios involving mild physical injuries. One way of interpreting this finding is that autistic adults are perceived as more vulnerable than non-autistic adults–perhaps as vulnerable as children. To examine this possibility, in Study 1, we compared how much pain non-autistic adults believe an autistic adult, an autistic child, a non-autistic adult, and a non-autistic child would feel in several physically painful scenarios.

In addition, we assessed participants' beliefs about target characters' attributes by asking them to rate the targets on their capacity to experience emotions and sensations, as well as their capacity to exercise agency (Gray et al., 2011). According to the influential mind perception framework, in people's perceptions of others, individuals' capacities are organized along two dimensions, including the capacity to experience sensations and emotions ("experience"), and capacities to bring about a change in the world ("agency") (Gray et al., 2007). Mind perception research shows that children are perceived to have a slightly higher capacity to experience emotions and sensations than adults, but lower capacity for exercising agency than adults (Gray et al., 2007). In line with our hypothesis that autistic adults are infantilized, we expected that participants would give the autistic adult, autistic child and non-autistic child targets high ratings on the experiential capacities of feeling hunger, fear, and pleasure, but low ratings on the agentic capacities of self-control, memory, and morality. We also expected that participants would give

the non-autistic adult target lower ratings on experiential capacities, but high ratings on agentic capacities.

Finally, to ensure that participants assigned to rate the autistic and the non-autistic targets' did not differ in their familiarity with autistic people, we included two measures assessing participants' level and quality of contact with autistic people (Gardiner & Iarocci, 2014).

Study 1's design, hypotheses, and planned analyses were pre-registered at https://osf.io/9r478. Table 3.1 shows details of any deviations from pre-registration.

Table 3.1

Deviations from pre-registered analyses

Study	Analysis	Pre-registered	Reported	Reason for discrepancy
Study 1	Model reported in power analysis	Sample size calculated for one predictor, assuming a model with **five total predictors**	Sample size calculated for one predictor, assuming a model with **four total predictors**	Removed one covariate in reported model to align with best practices; required sample size remains unchanged
Study 1	Regression models analyzing target pain and hardship ratings	Multiple regression model with **six total predictors**	Multiple regression model with **four total predictors (pain) and three total predictions (hardship, in SM)**	Removed covariates to align with best practices
Study 1	Regression model analyzing target pain ratings from target experience and agency ratings	**Multiple regression model** with eight total predictors	**Not reported**	Not appropriate for the research question given nature of the data
Study 2	Model reported in power analysis	Sample size calculated for the effect of one predictor, assuming a model with **seven total predictors**	Sample size calculated for the effect of one predictor, assuming a model with **three total predictors**	Removed covariates in reported models to align with best practices; required sample size remains unchanged
Study 2	Models to analyze target pain, hardship and autonomy ratings	Multiple regression models with **four total predictors**	Regression model with **two (pain, in SM); one (hardship, in SM); and three (authonomy) predictors**	Removed covariates to align with best practices
Study 2	Analyzing time taken to respond to autonomy scale	**t-test**	**Not reported**	Not relevant for research question
Study 3	Model reported in power analysis	Sample size calculated for the effect of one predictor, assuming a model with **eight total predictors**	Sample size calculated for one predictor, assuming a model with **four total predictors**	Removed covariates to align with best practices; required sample size remains unchanged
Study 3	Regression models to analyze target pain, hardship, and autonomy ratings	Multiple regression models with **six, five, and four predictors respectively**	Regression models with **four (pain, in SM), one (hardship, in SM) and three (autonomy, in SM) predictors**	Removed covariates to align with best practices
Study 3	Regression models analyzing target pity, warmth, and competence ratings	Multiple regression models with **five, four, and four predictors respectively**	Regression models with **four (pity), one (warmth), and one (competence) predictor respectively**	Removed covariates to align with best practices

Study 3	Predicting target pity ratings from target autonomy ratings	Regression model **predicting target autonomy ratings from target pity ratings**	Regression model **predicting target pity ratings from target autonomy ratings**	Improve alignment with research question
Study 3	Predicting target pity ratings from target pain ratings	Regression model **predicting target pain ratings from target pity ratings**	Regression model **predicting target pity ratings from target pain ratings**	Improve alignment with research question
Study 3	Target hardship ratings mediating target pity ratings	**Mediation analysis**	**Not reported**	Not relevant for research question

Note. Words in bold highlight specific differences between pre-registered and conducted analyses.

Methods

Participants

Undergraduates (N = 99) from a large mid-Atlantic university participated for course credit. Sample size was calculated a priori using G*Power (Faul et al., 2007). Since we were chiefly interested in detecting an interaction between target age (child vs. adult) and target neurotype (autistic vs. non-autistic), we assumed a medium effect size for one predictor variable in a model with four predictor variables. To achieve a power of .95 to detect a medium effect size (f^2 = 0.15) for one predictor in such a model, we would need 89 participants. We planned to recruit 100 participants and ended up with 99.

Participant demographics are presented in Table 3.2. Data from four participants were discarded because they failed an attention check (n = 3) or a manipulation check (n = 1); new participants were recruited to replace them to obtain the intended sample size. Data from one additional participant who reported being autistic were discarded. Data collection took place in February and March 2022.

Table 3.2

Participant Demographics

Study details	Sample	Condition	Gender	Age
Study 1 (February-March 2022)	College students 58% White, 30% Asian, 4% Black, 8% More than one race 8% Hispanic / Latinx, 92% Not Hispanic/Latinx	AT, Adult (*n* = 25)	20 F, 5 M	19. 16 (1.18)
		AT, Child (*n* = 24)	19 F, 5 M	19.04 (1.12)
		NT, Adult (*n* = 25)	20 F, 5 M	19.44 (1.26)
		NT, Child (*n* = 25)	20 F, 5 M	19.04 (1.14)
Study 2 (July 2022)	Prolific Workers 75% White, 10% Asian, 7% Black, 5% More than one race; 9% Hispanic / Latinx, 91% Not Hispanic / Latinx	AT, Adult (*n* = 60)	34 F, 23 M, 2 NB, 1 TM	33.72 (12.93)
		NT, Adult (*n* = 60)	36 F, 19 M, 2 NB, 1 TM	31.28 (9.81)
Study 3 (November-December 2022)	College students 60% White, 22% Asian, 9% Black, 7% More than one race; 9% Hispanic / Latinx; 90% not Hispanic / Latinx, 1% unspecified	AT, Order 1 (*n* = 54)	36 F, 18 M	18.98 (1.06)
		AT, Order 2 (*n* = 53)	33 F, 20 M	19.00 (1.00)
		NT, Order 1 (*n* = 54)	38 F, 15 M, 1 NB	19.02 (1.10)
		NT, Order 2 (*n* = 53)	38 F, 15 M	19.18 (1.29)

Note. Figures in parentheses represent SDs. In Condition, AT = Autistic Target, NT = Non-autistic Target, Order 1 = Pain ratings followed by pity ratings, Order 2 = Pity ratings followed by pain ratings. In Gender, F = Female, M = Male, NB = Nonbinary, TM = Transgender Male.

Design

Participants were randomly assigned to estimate the pain of either an adult target or a child target. Within each target age condition, they were randomly assigned to estimate the pain of either an autistic target or a non-autistic target. Three of the four conditions in this 2 x 2 design had 25 participants, and the fourth condition (autistic child target) had 24 participants.

Measures

Four of the measurement instruments in this study were the same as those used in Basargekar et al. (2024, Paper 1 of dissertation), including the pain sensitivity rating scale (α = .88 in the current study), the hardship beliefs scale (α = .81)[2], level of contact with autism report, and quality of contact with autism scale (α = .91). As in Basargekar et al. (2024), the quality of contact with autism scale was only administered to those participants who had indicated having had some contact with autistic people on the level of contact with autism report.

We also included the Experience-Agency Perception Scale, which consists of six items assessing the extent to which respondents attribute mental capacities to other entities (Gray et al., 2011). Three items on this scale ask respondents to rate a target on the capacity to experience sensations and emotions (e.g., "How capable of feeling fear do you think Taylor is?"). The other three items ask respondents to rate the target on agentic capacities, or the capacity for self-control and self-direction (e.g., "How capable of acting morally do you think Taylor is?"). Each item is rated on a 7-point scale, ranging from 0 (not at all) to 6 (very much). Since we had different hypotheses about target ratings of experiential capacities and ratings of agentic capacities, we report scores on experiential and agentic capacities separately. Internal consistency was good for items measuring perceptions of experiential capacity (α = .81) and agentic capacity (α = .85). See Appendix A for details about the Experience-Agency perception scale.

Procedure

Participants completed the study online via Qualtrics (Qualtrics, Version March 2022). All participants first estimated how much pain they would feel in physically painful situations,

[2] Hardship ratings were included to rule out the possibility that beliefs of how much hardship a target had experienced may inform target pain ratings, as has been found in past research investigating pain beliefs of other social groups (e.g., Summers et al., 2021; Trawalter et al., 2012).

and rated the hardship they believed they had experienced. One attention check was included on the pain ratings scale, asking participants to "Select 4 (Extremely painful)." Next, they read the following statement: "In this study, we are interested in how people rate the pain of others. We are going to ask you to carefully read a short description about a person's life." They were then randomly assigned to read one of four carefully matched vignettes:

> **Adult Autistic and Non-Autistic Vignettes.** Taylor is autistic [20 years old]. Taylor is a college student majoring in economics. In their spare time, Taylor enjoys painting and playing soccer. Taylor lives in an apartment with three roommates.
>
> **Child Autistic and Non-Autistic Vignettes.** Taylor is autistic [nine years old]. Taylor is in 4th grade. Taylor plays on their school soccer team and enjoys painting. Taylor's favorite ice cream flavor is chocolate. Taylor lives with their parents, one sibling, and a dog.

After reading their assigned vignette, participants responded to the same pain scenarios and hardship questions they had seen earlier, but this time with reference to their assigned target. One attention check was included on each target rating scale, asking participants to "Select 1 (Not Painful)." Additionally, two manipulation checks were included to ensure that the participants had attended to the age and neurotype information of the specific targets they had read about. First, participants were prompted to write everything they could remember about their target. Second, they were asked to select, out of four presented options, the information that was presented about their assigned target. For the participants assigned to rate an autistic target, the accurate response was "Taylor is autistic;" for those assigned to rate a non-autistic target, the accurate response was "None of the above." The distractor options were "Taylor has Down's

Syndrome" and "Taylor lives alone." As noted above, we replaced one participant who was assigned to rate a non-autistic target and failed to select "None of the above."

Next, participants responded to the Experience-Agency scale, indicating the extent to which they believed their assigned target character possessed six mental capacities. They then completed the Level of Contact with Autism Report, and (if they reported having contact with autistic people) the Quality of Contact with Autism Scale. Participants additionally completed the Mind Perception Scale for their assigned target character, which was for exploratory purposes and will not be discussed here.

Results

Table 3.3 shows the averages of all measured variables. Participants across the four conditions were similar in self-pain ratings (F (3, 96) = 0.51, p = .676), self-hardship ratings (F (3, 96) = 0.25, p = .859), self-reported level of contact with autistic people (F (3, 96) = 0.97, p = .412), and quality of contact with autistic people (F (3, 62) = 0.859, p = .467). Replicating past work (Basargekar et al., 2024), autistic targets were given higher hardship ratings than the non-autistic targets (F (1,96) = 24.50, p < .001). Target hardship ratings did not reliably vary by whether the target was an adult or a child (F (1,96) = 0.49, p = .122). In addition, the interaction between target age and target neurotype did not predict target hardship ratings: The difference between the pain ratings given to the autistic and the non-autistic targets was similar for both child and adult targets (F (1,96) = 0.09, p = .505).

Since past work shows that self-pain ratings are highly correlated with target pain ratings (e.g., Basargekar et al., 2024), we used self-pain ratings as a covariate in our model predicting target pain ratings. Unless otherwise noted, all models reported below had good diagnostics,

including acceptable homoscedasticity, normality of variables, and little multicollinearity (VIFs < 4).

Table 3.3

Averages of Variables Measured in Study 1

Variable	Adult Targets		Child Targets	
	Autistic target (n = 25)	Non-autistic target (n = 25)	Autistic target (n = 24)	Non-autistic target (n = 25)
Target pain ratings (min = 1, max = 4)	2.54 (0.40)	2.19 (0.33)	2.62 (0.47)	2.58 (0.33)
Target hardship ratings (min = 1, max = 5)	3.53 (0.50)	2.6 (0.37)	3.45 (0.44)	2.4 (0.48)
Target experiential capacity ratings (min = 1, max = 6)	5.20 (0.62)	5.04 (0.92)	5.25 (1.00)	5.12 (0.92)
Target agentic capacity ratings (min = 1, max = 6)	4.64 (0.74)	4.88 (0.89)	4.53 (1.20)	3.91 (1.19)
Self-pain ratings (min = 1, max = 4)	2.30 (0.28)	2.23 (0.31)	2.26 (0.46)	2.19 (0.26)
Self-hardship ratings (min = 1, max = 5)	2.38 (0.68)	2.39 (0.66)	2.36 (0.63)	2.24 (0.78)
Level of Contact Report (min = 0, max = 12)	5.96 (3.21)	7.48 (2.99)	6.92 (3.50)	6.8 (3.06)
Quality of Contact Scale (min = 1, max = 9)	6.77 (1.11)	6.30 (1.63)	6.54 (1.14)	7.03 (1.58)

Note. Figures in parentheses are SDs.

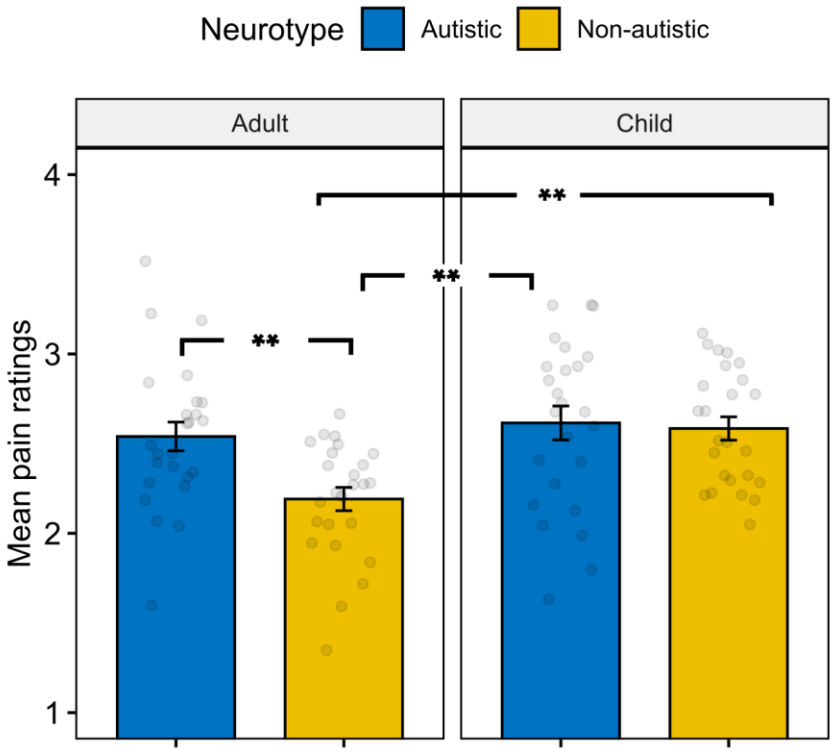
Target pain ratings

Figure 3.1 shows the amount of pain each target was estimated to feel as a function of target neurotype and target age. As the figure shows and as predicted, the autistic adult, autistic child, and non-autistic child targets were rated as feeling more pain than the non-autistic adult target. To analyze these data, we constructed a linear model predicting target pain ratings by target neurotype, target age, and the interaction between target neurotype and target age,

controlling for participants' self-pain ratings. Model plots showed one influential data point resulting in violation of linearity and homoscedasticity assumptions. Since the pattern of model results did not change when data from this participant were excluded, here we report the model with the complete data.

Figure 3.1

Average Target Pain Ratings (Study 1)



Note. Error bars represent standard errors of the mean. Asterisks represent Tukey-corrected significance levels: ** < .01.

As Table 3.4 shows, there was a main effect of target neurotype, such that autistic targets were given higher pain ratings than non-autistic targets, β = .18 [.04, .32], p = .015, f^2 = 0.02. There was also a significant effect of target age, such that child targets were given higher pain ratings than adult targets, β = .33 [.19, .48], p < .001, f^2 = 0.16. Importantly, as predicted and as

shown in Figure 3.1, the main effects were qualified by a significant interaction between target age and target neurotype, β = -.18 [-.32, -.04], p = .013, f^2 = 0.04: The autistic adult, autistic child and non-autistic child targets were rated as experiencing more pain than the non-autistic adult target, ts > 3.3, Tukey-corrected ps < .01. The level of pain the non-autistic child target, the autistic adult target, and the autistic child target were expected to feel did not differ, ts < 0.95, Tukey-corrected ps > .369. Finally, participants who gave high self-pain ratings also gave higher estimates of targets' pain, β = .57 [.43, .72], p < .001, f^2 = 0.66. That the autistic adult received similarly high pain ratings as the two child targets suggests that autistic adults were perceived as vulnerable like children, and more vulnerable than non-autistic adults[3].

Table 3.4

Multiple Regression Predicting Target Pain Ratings (Study 1)

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype[a]	**.18**	**.07**	**[.04, .32]**	**2.47**	**.015**	**0.02**
Target Age[b]	**.33**	**.07**	**[.19, .48]**	**4.62**	**< .001**	**0.16**
Target Age x Target Neurotype	**-.18**	**.07**	**[-.32, -.04]**	**-2.53**	**.013**	**0.04**
Self-pain ratings	**.57**	**.08**	**[.43, .72]**	**7.82**	**< .001**	**0.66**
F (4, 94) = 24.28, p < .001						
Multiple R= .51						
Adjusted R^2 = .49						

Note. Pain ratings were z-standardized to get standardized coefficients.
[a]Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target; [b]Target age was coded such that 1 = Child target and -1 = Adult target.

Target experiential capacity ratings

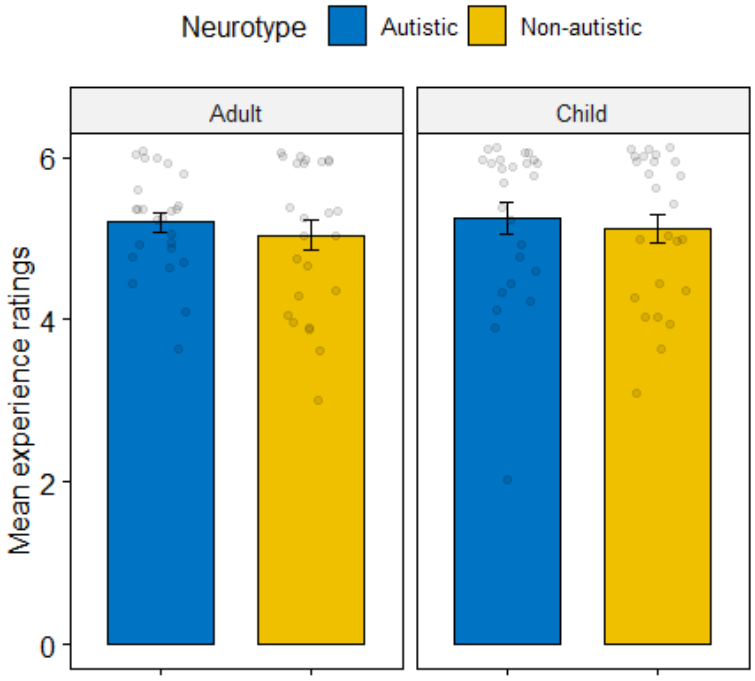
As Figure 3.2 shows, all four targets were believed to have similar and high capacity to experience fear, hunger, and pain. To analyze these data, we constructed a linear model

[3] In addition, target hardship ratings did not mediate the differences in the pain ratings given to autistic and non-autistic targets, β = -.05 [-.15, .03], p = .243 (see Supplementary Materials for model details).

predicting target experiential capacity ratings by target neurotype, target age, and the interaction between target neurotype and target age (Table 3.5).

Figure 3.2

Average Target Experiential Capacity (Fear, Hunger, and Pain) Ratings (Study 1)



Note. Error bars represent standard errors of the mean.

Target experience ratings were heavily skewed to the right, and therefore the distribution of residuals showed significant departure from normality. Since data transformation did not result in a more normal distribution of residuals, here we report the model with untransformed data. As Figure 3.2 and Table 3.5 show, contrary to predictions, there were no differences in experiential capacity ratings between the autistic and non-autistic targets, β = .08 [-.12, .28], p = .438, f^2 = 0.01. Also contrary to predictions, there were no differences in how capable the adult and child targets were perceived to be of these experiences, β = .03 [-.17, .24], p = .744, f^2=

0.00, nor was there an interaction between target neurotype and target age, β = -.01 [-.21, .19], p = .902, f^2 = 0.00: The difference in the experiential capacity ratings of the autistic and the non-autistic targets did not vary by whether the target was an adult or a child.

Table 3.5

Multiple Regression Predicting Target Experiential Capacity Ratings (Study 1)

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype[a]	.08	.10	[-.12, .28]	0.78	.438	0.01
Target Age[b]	.03	.10	[-.17, .24]	0.33	.744	0.00
Target Age x Target Neurotype	-.01	.10	[-.21, .19]	-0.124	.902	0.00
F (3, 95) = 0.24, p = .866						
Multiple R^2 = .01						
Adjusted R^2 = -.02						

Note. Target experience ratings were z-standardized to get standardized coefficients.
[a]Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target; [b]Target age was coded such that 1 = Child target and -1 = Adult target.

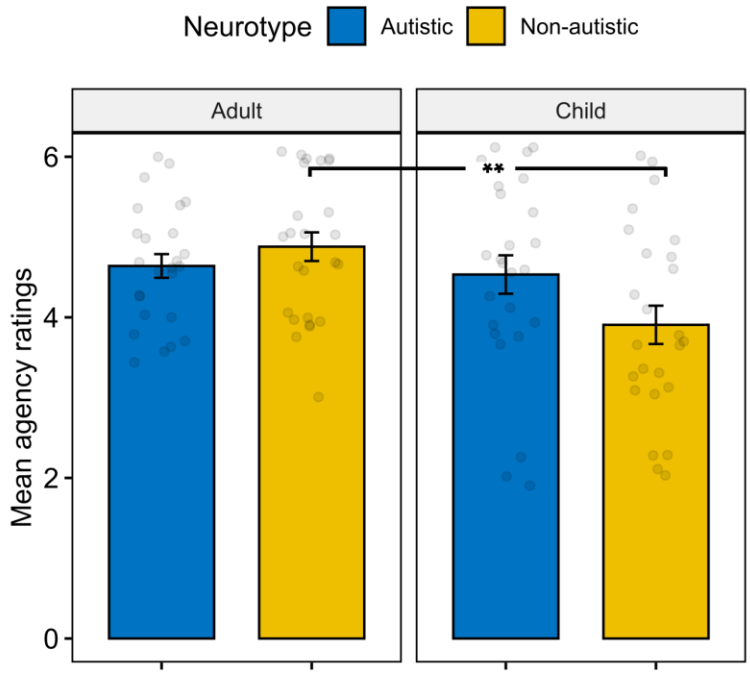
Because targets' experience capacity ratings did not differ as expected, we did not conduct the pre-registered mediation analysis predicting target pain ratings by target experiential capacity ratings.

Target agentic capacity ratings

As Figure 3.3 shows, the non-autistic adult target was rated highest and the non-autistic child target was rated the lowest on the capacity for memory, morality, and self-control. To analyze these data, we constructed a linear model predicting target agentic capacity ratings by target neurotype, target age, and the interaction between target neurotype and target age (Table 6).

Figure 3.3

Average Target Agentic Capacity (Self-Control, Memory, and Morality) Ratings (Study 1)



Note. Error bars represent standard error of the mean. Asterisks represent significance levels. ** $p < .01$

As predicted and as shown in Figure 3.3 and Table 3.6, child targets were believed to be less capable of agency than the adult targets were believed to be, β = -.27 [-.46, -.08], p = .006, f^2= 0.08. Contrary to predictions, targets' agentic capacity did not differ by target neurotype, β = .08 [-.11, .27], p = .428, f^2= 0.01. The main effect of target age was qualified by a marginal target age by target neurotype interaction, β = .19 [.00, .38], p = .052, f^2 = 0.04: The difference between the agentic capacity ratings of the autistic adult and child targets was smaller than the difference between the agentic capacity ratings of the non-autistic child and adult targets. Although this interaction was not significant, Tukey-corrected post-hoc comparisons showed that agency ratings of only the non-autistic child and adult characters differed significantly, t = 3.27, p =

.006. The agency ratings of the autistic adult and child targets were not significantly different, t = 0.59, p = .939. This suggests that the autistic adult and child targets were considered to be more similar in agentic capacity than were the non-autistic adult and child targets, which is consistent with the account that autistic adults are infantilized. However, contrary to expectations, the autistic adult was not rated differently than the non-autistic adult on agentic capacity, t = 1.04, p = .305. This is inconsistent with the possibility that autistic adults are infantilized.

Table 3.6
Multiple Regression Predicting Target Agentic Capacity Ratings (Study 1)

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype[a]	.08	.10	[-.11, .27]	0.80	.428	0.01
Target Age[b]	**-.27**	**.10**	**[-.46, -.08]**	**-2.79**	**.006**	**0.08**
Target Age x Target Neurotype	.19	.10	[.00, .38]	1.97	.052	0.04
F (3, 95) = 4.13, p = .008						
Multiple R^2 = .12						
Adjusted R^2 = .09						

Note. All variables were scaled to get standardized coefficients.
[a]Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target; [b]Target age was coded such that 1 = Child target and -1 = Adult target.

Because targets' agentic capacity ratings did not differ across the autistic and non-autistic targets as expected, we did not conduct the pre-registered mediation analysis examining if target agency ratings mediated the differences in pain ratings assigned to the targets.

Discussion

There were three main findings in Study 1. First, adult participants gave similarly high pain estimates to the autistic adult target, the autistic child target, and the non-autistic child target, and the estimates given to these three targets were significantly higher than the estimates given to the non-autistic adult target. The high pain ratings given to the autistic adult, autistic

child, and non-autistic child targets suggest that these targets are perceived to be similarly vulnerable. This belief is consistent with the infantilization of the autistic adult target.

One concern could be that the high pain ratings given to the autistic adult target reflect participants' beliefs about autistic people's sensory sensitivities. For example, autistic characters in popular media are often depicted as being particularly sensitive to environmental stimuli like loud noises and bright lights (e.g., Julia in *Sesame Street* [2017]). Perhaps beliefs about autistic hypersensitivity to environmental stimuli led participants to give higher pain ratings to the autistic compared to non-autistic targets. We think this is unlikely. First, in previous work, we found that compared to non-autistic adults, autistic adults are believed to feel more social pain in interpersonally hurtful situations as well as more physical pain (Basargekar et al., 2024). Although people's beliefs of sensitivity to sensory stimuli may lead them to assume high sensitivity to physical pain, beliefs of sensory sensitivity are unlikely to lead people to assume high sensitivity to social pain. Additionally, in the current study, had participants' pain ratings been influenced by beliefs that autistic people are hypersensitive to sensory stimuli, the autistic child target should have been given higher pain ratings than the non-autistic child. In fact, the autistic and non-autistic child targets' pain ratings did not differ from each other.

A second important finding was that the agentic capacity ratings (i.e., memory, self-control, and morality) of the non-autistic adult target and the non-autistic child target differed, while the agentic capacity ratings of the autistic adult target and the autistic child target did not. This may signal another way autistic adults are infantilized: They are perceived as less capable of the kinds of agentic characteristics that are required for growth and self-direction as non-autistic adults, which may hinder the opportunities they are given for developing their skills and shaping their lives (a possibility we investigate in Study 2). However, it is also worth noting that the

agentic capacity ratings of the autistic adult target did not differ from the agentic capacity ratings of the non-autistic adult target. Therefore, our data do not show that autistic adults are reliably believed to be less agentic than non-autistic adults, which is inconsistent with the account that autistic adults are infantilized.

A third important finding is that ratings of experiential capacities (the capacity to feel hunger, fear, or pain) did not differ across the four targets. One puzzling aspect of this finding was that the experiential capacities rating scale included an item about pain (i.e., "How capable of feeling pain do you think Taylor is?"). Even on this single item, the four target groups received similar ratings. This finding is surprising given that the non-autistic adult target was believed to feel less pain than the autistic adult target and child targets when rating specific pain scenarios (e.g., "How much pain would Taylor feel on getting a paper cut"). We speculate that when asked how *capable* a human entity is of feeling pain (generically, without reference to a specific event or type of pain), people may default to high ratings, whether the entity is young or old, autistic or non-autistic. It may seem inaccurate or inconsiderate to say that someone is less capable of feeling pain and therefore less likely to suffer no matter how mild or extreme the injury. However, when asked how much pain someone would feel in mildly injurious scenarios (e.g., if they knock their knee against furniture), people may expect relatively weaker entities to suffer more than relatively stronger entities.

Overall, Study 1 suggests that non-autistic people are less likely to differentiate between children and autistic adults on some important attributes, including their vulnerability (i.e., sensitivity to pain) and agency (i.e., capacity for self-control, memory and morality). If autistic adults are considered more similar to children than non-autistic adults are, it is possible that what is perceived to be good for children is also perceived to be good for autistic adults. Adults

usually do not grant to children the same kinds of latitude to make their own choices and decisions as they grant to adults (e.g., Peens & Louw, 2000). If autistic adults are perceived to be like children, people may similarly believe that autistic adults should have less autonomy than non-autistic adults to make their own decisions. This was the focus of Study 2 (and Study S1 reported in Supplemental Materials).

Study 2

In Study 2, we investigated non-autistic people's beliefs about how much autonomy autistic adults should have to make decisions about their lives. Adults believe children are vulnerable, which renders them in need of protection and nurturance and limited in their decisional authority (Peens & Luow., 2000). For example, adults generally do not believe that children younger than 12 years of age should be allowed to decide whether to attend school, or who their doctor should be (Peterson-Badali et al., 2003). As the age of the child increases, adults' endorsement that they should be making decisions about their lives also increases. For example, adults are more likely to agree that parents should select the TV shows a child watches or library books they borrow if the child is 10 years old than if they are 14 years old (Bohrnsted et al., 1981). We expected that if non-autistic adults think of autistic adults as children, they would grant less decisional authority to an autistic adult than to a non-autistic adult. For example, they would indicate that a college student's parents should have more authority to decide if the student could get a tattoo if the student was autistic than non-autistic.

In addition to measuring how much decisional autonomy participants granted to the autistic and non-autistic target, participants gave pain and hardship ratings to their assigned targets (as in Study 1), and completed a scale measuring their willingness to associate with

autistic people. We expected that, as in Study 1, participants would give higher pain ratings to the autistic compared to the non-autistic target. We also expected that how much pain participants attributed to the autistic target would be negatively related to how much decisional authority they granted the autistic adult. That is, especially among participants rating the autistic target, the higher their pain ratings of the target, the lower would be their autonomy ratings of the target. Finally, we expected that among participants rating the autistic target, those expressing more willingness to associate with autistic people would also be more likely to believe that the target (rather than the target's parents) should be making their own decisions. This prediction was based on our assumption that giving lower autonomy ratings to the target would signify a negative prejudice towards autistic people.

The hypotheses, design and planned analyses of Study 2 were pre-registered at https://osf.io/xus5n. Deviations from the pre-registered plan are reported in Table 3.1.

Methods

Participants

Participants (N = 120) were non-autistic adults recruited through Prolific, who were paid $1.50 for 10 minutes of study participation. Sample size was calculated a priori using G*Power (Faul et al., 2007). We assumed a medium effect size (f^2 = .12) for the effect of target neurotype on target autonomy ratings. We calculated that to achieve a power of .95 to detect a medium effect size of one predictor in a regression model with three total predictors with a significance criterion of α = .05, we would need 111 participants. We rounded up and planned to recruit 120 participants. Table 3.2 shows participant demographics.

Eight participants reported being autistic; their data were discarded and replaced with data from new participants. Data from six additional participants were replaced because of failed

attention checks (n = 1) or a failed bot check (n = 5). All participants in the final sample passed all checks and reported that they were not autistic. Data were collected in July 2022.

Design

Participants were randomly assigned to give ratings to either the autistic or non-autistic adult target, with 60 participants in each target condition.

Measures

We used the pain sensitivity rating scale (α = .87 in current study), hardship beliefs scale (α = .70), level of contact with autism report and quality of contact with autism scale (α = .92) from Study 1. We included two additional measures:

Autonomy Scale. We developed this scale to measure participants' beliefs about how much autonomy a college-aged adult should have to make their own life decisions. Some items describing these decisions were taken from Salt and Jahoda's (2019) investigation of autonomy experienced by people with and without intellectual disability to undertake different activities. Other items were added through discussions within the research team of the activities young college-aged adults might engage in. We tried to include items corresponding to different domains, such as health and medicine, education, earning and spending money, adventure, and political engagement.

Participants were told that the target wanted to do some things which their parents did not want them to do. Participants were then shown 17 items describing actions which a young adult might undertake (e.g., starting a gluten-free diet, accepting a scholarship to study abroad, quitting their campus job, traveling to a different city, giving a speech, etc.). For each activity, participants were asked to report how much autonomy they thought the target individual (vs. their parents) should have to make the final decision, using a 6-point scale (1 = Taylor's parents

should make the final decision; 6 = Taylor should make the final decision). The Autonomy Scale had excellent internal consistency, α = .93. See Appendix A for the full measurement instrument.

Social Distance Scale. The Social Distance Scale (Gillespie-Lynch et al., 2019) is an individual differences measure of autism acceptance, on which participants indicate their willingness to engage in various activities with autistic people. Participants expressed their agreement with 11 statements like "I would be willing to move next door to an autistic person" or "I would be willing to spend an evening socializing with someone who is autistic" on a 5-point rating scale with 1 representing strong disagreement and 5 indicating strong agreement. Higher scores on this scale indicated higher willingness to associate with autistic people, or lower autism stigma. The Social Distance Scale had excellent internal consistency, α = .92. See Appendix A for the full measurement instrument.

Procedure

Participants completed the study online via Qualtrics (Qualtrics, July 2022). We asked a bot check question intended to ensure that data was being collected from human participants and not an algorithm. As noted, data from five participants were replaced because of failed bot checks.

Participants first gave self-pain ratings and self-hardship ratings. They were randomly assigned to read a vignette describing the autistic adult target or the non-autistic adult target from Study 1. Participants then gave pain and hardship ratings to their assigned target. As in Study 1, we used one attention check on each pain rating scale; as noted, data from one participant were replaced because of a failed attention check. After rating their assigned target on pain and hardship, participants saw the same forced-choice manipulation check as in Study 1. Participants then responded to the Autonomy Scale, Social Distance Scale, the level of contact report, and if

they reported having some contact with autistic people, the quality of contact scale. Data from eight participants who reported being autistic on the level of contact report were replaced, so the final sample only had non-autistic participants.

Results

Table 3.7 shows means and SDs of all measured variables. Participants assigned to rate the autistic and the non-autistic targets were similar in self-pain ratings (t (117.4) = 0.67, p = .507), self-hardship ratings (t (115.56) = 0.67, p = .506), self-reported level of contact with autistic people (t (117.22) = 0.42, p = .677), and quality of contact with autistic people (t (78.91) = 1.40, p = .166).

As Figures 3.4a and 3.4b show, replicating Study 1 and findings from Basargekar et al. (2024), the autistic adult target was perceived to feel more pain and more hardship than the non-autistic adult target. These differences were significant (ps < .001); see Supplemental Materials for full models analyzing target pain and hardship ratings.

Table 3.7

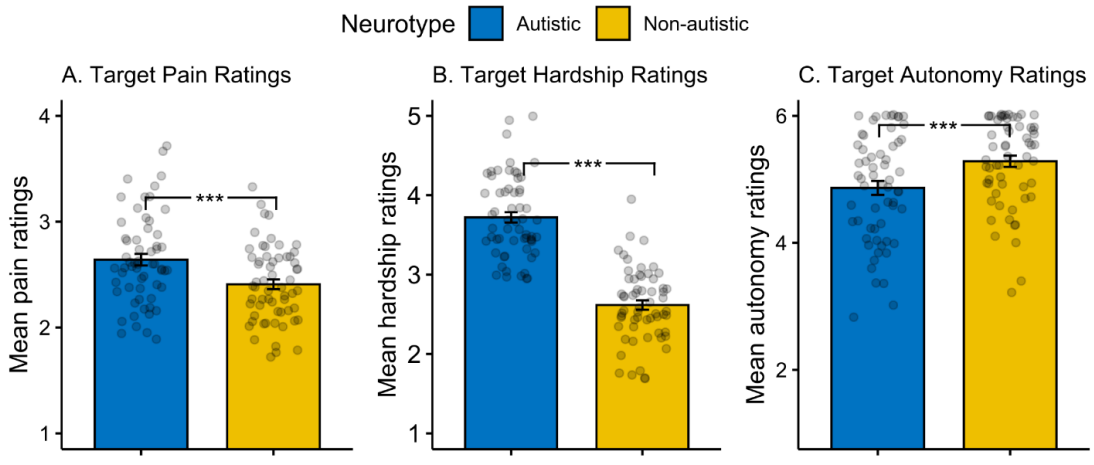
Means and SDs of All Variables (Study 2)

Variable	Autistic target (n = 60)	Non-autistic target (n = 60)
Autonomy scale ratings (min = 1, max = 6)	4.86 (0.85)	5.28 (0.68)
Target pain ratings (min = 1, max = 4)	2.64 (0.42)	2.41 (0.36)
Target hardship ratings (min = 1, max = 5)	3.72 (0.50)	2.62 (0.46)
Self-pain ratings (min = 1, max = 4)	2.41 (0.36)	2.45 (0.34)
Self-hardship ratings (min =1, max = 5)	2.84 (0.57)	2.91 (0.66)
Social Distance Scale (min = 1, max = 5)	4.45 (0.56)	4.03 (0.83)
Level of Contact Report (min = 1, max = 12)	6.97 (2.93)	6.73 (3.18)
Quality of Contact Scale (min = 1, max = 9)	7.07 (1.40)	6.61 (1.57)

Note. Figures in parentheses represent *SD*s.

Figure 3.4

Target Pain, Hardship and Autonomy Ratings (Study 2)



Note. Error bars represent standard errors. Asterisks represent *p*-values. ***$p < .001$.

As Figure 3.4c and Table 3.7 show, and as predicted, participants gave lower autonomy ratings to the autistic target than to the non-autistic target. To analyze these data, we constructed a regression model predicting target autonomy ratings from target neurotype (Table 8). Since we expected that participants' willingness to associate with autistic people would predict their ratings of the autistic target specifically, we included Social Distance Scale scores and the interaction between target neurotype and Social Distance Scale scores as two additional predictors. The model had good diagnostics, including homoscedasticity, acceptable normality of residuals, and little multicollinearity (VIFs < 4).

Table 3.8

Multiple regression predicting target autonomy ratings (Study 2)

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype [a]	**-.43**	**.08**	**[-.58, -.27]**	**-5.48**	**< .001**	**0.26**
Social Distance Scale	**.58**	**.08**	**[.41, .74]**	**6.93**	**< .001**	**0.33**
Target Neurotype x Social Distance Scale	**.38**	**.08**	**[.21, .55]**	**4.54**	**< .001**	**0.16**
F (3, 116) = 21.66, p < .001						
Multiple R^2 = .36						
Adjusted R^2 = .34						

Note. All continuous variables were z-standardized to get standardized coefficients.
[a]Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target.

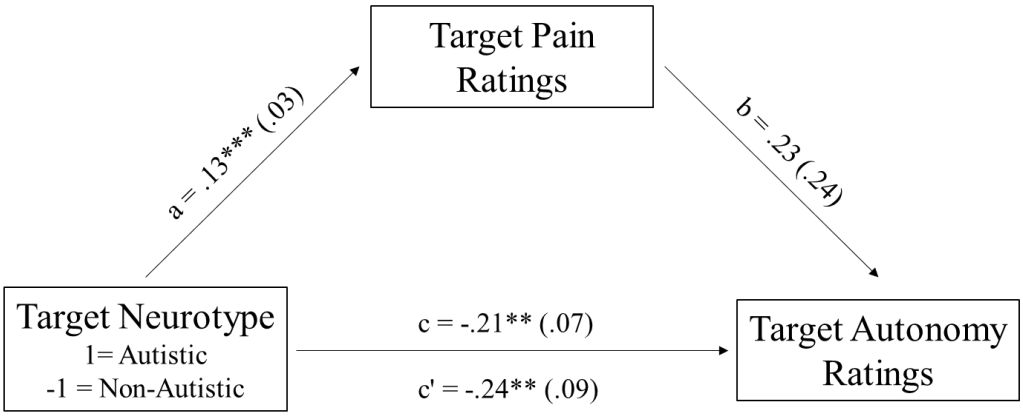
As Table 3.8 shows, compared to the participants who rated the non-autistic target, participants who rated the autistic target gave lower autonomy ratings, β = -.43 [-.58, -.27], p < .001, f^2 = 0.26. In addition, the more willing participants were to associate with autistic people, the more likely they were to believe that the targets should have more control than their parents over making life decisions, β = .58 [.41, .74], p < .001, f^2 = 0.33. Importantly, the interaction between autism acceptance and target neurotype also predicted target autonomy ratings, β = .38 [.21, .55], p < .001, f^2 = 0.16: Especially for the participants who rated the autistic target, those

who reported greater willingness to associate with autistic people gave higher autonomy ratings to the target. This indicates that the belief that an autistic adults' decisions should be subject to parental authority to a greater extent than a non-autistic adults' decisions does not indicate a protective and positive attitude towards autistic adults.

It is possible that participants' judgments about autonomy were related to how vulnerable they believed the target was. To test this possibility, we conducted a mediation analysis, including target pain ratings (our proxy for vulnerability) as a mediator in the model predicting target autonomy ratings from target neurotype, controlling for participants' self-pain ratings. As Figure 3.5 shows, after entering target pain ratings as a mediator, target neurotype continued to be a significant predictor of target autonomy ratings, $\beta = -.24$ [-.39, -.09], $p = .001$. Contrary to predictions, target pain ratings did not significantly predict target autonomy ratings, $\beta = .23$ [-.22, .66], $p = .317$, and target pain ratings did not significantly mediate the differences in autonomy ratings assigned to the targets, $\beta = .03$ [-.03, .09], $p = .318$. Thus, it does not seem to be the case that participants' beliefs about targets' vulnerability were related to how much decisional authority they granted the targets. The participants assigned to rate the autistic target as a group gave high pain ratings to the target (indicating perceptions of high vulnerability) and low autonomy ratings to the autistic target (indicating perceptions of low decisional authority). However, it is not the case that among those assigned to rate the autistic target, the same participants who gave high pain ratings gave low autonomy ratings; rather, pain ratings and autonomy ratings were independent of each other.

Figure 3.5

Mediation of the Effect of Target Neurotype on Target Autonomy Ratings by Target Pain Ratings (Study 2)



Note. Figures in parentheses are *SE*s. ** $p < .01$, *** $p < .001$.

Discussion

In Study 2, as in Study 1, the autistic adult target was rated as feeling more pain and having experienced greater life hardship compared to a non-autistic adult target. Additionally, participants who rated the autistic adult target granted the target less decisional authority relative to the target's parents than the participants who rated the non-autistic target. Like the autistic adult target in our study, parents' wishes are generally privileged over children's wishes when it comes to decisions about their lives. For example, adults tend to agree with statements like "Parents, rather than children, should decide which school a child will attend," and "Children should obtain permission from parents before taking a job" (Peterson-Badali et al., 2003). Therefore, it is consistent with infantilization of autistic adults that the autistic adult target's parents' wishes were privileged over their own, to a greater extent than for the non-autistic target.

There may be excellent reasons for restricting children's self-determination opportunities: Children do not have to participate in contexts typical of adulthood like employment and

political institutions, and may face risks to their wellbeing when they do so without adequate preparation. However, restricting self-determination opportunities of adults poses greater threats to their dignity and well-being by preventing them from growing and contributing in ways they would like to. The perception that autistic adults should have lower decisional authority than non-autistic adults suggests that autistic people are likely to face significant challenges to their opportunities for self-determination, and consequently to their wellbeing (e.g., Thompson-Hodgetts et al., 2023; White et al., 2018).

One might argue that participants' decisional authority ratings represent positive and protective attitudes towards autistic adults. By indicating that parents should be more involved in decisions about the autistic adult's life than about the non-autistic adult's life, participants may hope to protect and safeguard the autistic adult's interests. However, participants who believed that the autistic target should have less decisional authority relative to their parents also reported lower willingness to associate with autistic people. This suggests that a preference for lower decisional authority for the autistic adult target is consistent not only with infantilization of autistic adults, but also stigma (and not positive attitudes) towards autistic people.

In Study S1 reported in Supplemental Materials, we conducted a similar study using with autistic participants. Interestingly (and in contrast to the data reported here in the main text with non-autistic participants), autistic participants gave similar and high autonomy ratings to both autistic and non-autistic targets. This suggests that the belief that autistic people's autonomy requires more restriction is an outgroup belief. Again, such beliefs may hinder non-autistic people from supporting autistic people's self-determination, which can have detrimental effects for autistic people's wellbeing.

Contrary to predictions, target pain ratings were not related to target autonomy ratings. Non-autistic people's beliefs about how much autistic people should be able to make their own decisions does not appear to be driven by their beliefs about how vulnerable they are. Thus, a non-autistic person may simultaneously believe that autistic people are vulnerable and that they should make independent decisions; those who believe that autistic adults are vulnerable are not necessarily the ones granting them less decisional authority. Insofar as infantilization consists of restricting someone's decisional authority *due to* a perception that they are vulnerable, this finding is not consistent with an account that non-autistic people hold infantilizing beliefs towards autistic people. However, our findings show that beliefs that autistic adults are vulnerable and that they should have limited decisional authority exist within the same pool of people. We speculate that simultaneous existence of these beliefs may contribute to autistic people's experience of being infantilized in society, even if the people treating them as if they are vulnerable and the people restricting their autonomy are not the same individuals. In addition, our findings leave open the possibility of individual differences, wherein some non-autistic people may believe that autistic adults are vulnerable and should have limited decisional authority, while other non-autistic adults may believe that autistic adults are vulnerable and believe that they should have similar decisional authority as non-autistic adults.

In Study 3, we turn to a third way that infantilizing attitudes toward autistic adults may manifest themselves–namely, in the form of pity toward them.

Study 3

Disabled people who reported being infantilized and overprotected by others also report being pitied by others (Nario-Redmond et al., 2019). Pity represents a paternalistic attitude towards the pitied target, including both approach motives (e.g., sympathy) and avoidance

motives (e.g., feelings of false superiority and desire to maintain distance from the pitied target) (Florian et al., 1999; Soetemans & Jackson, 2021). Insofar as infantilizing beliefs about autistic adults include a combination of the approach (need to protect) and avoidance (unwillingness to support self-determination) motives documented in Studies 1 and 2, they are consistent with an attitude of pity towards autistic adults.

Moreover, popular narratives often invite audiences to pity autistic adults by painting them as unfortunate "eternal children" (Loftis, 2021). When children are treated like children, they are not pitied because they are given opportunities to act in ways consistent with what people believe is common and appropriate behavior for their developmental stage. But when adults are treated like children, they can be pitied because they are not given opportunities to act in ways consistent with societal expectations of appropriate behavior for adults. If non-autistic adults believe that autistic adults are more vulnerable (as Study 1 suggests), and are less suitable candidates for taking autonomous decisions than their non-autistic peers (as Study 2 suggests), they may feel pity for autistic adults.

Theoretical support for the possibility that autistic adults may be pitied by non-autistic people comes from the Stereotype Content Model (SCM), which provides a model for predicting the attitudes that are likely to be directed towards different social groups (Soetemans & Jackson, 2021). SCM posits that people's stereotypes about social groups are organized along two dimensions of how warm the members of groups are believed to be, and how competent the group members are believed to be. SCM suggests that social groups that are perceived to have low competence (based on their low status) and high warmth (based on their collaborativeness with the in-group) would be pitied by other groups (Cuddy et al., 2007; Fiske et al., 2002). Autistic people, like other disabled groups, comprise one such group perceived to be less

competent than the cultural default or the norm although relatively warm (Canton et al., 2022). This suggests that autistic adults are also perceived as being as warm as, but less competent than their non-autistic peers, and are pitied by non-autistic people.

In Study 3, we examined whether non-autistic participants pity the autistic adult target from Studies 1 and 2 more than the non-autistic adult target. We also examined differences in warmth and competence ratings of the two targets. Participants were also asked to rate how much pain they believed the target would feel using the pain ratings scale, how much hardship they believed the target had experienced using the hardship ratings scale, and the targets' decisional authority on the Autonomy Scale.

We expected that the autistic target would be pitied more than the non-autistic target, and that the autistic target would be perceived as less competent than, but not less warm than, the non-autistic target. In addition, we expected that the more pain the participants believed their target to feel, the more pity they would express for the target. Finally, we expected that the less participants granted decisional authority to the target, the more they would pity the target.

Study 3's design, hypotheses, and analysis plan were pre-registered at https://osf.io/gpdzf.

Participants

Sample size was determined using an a priori power analysis for a linear regression using G*Power (Faul et al., 2007). Since we did not have a-priori information for the effect size of pity, we assumed a small effect size. To detect a small effect size ($f^2 = 0.05$) for one variable in a model with four total variables, power of .90 and alpha of .05, we would need a sample size of 213. We planned to recruit 220 participants and were able to recruit 214 by the end of the data collection period. Table 3.2 contains participant demographics.

We removed data from six participants who reported being autistic. Data from 19 additional participants were replaced because of failed attention checks (n = 17) or failed manipulation check (n = 2). All participants in the final sample (N = 214) passed all checks and reported that they were not autistic. Data were collected in November-December 2022.

Design

Participants were randomly assigned to rate either the autistic adult target or the non-autistic adult target. Participants in each target condition were randomly assigned to either give pain ratings first, or pity ratings first. Each of the four cells in this 2 (target neurotype) x 2 (order) design had either 53 or 54 participants.

Measures

Participants completed the pain ratings Scale (α = .84 in the current sample), hardship beliefs scale (α = .73), Autonomy Scale (α = .89), the level of contact report and the quality of contact scale (α = .90). Participants additionally responded to two new measures:

Pity Scale. This scale was adapted from Soetemans and Jackson (2021). It measures respondents' attitudes of pity towards a target, encompassing feelings of empathic concern, beliefs that one's own life is superior to that of the target, and desire to avoid the target. Items on the original scale were adapted to suit the vignettes on the current scale, and a few items were added to increase the number of items measuring avoidance of the target (the original scale included just two items measuring avoidance; we used five items). The final scale included 16 items, including the final item, "I feel pity for Taylor" (see Table 3.9). Each item described beliefs or feelings participants might have towards the target, such as "Taylor's life must be worse than mine," and "I feel sorry for Taylor." Participants indicated the extent to which they agreed with each item on a 7-point scale, ranging from "very strongly disagree" to "very strongly

agree." The pity scale had good internal consistency (α = .83). In addition, all items on the pity scale were positively correlated with the item "I feel pity for Taylor."

Warmth-Competence Scale. The Warmth-Competence Scale was adapted from O'Connor and McFadden (2012). It included 12 items measuring the extent to which the target was perceived as having the key attributes of warmth and competence. In line with SCM research (e.g., Cuddy et al., 2007; Fiske et al., 2002), we asked participants to rate how much "the average American" would believe their assigned target had the qualities. This instructional phrasing is believed to mitigate social desirability effects associated with directly asking participants how warm or how competent they personally would rate a given social group (Fiske et al., 2002).

Six of the 12 items measured how warm (well-intentioned, trustworthy, sincere, friendly, good-natured, and warm) the target was perceived to be. The remaining six measured how competent (confident, capable, intelligent, efficient, skillful and competent) the target was perceived to be. Participants made their responses on a 5-point scale, ranging from "Not at all" to "Extremely". Internal consistency estimates were good for warmth items (α = .83) and competence items (α = .90).

Table 3.9

Items on Pity Rating Scale

Item on pity rating scale	Item correlations with the final item
Reading about Taylor made me feel uncomfortable.	r (218) = .39, p < .001
I would be worried if I had to do a group project with Taylor.	r (218) = .38, p < .001
I would want Taylor to move next door to me.*	r (218) = .12, p = .102
I would be embarrassed if someone close to me starts dating Taylor.	r (218) = .32, p < .001
I would want to start a business partnership with Taylor.*	r (218) = .08, p = .269
I am thankful I am not in the same position as Taylor.	r (218) = .49, p < .001
Taylor's life must be worse than mine.	r (218) = .57, p < .001
I am more fortunate than Taylor.	r (218) = .38, p < .001
Taylor must be miserable.	r (218) = .51, p < .001
I can't imagine how difficult things must be for Taylor.	r (218) = .51, p < .001
I feel sorry for Taylor	r (218) = .72, p < .001
I want to reduce Taylor's suffering.	r (218) = .37, p < .001
I feel obliged to help Taylor.	r (218) = .40, p < .001
If Taylor were sad, I would want to do something to help cheer them up.	r (218) = .17, p = .017
I wish for Taylor's wellbeing.	r (218) = .14, p = .049
I feel pity for Taylor.	

Note. P-values were corrected for multiple comparisons using False Discovery Rate corrections (Benjamini & Hocheburg, 1995).
*This item was reverse-scored.

Procedure

As in prior studies, all participants first gave self-pain and self-hardship ratings, and were randomly assigned to read the vignette introducing either the autistic adult target or the non-autistic adult target. After reading descriptions of their assigned target, participants within each target condition were randomly assigned to respond to target rating instruments in one of two orders. Approximately half the participants first rated how much pity they felt for their assigned targets, and then gave target pain and hardship ratings. The remaining participants responded to

target ratings in reverse order. One attention check each was included on target pain ratings (select “Not Painful”) and target pity ratings (select “Neutral”).

After responding to both scales, participants answered the multiple-choice vignette knowledge check as in prior studies. Participants then completed the Autonomy Scale and Warmth-Competence Scale for their assigned target. One attention check was included on the Warmth-Competence scale (select “A little”).

Finally, participants completed the level of contact report for themselves, and those who reported having had some contact with autistic people completed the quality of contact scale.

Results

Table 3.10 shows averages of all measured variables. Participants in the four conditions did not vary in their self-reported level of contact (F (3,216) = 1.41, p = .241) or quality of contact (F (3,155) = 1.46, p = .227) with autistic people. Analyses of target pain, hardship and autonomy ratings are presented in Supplemental Materials. Target pain and hardship ratings were in line with the patterns reported in Studies 1 and 2. Target autonomy ratings followed the pattern reported in Study 2 for one of the order conditions and not the other: Participants who gave target pain ratings before pity ratings gave lower autonomy ratings to the autistic than the non-autistic target, while those who gave target pity ratings before pain ratings gave similar autonomy ratings to both targets.

Table 3.10

Averages and SDs of all Measured Variables (Study 3)

Variable	Autistic target		Non-autistic target	
	Order: Pain ratings first (n = 54)	Order: Pity ratings first (n = 53)	Order: Pain ratings first (n = 54)	Order: Pity ratings first (n = 53)
Target pity ratings (min = 1, max = 7)	3.91 (0.64)	3.54 (0.56)	3.43 (0.48)	3.11 (0.45)
Target warmth ratings (min = 1, max = 5)	3.46 (0.63)	3.33 (0.73)	3.56 (0.55)	3.53 (0.49)
Target competence ratings (min = 1, max = 5)	2.93 (0.77)	3.06 (0.79)	3.73 (0.73)	3.79 (0.48)
Autonomy scale ratings (min = 1, max = 6)	4.82 (0.68)	4.91 (0.68)	5.10 (0.71)	4.78 (0.64)
Target pain ratings (min = 1, max = 4)	2.59 (0.40)	2.49 (0.37)	2.23 (0.32)	2.39 (0.32)
Target hardship ratings (min = 1, max = 5)	3.51 (0.45)	3.33 (0.46)	2.65 (0.46)	2.62 (0.39)
Self-pain ratings (min = 1, max = 4)	2.31 (0.32)	2.33 (0.31)	2.33 (0.36)	2.30 (0.26)
Self-hardship ratings (min = 1, max = 5)	2.48 (0.70)	2.50 (0.68)	2.53 (0.60)	2.48 (0.54)
Level of Contact Report (min = 0, max = 12)	7.28 (2.95)	7.53 (2.86)	6.63 (3.04)	7.66 (3.12)
Quality of Contact Scale (min = 1, max = 9)	6.71 (1.16)	6.34 (1.66)	7.00 (1.32)	6.53 (1.29)

Note. Figures in parentheses are SDs.

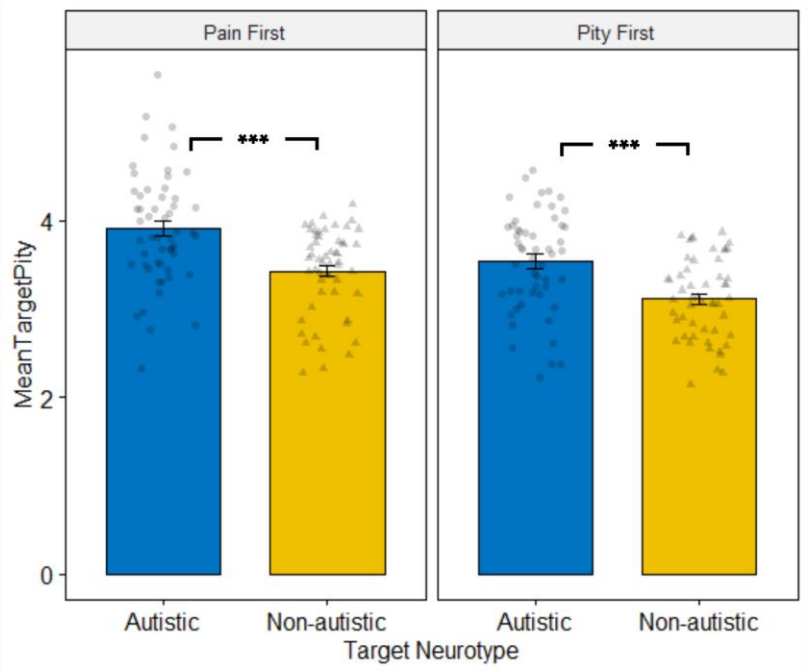
Predicting target pity ratings

We constructed a linear model to predict participants' ratings on the adapted pity scale. Predictors were target neurotype, order of instrument presentation, and the interaction between target neurotype and order instrument presentation. As Figure 3.6 and Table 3.11 show, as predicted, participants reported feeling more pity toward the autistic than non-autistic target, β = .35 [.23, .47], $p < .001$, $f^2 = 0.16$. In addition, the order of instrument presentation significantly affected pity ratings, β = .28 [.16, .40], $p < .001$, $f^2 = 0.10$: Participants who had given pain

ratings to targets before giving pity ratings reported pitying the targets more than participants who rated their pity for the target first. Reading about potential misfortunes that could befall the target (e.g., getting hit in the head by a frisbee) apparently led participants to report more pity towards both targets. Importantly, however, there was no interaction between the order in which participants responded to different instruments and target neurotype: Whether participants first rated beliefs of target's pain or their feelings of pity towards the target, the autistic target was given similarly higher pity ratings than the non-autistic target.

Figure 3.6

Target Ratings of Pity (Study 3)



Note. Error bars represent standard errors of the mean. Asterisks represent Bonferroni-corrected p-values associated with pairwise comparisons within each order condition, *** < .001

Table 3.11

Multiple Regression Predicting Target Pity Ratings (Study 3)

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype[a]	**.36**	**.06**	**[.23, .47]**	**5.79**	**< .001**	**0.16**
Order[b]	**.28**	**.06**	**[.16, .40]**	**4.69**	**<.001**	**0.10**
Target Neurotype x Order	.03	.06	[-.09, .14]	0.42	.616	0.00
F (3, 216) = 18.56, p < .001						
Multiple R^2 = .21						
Adjusted R^2 = .19						

Note. All variables were scaled to get standardized coefficients.
[a] Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target; [b] Order was coded as 1 = Pain ratings first and -1 = Pity ratings first.

We had also expected that the belief that the autistic target is vulnerable (i.e., highly sensitive to pain) could be associated with greater feelings of pity towards them. To examine this possibility, we constructed a regression model predicting target pity ratings by target neurotype, target pain ratings, and an interaction between target pain and target pity ratings. We controlled for order of instrument presentation since it had significantly predicted target pity ratings. As Table 3.12 shows, participants' ratings of target vulnerability (using pain as a proxy) did not significantly predict their ratings of target pity, β = .12 [-.01, .24], p = .069, f^2 = 0.02. The interaction between target neurotype and target pain ratings also did not predict pity for the target, β = .05 [-.08, .18], p = .430, f^2 = 0.00. The autistic target was pitied more than the non-autistic target, but this was unrelated to how vulnerable the autistic target was believed to be.

Table 3.12

Multiple Regression Predicting Target Pity Ratings by Target Pain Ratings (Study 3)

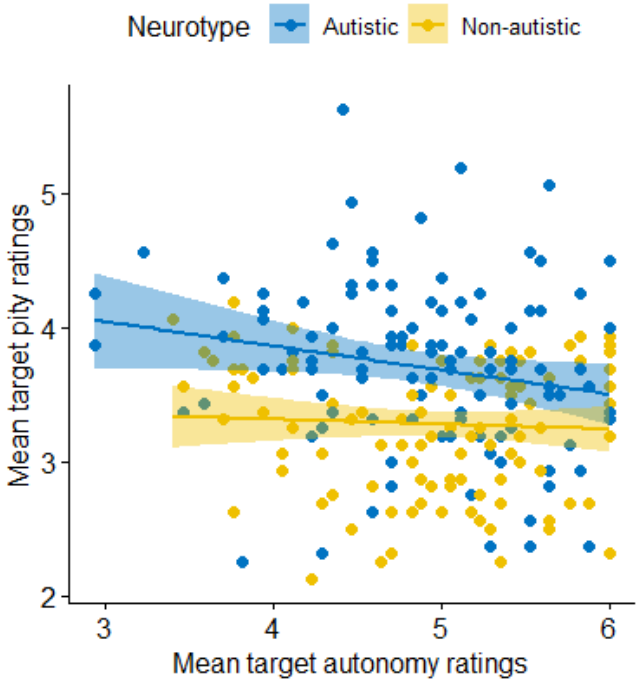
Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype[a]	**.32**	**.06**	**[.20, .44]**	**5.13**	**< .001**	**0.12**
Target pain ratings	.12	.06	[-.01, .24]	1.83	.069	0.02
Target Neurotype x Target pain ratings	.05	.06	[-.08 .18]	0.79	.430	0.00
Order[b]	**.27**	**.06**	**[.16, .39]**	**4.55**	**<.001**	**0.10**
F (4, 215) = 15.24, p < .001						
Multiple R^2 = .22						
Adjusted R^2 = .21						

Note. All variables were scaled to get standardized coefficients.
[a] Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target; [b] Order was coded as 1 = Pain ratings first and -1 = Pity ratings first.

We had also expected that participants who granted lower decisional authority to the autistic target would pity them more. To examine this possibility, we constructed a linear model predicting target pity ratings by target neurotype, target autonomy ratings, and the interaction between target neurotype and autonomy ratings, controlling for order of instrument presentation (Table 3.13). As Figure 3.7 shows, Participants who believed that their assigned targets should have more autonomy also pitied the target less, β = -.14 [-.26, -.03], p = .018, f^2 = 0.03. However, there was no interaction between target neurotype and target autonomy ratings, β = -.04 [-.16, .08], p = .516, f^2 = 0.00: The magnitude of the relation between target autonomy ratings and pity for the target was the same for both targets.

Figure 3.7

Scatterplot Predicting Target Pity Ratings by Target Autonomy Ratings (Study 3)



Note. Participants who believed that targets should have lower decisional authority also pitied the targets more.

Table 3.13

Multiple Regression Predicting Target Pity Ratings by Target Autonomy Ratings (Study 3)

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype[a]	**.34**	**.06**	**[.22, .46]**	**5.70**	**< .001**	**0.15**
Target autonomy ratings	**-.14**	**.06**	**[-.26, -.03]**	**-2.40**	**.018**	**0.03**
Target Neurotype x Target autonomy ratings	-.04	.06	[-.16, .08]	-0.65	.516	0.00
Order[b]	**.29**	**.06**	**[.17, .41]**	**4.77**	**<.001**	**0.11**
F (4, 215) = 15.72, p < .001						
Multiple R^2 = .23						
Adjusted R^2 = .21						

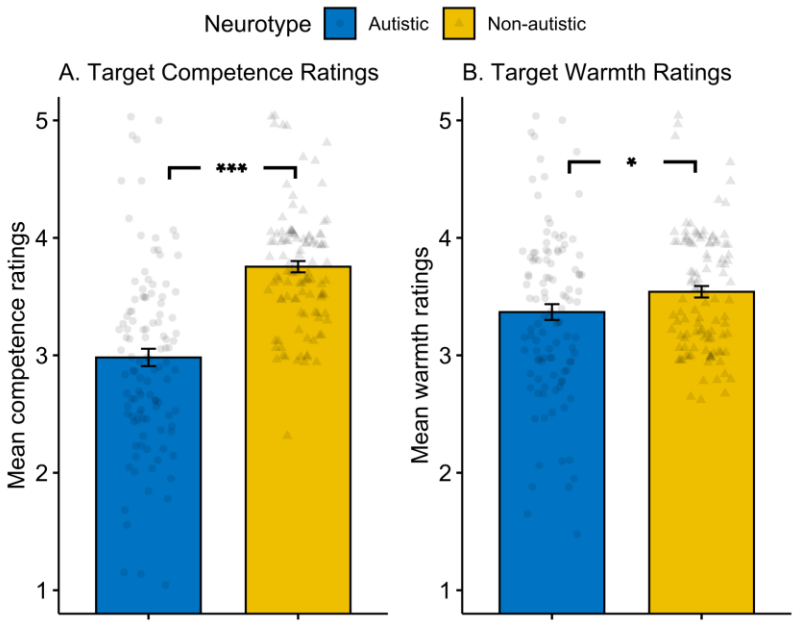
Note. All variables were scaled to get standardized coefficients.
[a] Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target; [b] Order was coded as 1 = Pain ratings first and -1 = Pity ratings first.

Predicting target warmth and competence ratings

In line with the findings of past SCM research on beliefs about disabled people (e.g., Fiske et al., 2002; Rohmer & Louvet, 2011), we had expected that our autistic target would be perceived as less competent than our non-autistic target, but as at least equally warm. As Figure 3.8a shows, as predicted, the autistic target was judged to be less competent than the non-autistic target, β = -.51 [-.62, -.39], $p < .001$, adjusted $R^2 = 0.26$. As Figure 3.8b shows, contrary to predictions, the autistic target was also rated lower in warmth than the non-autistic target, a finding confirmed by a linear model predicting target warmth ratings by target neurotype, β = -.14 [-.27, -.01], $p = .039$, Adjusted $R^2 = 0.01$. It is worth noting, however, that target neurotype explained 26% of the variation in target competence ratings, but only 1% of the variation in warmth ratings. Knowledge that a target is autistic influences others' perceptions about the target's competence much more than their perceptions of their warmth. Further, as Table 3.10 and Figure 3.8 show, consistent with SCM predictions, participants' ratings of the autistic target's warmth were higher than their ratings of the autistic target's competence, $t(109) = 6.37$, $p < .001$, $d = 0.52$, 95% CI [0.25, 0.79].

Figure 3.8

Mean Target Warmth and Competence Ratings (Study 3)



Note. Error bars represent standard error of the mean. Asterisks represent Bonferroni-corrected significance levels of pairwise comparisons within each order condition. *** $p < .001$, * $p < .05$.

Discussion

In Study 3, participants who rated the autistic target reported feeling more pity for the target than participants who rated the non-autistic target. Although expected, this finding is startling, since apart from the detail that one of the targets was described as being autistic, both targets were identical, accomplished college students, and to all appearances, living enjoyable lives. That an autistic adult can evoke greater pity than a very similar non-autistic adult in spite of showing no evidence of being in any difficulty suggests that pity is a strong prejudice directed towards autistic people.

We also found that participants' beliefs that a target should have less decisional autonomy were related to greater pity towards the target. This was true of both autistic and non-autistic

targets. This finding represents preliminary evidence that feelings of pity towards a target can signal infantilizing beliefs about that target. Since our data do not allow us to draw causal conclusions, several possibilities must be entertained. First, some infantilizing beliefs about autistic people, such as that they should have less decisional autonomy than non-autistic people, may foster pity towards autistic people. Alternatively, it is also possible that participants believed the autistic target should have less decisional autonomy because the autistic target was pitied more, or that attitudes of pity and beliefs of decisional autonomy have bidirectional influences on each other.

Surprisingly, the amount of pity participants reported towards their target was unrelated to how vulnerable they believed the target was. We had expected that a perception that an autistic adult is vulnerable as a child would lead non-autistic adults to pity the autistic adult. Since we did not obtain the predicted result, this finding is inconsistent with the infantilization account. Notably, however, the participants who completed the pain instrument before the pity instrument gave higher target pity ratings than those who completed the instruments in the opposite order. This suggests that priming thoughts of target suffering may boost feelings of pity towards the target. It is possible that a quantitative relationship between pain beliefs and pity exists, but was not detected in our study due to design features. It is also possible that our study was not sufficiently powered to detect the small-sized effect of pain ratings on pity ratings ($f^2 = 0.02$).

Finally, the autistic target was perceived as both less warm than the non-autistic target and less competent than the non-autistic target. However, the difference in warmth ratings of the two targets was smaller than the difference in competence ratings of the two targets. SCM suggests that groups who are perceived to be relatively warm (and therefore not antagonistic towards the in-group) but incompetent attract sympathetic attitudes but are not respected (Fiske

et al., 2002). In other words, such groups are pitied. Hence, this combination of stereotypes – that autistic people are more warm and well-meaning than they are competent– could also contribute to the pity non-autistic people feel towards autistic people.

General Discussion

The studies presented here examined non-autistic people's beliefs and attitudes towards autistic adults which can lead to autistic adults being infantilized. In Study 1, non-autistic people's beliefs about autistic adults overlapped considerably with their beliefs about children. Non-autistic participants expected that an autistic adult would feel pain at similar intensities as would children, and at higher intensities than non-autistic adults. This suggests that compared to non-autistic adults, autistic adults are perceived to be relatively vulnerable, like children. Non-autistic participants also believed that an autistic adult target would have similar levels of agentic capacities (e.g., self-control) as an autistic child target. In Study 2, non-autistic adult participants believed that an autistic adult should have less autonomy than a non-autistic adult to make decisions relevant to their lives. In Study 3, non-autistic adult participants reported feeling more pity for the autistic adult than for the non-autistic adult. They also judged the autistic target as being less competent and less warm than the non-autistic target.

In summary, in our studies we found that autistic adults are believed to be more vulnerable than non-autistic adults, are granted less decisional authority than non-autistic adults, and are pitied more than non-autistic adults. We speculate that the simultaneous existence of these beliefs and attitudes may create infantilizing conditions for autistic people in society. However, our data do not support the idea that these tendencies constitute infantilization as a unitary coherent attitude that non-autistic adults bring to bear on autistic adults. For example, in Study 2, participants' tendency to perceive the autistic adult as vulnerable was not related to how

much autonomy non-autistic adults granted autistic adults. In Study 3, participants' tendency to perceive the autistic adult as vulnerable was not related to how much they pitied the autistic adult. This suggests that the same people who believe that autistic adults are vulnerable are not always the ones denying decisional authority to autistic adults, or expressing pity for autistic adults. These beliefs and attitudes were not correlated in a way that supports the account of infantilization as a coherent attitude that manifests in terms of the perceptions vulnerability, denial of decisional authority, and feelings of pity on the part of the individual doing the infantilizing. Future research should investigate the possibility of such a unitary construct of infantilization, and individual differences in people's tendency to infantilize others. However, we reiterate that although the beliefs and attitudes we investigated were not correlated, by virtue of existing in society concurrently, they may still contribute to autistic adults' experience of being infantilized.

Note that these differences in target ratings were obtained even when the descriptions of the autistic and the non-autistic targets were nearly identical, depicted in terms of the same age-appropriate experiences and pursuits. The autistic adult target was described only in terms of their accomplishments and competence, but they were judged less competent than the non-autistic adult (Study 3). The autistic adult target was not described in terms of difficulties or challenges they faced, but they were pitied more than the non-autistic adult (Study 3). This suggests that attitudes that can lead to infantilization of autistic people are robust, and that autistic adults may be susceptible to being infantilized to some extent regardless of their personal profile of skills and challenges. It is also possible, however, that autistic people described as relatively more competent (as in the current studies) would be infantilized less than autistic people described as less competent. For example, non-speaking autistic people may be especially

likely to be treated like children because of assumptions that they lack linguistic and cognitive competence (Srinivasan, 2023).

Participants granted lower decisional authority to our autistic target relative to our non-autistic target (Study 2). These attitudes pose a challenge to the self-determination of autistic adults, which has been a cornerstone goal of the self-advocacy movement since its inception (Ward & Meyer, 1999). While making their own decisions is a valued goal for autistic people, many autistic people today struggle with getting social support for this necessary aspect of adulthood (Dorman, 2023). Such infantilizing attitudes may be especially harmful for the wellbeing of autistic adolescents or young adults, since this is a developmental stage where personal autonomy is particularly important (Eccles et al., 1991). Indeed, autistic youth report receiving a boost to their wellbeing and confidence after experiencing an increase in their autonomy (Cribb et al., 2019). Therefore, increasing social support for autistic adolescents' and adults' autonomy is an important goal, consistent with the overall goal of reducing infantilizing attitudes towards autistic adults.

The fact that our autistic adult target was granted less decisional autonomy and pitied more than the non-autistic adult in spite of not being described as less capable or more pitiable raises interesting questions about potential ways to ameliorate such attitudes. One possibility is suggested by the finding in Study 1 that non-autistic participants believed the autistic adult and child target to have similar levels of agency. Drawing attention to autistic adults' aspirations and goal-driven actions may help boost perceptions of autistic adults' agency, and may serve to increase social support for their autonomy in various contexts, such as employment or independent living. Another possibility is suggested by Soetemans and Jackson (2021), who found that when disabled characters were described as navigating an accessible environment,

they were pitied less. Portrayals of autistic adults engaged in productive and successful pursuits in environments which support them may be another way of reducing pity and infantilization of autistic adults.

Finally, our findings also highlight the ambivalent nature of the prejudices which are applied to autistic adults. Firstly, the high pain ratings given to the autistic adult indicate that they are perceived as vulnerable. Since beliefs of vulnerability are positively correlated with empathy towards the target (e.g., Green et al., 2009; Cikara & Fiske, 2011), beliefs of the autistic target's vulnerability may signal participants' empathic concern towards the target. However, that these findings co-exist with beliefs detrimental to autistic people's wellbeing suggests a mixture of positive and negative prejudices. Secondly, pity is known to be an ambivalent attitude, comprised of both approach and avoidance motives (Fiske et al., 2002; Florian et al., 1999). The behavioral correlates of these attitudes are likely to be similarly complex, with ambivalent impact, or potentially helpful intent resulting in harmful impact. For example, disabled people often receive unsolicited help from others. Although undertaken with helpful intent, such actions are damaging for the recipients of this help by revealing and reinforcing low expectations of the disabled person's competence (e.g., Nario-Redmond et al., 2019). In addition, attitudes of pity may engender direct facilitation towards a target group, such as helping them in difficulties, but also passive harm, such as neglecting them or failing to solicit their input in matters that concern them (Cuddy et al., 2007).

In the studies reported here, we have documented perceptions of autistic people that can promote autistic adults being infantilized in society. Future research should investigate the kinds of infantilizing behaviors that these perceptions may prompt, and whether changes in the underlying perceptions can bring about changes in behaviors. For example, studies could

investigate if participants who grant lower decisional authority to autistic people are also likely to avoid collaborating with an autistic individual in an experimental setting, or to speak in infantilizing ways to an autistic individual. In addition, studies could examine the effect of narratives which challenge the perceptions recorded in these studies, regarding autistic people's competence or agency. For example, describing autistic people's progress attained through self-advocacy efforts may help ameliorate infantilizing attitudes towards autistic people, further resulting in more respectful treatment of autistic people.

Future research could also investigate whether those who infantilize autistic people also dehumanize them. Some social groups who are believed to be child-like, like traditional and indigenous populations, are also "animalistically" dehumanized, i.e., they are believed to lack qualities of civility and refinement that are believed to set humans apart from other animals (Saminaden et al., 2010). Dehumanization research shows that autistic people are also dehumanized in this way (Cage et al., 2019). Identifying areas of overlap and separation between infantilization and dehumanization of autistic people could be a promising direction for future work.

Several limitations of the current work must be acknowledged. First, as noted, the relations between variables uncovered in the current work (such as between pity and autonomy beliefs) are correlational, and do not allow us to draw causal conclusions. We have made the case that believing that autistic adults have low decisional authority leads non-autistic people to pity autistic adults, but it is also possible that a feeling of pity towards autistic adults boosts non-autistic people's beliefs that autistic adults should have less decisional autonomy. Experimental work manipulating autonomy beliefs or attitudes of pity is required to establish the direction of causality.

Second, the autistic target in all these studies was described in terms of pursuits very typical for a college student of their age. This may have led participants to infer that this target had relatively low support needs, which may have influenced their ratings of target attributes such as autonomy and competence. Therefore, participants' attitudes towards the autistic target in this study may not be generalizable to all autistic individuals of different constellations of strengths and challenges, and different support needs. It may be that an autistic individual described as having high support needs would be infantilized to an even greater extent. An alternative possibility is that the autistic target in our studies was perceived as striving in spite of their (undescribed) challenges stemming from being autistic, and was therefore sympathized with to a greater extent than the non-autistic target. This greater sympathy stemming from the assumption that the autistic adult must face several challenges may have contributed to the higher pain ratings given to the autistic target. If this is the case, an autistic target who is not described as engaging in activities typical of their age may be sympathized with less, and receive lower pain ratings.

A third limitation is that the current work offers minimal insight into the perceptions of autistic adults on the infantilization they face. We focused on pain sensitivity and autonomy beliefs to understand non-autistic people's perceptions of autistic people. However, other aspects of infantilization, such as being offered unsolicited help or being excluded from participation in different contexts in society may be more important to autistic people.

In conclusion, the studies reported here found that non-autistic people hold infantilizing beliefs and attitudes about autistic adults: Autistic adults are believed to be vulnerable and to deserve less autonomy than non-autistic adults. Autistic adults are also pitied by non-autistic adults. Several autistic adults have pointed out the belittling and exclusionary effects of such

attitudes (e.g., Dorman, 2023; Loftis, 2021; Srinivasan, 2023). This work highlights the importance of fostering attitude change among non-autistic adults to create conditions conducive to autistic adults' flourishing.

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Paper 3:

Perceptions of Autistic Adults' Experience and Agency

Abstract

Autistic adults are believed to feel more pain than non-autistic adults, but similar levels of pain as autistic and non-autistic children. One interpretation of this finding is that autistic adults are believed to be vulnerable like children and are infantilized. In two preregistered studies, we examined whether autistic adults are perceived to be similar to children in their emotionality and agency. In Study 1, we examined if an autistic adult would be believed to feel sensations and emotions more intensely than a non-autistic adult. Participants (N = 210) believed that an autistic adult target would feel more pain, but not more happiness or unhappiness, than a non-autistic adult target. This suggests that autistic adults are perceived to be more vulnerable, but not broadly more reactive than non-autistic adults. In Study 2, we examined if an autistic adult would be perceived as less agentic than a non-autistic adult. Participants (N = 193) believed that an autistic adult target would be as capable as a non-autistic adult target of carrying out several activities requiring the agentic capacities of self-control, planning, and initiative, suggesting that autistic adults are not perceived to differ from non-autistic adults in their agency. Although autistic people may be infantilized in some ways, such as being considered vulnerable and weak, they may not be perceived to be like children in all respects.

Introduction

Information about the social group to which someone belongs, including their race or gender, can influence people's beliefs about how much pain they would feel (e.g., Wandner et al., 2012). Pain stereotypes are well-documented for Black people, who are believed to feel less pain than White people (e.g., Summers et al., 2024; Trawalter et al, 2012), and low-SES people, who are believed to feel less pain than high-SES people (e.g., Summers et al., 2021, 2023). The stereotypes about Black people's and low-SES people's hyposensitivity to pain are widespread and endorsed by ingroup and outgroup members (e.g., Summers et al, 2021; Trawalter et al., 2012). Interestingly, for targets with overlapping group identities (such as Black people and low SES people), people often use information about all group memberships separately to formulate beliefs about these targets' pain. For example, Black targets are believed to feel less pain than White targets, and within the race groups of Black and White targets, low-SES targets are believed to feel less pain than high-SES targets (Summers et al., 2021). Information about group membership thus tends to inform pain beliefs in additive rather than interactive ways.

Crucially, it is not group membership *per se*, such as race or SES, that informs people's beliefs about how much pain a group member would feel. Instead, it is people's perceptions of capacities or attributes of members of specific groups which inform pain stereotypes about these groups. For example, participants who believe that Black people feel less pain than White people also believe that Black people have faced more hardship than White people (Trawalter et al., 2012). In line with the cultural belief that "what doesn't kill you makes you stronger," Black people are believed to be toughened up due to the hardship they are believed to have experienced. As a result, people seem to expect that Black people would feel less pain than White people in the same physically painful scenarios. When Black people are described as

having experienced less hardship, they are also believed to feel more pain (Hoffman & Trawalter, 2016).

Similar beliefs also exist for low-SES people, who are believed to have faced more life hardship than high-SES people, and are consequently believed to feel less pain than high-SES people (Summers et al., 2021). Similarly to Black adults compared to White adults, Black children are believed to feel more pain than White children (e.g., Dore et al., 2014; Summers et al., 2024). In addition to perceptions of toughness developed through hardship, another explanation proposed for this belief is that Black children are perceived to be adultified compared to their same-aged White peers (e.g., Goff et al., 2014). People perceive Black children as older and more adult-like, which may lead them to believe that they are less vulnerable than White children, and thus feel less pain in the same injurious scenarios (Summers et al., 2024).

The examples of Black people and low-SES people show that the pain of people belonging to some disadvantaged groups is underestimated, but the pain of people belong to other disadvantaged groups may be *overestimated*. Basargekar et al. (2024, Paper 1 of dissertation) found that autistic people are believed to face more life hardship than non-autistic people, and yet are believed to feel *more* pain than non-autistic people. Unlike Black and low-SES people, they are not believed to be toughened up due to the life hardship they have experienced.

One explanation for this difference could involve the infantilization of autistic adults. Targets who are expected to feel high levels of pain are also believed to be more vulnerable, i.e., to be at risk of getting hurt and more in need of protection (Gray et al., 2007; Gray & Wegener, 2009). This perception is true of children, who are generally believed to be vulnerable entities in

need of protection and nurturance (e.g., Hewitt-Taylor & Heaslip, 2012; Peens & Luow, 2000), and are typically believed to feel more pain than adults in the same situations (Gray & Wegener, 2009). Similarly, that autistic people are believed to feel more pain than non-autistic adults may signal that they are perceived to be vulnerable like children.

There are several reasons to believe that autistic adults may be infantilized in people's perception, chiefly that autistic adults often report being treated by others as if they are children. For example, others may speak to them in a high-pitched simplified language that is often used in child-directed speech (e.g., Srinivasan, 2023), exclude them from decisions important for their lives (e.g., Dorman, 2023; Loftis, 2021), or underestimate their capacities (e.g., Cribb, 2022). Although there are more autistic adults than autistic children, narratives about autism including newspaper articles, autism websites, and fundraising campaigns more commonly feature autistic children than autistic adults (Stevenson et al., 2011). Even when autistic adults are mentioned in the media, they are often described as someone's child which positions them in a child's role relative to other adults (Akhtar et al., 2022). Autistic adults have recorded several instances in which they are infantilized in interpersonal interactions (e.g., Liesner & Mills, 1999), healthcare settings (e.g., Loftis, 2011), and legal guardianship debates (e.g., Dorman, 2023).

There is already some evidence that, at least in pain contexts, non-autistic people reason about autistic adults in the same way that they reason about children. First, although autistic adults are believed to feel more pain than non-autistic adults (Basargekar et al., 2024), they are believed to feel similar levels of pain as autistic and non-autistic children (Basargekar et al., in prep., Paper 2 of dissertation, Study 1). As noted, beliefs about how much pain someone feels may reflect beliefs about the amount of hardship they have experienced (e.g., Trawalter et al., 2012), but they can also signal beliefs about how likely they are to come to harm (Gray &

Wegener, 2009). A belief that autistic adults feel as much pain as children suggests that autistic adults are perceived to be as vulnerable as children (and more vulnerable than non-autistic adults). Also as previously noted, beliefs of how much pain an individual target would feel are typically informed additively rather than interactively by the different group identities of this target (e.g., for a Black and low-SES target, information about their racial group and their status influences pain estimates separately; Summers et al., 2024). That autistic adults were believed to feel similar levels of pain as autistic and non-autistic children suggests that the target attributes of neurotype (autistic / non-autistic) and age (adult / child) interactively rather than separately informed beliefs about targets' pain. This contrasts the pattern found in race and SES, where different attributes of the target (e.g., their race and gender) additively rather than interactively inform beliefs about targets' pain. This suggests that when estimating the pain of child targets and the autistic adult target, people may draw on similar underlying perceptions, indicating some overlap between people's perceptions of children and autistic adults.

Second, when a college-age person is making a relatively minor decision (e.g., whether to get a tattoo), non-autistic participants indicate that the person's parents should have more of a say in the decision when the individual is autistic than when they are not autistic (Basargekar et al., in prep., Paper 2 of dissertation, Study 2). This finding is consistent with infantilization insofar as adults tend to agree with statements suggesting that parents (rather than the children) should make decisions about matters like who should be the children's doctor (Peterson-Badali et al., 2003).

Finally, autistic adults are pitied more than non-autistic adults (Basargekar et al., in prep., Paper 2 of dissertation, Study 3). Although children are not pitied, an adult who is believed to be child-like and to be less capable of engaging in activities typical of adulthood (such as being

employed and providing consent) is likely to be pitied (Loftis, 2021). For example, autistic adult characters in mainstream media are often portrayed as being unable to fully enter the world of the adults around them, thus inviting audiences to pity them (e.g., Loftis, 2021). Indeed, pity is a paternalistic emotion associated with benevolent control over the pitied target (e.g., Fiske et al., 2002), and is therefore consistent with infantilization (Nario-Redmond et al., 2019).

In the studies here, we investigate whether non-autistic participants show two additional patterns in their reasoning about autistic adults that are consistent with infantilization and which might help to explain why autistic adults are believed to feel more pain than non-autistic adults. First, compared to adults, children are believed to have slightly higher capacities to feel emotions and sensations like joy, rage, and hunger (Gray et al., 2007). In addition, children are perceived to require support with emotion regulation from adult caregivers, such as parents and teachers (Eisenberg et al., 1998; Manchini et al., 2022; Morris et al., 2017). This suggests a perception that children are less in control of their emotions than adults; they need support in dealing with their highs and lows. While adolescents are believed to feel basic emotions with the same frequency as younger children, they are believed to express these emotions with lower frequency than younger children (Fabes & Martin, 1991). This suggests that children are perceived to get better at controlling their emotions with age. Therefore, beliefs that autistic adults are more emotional than non-autistic adults would be consistent with an infantilization account that posits that autistic adults are perceived to be like children, who are believed to be more emotional than older individuals. Thus, in Study 1, we ask whether non-autistic participants attribute to an autistic adult target not just greater sensitivity to painful scenarios, but also greater response to scenarios designed to evoke happiness and situations designed to evoke unhappiness.

A second pattern of reasoning that might reveal infantilization concerns agency. Compared to adults, children are perceived to have lower capacity to enact their will and bring about changes in the world, including lower capacity for self-control, planning, morality, and memory (Gray et al., 2007). For example, when a child or an adult are described as having contributed to the same negative outcome, the child is perceived as being less blameworthy than the adult (Gray & Wegener, 2009). Perceptions of agency represent how capable someone is believed to be of intentionally executing an action in order to bring about a change in the world. Since adults are believed to be more capable of exercising their will in this manner, a perception that autistic adults are less agentic than non-autistic adults would also be consistent with an infantilization account positing that autistic adults are perceived to be like children. Perceptions of agency are also similar to perceptions of self-regulation, which is associated with regulating one's response to pain (e.g., Hamilton et al., 2004). If autistic adults are perceived to be less agentic than non-autistic adults, this may indicate that they are perceived to lack self-regulation capacity compared to non-autistic adults. Further, they may be believed to feel high levels of pain because of this lack of self-regulation ability. That is, they may be perceived to not be able to control their response in painful situations, and therefore experience more distress than non-autistic adults in the same situations.

Perceptions of agency are related to, but conceptually different from, perceptions of autonomy. Perceptions of autonomy represent to what extent an individual is believed to be enabled within their social context to make decisions and act according to their desires, or the extent to which they are perceived as being free from external constraints in making these decisions (e.g., Campbell, 2017). It is possible for an individual to simultaneously be perceived as having agency (i.e., having the internal capacity to exercise their will) and lacking in

autonomy (i.e., being constrained by external forces from exercising their will). However, if an individual is perceived as lacking agency, it is likely that they will be denied autonomy as well. That is, people may believe that individuals who are not capable of exercising their will should not have much autonomy to do so (e.g., Jongsma et al., 2017). In a prior study, an autistic adult target was granted lower decision making authority than a non-autistic adult target (Basargekar et al., in prep., Study 2). Perhaps one reason for this belief is that autistic adults are believed to have lower levels of agency than non-autistic adults. The finding that non-autistic adults grant less decisional autonomy to autistic adults than to non-autistic adults is therefore consistent with the possibility that autistic adults are believed to be less agentic than non-autistic adults, and that autistic adults are infantilized.

Thus, in Study 2, we investigated whether non-autistic participants attribute less agency to an autistic adult target than a non-autistic adult target, in terms of the target's capability to execute actions requiring initiative, planning, and self-control.

Study 1

In Study 1, we compared how much pain, happiness, and unhappiness non-autistic adults believe an autistic adult and a non-autistic adult would feel. One possibility is that the autistic adult would be perceived as feeling not only more pain, but also more happiness and unhappiness than the non-autistic adult. This would be consistent with a hypersensitivity account, suggesting that autistic people are perceived as highly sensitive to all types of experiences and not just painful ones. This would also be consistent with an infantilization account insofar as children are perceived to be more emotional than adults (e.g., Fabes & Martin, 1991; Gray et al., 2007).

A second possibility is that the autistic adult would be believed to feel more pain and unhappiness, but not more happiness, than the non-autistic adult. This possibility is consistent with the fundamental negativity bias that attends disabled people, wherein disabled people's negative experiences are emphasized much more than neutral or positive ones (Dunn, 2019; Wright, 1988). It is also consistent with non-disabled people's tendency to (erroneously) assume that disabled people have a poor quality of life (e.g., Amundson, 2010). Such an assumption may lead individuals to believe that autistic adults would find disappointing situations more disappointing, and enjoyable situations less enjoyable than would non-autistic people. This possibility is not compatible with an infantilization account, since children are not believed to be especially susceptible to negative sensations and not positive ones.

The third possibility is that the autistic adult would be believed to feel more pain, but not more happiness or unhappiness than the non-autistic adult. This would signify that autistic adults are perceived to be more vulnerable than non-autistic adults, but are not perceived to be more emotional than non-autistic adults. This possibility is not compatible with the account that autistic people are perceived to be emotional like children, but it is compatible with the account that autistic adults are perceived to be vulnerable like children. This perception may still be associated with autistic adults being infantilized in some ways, but it would also mean that people's perceptions of autistic adults only partially overlap with their perceptions of children.

Study 1's hypotheses (including the above three possibilities), design, and planned analyses were pre-registered at https://osf.io/5tps4.

Methods

Participants

Undergraduates (N = 210) from a large mid-Atlantic university participated for course credit. Sample size was calculated a priori using G*Power (Faul et al., 2007). We were interested in detecting a difference in target experience ratings, as predicted by target neurotype (autistic or non-autistic), self-ratings, type of experience (pain, happiness, or unhappiness), and the interaction between target neurotype and target experience. Therefore, we calculated the sample size required to detect a small-to-medium sized effect on the experience ratings from a multiple regression model with six predictor variables. To achieve a power of .80 to detect a small-to-medium sized effect ($f^2 = 0.07$) from six predictors would require 202 participants. We rounded up and recruited 210 participants. Data from 11 additional participants were discarded because they identified as autistic ($n = 3$), failed an attention check ($n = 3$) or a manipulation check ($n = 1$), or gave incomplete or inappropriate[4] responses ($n = 4$). Demographics are presented in Table 4.1.

Table 4.1

Participant Demographics

Study details	Sample	Condition	Gender	Age
Study 1 ($N = 210$)	College Students 66% White, 17% Asian, 7% Black, 10% More than one race 9% Hispanic / Latinx, 91% Not Hispanic / Latinx	Target: Autistic, Experience: Pain ($n = 35$)	27 F, 8 M	18.63 (0.97)
		Target: Non-autistic, Experience: Pain ($n = 35$)	27 F, 8 M	19.05 (0. 95)
		Target: Autistic, Experience: Happiness ($n = 35$)	15 F, 10 M	19.54 (2.42)
		Target: Non-autistic, Experience: Happiness (n = 35)	27 F, 8 M	18.60 (0.65)
		Target: Autistic, Experience: Unhappiness (n = 35)	25 F, 10 M	18.94 (1.11)

[4] Only one participant gave inappropriate responses, where they indicated on the demographics form that they were 200 years old and belonged to all racial backgrounds.

		Target: Non-autistic, Experience: Unhappiness (n = 35)	23 F, 12 M	19.11 (1.11)
Study 2 (*N* = 193)	College Students 62% White, 21% Asian, 5% Black, 6% More than one race 9% Hispanic / Latinx, 89% Not Hispanic / Latinx, 2% Unknown	Target: Autistic (*n* = 97)	60 F, 37 M	19.03 (1.47)
		Target: Non-autistic (*n* = 96)	59 F, 36 M, 1 NB	18.99 (1.03)

Note. In Gender, F = Female, M = Male, NB = Non-binary.

Design

Participants were randomly assigned to provide ratings of either the autistic or the non-autistic adult target. Within each target condition, they were randomly assigned to provide pain, happiness, or unhappiness ratings. Each of the six conditions in this 2 x 3 design had 35 participants.

Measures

Two of the instruments used in this study were the same as those used in Basargekar et al. (2024, Paper 1 of dissertation), including the pain sensitivity rating scale (α = .85 in the current study) and the level of contact with autism report (Gardiner & Iarocci, 2014). We also included the following two measures:

Happiness ratings scale. Participants read 18 statements describing mildly fortunate and enjoyable events, like seeing a cute animal, or getting a free drink at a café. As with the pain ratings scale, participants completed the happiness ratings scale twice, first estimating how happy they would be if they experienced these events, and next estimating how happy their assigned target would be if they experienced the same events. Participants rated each event on a

4-point scale, ranging from “not happy” to “extremely happy”. The internal consistency of the happiness ratings scale was good (α = .85).

Unhappiness rating scale. Participants read 18 statements describing mildly unfortunate and disappointing events, from situations like losing a water bottle, or having to return a library book before finishing it. As with the pain and happiness ratings scales, participants completed the unhappiness ratings scale twice, first estimating how unhappy they would be, and then estimating how unhappy their assigned target would be, in the same situations. Participants rated each item on a 4-point scale, ranging from “not unhappy” to “extremely unhappy”. The internal consistency of the unhappiness ratings scale was good (α = .85).

Procedure

Participants completed the study online via Qualtrics (Qualtrics, Version November 2023). At the start of the survey, participants read, “In this study, we are interested in how people think about different types of experiences.” Participants then gave self-ratings, estimating how much pain, happiness, or unhappiness (depending on the condition to which they had been assigned) they would feel in the scenarios described above. One attention check was included, asking participants to select a specific response option (e.g., “Select extremely painful (4)”).

Next, depending on which experience condition they were assigned to, participants read the following statement: “In this study, we are interested in how people rate the pain / happiness / unhappiness of others. We are going to ask you to carefully read a short description of an individual.” Half of the participants in each of the three conditions read a vignette describing an autistic adult target and half read a vignette describing a non-autistic adult target:

> Jamie is autistic [or Jamie is 20 years old]. Jamie is a college student majoring in economics. In their spare time, Jamie enjoys painting and playing soccer. Jamie lives in an apartment with three roommates.

After reading their assigned vignette, participants rated how much pain, happiness, or unhappiness their assigned target would feel in each of the scenarios they had earlier rated for themselves. One attention check was randomly inserted on all target ratings, asking participants to select a specific option (e.g., "Select not at all happy (1)").

After providing the target ratings, participants responded to a manipulation check question to confirm that they remembered the neurotype of the target they had read about. They were shown four options and were asked to select one that was true of their target (i.e., "Jamie is autistic," "Jamie has Down's Syndrome," "Taylor lives alone," and "None of the above"). Finally, participants responded to the level of contact report indicating their level of contact with autistic people.

Results

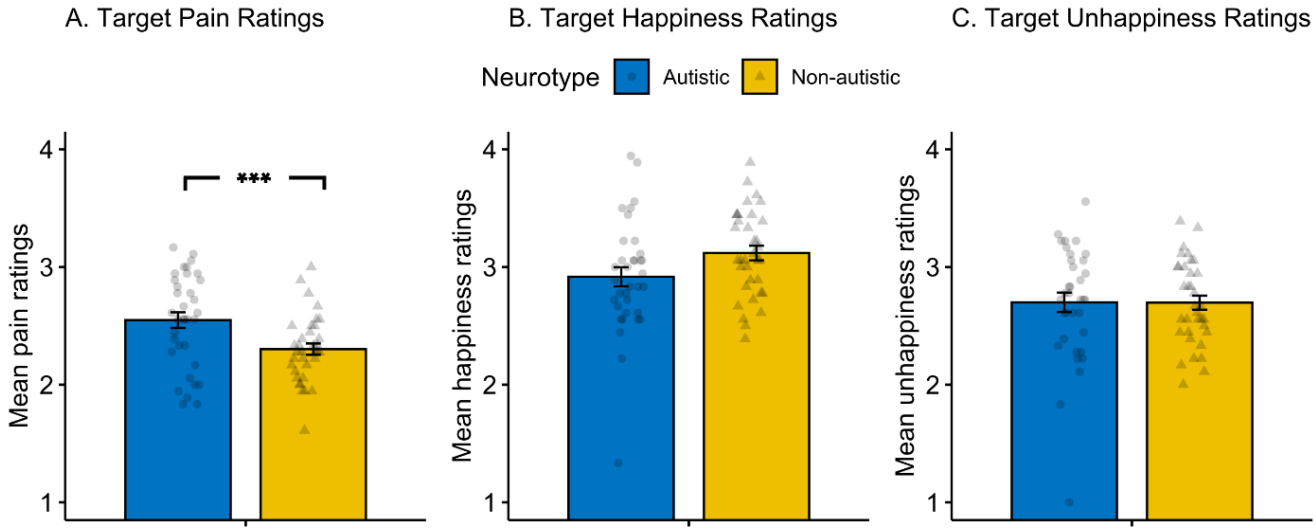
Participants across the six conditions did not differ in their self-reported level of contact with autistic people, $F(5, 204) = 1.66$, $p = .146$ ($M_{autistic\text{-}pain} = 7.31$, $SD_{autistic\text{-}pain} = 2.84$; $M_{nonautistic\text{-}pain} = 5.86$, $SD_{nonautistic\text{-}pain} = 3.26$; $M_{autistic\text{-}happiness} = 7.80$, $SD_{autistic\text{-}happiness} = 2.79$; $M_{nonautistic\text{-}happiness} = 7.14$, $SD_{nonautistic\text{-}happiness} = 2.95$; $M_{autistic\text{-}unhappiness} = 6.94$, $SD_{autistic\text{-}unhappiness} = 2.85$; $M_{nonautistic\text{-}unhappiness} = 7.00$, $SD_{nonautistic\text{-}unhappiness} = 3.01$). Therefore, any condition-wise differences in ratings of targets' experience are likely not attributable to influences from participants' familiarity with autistic people.

As Figure 4.1 shows, participants gave higher pain ratings to the autistic target than the non-autistic target, but they did not give higher happiness or unhappiness ratings to the autistic

vs. non-autistic target. To analyze these data, we constructed a linear model predicting target ratings of experience by target neurotype (autistic or non-autistic), type of experience (pain, happiness and unhappiness), the interaction between target neurotype and type of experience, and participants' self-ratings of experience[5]. We used contrast coding to represent the categorical variables of target neurotype (autistic target = 1, non-autistic target = -1) and type of experience[6] (Code 1: pain = 2, happiness = -1, unhappiness = -1; Code 2: pain = 0, happiness = 1, unhappiness = -1).

Figure 4.1

Target Ratings of Pain, Happiness and Unhappiness (Study 1)



Note. Error bars represent standard error of the mean. Asterisks represent significance levels. *** $p < .001$

[5] Self-ratings were entered as covariates in the model analyzing target ratings because past work on pain judgments has shown that they are a strong predictor of target pain ratings (e.g., Basargekar et al., 2024).
[6] Since the products of the two Experience Code Sequences sum to zero, these codes are orthogonal to each other, as recommended by Judd et al. (2017).

As Table 4.2 shows, ratings of the target's experiences did not vary by whether participants were assigned to rate the autistic or the non-autistic target, β = .08 [-.01, .17], p = .089, f^2 = 0.01. On average, participants gave similar target experience ratings across the three experience types: Ratings of target pain were no different from the average of target happiness and unhappiness ratings (Experience Type Code 1), β = -.05 [-.13, .04], p = .174, f^2 = 0.01), and target happiness ratings were no different from target unhappiness ratings (Experience Type Code 2), β = -.06 [-.17, .02], p = .376, f^2 = 0.00.

Table 4.2

Multiple regression predicting target experience ratings

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype	.08	.05	[-.01, .17]	1.71	.089	0.01
Experience Type Code 1	-.05	.04	[-.13, .02]	-1.37	.174	0.01
Experience Type Code 2	-.06	.07	[-.19, .07]	-0.89	.376	0.00
Interaction Term 1: Target Neurotype X Experience Type Code 1	**.12**	**.03**	**[.05, .18]**	**3.57**	**< .001**	**0.06**
Interaction Term 2: Target Neurotype X Experience Type Code 2	-.09	.06	[-.20, .02]	-1.59	.113	0.01
Self-ratings	**.70**	**.06**	**[.57, .83]**	**10.87**	**< .001**	**0.58**
F (6, 203) = 42.69, p < .001 Multiple R^2 = .56 Adjusted R^2 = .54						

Note. Continuous variables were z-standardized to get standardized coefficients. Categorical variables were contrast coded. Target Neurotype: Autistic target = 1, Non-autistic target = -1; Experience Type Code 1: Pain = 2, happiness = -1, unhappiness = -1; Experience Type Code 2: Pain = 0, happiness = 1, unhappiness = -1.

However, there was a significant interaction between target neurotype and Experience Code 1: The difference between the autistic and non-autistic target pain ratings was larger than the difference between the average happiness and unhappiness ratings given to the autistic and non-autistic targets, β = .12 [.05, .18], p < .001, f^2 = 0.06. But there was no interaction between target neurotype and Experience Code 2, suggesting that the difference between the autistic target and non-autistic target happiness ratings did not differ from the difference between the autistic target and non-autistic target unhappiness ratings, β = -.09 [-.20, .02], p = .113, f^2 = 0.01. In short, participants gave higher pain ratings to the autistic target than to the non-autistic target, but gave similar happiness and unhappiness ratings to both targets.

The interactive model reported above does not allow us to straightforwardly conclude if there was a significant difference in the happiness ratings given to the autistic and the non-

autistic target, or the unhappiness ratings given to the autistic and the non-autistic target. To investigate these possibilities directly, we ran separate linear models for target ratings of happiness and unhappiness. In each model, target ratings were predicted by target neurotype, and self-experience ratings were entered as covariates. As Table 4.3 shows, the autistic and non-autistic targets were not believed to feel different levels of happiness, β = -.14 [-.34, .06], p = .157, f^2 = 0.03, or unhappiness, β = .07 [-.12, .26], p = .478, f^2 = 0.01.

Table 4.3

Regression Models Predicting Target Ratings of Happiness and Unhappiness

Model details	Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Predicting target happiness ratings	Target Neurotype [a]	-.14	.10	[-.34, .06]	-1.43	.157	0.03
	Self-happiness ratings	**.56**	**.10**	**[.37, .76]**	**5.72**	**< .001**	**0.49**
	F (2, 67) = 19.2, p < .001 Multiple R^2 = .36 Adjusted R^2 = .35						
Predicting target unhappiness ratings	Target Neurotype [a]	.07	.10	[-.12, .26]	0.71	.478	0.01
	Self-unhappiness ratings	**.62**	**.10**	**[.43, .81]**	**6.4**	**< .001**	**0.61**
	F (2, 67) = 20.45, p < .001 Multiple R^2 = .38 Adjusted R^2 = .36						

Note. All target and self-ratings were z-standardized to get standardized coefficients.

[a] Target neurotype was coded as Autistic Target = 1, Non-autistic Target = -1.

Discussion

In Study 1, participants believed that the autistic adult target would feel more pain than the non-autistic adult target (replicating Basargekar et al., 2024), but similar levels of happiness

and unhappiness as the non-autistic target. This pattern of results is not consistent with the possibility that autistic people are believed to experience heightened responses to all positive or negative stimuli, which might be the pattern expected of children's emotional experiences (e.g., Fabian & Martin, 1991; Gray et al., 2007). Findings of Study 1 are also not consistent with the possibility that autistic people are believed to experience heightened responses to negative stimuli: While participants rated the autistic target as experiencing more pain, they did not rate them as experiencing more unhappiness, which would be expected if autistic people were subjected to a fundamental negative bias in people's perceptions (Wright, 1988). Instead, that higher experience ratings were given only in the pain scenarios suggests that autistic people are perceived to be more at risk of coming to harm, and thus more vulnerable, than non-autistic people.

On the one hand, this pattern of results is not completely consistent with the infantilization hypothesis that motivated the study. As noted, children are believed to require support with emotional regulation (e.g., Eisenberg et al., 1998) and may be perceived as being more emotional (Fabian & Martin, 1991). But on the other hand, that the autistic target was perceived to be more sensitive than the non-autistic target uniquely to pain may still indicate that autistic adults are perceived as vulnerable (like children). Attributions of vulnerability carry an assumption that the target deemed vulnerable is also likely to be more at risk and is less capable of dealing with challenging situations (Hewitt-Taylor & Heaslip, 2012; Peterson-Badali et al., 2003). At the same time as people believe autistic adults to be vulnerable, they may underestimate their strength and resilience, resulting in fewer opportunities to engage in activities in ways they would like to (e.g., Basargekar et al., in prep., Paper 2 of dissertation;

Clough, 2017; Cribb et al., 2019). Therefore, perceptions of autistic adults' vulnerability may result in autistic adults being underestimated and infantilized in practice.

Individuals believed to be vulnerable are also deemed to be less agentic—for example, less intentional and responsible for their behavior. For example, Gray and Wegner (2009) found that adults believed a child feels more pain than an adult, which suggests they believe a child to be more vulnerable than an adult. Interestingly, when adults heard a story about, for example, a character who pushed a tray of glasses off a table, resulting in a shard of glass cutting into the character's leg, they believed a child character was less intentional in pushing the tray and less responsible for the outcome than an adult character. In another study from Gray and Wegner (2009), the amount of praise a character with "severe mental retardation" was due for bringing about a good outcome and blame they were due for a bad outcome was inversely correlated with their ratings of the character's vulnerability (Gray & Wegener, 2009).

Conversely, individuals believed to be agentic are also deemed to be less vulnerable. For example, Goranson et al. (2020) found that people believe medical doctors to have high agency and low vulnerability. Compared to non-doctors, they are thought to be more capable of thinking, planning for the future, remembering details, and exerting self-control and less vulnerable to fatigue and ill health. People perceived to be highly agentic may therefore be perceived to be less vulnerable, perhaps because they are thought to be capable of self-control and resilience. Particularly, with respect to pain

In Study 2, we investigated the possibility that along with being perceived as more vulnerable than non-autistic people, autistic people may also be perceived to be less agentic than non-autistic people. We also examined if people's perceptions of autistic people's agency are inversely correlated with their perception of autistic and non-autistic adults' vulnerability.

Although participants' beliefs about autistic adults may not represent completely infantilizing perceptions, in that autistic adults are not believed to experience heightened levels of all emotions as children are, perceptions of autistic people's higher vulnerability may still indicate that autistic adults are still infantilized in other ways, such as through underestimation of their capabilities.

Study 2

In Study 2, we compared how much agency non-autistic participants believe an autistic adult and a non-autistic adult would have to pursue goals and carry out actions. Drawing on the mind perception framework (Gray et al., 2007), we defined agency broadly as the ability to enact one's will and bring about change in the world, including planning, exercising initiative, and exercising self-control. We asked participants to judge how capable their assigned target would be of carrying out specific tasks that would require planning, initiative, and self-control. Drawing on findings reviewed above suggesting that individuals believed to be relatively vulnerable may be perceived to be less agentic (Goranson et al., 2020; Gray et al., 2007), we expected that our autistic adult target would also be perceived as less agentic than the non-autistic adult target. We also collected pain ratings of the two targets as a proxy for vulnerability. We hypothesized that perceptions of target agency would mediate the difference in perceptions of vulnerability of the autistic and non-autistic targets. The design, hypotheses, sample size, and planned analyses of Study 2 were pre-registered at https://osf.io/52q9m.

Methods

Participants

Sample size was calculated a priori using a power analysis for a simple mediation model using Monte Carlo simulations (Schoemann et al., 2023). We wanted a sample large enough to

detect a mediation effect of target agency ratings on the relation between target neurotype and target pain ratings. In a prior study, we had used the same pain ratings scale and a different measure of perceptions of target agency (Basargekar et al., in prep., Paper 2 of dissertation, Study 1). From this study, we obtained estimates of coefficients for the effect of target neurotype on target agency ratings (path a; $\beta = -.30$), the effect of target agency ratings on target pain ratings (path b; $\beta = -.35$), and the effect of target neurotype on target pain ratings after controlling for target agency ratings (path c'; $\beta = -.36$). Using these parameters, we calculated that 176 participants would be required to achieve power of .95 to detect the mediation effect of target agency ratings on the relation between target neurotype and target pain ratings, with a significance criterion of .05. To increase the likelihood of detecting an effect should one exist, we attempted to recruit 200 participants.

Undergraduates from the same university as Study 1 participated for course credit. Our initial sample included 200 participants. Data from seven participants were replaced because they failed an attention check (n = 1) or a manipulation check (n = 6), and data from an additional seven participants were discarded because they self-reported being autistic (we did not replace these participants because of time constraints). Thus, the final sample comprised 193 participants. Participant demographics are presented in Table 4.1. Data collection took place in November 2023.

Design

Participants were randomly assigned to provide ratings of either the autistic ($n = 97$) or the non-autistic target ($n = 96$).

Measures

Measures included the pain rating scale (α = .87 in current study) and level of contact report from Study 1. In addition, we created an agency scale to measure beliefs about a character's self-control and planning. It consisted of 18 statements describing activities that would require planning, initiative, and self-control for their execution, such as remembering to take one's medicine, campaigning for a political candidate, and standing up to a bully (see Figure 4.3 for all items). Participants indicated how capable their assigned target would be of executing each activity on a 5-point scale, ranging from "Not at all capable" to "Highly capable". The internal consistency of the agency rating scale was good (α = .85, 95% CIs [.82—.88]).

Procedure

Participants completed the study online via Qualtrics (Qualtrics, Version November 2023). Participants were first given the following instruction: "In this study, we are interested in how people think about different types of experiences." Participants then responded to the pain ratings scale for themselves, rating how much pain they would feel in the 18 situations described on the scale. Next, participants read the following statement: "In this study, we are interested in how people rate the pain of others. We are going to ask you to carefully read a short description of an individual." Participants were randomly assigned to read the description of either the autistic or the non-autistic target from Study 1. After reading their assigned vignette, participants responded to the pain rating scale a second time, this time estimating how much pain their assigned target would feel in the described situations.

After providing target pain ratings, participants read, "Now we are interested in how capable you think Jamie is of doing several things." The vignette describing the target remained visible as participants responded to the items on the agency rating scale in a randomized order, indicating how capable they thought their assigned target was of executing the described

activities. One attention check was included on the agency rating scale, asking participants to "Select fairly capable (4)". After the agency rating scale, participants also responded to the same manipulation check used in Study 1, where they were asked to select, out of four options, information that had been presented in the vignette about Jamie. Finally, participants indicated their level of contact with autism on the level of contact report (as noted, the data from the seven participants who self-reported being autistic were discarded).

Results

Participants assigned to rate the autistic or the non-autistic target did not differ in their self-reported contact with autistic people ($M_{autistic} = 7.58$, $SD_{autistic} = 2.77$; $M_{non\text{-}autistic} = 6.91$, $SD_{non\text{-}autistic} = 3.06$), $t(188.75) = 1.60$, $p = .112$. This suggests that relatively greater or lower familiarity with autistic people is not a likely reason for the pain and agency ratings given to the autistic target compared to the non-autistic target.

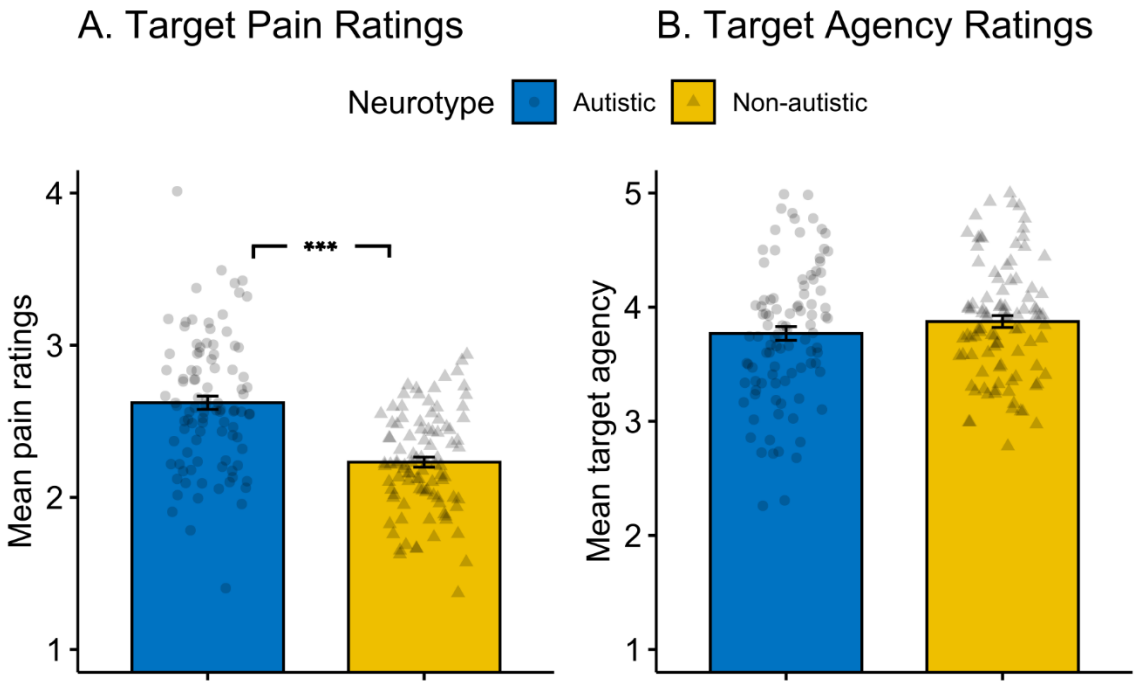
As Figure 4.2a shows and as expected, participants gave higher pain ratings to the autistic target than to the non-autistic target. To analyze these data, we ran a regression model predicting target pain ratings by target neurotype (1 = autistic target, -1 = non-autistic target) and participants' self-pain ratings. The model was significant, $F(2, 190) = 103.5$, $p < .001$, adjusted $R^2 = 0.52$. Replicating Study 1, the autistic target was given higher pain ratings than the non-autistic target, $\beta = .42$ [.32, .52], $p < .001$, $f^2 = 0.37$, and participants who expected to feel more pain also expected their respective targets to feel more pain in the same scenarios, $\beta = .56$ [.46, .66], $p < .001$, $f^2 = 0.66$.

As Figure 4.2b shows and contrary to expectations, participants' ratings of the autistic and non-autistic target's agency did not differ. To analyze these data, we constructed a regression model predicting target agency ratings by target neurotype. The model was not significant, $F(1,$

191) = 1.72, p = .192, adjusted R^2 = .004., with a non-significant effect of target neurotype on target agency ratings, β = -.09 [-.24, .05], p = .192, f^2 = .01.

Figure 4.2

Target Pain and Agency Ratings (Study 2)



Note. Error bars represent standard error of the mean. Asterisks represent significance levels. *** p < .001

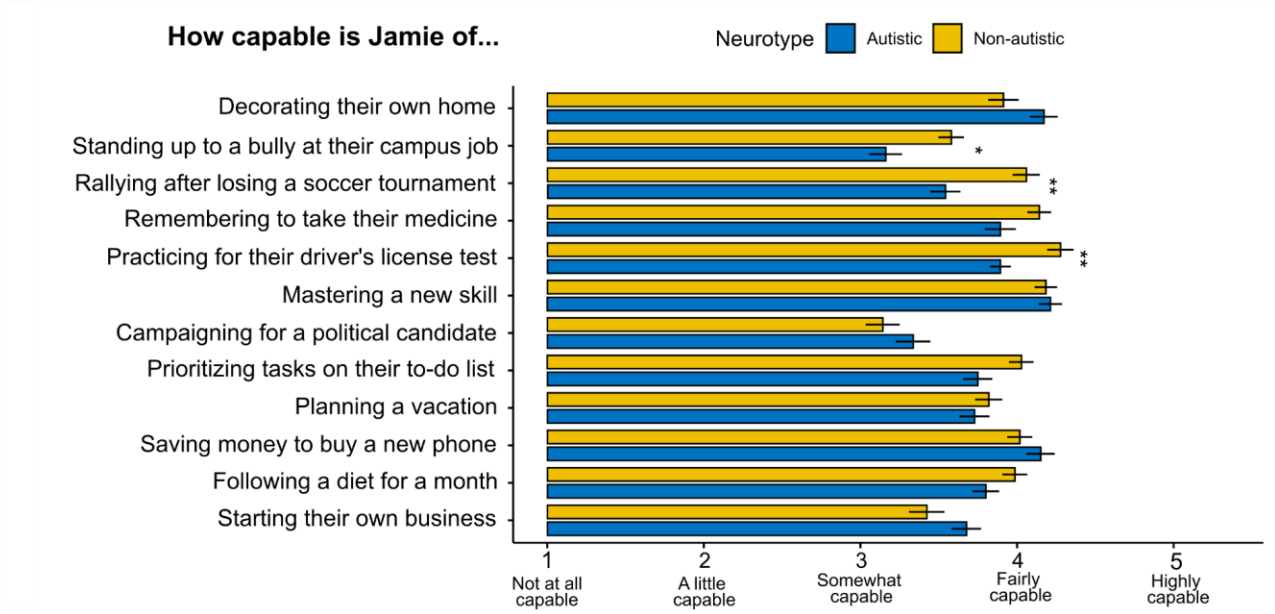
We had hypothesized that target agency ratings would mediate the difference between pain ratings of the two targets. To examine this possibility, we added target agency ratings as a mediator in the regression model predicting target pain ratings from target neurotype and self-pain ratings. After entering target agency ratings as a mediator, the effect of target neurotype on target pain ratings was still significant, β = .18 [.13, .22], p < .001. But target agency ratings did not significantly predict target pain ratings, β = 0.00 [-.08, .08], p = .972, and target agency

ratings were not a significant mediator of the relation between target neurotype and target pain ratings, β = 0.00 [-.01, .01], p = .977. Participants' ratings of targets' pain were unrelated to their ratings of the targets' agency.

To examine if the two targets were perceived to be similarly capable of all activities on the agency ratings scale, we conducted item-wise comparisons for the target ratings. As Figure 4.3 shows, ratings of the two targets were significantly different across only three items: The autistic target was believed to be less capable than the non-autistic target of standing up to a bully at their campus job, rallying after losing a soccer tournament, and practicing for their driver's license test (ts > 3.10, Holmes-corrected ps < .05).

Figure 4.3

Item-wise Ratings of Target Agency for the Autistic and the Non-autistic Target (Study 2)



Note. Error bars represent standard errors. P-values for t-tests were corrected using the Holm method. * < .05, ** < .01.

Discussion

In Study 2, contrary to our expectations, the autistic adult target was not believed to differ from the non-autistic adult target in their agentic capacities. Further, target ratings of agency were unrelated to target ratings of pain, suggesting that participants' perceptions of the autistic target's vulnerability (using pain beliefs as a proxy) were unrelated to their expectations of the autistic target's agency.

The finding that the autistic target was believed to have similar levels of agency as the non-autistic target is surprising in view of past research, which suggests that autistic people are perceived as incompetent (Canton et al., 2022; Basargekar et al., in prep., Paper 2 of dissertation, Study 3). Prima facie, the constructs of agentic capacity (e.g., Gray et al., 2007) and competence (Fiske et al., 2002) seem to be closely related, since both dimensions include capacities such as intelligence, efficiency, and confidence. Given this overlap, it is surprising that the same autistic target should be judged less competent than a non-autistic target in one study (e.g., Basargekar et al., in prep, Paper 2 of dissertation, Study 3), and equally agentic as the same non-autistic target in this study.

Reasons for this discrepancy could be related to differences in the instruments generally used to measure perceptions of competence and the instrument we used to measure perceptions of agency in the current study. In work examining perceptions of disabled people's competence, participants are usually asked to rate how society perceives disabled people, rather than how they themselves perceive disabled people (e.g., Canton et al., 2022; Rohmer & Louvet, 2012). Asking about society's perceptions is intended to avoid social desirability effects, i.e., to circumvent the possibility that people may express beliefs that they perceive to be socially appropriate, rather than their true beliefs. In contrast, in the current study, to maintain alignment between pain ratings instrument and agency ratings instrument, we asked participants to rate how capable they

believed the targets were. Perhaps in the current study, if we had asked participants to rate the general social beliefs of their targets' capacities to execute given activities, we would have obtained a difference in the expected direction in the agency ratings of the autistic and the non-autistic target.

Second, the instrument used to measure beliefs of target competence in Basargekar et al. (in prep, Paper 2 of dissertation, Study 3) differed from the instrument used to measure beliefs of target agency in the current study in terms of the specificity of item phrasing. While measuring perceptions of target competence, we asked participants to provide a rating of how competent, intelligent, skillful, capable, confident, and efficient the target was believed to be. In contrast, the agency rating scale used in Study 2 asked participants how much they believed their assigned targets were capable of performing specific tasks requiring these kinds of capacities. Autistic people are sometimes described as having a "spiky" profiles of capabilities, where they are shown as lacking in some capacities but excelling in others (e.g., Milton, 2012). Even autistic characters in popular media are described in ways that describe them as having some extraordinary strengths, like analytic thinking or memory, and some extraordinary weaknesses, like lacking social skills, such as Christopher Boone from *The Curious Incident of the Dog in the Night-Time* (Haddon, 2003), or Dr. Sean Murphy from *The Good Doctor* (Shore, 2017-present).

In the current study, it is possible that participants believed the autistic target to be more agentic than the non-autistic target in some ways, but less agentic in other ways. Indeed, item-wise comparison of autistic and non-autistic targets' agency ratings shows that the autistic target was rated as being less agentic on some items, and similarly agentic on other items, than the non-autistic target. However, individual participants' ratings of the autistic target's agency across all items were not more variable (mean $SD = 0.72$) than participants' item-wise ratings of the non-

autistic target's agency (mean *SD* = 0.74). Therefore, our data are unlikely to be explained by participants' perceptions that the autistic target had a spiky profile of capacities.

Our data are also not consistent with an infantilization account that posits that autistic people's capacities are perceived to be similar to those of children. Our autistic target was believed to be fairly capable of starting their own business, campaigning for a political candidate, and saving money to buy a new phone—activities which a child would not be perceived as highly capable of executing. However, autistic people's experiences of being assumed to be incompetent (e.g., Srinivasan, 2023) and the noted limitations of our measurement instrument suggest that firm conclusions cannot be drawn about perceptions of autistic people's agentic capacities. Research suggests that people's infantilizing beliefs are sometimes more evident through implicit ways more than through explicit ways (Robey et al., 2006). Another way of measuring people's capacities of autistic people, such as an implicit association task, may reveal a different picture.

In Study 2, participants' perceptions of the targets' agency were unrelated to their perceptions of targets' vulnerability. This suggests that autistic people are not perceived to be less vulnerable overall as a consequence of being perceived as less agentic. This suggests that being perceived as more vulnerable may not signal that autistic people's capacities are underestimated. Future research should explore other reasons why autistic people may be perceived to be highly vulnerable, such as beliefs of physical weakness rather than beliefs of agency. However, it is also possible that a link between perceptions of vulnerability and agency may be found if beliefs of agency were measured in a different way, or if our autistic target were described in ways that emphasized their passivity rather than their accomplishments and competence (in the way that our autistic target was described). Finally, it is also possible that some but not all participants do

believe that autistic people are vulnerable to the extent that they are less agentic. Our sample in the current study consisted of young college students who may have progressive attitudes towards autistic people. A link between perceptions of agency and vulnerability in the expected direction may be found with a more diverse sample of participants in terms of age and educational background.

General Discussion

In studies reported here, we investigated non-autistic people's perceptions of autistic adults, with the aim of examining if autistic adults are perceived in infantilizing ways, i.e., as if they are child-like. In Study 1, replicating past work (Basargekar et al., 2024, Paper 1 of dissertation), we found that an autistic target was believed to feel more pain than a non-autistic target. However, the autistic and non-autistic targets were believed to experience similar levels of happiness and unhappiness. In Study 2, we found that an autistic target was believed to feel more pain than a non-autistic target. However, the autistic and non-autistic adult targets were given similar ratings on their capacity to execute actions requiring agency.

Our findings are not completely consistent with an infantilization account of autistic people. If participants perceived autistic adults exactly like children, we had expected that in addition to rating an autistic adult as experiencing more pain than a non-autistic adult, they would also have rated them as experiencing more happiness and unhappiness and less agency. This is not what we found.

As noted earlier, there are methodological explanations for why the autistic and non-autistic adult were perceived as similar in happiness, unhappiness, and agency. In the case of happiness and unhappiness scenarios in Study 1, the items were specifically selected to be appropriate for a college aged adult, and included scenarios like a traffic light turning green just

as one arrives at an intersection (for happiness) and the target's laptop crashing before their work could be saved (for unhappiness). It is likely that such scenarios may not be considered to be especially likely to make children happy or unhappy. If autistic adults are perceived to be similar to children, people may believe that they would feel happier than non-autistic adults in those situations in which children feel happier than adults. Future work should investigate whether perceptions of autistic adults' emotional experience map on to perceptions of children's emotional experience: That is, if autistic adults are perceived to have heightened emotional reactions in scenarios which are perceived to be highly evocative for children. For example, compared to adults, children may be expected to get greater joy out of going to an amusement park, and feel more disappointment if their favorite chocolate bar is sold out at the candy store.

It is also possible that autistic adults are perceived to be highly sensitive to the types of situations which make demands on one's self-regulation and coping abilities. For example, reactions and suffering from pain is associated with self-regulation (Hamilton et al., 2004). Similarly, emotions like frustration and joy, which are more intense than the sensations happiness and unhappiness involved in our emotion scenarios, may be perceived to require greater self-regulation. It is possible that the autistic adult would be perceived as being more sensitive than the non-autistic adult target for these more intense emotions which require higher coping.

In the case of agency in Study 2, the Moral Typecasting Hypothesis (Gray & Wegener, 2009) suggests that individuals in a morally salient situation are either perceived as moral patients (i.e., victims worthy or protection) or moral agents (i.e., perpetrators or saviors capable of bad and good actions on a moral patient). That autistic people were perceived as more vulnerable in potentially harmful situations (as indicated by pain ratings of the autistic target) suggests that they are typecast as moral patients in situations with some moral valence.

Accordingly, they may be perceived to lack moral agency in such situations, although not in situations which do not have moral import. For example, autistic adults may be perceived to have relatively high agency in a situation where they are pursuing their own goals with no cost or benefit to anyone else, such as starting their own business, but less agency in situations where they are attempting to bring about a harmful or helpful outcome, such as trying to commit a crime or trying to protect someone from harm. Future research should investigate if autistic people are specifically believed to lack moral agency, and to have relatively high capacities for agency in amoral situations.

Some limitations of the current research must be noted. Firstly, as already mentioned, the findings of Study 2 are not consistent with past work investigating beliefs and perceptions of autistic people. Specifically, past research has shown that autistic people are believed to have lower competence than non-autistic people (e.g., Canton et al., 2022; Rohmer & Louvet, 2011), and that autistic people are perceived to lack qualities of civility and refinement, like conscientiousness and thoroughness (Cage et al., 2019). Given these prior findings, one might expect that autistic people would be perceived to have less agency than non-autistic people. This is not what we found. Given these striking inconsistencies, it is important that findings from Study 2 be replicated, perhaps with different instructions for participants, a wider variety of items to examine perceptions of agency, and with a more diverse pool of participants than college students.

Second, in the current work, our autistic target was a college student engaged in activities typical of a young college going adult, which may have led participants to believe that they had relatively low support needs. Therefore, participants' perceptions of the autistic target in our

studies may not generalize to all autistic people. Autistic targets described as having higher levels of support needs may be perceived in more infantilizing ways than currently documented.

In summary, these studies suggest that autistic people are perceived to be more vulnerable than non-autistic people, but otherwise not more sensitive than non-autistic people to a variety of sensations and emotions. Autistic people may not be perceived to differ in agency from non-autistic people. Examining beliefs of autistic people's pain sensitivity has allowed us to rule out one potential explanation for this belief – that autistic people are perceived as oversensitive to all sensations and experiences. In addition, these studies show that non-autistic people are not perceived to be like children in terms of their emotionality and agency, even if they may be perceived to be like children in terms of how vulnerable they are believed to be. Future work should examine ways in which autistic adults may or may not be infantilized, and the implications of these beliefs for their inclusion and wellbeing.

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General Discussion

The three papers comprising this dissertation examined stereotypes about autistic people's pain sensitivity and what these stereotypes reveal about people's perceptions of autistic people. In Basargekar et al. (2024; Paper 1 of dissertation), I documented a stereotype that autistic people are believed to feel more pain than non-autistic people. Drawing on studies that show that members of some marginalized groups are thought to have experienced more hardship and would feel less pain than majority groups (e.g., Summers et al., 2021; Trawalter et al., 2012), I began by hypothesizing that an autistic target would also be believed to have experienced more hardship and to feel less pain than a non-autistic target. I found that although the autistic target was believed to feel more hardship than the non-autistic target, they were thought to experience less pain than the non-autistic target. Both autistic and non-autistic participants shared this belief, suggesting that it is a widespread stereotype.

Since pain judgments about social groups are informed by perceptions of group members' attributes like toughness (e.g., Hoffman & Trawalter, 2016) or emotionality (e.g., Paganini et al., 2023), I investigated perceptions of autistic people which may inform pain beliefs of autistic people (Basargekar et al., in prep., Paper 2 of dissertation; Basargekar et al., in prep., Paper 3 of dissertation). Since autistic adults are infantilized in popular portrayals of autism (e.g., Akhtar et al., 2022; Loftis, 2021; Stevenson et al., 2011), I hypothesized that non-autistic people's infantilizing beliefs about autistic adults may explain their judgments of autistic adults' pain. I found some evidence supporting the possibility that non-autistic people perceive autistic people in infantilizing ways (Paper 2) and some evidence that was not consistent with the infantilizing explanation (Paper 3).

On the one hand, non-autistic participants judged an autistic adult target to be more sensitive to pain than a non-autistic adult and similarly sensitive as an autistic child and a non-autistic child target (Paper 2, Study 1), which suggests that autistic adults are perceived to be vulnerable like children. Additionally, non-autistic participants believed that an autistic adult's decisions should be subject to parental control more than a non-autistic adult's decisions (Paper 2, Study 2), suggesting that autistic people are granted lower decisional authority than non-autistic people, similarly to how children are granted lower decisional authority than adults. Finally, non-autistic participants also pitied an autistic adult target more than a virtually identical non-autistic adult target (Paper 2, Study 3), suggesting that paternalistic attitudes are targeted to autistic adults to a greater extent than to non-autistic adults. These findings are all consistent with the account that autistic people are infantilized.

However, it is important to note that across the three studies in Paper 2, participants' pain ratings of autistic adults, autonomy ratings of autistic adults, and pity ratings of autistic adults were not correlated in predicted ways. Contrary to predictions, participants' pain ratings of targets did not mediate the difference between the autonomy ratings given to the autistic and non-autistic target (Paper 2, Study 2). Also contrary to predictions, participants' self-reported pity for the targets did not predict the pain ratings they gave to the autistic and the non-autistic target (Paper 2, Study 3). This suggests that it is not necessarily the same individuals who simultaneously believe that autistic adults are as vulnerable as children, deny them decisional authority, and express pity towards them. Therefore, individual differences in people's attitudes towards autistic people merit further investigation. For example, some individuals may hold this set of beliefs about autistic people, while others may simply perceive autistic adults as a vulnerable group without denying their decisional authority or pitying them. Regardless, the fact

that beliefs of autistic people's vulnerability, decisional authority, and attitudes of pity towards autistic adults concurrently exist in society may result in creating infantilizing conditions for autistic adults.

In Study 3, I also found some evidence that people's perceptions of autistic adults' do not overlap completely with their perceptions of children's attributes. Non-autistic participants believed that an autistic adult target would feel similar levels of happiness and unhappiness as a non-autistic adult target (Paper 3, Study 1). Insofar as children are perceived to be highly emotional (e.g., Fabian & Martin, 1991; Gray et al., 2007), the perception that autistic adults are not overly emotional is inconsistent with an infantilization account. Additionally, non-autistic participants believed that an autistic adult target would be similarly capable as a non-autistic adult target to carry out activities requiring self-control, planning, initiative and agency (Paper 3, Study 2). Since children are usually believed to have less agency than adults (Goranson et al., 2020; Gray et al., 2007; Gray & Wegener, 2009), this belief too is inconsistent with an infantilization account. Papers 2 and 3 together suggest that autistic adults may be infantilized in some ways, but are not always perceived to be child-like.

Across the studies in Paper 2, I found that autistic adults are not perceived to be more highly emotionally reactive than non-autistic adults in happiness and unhappiness inducing scenarios, and are not perceived to have lower agency than non-autistic adults. However, it is possible that happiness and unhappiness-inducing scenarios are not comparable to painful scenarios insofar as they do not require similar levels of coping and emotion regulation capacities. An autistic adult may be perceived to be particularly sensitive to pain because they are believed to be less capable of coping with this distressing sensation. If autistic people's perceived sensitivity to pain is associated with beliefs of their low self-regulation capacities, then autistic

adults may be perceived as being more sensitive than non-autistic adults to emotions like anger or frustration, which also make similar self-regulation and coping demands as pain. That our autistic adult was believed to be similarly agentic as the non-autistic adult may be evidence contradicting this possibility. However, as mentioned, our agency rating instrument may have provided a global rating of agency, rather than of specific agentic capacities like self-control, coping, or self-regulation. These studies leave open the possibility that autistic adults are perceived to lack self-regulation compared to non-autistic adults, and because of this, are believed to be less capable of coping with painful (and possibly other distressing) situations.

The studies documented in this dissertation have several theoretical and practical implications. First, this work has implications for our understanding of group-based pain judgments. The autistic target was believed to feel more pain than the non-autistic target in seven studies. This confirms that group membership is a robust and reliable basis for organizing pain beliefs. Specifically, these studies show that in addition to race and SES, autism status (and possibly disability status) is another group identity associated with stereotypes about pain sensitivity. Future research should aim to identify what distinguishes marginalized groups that are perceived to be hyposensitive to pain from those thought to be hypersensitive to pain.

An account I have advanced in these studies is that infantilizing perceptions can lead people to believe that members of infantilized groups are hypersensitive to pain. As noted, our findings suggest that autistic people are perceived to be like children only in some ways and not in others. But if the infantilization account is correct, groups that are typically infantilized in society (such as the elderly) should be perceived to feel more pain than their more privileged counterparts (i.e., younger adults). In the context of disability, it is possible that people with developmental disabilities are perceived in more infantilizing ways than people with acquired

disabilities. If infantilization informs pain beliefs, people with developmental disabilities should be judged to be more sensitive to pain than people with acquired disabilities.

Another contribution of this work is the finding that not all groups believed to have experienced great life hardship are perceived to be toughened up by this experience. One possibility is that in people's perceptions, the hardship faced by groups like Black people is different from the hardship faced by autistic people, in its nature or source. For example, Black people's hardship may be attributed primarily to their lack of privilege in society (e.g., Trawalter et al., 2012), whereas autistic people's hardship may be attributed primarily to their assumed incompetence (e.g., Canton et al., 2022). Another possibility is that people's beliefs about group members' bodies are influential in shaping their beliefs about whether members of a group will be perceived to be toughened up by their hardship. For example, people's beliefs that Black people feel less pain than White people are related to their biological misconceptions about Black people's bodies, such as about the thickness of Black skin (Hoffman et al., 2016). In contrast, people's beliefs about the weakness of autistic people's bodies may lead them to believe that autistic people are unlikely to toughen up from experiences of hardship. Future research could probe people's perceptions of the nature of hardship faced by autistic people, and their beliefs about autistic people's bodies.

These studies also raise questions about what it means to be infantilized. I found that autistic adults are believed to be vulnerable to a similar extent as children, and are granted less decisional authority than non-autistic adults (Paper 2). However, I also found that autistic adults are believed to feel positive and negative emotions (like happiness and unhappiness) to the same extent as non-autistic adults, and to have the same level of agency as non-autistic adults (Paper 3). This suggests that people may be treated in an infantilizing manner even if they are not

believed to be child-like. For example, elderly people are often infantilized by having their activities and movement restricted (e.g., Epstein et al., 2023), although they are definitionally not children, and are likely not perceived to be child-like in all ways. Identifying the perceptions of individuals or groups which predict that they will be treated as if they are children may be an interesting direction for future research.

By shedding light on the attitudes directed at autistic adults, my studies also have practical implications for autistic adults' social inclusion and self-direction opportunities. First, these studies show that attitudes towards autistic adults are ambivalent rather than straightforwardly positive or negative. Autistic adults are perceived to be vulnerable, due to which they may be perceived to deserve protection from harm (e.g., Gray & Wegener, 2009). At the same time, autistic adults are granted less decisional authority, which means that they may face restriction to their self-determination (e.g., deciding how they want to live). Autistic adults are pitied more than non-autistic adults (Paper 2, Study 3). Pity is known as an ambivalent attitude, comprising both approach and avoidance motives towards the pitied target (e.g., Cuddy et al., 2007; Fiske et al., 2002; Florian et al., 1999). These ambivalent perceptions suggest that autistic people may receive social support in some domains but not in others, such as being protected from harm but not receiving support for their goals. Another possibility is that non-autistic people may aim to support autistic people in ways which autistic people do not find helpful (e.g., receiving unsolicited help or overtures that reveal and reinforce non-autistic people's low expectations from autistic people).

These studies examining infantilization may have especially important implications for autistic adolescents and young adults, who are beginning to transition out of childhood settings like schools and entering contexts where most adults have greater personal autonomy.

Adolescence is known to be a developmental stage where autonomy assumes special significance for one's wellbeing (e.g., Beyers et al., 2024; Eccles et al., 1991, 1993). Autistic young adults, too, note the boost in their wellbeing that comes from receiving autonomy support, and feeling more in control of their lives (Cribb et al., 2023). Infantilizing attitudes that pose challenges to autistic people's decisional autonomy would be undesirable at any time of their life, but may be especially detrimental during adolescence. Future research should examine the consequences of such infantilization for autistic adolescents and young adults, and find ways to ameliorate infantilizing attitudes.

The focus of this dissertation has been on what pain beliefs about autistic people reveal about how autistic people are perceived. However, it is important to address the implications of pain beliefs for medical treatment, especially because autistic people often report challenges getting adequate pain care (Kalingel-Levi et al., 2022; Kraemer, 2021). In the case of other social groups like Black people, beliefs that Black people are hyposensitive to pain contribute to the inadequate pain care Black people receive (Hoffman et al., 2016). However, because autistic people are believed to feel more pain than non-autistic people, systematic pain stereotypes about autistic people are unlikely to contribute to inadequate pain care for autistic people.

One possible reason for why autistic people may receive less than optimal levels of pain care is "diagnostic overshadowing", whereby any problems autistic people report are attributed simply to their autism without due consideration of other potential causes (Shaw et al., 2023). Other research has pointed to the need of establishing appropriate communicative supports in healthcare settings to ensure that autistic people can express their needs adequately (Nicolaides et al., 2015). Another possibility is suggested by my data: If autistic people are infantilized and are believed to have lower authority over their lives, they may not be believed to be credible

reporters of their own pain, and their own reports may be superseded by opinions of those deemed to be more authoritative, like medical professionals. This possibility is consistent with the experiences of many autistic people who report that their pain is dismissed in healthcare settings, even in case of obvious injuries like fractures (Kraemer, 2021). Even outside of pain contexts, infantilization in medical settings can significantly detract from autistic adults' wellbeing, such as when they are assumed to be incapable of consenting for medical procedures (Loftis, 2021). These experiences of autistic people suggest that consequences of autistic people's infantilization in medical settings merit further investigation.

Finally, some limitations of the current work must be acknowledged. First, the autistic target in all my studies was a college-age young adult, described in terms of age-appropriate pursuits and accomplishments. This may have led my participants to conclude that this target had relatively lower support needs compared to other autistic people. Since I did not measure participants' perceptions of an autistic adult target with high support needs, I cannot draw any conclusions about people's perceptions of autistic people with high support needs. One possibility is that an autistic adult target with high support needs would be infantilized and pitied even more than our college-going soccer-playing autistic target who was majoring in economics while living with three roommates. Another possibility is that my autistic target was perceived as striving to succeed in spite of their undescribed but assumed challenges. If my participants surmised that our autistic target was trying to cope in an environment they were not suited for, they may have attributed more vulnerability to the target than they would to a well-supported autistic target with high support needs, who was not perceived to be trying to cope with a challenging environment.

Second, my autistic target was introduced with a gender-neutral language and without any information about other social groups they may belong to. My studies do not shed any light on intersectionality--what people would believe about the autistic target's pain if the target were, for example, a Black individual, or had low SES a Black or low-SES individual, compared to if they were described as a White or high-SES individual. Pain beliefs are informed by a range of group identities and attributions, and intersecting identities of autistic targets may influence pain beliefs differently from what was found in my studies.

Third, most of the studies reported in this dissertation recruited non-autistic adults as participants. While this was in line with my goals of examining disabling attitudes towards autistic people, my studies shed limited insight on autistic adults' own perceptions. We know that autistic people too believe that autistic adults feel more pain than non-autistic adults, suggesting that they share the pain stereotype (Paper 1, Study 2). However, these studies also know that autistic adults grant equal decisional authority to autistic and non-autistic adults (Paper 2, Supplemental Study). This suggests that autistic people may believe that autistic adults are vulnerable without infantilizing them. However, the limited data I have does not permit clear conclusions. Future research investigating autistic people's infantilization should involve greater participation from autistic adults.

Fourth, findings of some of my studies appear to contradict each other. Specifically, in one of my studies, the autistic target was rated as less competent, intelligent, efficient, skilful, and capable than the non-autistic target (Paper 2, Study 3). In another study, the autistic target was rated as equally capable as the non-autistic target of carrying out a range of activities that would require these same attributes, like starting a business, saving money, or campaigning for a political candidate (Paper 3, Study 2). These apparently inconsistent findings may be due to

differences in instructions provided to participants or the measurement instruments themselves. While identifying the precise reason for this discrepancy is outside the scope of these studies, the data reported in this dissertation do not permit firm conclusions about what people believe about autistic people's agency and capabilities. Additional work is required to confirm either possibility.

In summary, the studies reported here showed that autistic adults are believed to feel more pain than non-autistic adults, signifying that autistic adults are believed to be more vulnerable than non-autistic adults. The autistic adult target in my studies was believed to be similarly vulnerable to children, granted lower decisional autonomy, and pitied more than our non-autistic adult target. These perceptions and attitudes contributed to a pattern of infantilization towards autistic adults. However, the autistic adult target was perceived to be similarly emotional and agentic as the non-autistic adult target, suggesting that some of autistic adults' attributes are not perceived to be similar to those of children. These findings have theoretical implications for perceptions of social groups and practical implications for improving autistic adult' social inclusion and self-determination. Through examining perceptions of autistic people, these studies aim to contribute to improving autistic adults' dignity and wellbeing in society.

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Appendix A

Measurement instruments used in all studies

Table with measurement instrument corresponding to each study

Measurement Instrument	**Paper 1 Study 1**	**Paper 1 Study 2**	**Paper 2 Study 1**	**Paper 2 Study 2**	**Paper 2 Study 3**	**Paper 3 Study 1**	**Paper 3 Study 2**
Physical pain rating scale	✓	✓	✓	✓	✓	✓	✓
Social pain rating scale	✓	✓					
Hardship beliefs scale	✓	✓	✓	✓	✓		
Social Distance Scale	✓			✓			
Social Desirability Scale - 17	✓						
Level of contact report	✓	✓	✓	✓	✓	✓	✓
Quality of contact with autism scale	✓	✓	✓	✓	✓		
Ritvo Autism and Asperger Diagnostic Scale-14 (RAADS-14)	✓						
Experience-Agency Scale			✓				
Autonomy Scale				✓	✓		
Pity Scale					✓		
Warmth-Competence Scale					✓		
Happiness rating scale						✓	
Unhappiness rating scale						✓	
Agency rating scale							✓

Physical pain rating scale (Trawalter et al., 2012)

Instructions

Instructions for self ratings: For each situation, please read the item carefully and then rate the intensity of pain you would experience on a scale from 1 (Not Painful) to 4 (Extremely Painful).

Instructions for target ratings: Now we would like you to complete the same questionnaire as before, but for the person described below. For each situation, please read the item carefully and then guess the intensity of pain that they would experience on a scale from 1 (Not Painful) to 4 (Extremely Painful).

(On the list of items below, **bolded text in square brackets** indicates the wording used for the target.)

1 (Not Painful) 2 (Slightly Painful) 3 (Moderately Painful) 4 (Extremely Painful)

I disinfect **[They disinfect / Taylor disinfects]** a sore.
I get **[They get / Taylor gets]** an injection in the arm.
I get **[They get / Taylor gets]** hit on the head by a stray frisbee.
I hit **[They / Taylor]** my **[their]** funny bone.
I get **[They get / Taylor gets]** a speck of dust in my **[their]** eye.
I knock **[They knock / Taylor knocks]** my **[their]** head on the corner of a piece of furniture.
I cut **[They cut / Taylor cuts]** myself **[themself]** with a sheet of paper.
I bite **[They bite / Taylor bites]** my **[their]** tongue.
I stub **[They stub / Taylor stubs]** my **[their]** toe on a chair leg.
I get **[They get / Taylor gets]** sunburnt and someone touches me **[them]** on that spot.
I catch **[They catch / Taylor catches]** my **[their]** finger in a zipper.
I have **[They have / Taylor has]** a splinter under the skin of a finger.
I get **[They get / Taylor gets]** shampoo in my **[their]** eye.
I get **[They get / Taylor gets]** sunburnt on my **[their]** face.
I burn **[They burn / Taylor burns]** my **[their]** tongue tasting scorching hot food.
I get **[They get / Taylor gets]** my **[their]** fingers caught in the car door.
My **[Their / Taylor's]** lips are chapped.
I walk **[They walk / Taylor walks]** on burning sand.
Randomly inserted attention check: Select "Extremely painful" / "Not painful."

Social pain sensitivity rating scale (Deska et al., 2020)

Instructions

Instructions for self ratings: For each situation, please read the item carefully and then rate the intensity of pain you would experience on a scale from 1 (Not Painful) to 4 (Extremely Painful). To move onto the next situation, click the arrow to the right of the box. When you have responded to the last situation, click the arrow beneath the rating scale.

Instructions for target ratings: Now we would like you to complete the same questionnaire as before, but for the person described below. For each situation, please read the item carefully and then guess the intensity of pain that they would experience on a scale from 1 (Not Painful) to 4 (Extremely Painful). To move onto the next situation, click the arrow to the right of the box. When you have responded to the last situation, click the arrow key beneath the rating scale.

> (On the list of items below, **bolded text in square brackets** indicates the wording used for the target. For study 1b, we used the pronoun "They" to refer to the target, and for Studies 2 and 3, we used "Taylor," the name we had given to the target.)

1 (Not Painful) 2 (Slightly Painful) 3 (Moderately Painful) 4 (Extremely Painful)

Your **[Their / Taylor's]** best friend moves across the country.

You realize **[They realize / Taylor realizes]** after walking around all day that a pair of underwear was stuck to the back of your **[their]** shirt.

Strangers laugh at your **[their / Taylor's]** haircut.

Your **[Their / Taylor's]** best friend gossips about you **[them]** behind their back.

A friend makes fun of you **[them / Taylor]** in front of others.

You invite **[They invite / Taylor invites]** friends over to celebrate your **[their]** birthday and no one comes.

You overhear **[They overhear / Taylor overhears]** a coworker talking about your **[their]** incompetence at your **[their]** job.

Your **[Their / Taylor's]** family pet passes away.

You trip and fall **[They trip and fall / Taylor trips and falls]** and people laugh at you **[them]**.

Your **[Their / Taylor's]** romantic partner asks you **[them]** for some "space".

Randomly inserted attention check: Select "Extremely painful" / "Not painful."

Hardship beliefs scale (Trawalter et al., 2012)

Instructions for self ratings: Please read each statement carefully and select the rating that best fits your beliefs about yourself. Please be as honest as possible; all information you provide will be completely anonymous and confidential.

Instructions for target ratings (Studies 1a and 1b): Please read each statement carefully and select the rating that best fits your beliefs about the person who is autistic who is pictured above. Please be as honest as possible; all information you provide will be completely anonymous and confidential.

Instructions for target ratings (Studies 2 and 3): Please read each statement carefully and select the rating that best fits your beliefs about Taylor who is described below. Please be as honest as possible; all information you provide will be completely anonymous and confidential.

> (On the list of items below, **bolded text in square brackets** indicates the wording used for the target.)

How privileged do you think you **[they]** are?

Not at all (1) privileged	A little (2)	Somewhat (3)	Very much (4)	Extremely (5) privileged

How hard do you think your **[their]** life has been?

Not at all hard (1)	A little (2)	Somewhat (3)	Very much (4)	Extremely hard (5)

How lucky do you think you **[they]** have been?

Not at all lucky (1)	A little (2)	Somewhat (3)	Very much (4)	Extremely lucky (5)

How much adversity do you think you [they] have overcome?

No adversity at all (1)	A little (2)	Somewhat (3)	Very much (4)	Extreme adversity (5)

Social Distance Scale

Adapted from Gillespie-Lunch, K., Nidal, D., Sanchez-Ruiz, M.-J., Kapp, S. K., & Obeid, R. (2019). Factors underlying cross-cultural differences in stigma toward autism among college students in Lebanon and the United states. *Autism, 23*(8), 1993-2006. DOI: 10.1177/1362361318823550

Instructions: How much do you agree with the following statements? For each statement, select a number from '1' (Strongly Disagree) to '5' (Strongly Agree) that represents the degree to which you disagree or agree with the statement.

(To ensure consistent language across all measures, we revised the items to use identity-first rather than person-first language (i.e., "autistic person," not "person with autism.")

Strongly disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly agree (5)

I would be willing to move next door to an autistic person.

I would NOT be willing to take a class with an autistic student.* §

I would be willing to spend an evening socializing with someone who is autistic.

I would NOT be willing to take a class taught by an autistic professor.* §

I would be willing to start a collaborative project with someone who is autistic.

I would NOT be willing to do a group presentation with an autistic person.* §

I would be willing to make friends with an autistic person.

I would NOT be willing to go to a formal event with an autistic person.*

I would be willing to have an autistic person marry into the family.

I would not be willing to open a business with an autistic person.

I would be willing to marry or date an autistic person.

* These items were reverse-scored.

§ Following Kim et al. (2021), we dropped these items from the survey administered to the Prolific Participants in Study 2.

Social Desirability Scale – 17 (Stober, 2001)

(Per author's recommendation, we used the 16-item version of the Social Desirability Scale-17.)

Instructions: Below you will find a list of statements. Please read each statement carefully and decide if that statement describes you or not. If it describes you, check the word "true," if not, check the word "false."

True (1) False (0)

I sometimes litter.*

I always admit my mistakes openly and face the potential negative consequences.

In traffic I am always polite and considerate of others.

I always accept others' opinions, even when they don't agree with my own.

I take out my bad moods on others now and then.*

There has been an occasion when I took advantage of someone else.*

In conversations, I always listen attentively and let others finish their sentences.

I never hesitate to help someone in case of an emergency.

When I have made a promise, I keep it – no ifs, ands, or buts.

I occasionally speak badly of others behind their backs.*

I would never live off other people.

I always stay friendly and courteous with other people, even when I am stressed out.

During arguments, I always stay objective and matter-of-fact.

There has been at least one occasion when I failed to return an item that I borrowed.*

I always eat a healthy diet.

Sometimes I only help because I expect something in return.*

*These items were reverse-scored, so that a response of "True" yielded a score of 0 and "False" yielded a score of "1".

Level of Contact Report (Gardiner & Iarocci, 2014)

Instructions: Please read each of the following statements carefully. After you have read all the statements below, select yes or no for each statement depending on whether or not that statement accurately depicts your exposure to autistic persons.

(On the list of items below, the numbers after each statement represent that statement's score. A respondent's final score is the score corresponding to the highest-scoring statement for which they select "Yes."

For example, someone selecting "Yes" for "I have a relative who is autistic" would get a score of 10 -- IF they also selected "No" for "I live with an autistic person" and "I am autistic," REGARDLESS OF other lower-scoring statements for which they selected "Yes." The highest possible score on this measure was 12, which would go to those selecting "Yes" for "I am autistic."

To ensure consistent language across all measures, we revised the items to use identity-first rather than person-first language; i.e., "autistic person", not "person with autism.")

Yes No

I have watched a movie or television show in which a character depicted an autistic person. **3.**

My job involves providing services/treatment for autistic persons. **8.**

I have observed, in passing, a person I believe may have been autistic. **2.**

I have observed autistic persons on a frequent basis. **5.**

I am autistic. **12.**

I have worked with an autistic person at my place of employment. **6.**

I have never observed a person that I was aware was autistic. **1.**

My job involves providing services to autistic persons. **7.**

A friend of the family is autistic. **9.**

I have a relative who is autistic. **10.**

I have watched a documentary on the television about autism. **4.**

I live with a person who is autistic. **11.**

Quality of Contact with Autism Scale (Gardiner & Iarocci, 2014)

Instructions: Please read each statement and select a number from the 9-point scale that best represents the degree to which you agree with the statement. 1 indicates that you very strongly disagree and 9 indicates that you very strongly agree.

(To ensure consistent language across all measures, we revised the items to use identity-first rather than person-first language; i.e., "autistic person," not "person with autism.")

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

In the past, my experiences with autistic individuals have been pleasant.

I have had many positive experiences with autistic individuals.

Over the course of my life, I have had many friends who are autistic.

Overall I have had positive experiences with autistic people.

I have enjoyed the experiences I have had with autistic people.

The experiences I have had with autistic people have been fun.

Ritvo Autism and Asperger Diagnostic Scale – 14 (RAADS-14; Eriksson et al., 2013)

Instructions: Below you will find a list of life experiences and personality characteristics that may apply to you. Please read each statement and select an answer choice according to what is true for you.

True now and when I was young (3)	True only now (2)	True only when I was younger than 16 (1)	Never True (0)

It is difficult for me to understand how other people are feeling when we are talking.

Some ordinary textures that do not bother others feel very offensive to when they touch my skin.

It is very difficult for me to work and function in groups.

It is difficult to figure out what other people expect of me.

I often don't know how to act in social situations.

I can chat and make small talk with people.*

When I feel overwhelmed by my senses, I have to isolate myself to shut them down.

How to make friends and to socialize is a mystery to me.

When talking with someone, I have a hard time telling when it is my turn to talk or listen.

Sometimes I have to cover my ears to block out painful noises (like vacuum cleaners or people talking too much or too loudly).

It can be very hard to read someone's face, hand, and body movements when we are talking.

I focus on details rather than the overall idea.

I take things too literally, so I often miss what people are trying to say.

I get extremely upset when the way I like to do things is suddenly changed.

*These items are reverse-scored.

Experience-Agency Perception Scale (Gray et al., 2011)

Please indicate the extent to which you believe X has the following capacities, on a scale from 0 (not at all) to 6 (very much).

0	1	2	3	4	5	6
Not at all						Very much

How capable of **feeling fear** do you think X is?

How capable of **exercising self-control** do you think X is?

How capable of **feeling pleasure** do you think X is?

How capable of **remembering** do you think X is?

How capable of **feeling hunger** do you think X is?

How capable of **acting morally** do you think X is?

Autonomy Scale

Instructions: Below is a list of things that Taylor would like to do, but which their parents do not want them to do. How much autonomy should Taylor have to make each of these decisions?

1	2	3	4	5	6
None, Taylor's parents Should make the Final decision					Total, Taylor should make final decision

Travel alone to another city for a vacation

Purchase a $1000 video game system with money inherited from their grandmother

Volunteer weekly at a homeless shelter

Quit their part-time job on campus

Get a tattoo

Start a gluten-free diet

Take up a martial art like judo, which involves a good deal of physical contact

Get a motorcycle license

Discontinue medication that makes them feel tired

Give a speech in front of a large audience

Accept a scholarship to spend a semester studying abroad

Lease a new car

Take a nannying job for extra money

Decide who to vote for in a Presidential election

Participate in a research study investigating drug efficacy

Drop out of an optional program in which undergraduates like Taylor are mentored by a faculty member

Move in with a significant other

Pity measurement scale

Adapted from Soetemans, J. K., & Jackson, L.M. (2021). The influence of accessibility on perceptions of people with disabilities. *Canadian Journal of Disability Studies, 10*(1), 185-206. https://doi.org/10.15353/cjds.v10i1.734

Instructions: Please rate the extent to which you agree or disagree with the following statements.

1	2	3	4	5	6	7
Very Strongly Disagree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Very Strongly Agree

Reading about Taylor made me feel uncomfortable.
I would be worried if I had to do a group project with Taylor.
I would want Taylor to move next door to me.*
I would be embarrassed if someone close to me starts dating Taylor.
I would want to start a business partnership with Taylor.*
I am thankful that I am not in the same position as Taylor.
Taylor's life must be worse than mine.
I am more fortunate than Taylor.
Taylor must be miserable.
I can't imagine how difficult things must be for Taylor.
I feel sorry for Taylor.
I want to reduce Taylor's suffering.
I feel obliged to help Taylor.
If Taylor were sad, I would want to do something to cheer them up.
I wish for Taylor's well-being.
I feel pity for Taylor.
I don't care about Taylor.*
I respect Taylor.

**This item was reverse scored.*

Warmth – competence scale

Adapted from O'Connor, M. L., & McFadden, S. H. (2012). A terror-management perspective on young adults' ageism and attitudes towards dementia. *Educational Gerontology, 38*(9), 627-643. https://doi.org/10.1080/03601277.2011.595335

Instructions: Please indicate the extent to which you believe Taylor has the following qualities /

Please indicate the extent to which the average American would believe that Taylor has the following qualities.

1	2	3	4	5
Not at all	A little	Somewhat	Very much	Extremely

Taylor is competent.

Taylor is confident.

Taylor is capable.

Taylor is efficient.

Taylor is intelligent.

Taylor is skillful.

Taylor is friendly.

Taylor is well-intentioned.

Taylor is trustworthy.

Taylor is warm.

Taylor is good-natured.

Taylor is sincere.

Happiness rating scale

Instructions

Instructions for self ratings: For each situation, please read the item carefully and then rate the intensity of happiness you would experience on a scale from 1 (Not Happy) to 4 (Extremely Happy).

Instructions for target ratings: Now we would like you to complete the same questionnaire as before, but for the person described below. For each situation, please read the item carefully and then guess the intensity of happiness that they would experience on a scale from 1 (Not Happy) to 4 (Extremely Happy).

(On the list of items below, **bolded text in square brackets** indicates the wording used for the target.)

1 (Not Happy) 2 (Slightly Happy) 3 (Moderately Happy) 4 (Extremely Happy)

The traffic light turns green just as you get **[Jamie gets]** to an intersection.

A professor extends the due date for an essay **[Jamie's essay]** by a week.

The cookies you are **[Jamie is]** baking turn out perfectly.

Your **[Jamie's]** computer is running out of battery before class and a seat opens up next to an outlet.

You see **[Jamie sees]** a cute animal.

An Uber arrives as soon as you request **[Jamie requests]** it.

You go **[Jamie goes]** for a walk in beautiful weather.

Your **[Jamie's]** dog learns a new trick.

The shoes you want **[Jamie wants]** are on sale.

You find **[Jamie finds]** a book you **[they]** had misplaced.

You find out **[Jamie finds out]** that there will be a sequel to a movie you **[they]** enjoy.

The screen on your **[Jamie's]** phone doesn't crack after it falls on the floor.

The vending machine gives you **[Jamie]** an extra item.

You get **[Jamie gets]** a free drink at a café.

A parking spot appears just as you were **[Jamie was]** looking for one.

You find **[Jamie finds]** $5 in the pocket of your **[their]** jeans.

You are **[Jamie is]** upgraded to business class on an airplane.

Randomly inserted attention check: Select "Extremely happy" / "Not happy."

Unappiness rating scale

Instructions

Instructions for self ratings: For each situation, please read the item carefully and then rate the intensity of unhappiness you would experience on a scale from 1 (Not Unhappy) to 4 (Extremely Unhappy).

Instructions for target ratings: Now we would like you to complete the same questionnaire as before, but for the person described below. For each situation, please read the item carefully and then guess the intensity of unhappiness that they would experience on a scale from 1 (Not Unhappy) to 4 (Extremely Unhappy).

(On the list of items below, **bolded text in square brackets** indicates the wording used for the target.)

1 (Not Unhappy) 2 (Slightly Unhappy) 3 (Moderately Unhappy) 4 (Extremely Unhappy)

The traffic light turns red just as you get **[Jamie gets]** to an intersection.

Your **[Jamie's]** leftovers from a restaurant go bad in the fridge.

The cookies you are **[Jamie is]** baking burn.

You lose your [**Jamie loses their]** water bottle.

You have to **[Jamie has to]** take a 10-minute detour on your **[their]** way home because of construction.

A library book you are **[Jamie is]** enjoying has to be returned before you **[they]** have time to finish it.

You drop your **[Jamie drops their]** phone on the floor and it cracks.

A coupon you were **[Jamie was]** intending to use for a free coffee expires.

You **[Jamie]** cannot get into one of your **[their]** preferred classes while enrolling for the semester.

The item you pay **[Jamie pays]** for in a vending machine gets stuck.

A pen bursts and ink gets everywhere in your **[Jamie's]** backpack.

Your **[Jamie's]** work deletes before you **[they]** can save it.

Your [**Jamie's]** usual café increases the prices of all drinks.

You realize **[Jamie realizes]** in the morning that your **[their]** phone had not been charging overnight.

An assignment has an earlier due date than you **[Jamie]** initially thought.

You **[Jamie]** has to miss a concert because you **[they]** are sick.

You order **[Jamie orders]** an item you **[they]** really want, but it gets lost in the mail.

A parking spot appears just as you were **[Jamie was]** looking for one.

You do not [**Jamie does not]** receive the airplane seat you **[they]** requested.

Randomly inserted attention check: Select "Extremely happy" / "Not happy."

Agency rating scale

Instructions: Please rate the extent to which you believe Taylor is capable of executing the following tasks / Please rate the extent to which Taylor is suited to perform the following tasks

1	2	3	4	5
Not at all Capable	A little Capable	Somewhat Capable	Fairly Capable	Highly Capable

Starting their own business

Following a diet for a month

Saving money to buy a new phone

Planning a vacation

Prioritizing tasks on their to-do list

Campaign for a political candidate

Mastering a new skill

Practicing for their driver's license test

Remembering to take their medicine

Rallying after losing a soccer tournament

Standing up to a bully at their campus job

Decorate their own home

Appendix B

Supplemental Materials for

Autistic People are Believed to Feel More Pain than Non-Autistic People

This file includes:

Studies 1 and 2 manipulation checks

In Study 1, to ensure that participants assigned to evaluate the autistic target had attended to the sentence in the vignette introducing Taylor as autistic, we included two manipulation checks. First, the vignette describing Taylor disappeared, and participants were invited to input into a text box everything they remembered about Taylor. The response was deemed incorrect if the participants assigned to read the autistic character vignette failed to mention that Taylor was autistic. If the participants assigned to read the non-autistic character vignette typed in anything that was explicitly not mentioned in the vignette, their response too was deemed incorrect. Second, participants were asked to select which of four statements about Taylor was true: 1) Taylor is autistic, 2) Taylor has Down Syndrome, 3) Taylor lives alone, or 4) None of the above. The correct response for those in the autistic target condition was to select "Taylor is autistic" and for those in the non-autistic target condition, the correct response was to select "None of the above". We discarded data from the participants who failed either manipulation check, and recruited new participants to replace their data.

In Study 2, we used only the multiple-choice attention check described above. In Study 1, anyone who failed the text-entry manipulation check had also failed the multiple-choice attention check. Since the text-entry check was redundant, we removed it in Study 2.

Table S1

Averages (SD in parentheses) for all Variables in Study 1

Variable	College student participants				Prolific worker participants			
	Physical pain		Social pain		Physical pain		Social pain	
	Autistic target (n = 19)	Non-autistic target (n = 20)	Autistic target (n = 20)	Non-autistic target (n = 20)	Autistic target (n = 20)	Non-autistic target (n = 20)	Autistic target (n = 20)	Non-autistic target (n = 20)
Target pain ratings	2.66 (0.44)	2.32 (0.28)	3.16 (0.28)	2.86 (0.40)	2.71 (0.48)	2.28 (0.32)	3.10 (0.51)	2.78 (0.51)
Target hardship ratings	3.59 (0.43)	2.54 (0.40)	3.68 (0.51)	2.69 (0.40)	3.61 (0.53)	2.6 (0.42)	3.66 (0.42)	2.54 (0.48)
Self-pain ratings	2.25 (0.30)	2.28 (0.31)	3.00 (0.41)	2.78 (0.31)	2.39 (0.36)	2.29 (0.36)	2.78 (0.51)	2.71 (0.49)
Self-hardship ratings	2.25 (0.58)	2.59 (0.60)	2.38 (0.57)	2.69 (0.60)	3.08 (0.72)	2.62 (0.67)	3.1 (0.91)	3.06 (0.73)
Social Distance Scale	4.11 (0.57)	4.17 (0.67)	4.19 (0.55)	4.23 (0.73)	4.16 (0.82)	4.34 (0.61)	3.96 (1.05)	3.94 (0.90)
Social Desirability Scale - 17	7 (3.50)	7.85 (2.58)	7.4 (3.32)	7.85 (3.25)	7.9 (3.81)	8.3 (3.48)	8.1 (3.51)	9.15 (3.57)
Level of Contact report	7.11 (2.93)	6.85 (2.89)	7 (3.18)	6.35 (2.62)	7.3 (3.10)	6.25 (3.27)	7.35 (3.44)	7.6 (3.32)
Quality of Contact Scale	6.05 (0.90)	6.44 (1.33)	6.49 (1.15)	6.18 (1.73)	6.31 (1.95)	6.19 (1.41)	5.74 (2.12)	6.34 (2.18)

Note. Possible pain ratings range: 1-4; possible hardship ratings range: 1-5; possible Social Distance Scale range: 1-5; possible Social Desirability Scale-17 range: 0-16; possible Level of Contact range: 1-12; possible Quality of Contact range: 1-9.

Table S2

Correlations of all Measured Variables in Study 1

Variable	1	2	3	4	5	6	7	8
1. Target pain ratings	—							
2. Target hardship ratings	.33***	—						
3. Self-pain ratings	.64***	.13	—					
4. Self-hardship ratings	.02	.05	.01	—				
5. Social Distance Scale	-.14	-.02	-.15	-.13	—			
6. Social Desirability Scale-17	.02	-.10	.01	.17*	-.08	—		
7. Level of Contact Report	.07	.11	-.00	.01	.13	-.22**	—	
8. Quality of Contact Scale	-.05	-.00	-.04	-.04	.75***	.02	.33***	—
9. Participant age	.02	-.15	-.03	.27***	-.02	.20*	.02	-.10

Note. Pearson's *r* values reported for all correlations.

* $p < .05$, ** $p < .01$, $p < .001$

Table S3

Study 1 Mediation Analysis

Type	Effect	β	*SE*	95% CIs	*z*-value	*p*
Indirect effect components	Target neurotype → Target hardship ratings (a)	.52	.04	[.44, .59]	13.61	< .001
	Target hardship ratings → Target pain ratings (b)	.06	.08	[-.09, .20]	0.78	.466
	Target neurotype → target hardship → target pain ratings (ab)	.03	.04	[-.04, .11]	0.73	.465
Direct effect	Target neurotype → Target pain ratings (c')	.11	.05	[.01, .22]	2.26	.024
Total effect	Target neurotype → Target pain ratings (c)	.14	.03	[.09, .20]	4.81	< .001

Note. Target neurotype was coded such that -1 = Non-autistic target and 1 = Autistic target. Self-pain ratings were included as covariates in all models. Standardized coefficients and SEs of standardized coefficients are reported.

We conducted a mediation analysis using the *lavaan* package in R (Rossyl, 2012) to examine if participants' attributions of higher pain to the autistic compared to the non-autistic target were related to their higher attribution of life hardship to the autistic compared to the non-autistic target. We used self-pain ratings as a covariate in our models. Before adding target hardship ratings as a predictor, the total effect of neurotype on target pain ratings was significant, β = .14 [.09, .20], $p < .001$. After adding hardship ratings as a predictor, the effect of target neurotype on target pain ratings remained significant, β = .11 [.01, .22], $p = .024$. Target hardship ratings did not significantly predict target pain ratings, β = .06 [-.09, .20], $p = .466$. Target hardship ratings did not significantly mediate the effect of target neurotype on target pain ratings, β = 0.03 [-.04, .11], $p = .465$.

Table S4

Averages (SD in parentheses) for all Variables in Study 2

Variable	Autistic participants		Non-autistic participants	
	Autistic target (n = 32)	Non-autistic target (n = 32)	Autistic target (n = 32)	Non-autistic target (n = 32)
Target physical pain ratings	2.60 (0.38)	2.54 (0.43)	2.63 (0.42)	2.41 (0.50)
Target social pain ratings	3.27 (0.42)	3.11 (0.40)	3.05 (0.58)	2.94 (0.53)
Target hardship ratings	3.42 (0.58)	2.69 (0.66)	3.69 (0.54)	2.54 (0.47)
RAADS-14 scores	30.4 (10.5)	27.2 (8.58)	10.2 (9.65)	11.0 (8.85)
Self-hardship ratings	3.19 (0.76)	3.26 (0.78)	3.02 (0.67)	2.73 (0.66)
Self-physical pain ratings	2.35 (0.37)	2.48 (0.42)	2.42 (0.36)	2.35 (0.42)
Self-social pain ratings	2.81 (0.31)	2.75 (0.57)	2.76 (0.41)	2.72 (0.43)
Level of Contact Report	12 (0)	12 (0)	6.19 (3.04)	6.44 (3.38)
Quality of Contact Scale	7.22 (1.14)	7.41 (1.32)	6.02 (1.63)	6.73 (1.42)

Note. Possible pain ratings range: 1-4; possible hardship ratings range: 1-5; possible RAADS range: 0-42; possible Level of Contact range: 1-12; Possible Quality of Contact range: 1-9.

Table S5

Correlations of all Measured Variables in Study 2

Variable	1	2	3	4	5	6	7	8	9
1. Target physical pain ratings	—								
2. Target social pain ratings	.36***	—							
3. Target hardship ratings	.14	.10	—						
4. Self-physical pain ratings	.66***	.12	.03	—					
5. Self-social pain ratings	.20*	.54***	-.05	.35***	—				
6. Self-hardship ratings	.24**	.02	.05	.22*	-.04	—			
7. Level of Contact Report	.10	.17	-.03	.10	.09	.23*	—		
8. Quality of Contact Scale	-.20*	.02	-.05	-.17	-.00	.10	.48***	—	
9. RAADS-14	-.09	.16	.07	-.00	.15	.21*	.52***	.21*	—
10. Participant Age	.26**	.06	.11	.18*	-.03	.17	-.14	.17*	-.31***

Note. Pearson's *r* values reported for all correlations.

* $p < .05$, ** $p < .01$, ***$p < .001$

Study 1: Predicting target hardship ratings including all covariates

As a supplement to the hardship ratings analysis reported in the main text, we constructed a linear model predicting target hardship ratings by target neurotype, controlling for sample (Prolific workers or undergraduates), self-hardship ratings, participant age, gender, Social Distance Scale scores, Social Desirability Scale-17 scores, Level of Contact scores, and Quality of Contact scores. The model was significant; F (9,135) = 20.07, $p < .001$, adjusted $R^2 = .54$. As Table S6 shows, the autistic target was given significantly higher hardship ratings than the non-autistic target. There were no other significant effects.

Table S6

Study 1 Supplemental Analysis: Multiple Regression Predicting Target Hardship Ratings

Predictor	B	*SE*	95% CI	*t*	*p*	f^2
Target neurotype [a]	**.70**	**.06**	**[.59, .82]**	**12.05**	**< .001**	**1.07**
Self-hardship ratings	.07	.06	[-.05, .20]	1.19	.237	0.01
Sample [b]	-.14	.08	[-.29, .01]	-1.88	.063	0.03
Social Distance Scale	-.05	.09	[-.22, .13]	-0.55	.585	0.00
Social Desirability Scale-17	-.05	.06	[-.17, .07]	-0.88	.382	0.01
Level of Contact scores	.08	.07	[-.06, .21]	1.14	.255	0.00
Quality of Contact scores	.06	.09	[-.13, .24]	0.62	.534	0.01
Gender [c]	.04	.06	[-.09, .16]	0.61	.545	0.00
Age	.14	.07	[.00, .29]	1.91	.058	0.03

F (9, 135) = 20.07, $p < .001$
Multiple $R^2 = .57$
Adjusted $R^2 = .54$

Note. All continuous variables were z-standardized to get standardized coefficients.

[a] Target neurotype was coded such that -1 = Non-autistic target and 1 = Autistic target; [b] Sample was coded such that -1 = College students and 1 = Prolific workers; [c] Gender was coded such that -1 = non-females and 1 = female (all but two of the non-females were males).

Study 1: Predicting target pain ratings including all covariates

As a supplement to the analysis presented in the main text, we constructed a linear model predicting target pain ratings by self-pain ratings, pain type, target neurotype, and the interaction between pain type and target neurotype, this time controlling for all covariates including sample, participant age, participant gender, Social Distance Scale scores, Social Desirability scores, Level of Contact scores, and Quality of Contact scores. The model was significant; $F(11,133) = 14.39$, $p < .001$, adjusted $R^2 = .51$. As Table S7 shows, there was a significant effect of target neurotype: The autistic target received higher pain ratings than the non-autistic target. Social pain ratings were higher than physical pain ratings. Those who gave higher pain ratings to themselves also gave higher pain ratings to the target. None of the other effects or interactions were significant.

Table S7

Study 1 Supplemental Analysis: Multiple Regression Predicting Target Pain Ratings

Predictor	β	*SE*	95% CI	*t*	*p*	f^2
Target neurotype [a]	**.30**	**.06**	**[.18, .41]**	**4.95**	**< .001**	**0.18**
Self pain ratings	**.50**	**.07**	**[.36, .65]**	**6.94**	**< .001**	**0.36**
Pain type [b]	**.21**	**.07**	**[.07, .35]**	**2.99**	**.003**	**0.07**
Target neurotype x Pain type	-.10	.06	[-.22, .01]	-1.73	.086	0.02
Sample [c]	.01	.08	[-.16, .14]	0.16	.872	0.00
Social Distance Scale	.00	.09	[-.18, .18]	-0.04	.971	0.00
Social Desirability Scale - 17	.05	.06	[-.07, .18]	0.88	.383	0.01
Level of Contact scores	.05	.07	[-.09, .18]	0.69	.492	0.00
Quality of Contact scores	-.02	.10	[-.20, .17]	-0.16	.872	0.02
Gender [d]	-.06	.06	[-.17, .07]	-0.88	.378	0.01
Age	-.02	.08	[-.17, .13]	-0.24	.812	0.00
F (11, 133) = 14.39, p < .001 Multiple R^2 = .54 Adjusted R^2 = .51						

Note. All continuous variables were z-standardized to get standardized coefficients.

[a] Target neurotype was coded such that -1 = Non-autistic target and 1 = Autistic target; [b] Pain type was coded such that -1 = Physical pain and 1 = Social pain; [c] Sample was coded such that -1 = College students and 1 = Prolific workers; [d] Gender was coded such that -1 = non-females, 1 = females (all but two of the non-females were male).

Supplementary Study S1a

In Study S1a, we investigated non-autistic people's beliefs about hardship and physical pain experienced by an autistic or a non-autistic target, introducing both targets using photos. For exploratory purposes, we also measured social dominance orientation (Pratto et al., 1994), asking whether participants who were more comfortable with social inequality would give lower pain ratings to the autistic character. Study S1a was conducted before Studies 1 and 2 reported in the main text.

Methods

Participants

We aimed to recruit 100 participants, 50 in each of two target neurotype conditions. This sample size was selected because we did not yet have effect size information on which to base an a priori power analysis. In actuality, 96 undergraduates at a large public mid-Atlantic university in the U.S. participated for course credit. See Table S8 for demographic information. Data from two additional participants were excluded because they failed one or both attention checks (described below). A post-hoc sensitivity analysis specifying a multiple regression with five predictor variables showed that this sample was sufficiently powered to detect a medium effect ($f^2 = 0.14$) or greater with 80% power (G* Power, V3.1.9.4, Faul et al., 2007).

Table S8

Participant Demographics for Study S1a

Study details	Sample	Condition	Gender	Age
Study S1a (April 2021)	**College students** 64% White, 20% Asian, 6% Black, 1% American Indian or Alaska native, 5% mixed race; 12.5% Hispanic / Latinx, 83% not Hispanic / Latinx	AT (n = 47)	22 F, 25 M	19.47 (1.21)
		NT (n = 49)	28 F, 21 M	19.29 (1.14)

Note. Figures in parentheses indicate SDs. Condition: AT = Autistic Target, NT = Non-autistic target; Gender: F = female, M = male, NB = non-binary, TF = transgender female, TM = transgender male.

Procedure

Participants completed the measures online via Qualtrics (Qualtrics, Provo, UT). Participants first rated how much pain they would feel in 18 physically painful scenarios taken from Trawalter et al. (2012) (α = .81, 95% CIs [.77, .85]). We included an attention check item at a random point in the self-pain questions, instructing participants to select "Extremely painful (4)." Participants next read four questions asking about the amount of hardship they had experienced (e.g., "how hard do you think your life has been?"), and responded on a 5-point scale, from "not at all" to "extremely" (α = .81, 95% CIs [.77, .85]). Average self-pain ratings were used as covariates in analyses investigating participants' estimates of the target character's pain.

Next, participants saw a display of eight photos, arranged in two rows, of four autistic and four non-autistic people (faces and bodies visible, facing the camera; taken from Sasson et al., 2017). The instructions explained, "We are interested in how people rate the pain of people with and without various disabilities." Participants read that they would provide ratings about one individual from the presented set of eight faces (see Hoffman et al., 2016). One photo of an autistic woman represented the autistic target, and one photo of a non-autistic woman

represented the non-autistic target. Participants were randomly assigned to the autistic (n = 47) or non-autistic (n = 49) target conditions. When participants clicked to the next screen, the array of photos was replaced by the assigned target photo, along with a sentence explaining in a large, red font that they were "autistic" or that they did "not have a developmental disability". The photo and sentence remained visible as participants responded a second time to the 18 pain ratings items and the four hardship questions, this time in reference to their assigned target. We included another attention check at a random point in the other-pain questions, instructing participants to select "Not painful (1)."

Finally, the target's picture and description disappeared and participants completed a Social Dominance Orientation (SDO) measure assessing their feelings about social inequality (Pratto et al., 1994). Participants read 14 statements describing social inequality or social dominance of some groups over others (e.g., "Some groups of people are simply inferior to other groups"), and rated each statement on how negatively or positively they felt about it on a 7-point scale ranging from "very negative" to "very positive" (α = .86, 95% CIs [.80, .90]).

Results

As Table S9 shows, participants gave higher hardship ratings and higher social pain ratings to the autistic target compared to the non-autistic target. Table S10 shows correlations of all measured variables.

Table S9

Averages (SD in parentheses) for all Variables in Study S1a

Variable	Autistic target (n = 47)	Non-autistic target (n = 49)
Target hardship ratings	3.82 (0.43)	2.66 (0.49)
Target pain ratings	2.65 (0.33)	2.42 (0.26)
Self-hardship ratings	2.51 (0.61)	2.54 (0.59)
Self-pain ratings	2.34 (0.30)	2.30 (0.29)
SDO score	2.22 (0.81)	2.25 (0.78)

Note. Possible pain ratings range: 1-4; possible hardship ratings range: 1-5; possible SDO (Social Dominance Orientation) range: 1-7.

Table S10

Correlations of all Measured Variables in Study S1a

Variable	1	2	3	4	5
1. Target pain ratings	—				
2. Target hardship ratings	0.34***	—			
3. Self pain ratings	0.61***	0.09	—		
4. Self hardship ratings	0.14	0.03	0.04	—	
5. SDO scores	-0.02	0.15	0.07	0.04	—
6. Participant age	-0.01	0.1	-0.06	0.14	0.19

Note. Pearson's r values reported for all correlations.
*** $p < .001$

Beginning with the hardship ratings, a linear regression predicting target hardship ratings from target neurotype (1 = autistic, -1 = non-autistic) was significant, $F(1,94) = 150.7$, $p < .001$, adjusted $R^2 = .61$. The autistic target was given significantly higher hardship ratings than the non-autistic target, $\beta = .78$ [.65, .91], $p < .001$, $f^2 = 1.60$.

To investigate target pain ratings, we constructed a linear model predicting target pain ratings from target neurotype, controlling for self-pain ratings. Model diagnostic plots showed non-normal distribution of residuals. After log-transforming target pain ratings, model diagnostic plots showed normally distributed residuals. Since the models with and without transformations showed the same pattern of results, here we report the model with untransformed data for ease of interpretation. As Table S11 shows, the autistic target was given higher pain ratings than the non-autistic target, and those who gave higher pain ratings to themselves also gave higher pain ratings to the target.

Table S11

Multiple Regression Predicting Target Physical Pain Ratings (Study S1a)

Predictor	β	*SE*	95% CI	*t*	*p*	f^2
Target neurotype[a]	**.31**	**.08**	**[.17, .46]**	**4.18**	**< .001**	**0.19**
Self-pain ratings	**.59**	**.08**	**[.44, .74]**	**7.78**	**< .001**	**0.65**
F (2, 93) = 41.38, p < .001 Multiple R^2 = .47 Adjusted R^2 = .46						

Note. Pain ratings were z-standardized to get standardized coefficients.

[a] Target neurotype was coded such that -1 = Non-autistic target and 1 = Autistic target.

To investigate whether target hardship ratings mediated the relation between target neurotype and target pain ratings (as has been found in the context of racial pain sensitivity beliefs; Trawalter et al., 2012), we conducted a mediation analysis using the *lavaan* package (Rossyl, 2012). We constructed a model predicting target pain ratings from target neurotype and target hardship ratings (using self-pain ratings as a covariate). As Table S12 shows, the direct effect of target neurotype was significant in predicting target pain ratings after accounting for target hardship ratings, β = .07 [.00, .15], p = .038. Target hardship ratings did not significantly

predict target pain ratings, β = .04 [-.07, .16], p = .483. Target hardship ratings did not significantly mediate the effect of target neurotype on target pain ratings, β = .02 [-.04, .10], p = .487. Participants' beliefs about how much more pain the autistic target experienced than the non-autistic target did not vary consistently by their beliefs of how much more hardship the autistic target had faced compared to the non-autistic target.

Table S12

Study S1a Mediation Analysis

Type	Effect	β	SE (β)	95% CIs	z-value	*p*
Indirect effect components	Target neurotype → Target hardship ratings (a)	.58	.05	[.49, .68]	12.00	< .001
	Target hardship ratings → Target pain ratings (b)	.04	.06	[-.07, .16]	0.70	.483
	Target neurotype → target hardship → target pain ratings (ab)	.02	.03	[-.04, .10]	0.70	.487
Direct effect	Target neurotype → Target pain ratings (c')	.07	.04	[.00, .15]	2.08	.038
Total effect	Target neurotype → Target pain ratings (c)	.10	.02	[.05, .15]	4.26	<.001

Note. Target neurotype was coded such that -1 = Non-autistic target and 1 = Autistic target. Self-pain ratings were included as covariates in all models. Standardized coefficients and SEs of standardized coefficients are reported.

Discussion

In Study S1a, we had expected that the autistic target would receive higher hardship ratings and lower pain ratings than the non-autistic target. The autistic target was rated as having experienced more hardship than the non-autistic target but contrary to our expectations, the autistic target was also rated as experiencing *more* pain than the non-autistic target. Additionally, hardship ratings did not mediate the relation between target neurotype and target pain ratings.

Perhaps these unexpected results reflect an awareness among participants that autistic people can be hypersensitive to environmental stimuli (APA, 2022). Although classical accounts of autism have suggested that autistic people are hyposensitive to pain (e.g., Frith, 1989), autistic characters in popular media, like Julia in *Sesame Street* (Sesame Street, 2017) and Sam in the Netflix series *Atypical* (Rashid et al., 2017), are frequently portrayed as being extremely sensitive to sounds and lights. Perhaps participants drew on these kinds of portrayals of sensory sensitivity when estimating the autistic character's sensitivity to physical pain. In addition, perhaps participants were aware that autistic people are more likely than non-autistic people to have disorders associated with chronic pain, such as gastrointestinal problems (Coury, 2010), which could lead them to expect that autistic people would feel more pain than non-autistic people (Dubois et al., 2017). One way to investigate this possibility is to ask participants to estimate an autistic target's social pain, or how much emotional distress an autistic target would experience in interpersonal situations. This was the focus of Study S1b.

Supplementary Study S1b

Although awareness of autistic hypersensitivity to environmental stimuli or painful co-occurring conditions could be an explanation for why participants in Study S1a estimated the autistic character felt more physical pain than the non-autistic character, it would not be expected to influence estimates about how much social pain the autistic character would feel. Indeed, autistic people are sometimes considered to be socially indifferent (e.g., Chevallier et al., 2012; but see Jaswal & Akhtar, 2019). In Study S1b, we used a similar procedure as in Study S1a to investigate beliefs about the intensity of autistic people's social pain.

Methods

Participants

Ninety-nine undergraduates at the same university as Study S1a participated for course credit. Sample size was selected to match that used in Study S1a. Demographics are shown in Table S13. Data from one additional participant were excluded because they failed both attention checks. A post-hoc sensitivity analysis using G*Power version 3.1.9.4 (Faul et al., 2007) showed that a sample of $N = 99$ could achieve 80% power to detect a medium effect ($f^2 = 0.14$) or larger for a multiple regression with five predictor variables.

Table S13

Participant Demographics in Study S1b

Study details	Sample	Condition	Gender	Age
Study S1b (May 2021)	**College students** 68% White, 18% Asian, 4% Black, 8% mixed race; 7% Hispanic / Latinx, 92% not Hispanic / Latinx	AT (n = 49)	31 F, 18 M	19.38 (1.17)
		NT (n = 50)	34 F, 16 M	19.34 (1.17)

Note. Figures in parentheses indicate SDs. Condition: AT = Autistic Target, NT = Non-autistic target; Gender: F = female, M = male.

Procedure

The procedure was the same as Study S1a with one exception: Instead of asking participants to give self- and target-ratings of physical pain scenarios, we asked participants to give self- and target-ratings of the social pain scenarios used by Deska et al. (2020) (e.g., a family pet dying, a friend moving across the country), α = .78, 95% CIs [.72, .82]. In addition, participants responded to the same hardship beliefs measure for themselves and for their assigned target (α = .82, 95% CIs [.78, .86]), and the social dominance orientation scale (α = .87, 95% CIs [.83, .91]) used in Study S1a.

Results

As Table S14 shows, participants estimated that the autistic target had experienced more hardship than the non-autistic target and would feel more social pain than the non-autistic target. Table S15 shows correlations of all measured variables.

Table S14

Averages (SD in parentheses) for all Variables in Study S1b

Variable	Autistic target (n = 49)	Non-autistic target (n = 50)
Target hardship ratings	3.84 (0.55)	2.85 (0.32)
Target pain ratings	3.19 (0.44)	2.86 (0.43)
Self-hardship ratings	2.40 (0.55)	2.47 (0.68)
Self-pain ratings	2.88 (0.45)	2.87 (0.43)
SDO score	2.25 (0.78)	2.48 (0.83)

Note. Possible pain ratings range: 1-4; possible hardship ratings range: 1-5; possible SDO (Social Dominance Orientation) range: 1-7.

Table S15

Correlations of all Measured Variables in Study S1b

Variable	1	2	3	4	5
1. Target pain ratings	—				
2. Target hardship ratings	0.36***	—			
3. Self-pain ratings	0.44***	-0.03	—		
4. Self-hardship ratings	-0.07	-0.03	-0.05	—	
5. SDO scores	-0.22*	-0.05	-0.31*	0.05	—
6. Participant age	-0.03	0.11	-0.09	0.06	0.18

Note. Pearson's *r* values reported for all correlations.
* $p < .05$, *** $p < .001$

A regression model predicting target hardship ratings from target neurotype was significant, $F(1, 97) = 121$, $p < .001$, adjusted $R^2 = .55$; and showed that the autistic target was given higher hardship ratings than the non-autistic target, β = .74 [.61, .88], $p < .001$, $f^2 = 1.25$. As Table S16 shows, a linear model predicting target social pain ratings from target neurotype and self-pain ratings showed that the autistic target was given higher social pain ratings than the non-autistic target, and those who gave higher social pain ratings to themselves also gave higher social pain ratings to the target.

Table S16

Multiple Regression Predicting Target Social Pain Ratings in Study S1b

Predictor	β	*SE*	95% CI	*t*	*p*	f^2
Target neurotype [a]	**.34**	**.08**	**[.17, .51]**	**4.06**	**< .001**	**0.17**
Self-social-pain ratings	**.43**	**.08**	**[.27, .60]**	**5.13**	**< .001**	**0.22**
F (2, 96) = 21.84, $p < .001$						
Multiple $R^2 = .31$						
Adjusted $R^2 = .30$						

Note. All variables were z-standardized to get standardized coefficients.

[a] Target neurotype was coded such that -1 = Non-autistic target and 1 = Autistic target.

We conducted a mediation analysis to examine if participants' attributions of higher social pain to the autistic compared to the non-autistic target were related to their higher attribution of life hardship to the autistic compared to the non-autistic target. As in Study S1a, we used self-social-pain ratings as a covariate. As Table S17 shows, after accounting for target hardship ratings, the direct effect of neurotype on target social pain ratings was no longer significant, β = .07 [-.05, .17], p = .228. Unlike for physical pain ratings, target hardship ratings significantly predicted target social pain ratings, β = .19 [.01,.37], p = .032. Unlike Study S1a, the mediation of the effect of target neurotype on target pain ratings by target hardship ratings was significant, β = .09 [.00,19], p = .036. As Figure S1 shows, the higher participants rated the targets' hardship, the more social pain they believed the targets would feel.

Table S17

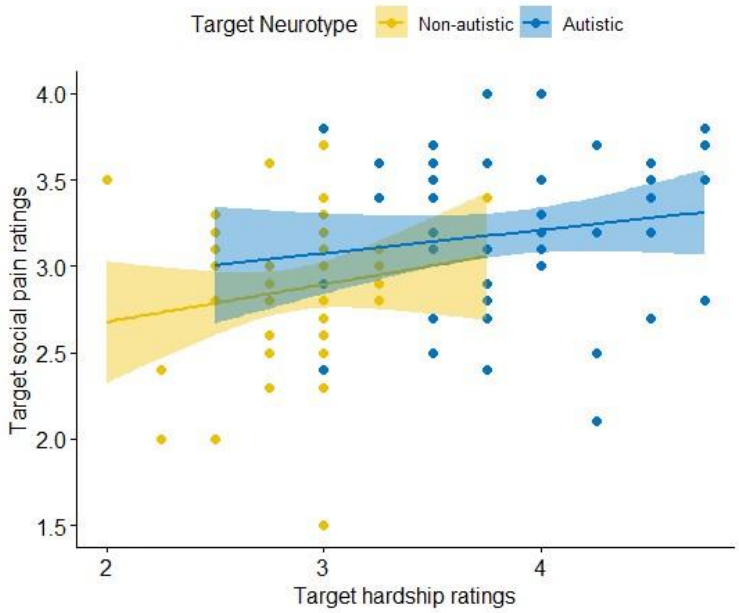
Study S1b Mediation Analysis

Type	Effect	β	SE (β)	95% CIs	z-value	p
Indirect effect components	Target neurotype → Target hardship ratings (a)	.49	.05	[.41, .59]	10.88	< .001
	Target hardship ratings → Target social pain ratings (b)	.19	.09	[.01, .37]	2.15	.032
	Target neurotype → target hardship → target social pain ratings (ab)	.09	.05	[.00, .19]	2.10	.036
Direct effect	Target neurotype → Target social pain ratings (c')	.07	.05	[-.05, .17]	1.21	.228
Total effect	Target neurotype → Target pain ratings (c)	.16	.04	[.08, .23]	4.17	< .001

Note. Target neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target. Self-pain ratings, average SDO sores, participant age, and participant gender were included as covariates in all models. Standardized coefficients and SEs of standardized coefficients are reported.

Figure S1

Relation Between Target Hardship Ratings and Target Social Pain Ratings in Study S1b



Discussion

Replicating Study S1a, non-autistic participants indicated that an autistic target had experienced more life hardship than a non-autistic target. Also like Study S1a, the autistic target was estimated to experience more pain than the non-autistic target. Beliefs about the autistic target's relatively high physical pain sensitivity in Study S1a could possibly be explained by awareness that autistic people can be hypersensitive to environmental stimuli or often endure co-occurring conditions involving significant pain. However, these explanations cannot account for why autistic people would be thought to feel more social pain than non-autistic people.

Unlike Study S1a, where target hardship ratings did not mediate the relation between target physical pain ratings and target neurotype, in Study S1b, target hardship ratings significantly mediated the relation between target neurotype and target social pain ratings. The higher hardship participants attributed the targets, the more pain they believed the target would

feel in emotionally distressing situations. Because this was the only study in which hardship mediated the relation between target pain ratings and target neurotype, we are reluctant to speculate about this finding.

As discussed in the main text, Studies S1a and S1b show that the pain judgments of autistic targets differ from the pain judgments of other disadvantaged groups, like Black targets (compared to White targets). While Black targets are believed to be toughened by their hardship and are accordingly expected to feel less social pain than White targets (Deska et al., 2020), autistic targets are believed to have experienced significant hardship and are correspondingly believed to feel *more* social pain than non-autistic targets. This signifies that autistic people are not expected to develop toughness as a consequence of their hardship in the same way that Black people are expected to develop toughness (Deska et al., 2020; Trawalter et al., 2012). (And indeed, if the mediation model described above were to replicate in future work, autistic people may be believed to be rendered more vulnerable to socially and emotionally distressing situations as a result of the life hardship they have endured.)

Supplementary Study S2

This study was designed to reduce the possibility that social desirability influenced participants' ratings of the autistic target's pain in Studies S1a and S1b. Study S2 was conducted before Study 1 reported in the main text, but the design was very similar. We used vignettes to introduce the autistic and non-autistic target targets, and we randomly assigned participants to respond to either physical or social pain rating scales. We did not mention "developmental disabilities" in study instructions (as we had done in Studies S1a and S1b). We recruited college student participants only (Study 1 in the main text also included Prolific workers). We used the Social Dominance Orientation measure (Pratto et al., 1994) from Studies S1a and S1b, and the Social Distance Scale (Gillespie-Lynch et al., 2019) described in Study 1. In addition, we used a scale measuring autism awareness (Kim et al., 2021).

Study S2's design, hypotheses and planned analyses were pre-registered at https://osf.io/aqze8.

Methods

Participants

Undergraduates (N = 161) from the same university as Studies S1a and S1b participated for course credit. Sample size was determined a priori using G*Power (Faul et al., 2007). We had obtained large overall effect sizes in Studies S1a ($f^2 = 0.89$) and S1b ($f^2 = 0.45$). However, since we expected a smaller effect from the more subtle manipulation in the current study, we calculated the required sample size to detect a medium-sized effect ($f^2 = 0.15$). To achieve .95 power to detect a medium effect ($f^2 = 0.15$) at a significance criterion of $\alpha = .05$ for a linear model with seven predictors, data from 153 participants would be required. So that we would

have an equal number of participants in each of the four cells of this 2 x 2 design, we rounded up to 160 participants, and ended up with 161. Participant demographics are reported in Table S18.

Data from additional 12 participants were discarded because they failed attention checks (n = 7), manipulation checks (n = 2), or did not complete the study (n = 3). Data collection took place in September and October 2021.

Table S18

Study S2 Participant Demographics

Sample	Condition	Gender	Age
College students 70% White, 18% Asian, 2% Black, 1% Native Hawaiian or Pacific Islander, 4% mixed race; 9% Hispanic / Latinx, 9% not Hispanic / Latinx	AT, PP	33 F, 7 M	18.8 (0.84)
	AT, SP	24 F, 15 M, 1 NB	18.9 (0.86)
	NT, PP	28 F, 13 M	18.6 (0.78)
	NT, SP	17 F, 12 M, 1 TGM	18.5 (0.85)

Note. Figures in parentheses indicate SDs. Condition: AT = Autistic Target; NT = Non-autistic Target, PP = Physical Pain, SP = Social Pain. Gender: F = female, M = male, NB = non-binary, TGM = transgender male. Participants in the Autistic Target conditions were slightly older than those in the Non-autistic Target Conditions, $F(1, 157) = 6.89$; $p = .009$. There were no other differences by age and gender between conditions.

Procedure

The procedure was similar to the one used in Study 2. Participants were randomly assigned to give physical or social pain ratings. They first rated how painful they would find the physical pain scenarios taken from Trawalter et al. (2012) (α = .84, 95% CIs [.80, .87] in the current sample) or the social pain scenarios taken from Deska et al. (2020) (α = .72, 95% CIs [.66, .78] in the current sample). One attention check was randomly inserted in the self-pain questions, where participants were instructed to select “Extremely painful (4)”. Participants next provided self-ratings on the hardship beliefs scale, indicating how much life hardship they believed they had faced (α = .78, 95% CIs [.73, .82]).

Participants were then presented with the same instructions as in Study 1 reported in the main text. Within each pain condition, they were randomly assigned to evaluate either the autistic or non-autistic target, presented using the same vignettes as in Study 1. They next provided physical or social pain ratings for that character. One attention check was randomly inserted in the pain rating questions, where participants were instructed to select "Not painful (1)".

After providing target ratings, as a manipulation check, participants first noted in an open-text field everything they remembered about the character they had read about, and then selected, out of four options, information that they remembered reading about the character. All participants assigned to the autistic target condition indicated that Taylor was autistic (or was "a person with autism" or "had autism") on the text-entry question, and additionally selected the correct option on the multiple-choice question (i.e., "Taylor is autistic"). As noted earlier, two participants in the non-autistic target condition were replaced because they failed to select "None of the above" on the multiple-choice question.

Participants then completed the Social Dominance Orientation Scale (Pratto et al., 1994) used in Studies S1a and S1b (α = .89, 95% CIs [.87, .92]). Next, participants responded to the Participatory Autism Knowledge-Measure (Kim et al., 2021), which consists of 29 statements about autism, some true (e.g. "Autistic people tend to be good at recognizing patterns") and some false (e.g., "Most autistic people have low intelligence"). Participants indicated the extent to which they agreed or disagreed with each statement on a 5-point scale, with 1 representing strong disagreement and 5 representing strong agreement (α = .82, 95% CIs [.77, .85]). Finally, participants responded to the Social Distance Scale (Gillespie-Lynch et al., 2019), indicating the extent to which they agreed with 11 statements like "I would be willing to move next door to someone with autism" or "I would be willing to spend an evening socializing with someone with

autism" on a 5-point rating scale with 1 representing strong disagreement and 5 indicating strong agreement (α = .94, 95% CIs [.92, .96]).

Results

As Table S19 shows, our findings replicated those of Studies S1a and S1b: Participants gave higher hardship ratings to the autistic than to the non-autistic target, and gave higher physical and social pain ratings to the autistic than to the non-autistic target. Table S20 shows correlations of all measured variables.

Table S19

Averages (SDs in parentheses) for all Variables in Study S2

Variable	Physical Pain		Social Pain	
	Autistic target (n = 40)	Non-autistic target (n = 41)	Autistic target (n = 40)	Non-autistic target (n = 40)
Target pain ratings	**2.42 (0.37)**	**2.28 (0.35)**	**3.20 (0.42)**	**2.95 (0.42)**
Target hardship ratings	**3.38 (0.42)**	**2.55 (0.44)**	**3.59 (0.46)**	**2.61 (0.40)**
Self-pain ratings	2.28 (0.36)	2.30 (0.33)	2.83 (0.39)	3.00 (0.36)
Self-hardship ratings	2.36 (0.59)	2.38 (0.55)	2.12 (0.54)	2.49 (0.58)
SDO	2.18 (0.88)	2.40 (0.93)	2.22 (0.95)	2.17 (0.87)
PAK-M	4.04 (0.26)	4.01 (0.32)	3.97 (0.30)	3.93 (0.32)
Social Distance Scale	4.44 (0.54)	4.28 (0.80)	4.28 (0.56)	4.15 (0.75)

Note. Figures in brackets indicate SDs. Possible pain ratings range: 1-4; possible hardship ratings range: 1-5; possible SDO (Social Dominance Orientation) range: 1-7; possible PAK-M (Participatory Autism Knowledge-Measure) range: 1-5; possible Social Distance Scale range: 1-5.

Table S20
Correlations of all Measured Variables in Study S2

Variable	1	2	3	4	5	6	7
1. Target pain ratings	—						
2. Target hardship ratings	.28***	—					
3. Self-pain ratings	.70***	.01	—				
4. Self-hardship ratings	-.00	.06	.02	—			
5. Social Distance Scale	.06	.00	.06	-.20*	—		
6. SDO Scale	-.12	.01	-.17*	.15	-.51***	—	
7. PAK-M	-.02	.06	-.03	-.22**	.52***	-.37***	—
8. Participant Age	.00	.13	.02	-.14	-.07	.09	-.08

Note. Pearson's *r* values reported for all correlations.
* $p < .05$, ** $p < .01$, ***$p < .001$

We first report a linear model predicting target hardship ratings from target neurotype, controlling for pain type, self-hardship ratings, SDO scores, PAK-M scores, and Social Distance Scale scores. The model was significant, F (6,154) = 35.83, $p < .001$, adjusted $R^2 = .57$. As Table S21 shows, there were three significant effects: target neurotype, self-hardship ratings, and pain type. First, replicating Studies S1a and S1b, participants rating the autistic target gave higher hardship ratings to the target than those rating the non-autistic target. Second, the higher participants rated their own hardship, the higher they rated the target's hardship. Third, participants evaluating social pain gave higher target hardship ratings than the participants evaluating physical pain.

Table S21

Multiple Regression Predicting Target Hardship Ratings in Study S2

Predictor	B	*SE*	95% CI	*t*	*p*	f^2
Target neurotype [a]	**.76**	**.05**	**[.65, .86]**	**14.30**	**< .001**	**1.33**
Self-hardship ratings	**.21**	**.05**	**[.10, .32]**	**3.80**	**<.001**	**0.09**
Pain type [b]	**.13**	**.05**	**[.03, .23]**	**2.45**	**.015**	**0.04**
SDO Scale	.03	.06	[-.09, .15]	0.47	.638	0.00
Social Distance Scale	-.07	.07	[-.20, .06]	-1.02	.309	0.01
PAK-M	.12	.06	[.00, .24]	1.93	.056	0.02
F (6, 154) = 35.83, p < .001 Multiple R^2 = .58 Adjusted R^2 = .57						

Note. All continuous variables were z-standardized to get standardized coefficients.

[a] Target neurotype was coded such that -1 = Non-autistic target and 1 = Autistic target; [b] Pain type was coded such that -1 = Physical pain and 1 = Social pain.

We next constructed a linear model predicting target pain ratings from target neurotype, controlling for pain type, the interaction between target neurotype and pain type, self-pain ratings, SDO scores, PAK-M scores, and Social Distance Scale scores. The model was significant; $F(7,153) = 37.82$, $p < .001$, adjusted $R^2 = .68$. As Table S22 shows, there were three significant effects: target neurotype, self-pain ratings, and pain type. Replicating the main findings from Studies S1a and S1b, the autistic target was rated as experiencing more pain than the non-autistic target. As in Studies S1a and S1b, the higher participants rated their own pain, the higher they tended to rate the target's pain. Participants in the social pain condition gave higher pain ratings to both the autistic and non-autistic targets than participants in the physical pain condition.

Table S22

Multiple Regression Predicting Target Pain Ratings in Study S2

Predictor	β	*SE*	95% CI	*t*	*p*	f^2
Target neurotype [a]	**.22**	**.05**	**[.12, .32]**	**5.34**	**< .001**	**0.13**
Self pain ratings	**.50**	**.07**	**[.36, .63]**	**7.39**	**< .001**	**0.36**
Pain type [b]	**.35**	**.07**	**[.22, .49]**	**5.34**	**<.001**	**0.19**
Target neurotype x Pain type	.08	.05	[-.01, .18]	1.68	.095	0.02
SDO Scale	.01	.06	[-.11, .12]	0.15	.878	0.00
Social Distance Scale	.05	.06	[-.07, .18]	0.85	.399	0.00
PAK-M	-.01	.06	[-.12, .11]	-0.11	.912	0.00
F (7, 153) = 37.82, p < .001 Multiple R^2 = .63 Adjusted R^2 = .62						

Note. All continuous variables were z-standardized to get standardized coefficients.

[a] Target neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target; [b] Pain type was coded such that -1 = Physical pain and 1 = Social pain.

Mediation analysis

We conducted a mediation analysis to examine if the greater pain ratings given to the autistic target were related to the greater hardship ratings given to the autistic target. We entered target hardship ratings as an additional predictor into the model predicting target ratings from target neurotype, adding self-pain ratings as a covariate. As Table S23 shows, after entering target hardship ratings as a predictor, target neurotype no longer predicted target pain ratings, β = .07 [-.02, .15], p = .123. Target hardship ratings significantly predicted target pain ratings, β = .15 [.00, .30], p = .044). A bootstrap analysis showed that the mediation by target hardship in the effect of target neurotype on target pain ratings was not significant, ACME = 0.07 [.00, .14], p =

.055). As in Study S1a, beliefs about target hardship did not mediate the relation between target neurotype and target pain ratings.

Table S23

Study S2 Mediation analysis

Type	Effect	β	*SE*	95% Cis	*z*-value	*p*
Indirect effect component	Target neurotype → Target hardship ratings (a)	.46	.03	[.39, .53]	13.39	< .001
	Target hardship ratings → Target pain ratings (b)	.15	.08	[.00, .30]	2.02	.044
	Target neurotype → target hardship → target pain ratings (ab)	.07	.04	[.00, .14]	1.92	.055
Direct effect	Target neurotype → Target pain ratings (c')	.07	.04	[-.02, .15]	1.54	.123
Total effect	Target neurotype → Target pain ratings (c)	.14	.03	[.08, .19]	4.56	<.001

Note. Target neurotype was coded such that -1 = Non-autistic target and 1 = Autistic target. Self-pain ratings were included as covariates in all models. Standardized coefficients and SEs of standardized coefficients are reported.

Discussion

Study S2 was designed to minimize the possibility that social desirability factors inherent in our manipulation in Studies S1a and S1b influenced participants' ratings. Unlike Studies S1a and S1b, we did not highlight for participants our interest in autism or developmental disabilities in the instructions, and the autistic identity of the autistic target was not emphasized visually (i.e., with larger, red, bold font). Instead, the autistic and non-autistic targets were introduced using a vignette that differed only in the first sentence. Even with this arguably more subtle manipulation of the neurotype of the target, we replicated the primary finding from Studies S1a and S1b: For both physical and social pain, participants expected the autistic target to experience higher levels of pain than the non-autistic target, even when we controlled for potentially

relevant variables like participants' knowledge about autism, acceptance of autistic people, and endorsement of social inequalities in our analysis of participants' responses.

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Appendix C

Supplemental Materials for

Non-autistic adults infantilize autistic adults

This file includes:

Study 1: Mediation of differences between target pain ratings by target hardship ratings

To investigate whether the autistic target's pain estimates could be explained by target hardship ratings, we conducted a mediation analysis using the lavaan package in R (Rosseel, 2012). We included target hardship ratings as a mediator variable in the model predicting target pain ratings from target neurotype (autistic target = 1, non-autistic target = -1) and self-pain ratings. After entering target hardship ratings as a mediator, target neurotype continued to be a significant predictor of target pain ratings, $\beta = .13$ [.02, .23], $p = .017$. Target hardship ratings did not significantly predict target pain ratings, $\beta = -.11$ [-.28, .09], $p = .245$. Importantly, the target hardship ratings did not significantly mediate the differences in pain ratings given to the four targets, $\beta = -.05$ [-.15, .04], $p = .251$.

This suggests that participants did not give higher pain ratings to the autistic targets than the non-autistic targets because they were believed to have experienced substantial hardship. How much pain targets were believed to feel was unrelated to how difficult the targets' lives were believed to be.

Study 2: Regression models analyzing target pain and hardship ratings

Predicting target pain ratings

To determine if the pain ratings given to the two targets were significantly different, we constructed a linear model predicting target pain ratings by target neurotype, controlling for participants' self-pain ratings. Model diagnostic plots showed that residuals were not normally distributed, so we log-transformed the dependent variable, upon which the model showed good diagnostics. The model with log-transformed data yielded the same pattern of significant results as the model with untransformed data. For ease of interpretation, here we report results from the model with untransformed data.

As Table S1 shows, replicating the adult target results from Study 1 and previous work (Basargekar et al., 2024), the autistic adult target was judged to feel more pain than the non-autistic adult character, β = .32 [.16, .47], $p < .001$, $f^2 = 0.16$. In addition, participants who expected to feel more pain also expected the targets to feel more pain, β = .55 [.40, .70], $p < .001$, $f^2 = 0.47$.

Table S1

Multiple regression predicting target pain ratings (Study 2b)

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype[a]	.32	.07	[.17, .46]	4.38	< .001	0.16
Self-pain ratings	.54	.07	[.40, .69]	7.43	< .001	0.47
F (2, 117) = 35.31, $p < .001$						
Multiple $R^2 = .38$						
Adjusted $R^2 = .37$						

Note. Pain ratings were z-standardized to get standardized coefficients.
[a]Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target.

Predicting target hardship ratings

Similarly, we constructed a linear model to predict target hardship ratings by target neurotype, controlling for participants' self-hardship ratings. Model diagnostic plots showed acceptable normality of residuals and homoscedasticity, and multicollinearity was not a concern, all VIFs < 4. As Table S2 shows, replicating the findings from Study 1, the autistic target was judged to have experienced greater hardship than the non-autistic target, β = .76 [.64, .88], p < .001, f^2 = 1.38.

Table S2

Multiple regression predicting target hardship ratings (Study 2a)

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype[b]	.76	.06	[.64, .88]	12.72	< .001	1.38
Self-hardship ratings	.09	.06	[-.03, .21]	1.45	.149	-0.01
F (2, 117) = 81.15, p < .001						
Multiple R^2 = .58						
Adjusted R^2 = .57						

Note. All variables were z-standardized to get standardized coefficients.
[b]Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target.

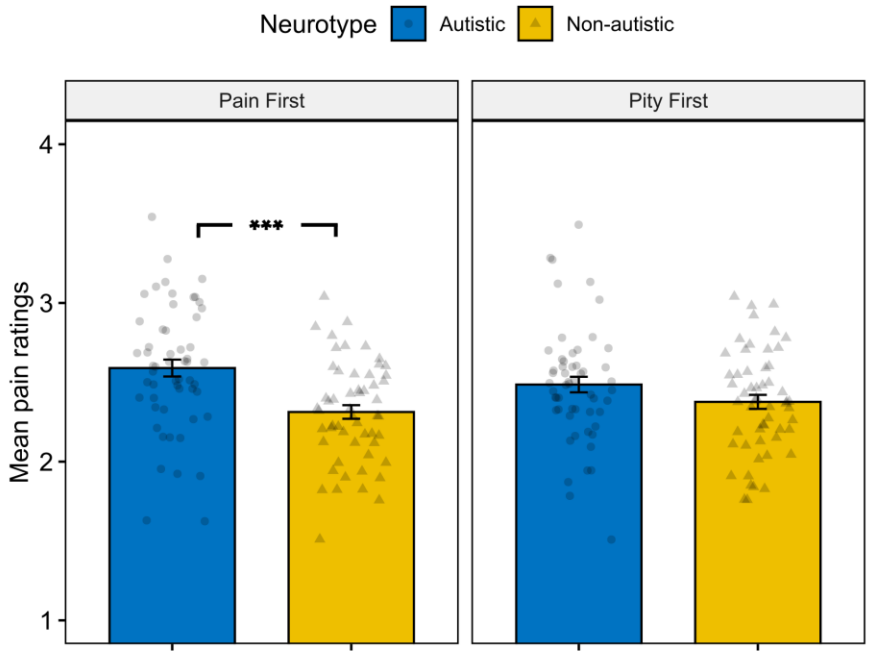
Study 3: Regression models analyzing target pain, hardship and autonomy ratings

Predicting target pain ratings

Target pain ratings are shown in Figure S1. We constructed a linear model to predict target pain ratings by target neurotype, the order of instrument presentation, and the interaction between the two, controlling for participants' self-pain ratings. As Figure S1 and Table S3 show, replicating Studies 1 and 2, participants who rated the autistic target believed the target would feel more pain than those who rated the non-autistic target, $\beta = .24$ [.14, .35], $p < .001$, $f^2 = 0.11$. Interestingly, there was a significant interaction between target neurotype and order of presentation of measurement instruments, $\beta = .14$ [.04, .25], $p = .006$, $f^2 = 0.04$: While the autistic target was given higher pain ratings than the non-autistic target in both order conditions, the difference between target pain ratings was smaller when participants had rated how much they pitied the target before rating target pain. Pairwise comparisons within each order condition showed that the difference in the pain ratings of the autistic and the non-autistic target was only significant when participants gave target pain ratings before giving target pity ratings, t (103.23) = 4.05, $p < .001$, $d = 0.77$, 95% CI [0.38, 1.16]. The difference in participants' ratings of the two targets' pain was not significant in the condition where participants rated their pity for targets before giving pain ratings, t (106.84) = 1.65, $p = .101$, $d = 0.31$, 95% CI [-0.07, 0.70], In addition, participants who expected to feel more pain also expected their assigned target to feel more pain, $\beta = .59$ [.49, .69], $p < .001$, $f^2 = 0.61$.

Figure S1

Average Target Pain Ratings (Study 3)



Note. Error bars represent standard error of the mean Asterisks represent *p*-values. ***$p < .001$

Table S3

Multiple Regression Predicting Target Pain Ratings (Study 3)

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype[a]	**.24**	**.05**	**[.14, .35]**	**4.76**	**< .001**	**0.11**
Order [b]	.02	.05	[-.08, .12]	0.40	.690	0.00
Target Neurotype x Order	**.14**	**.05**	**[.04, .25]**	**2.76**	**.006**	**0.04**
Self-pain ratings	**.59**	**.05**	**[.49, .69]**	**11.46**	**< .001**	**0.61**
F (4, 215) = 40.77, $p < .001$						
Multiple R^2 = .43						
Adjusted R^2 = .42						

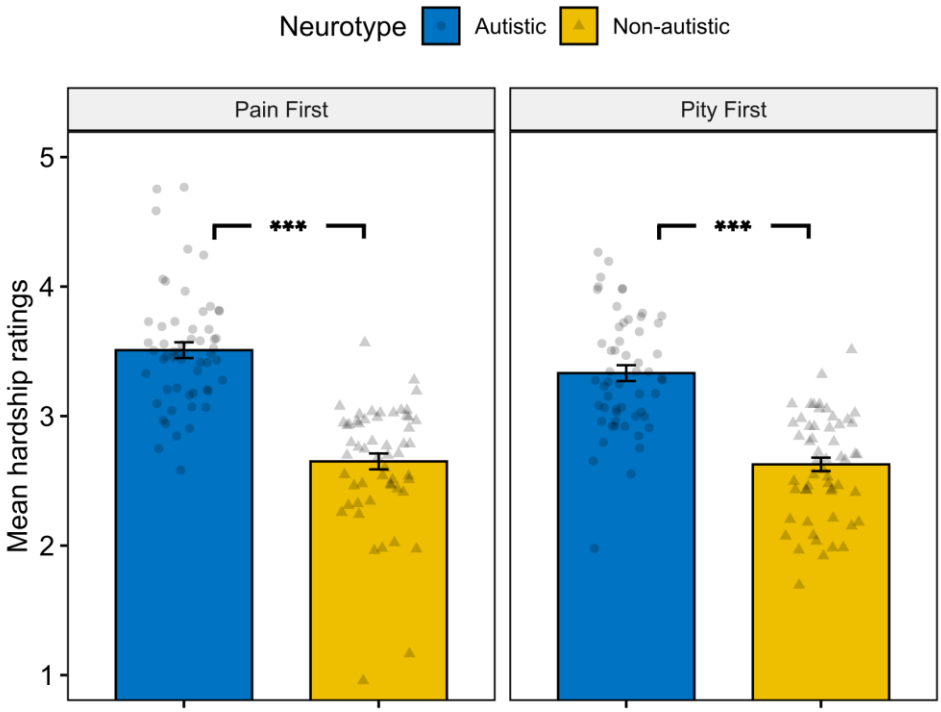
Note. All variables were scaled to get standardized coefficients.
[a] Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target; [b] Order was coded as 1 = Pain ratings first and -1 = Pity ratings first.

Predicting target hardship ratings

Similarly, we constructed a linear model to predict target hardship ratings from target neurotype, order of instrument presentation, and the interaction between target neurotype and order of instrument presentation. Participants' self-hardship ratings were entered as covariates. As Figure S2 and Table S4 shows, replicating Studies 1 and 2, the autistic target was believed to have faced greater hardship than the non-autistic target, β = .66 [.57, .76], $p < .001$, $f^2 = 0.88$. In addition, participants who believed they had faced more hardship also gave higher hardship ratings to the targets, β = .21 [.10, .30], $p < .001$, $f^2 = 0.09$.

Figure S2

Average Target Hardship Ratings (Study 3)



Note. Error bars represent standard error of the mean. Asterisks represent p-values. *** $p < .001$.

Table S4

Multiple Regression Predicting Target Hardship Ratings (Study 3)

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype[a]	**.66**	**.05**	**[.57, .76]**	**13.79**	**< .001**	**0.88**
Order [b]	.07	.05	[-.01, .18]	1.54	.125	0.01
Target Neurotype x Order	.08	.05	[-.02, .17]	1.76	.081	0.01
Self-hardship ratings	**.21**	**.05**	**[.10, .30]**	**4.29**	**< .001**	**0.09**
F (4, 215) = 53.33, p < .001						
Multiple R^2 = .50						
Adjusted R^2 = .49						

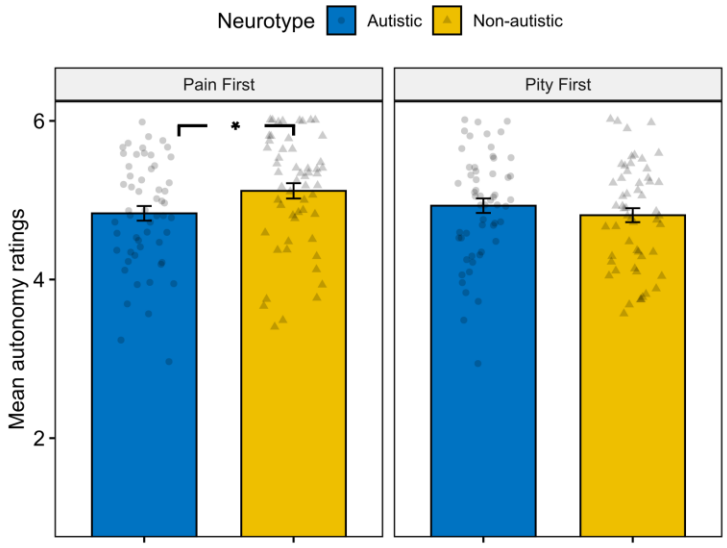
Note. All variables were scaled to get standardized coefficients.
[a] Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target; [b] Order was coded as 1 = Pain ratings first and -1 = Pity ratings first.

Predicting target autonomy ratings

Target autonomy ratings are shown in Figure S3. We constructed a linear model to predict target autonomy ratings by target neurotype, order of instrument presentation, and the interaction between target neurotype and order (Table S5). Unlike in Study 2, target neurotype was not a significant predictor of target autonomy ratings, β = -.06 [-.19, .07], p = .376, f^2 = 0.00. There was no significant main effect of whether participants gave the pity ratings before or after the pain ratings, β = .08 [-.06, .21], p = .254, f^2 = 0.01. However, the interaction between target neurotype and order was significant, β = -.15 [-.28, -.01], p = .030, f^2 = 0.02: Participants who gave pain ratings to their assigned targets before pity ratings (i.e., who had rated how much they pitied their respective target just before seeing the autonomy scale) gave lower autonomy ratings to the autistic target than to the non-autistic target t(105.76) = -2.12, p = .036, d = -0.40, 95% CI [-0.77, -0.02], while participants who had seen the pain scenarios just before seeing the autonomy scale gave similar autonomy ratings to both targets, t(107.87) = 0.94, p = .347, d = 0.18, 95% CI [-0.20, 0.56]. There were no other significant effects.

Figure S3

Average Target Autonomy Ratings (Study 3)



Note. Error bars represent standard error of the mean. Asterisks represent *p*-values. * $p < .05$.

Table S5

Multiple regression predicting target autonomy ratings (Study 3)

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype[a]	-.06	.07	[-.19, .07]	-0.89	.376	0.00
Order [b]	.08	.07	[-.06, .21]	1.14	.254	0.01
Target Neurotype x Order	**-.15**	**.07**	**[-.28, -.01]**	**-2.19**	**.030**	**0.02**
F (3, 216) = 2.29, p = .079						
Multiple R^2 = .03						
Adjusted R^2 = .02						

Note. All variables were scaled to get standardized coefficients.

[a] Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target; [b] Order was coded as 1 = Pain ratings first and -1 = Pity ratings first.

Supplementary Study

In Supplementary Study, we recruited autistic and non-autistic adult participants on Prolific (www.prolific.co). We randomly assigned participants to read the description of either the autistic or the non-autistic adult target from Studies 1, 2, and 3 in the main text. Participants provided autonomy ratings for their assigned targets (indicating whether, e.g., the target or their parents should make decisions about whether the target should stop a medication, get a motorcycle license, etc.). Additionally, participants provided self-pain, self-hardship, target pain and target hardship ratings for a study that is reported elsewhere (Basargekar et al., 2024); these measures will not be discussed here. This study was preregistered at https://osf.io/xus5n.

Method

Participants

We recruited 64 autistic and 64 non-autistic participants on Prolific. This sample size was chosen to examine a question about differences in beliefs about pain between autistic and non-autistic participants (Basargekar et al., 2024). A post-hoc sensitivity analysis showed that given a multiple regression model with five predictors, this sample size (N = 128) was sufficient to detect an effect of a smaller size (f^2 = 0.10) than the effect size in Study 2 for the effect of target neurotype on autonomy ratings (f^2 = 0.26), with a power of .80 and an alpha of .05.

Autistic participants (78% White, 5% Black, 1% Asian, 8% mixed race; 11% Hispanic/Latinx, 83% not Hispanic/Latinx) were U.S.-based Prolific workers who had (in the Prolific platform) reported receiving "a formal clinical diagnosis of autism spectrum disorder, made by a psychiatrist, psychologist, or other qualified medical specialist" either as an adult or as a child. Autistic participants varied in age (M = 32.4 years, SD = 10.8) and gender (18 female, 33 male, 10 non-binary, 1 transgender female and 2 transgender male). Non-autistic participants

(81% White, 6% Asian, 3% Black, 1% American Indian or Alaska Native, 5% mixed race; 6% Hispanic/Latinx, 94% not Hispanic/Latinx) were U.S.-based Prolific workers who had not reported receiving a formal diagnosis of autism. Non-autistic participants varied in age (M = 38.4 years, SD = 15) and gender (42 female, 22 male).

Autistic participants were paid $10, and non-autistic participants were paid $3. We paid autistic participants a higher amount to incentivize their participation. We replaced participants who failed the bot check (n = 2) or the manipulation check (n = 3). Data were collected in September 2022.

Design

Participants in each group (autistic and non-autistic) were randomly assigned to rate either the autistic or the non-autistic target, with 32 participants in each cell in this 2 x 2 (participant group x target neurotype) design.

Measures

To collect target autonomy ratings, we used the same Autonomy Scale as in Studies 2 and 3 in the main text. The Autonomy Scale had excellent internal consistency in the current study, α = .95; autistic participants α = .95, non-autistic participants α = .96.

Ritvo Autism and Asperger Diagnostic Scale (RAADS-14). The RAADS-14 (Eriksson et al., 2013) is a widely used self-report instrument for autism screening comprised of14 statements describing common life experiences and personality characteristics of autistic people, such as "some ordinary textures that do not bother others feel very offensive when they touch my skin," and "I take things too literally, so I often miss what people are trying to say." Participants rated the extent to which each statement was true for them, selecting one of four options: "true now and when I was young (3)", "true only now (2)", "true only when I was younger than 16 (1)",

and “never true (0)”. Higher scores on this instrument indicate closer resemblance to autistic-like experiences and personality characteristics. The internal consistency of the RAADS-14 for the current sample was very good (overall $\alpha = .92$; autistic participants $\alpha = 0.85$; non-autistic participants $\alpha = .85$). We used scores on the RAADS-14 to supplement participants’ diagnostic information reported via Prolific.

Participants additionally responded to the level of contact report used in the studies in the main text. All autistic participants reported being autistic on the level of contact report by responding “Yes” to the item “I am autistic”; none of the non-autistic participants reported being autistic on this item.

Procedure

We included a bot check at the start of the Qualtrics survey to ensure that we were getting responses from human participants. As noted earlier, two participants failed the bot check and their data were replaced.

Participants first provided pain and hardship ratings for themselves and a non-autistic or autistic target (introduced using the adult vignette provided in Study 1); as noted, these data are reported in Basargekar et al. (2024). Next, participants completed the Autonomy Scale for their assigned targets and the level of contact report. All participants who reported having some contact with autistic people also completed the quality of contact scale. All participants completed the RAADS-14. Finally, participants completed some open-ended prompts about their experiences of pain. These responses were exploratory measures to inform future work, and will not be discussed here.

Results

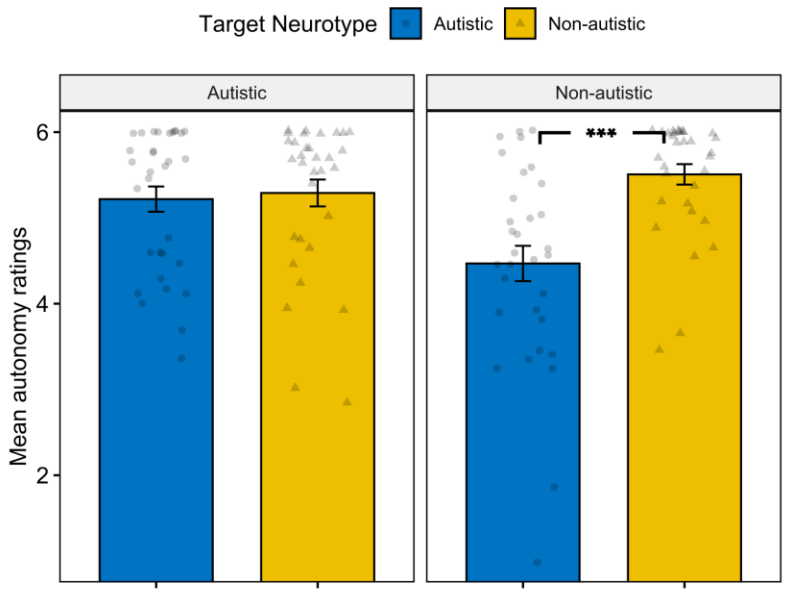
The autistic participants were, on average, younger than the non-autistic participants, $F(1, 126) = 6.90$, $p = .010$. The two participant groups did not differ in gender distribution ($\chi 2$ (3, N = 128) = 7.69, $p = .053$). As expected, autistic participants scored higher on the RAADS-14 than the non-autistic participants, indicating that they possessed more autistic-like characteristics ($M_{autistic} = 28.83$, $SD = 9.62$, vs. $M_{non\text{-}autistic} = 10.63$, $SD = 9.19$), $F(1,125) = 119.32$, $p < .001$. The RAADS-14 scores, in addition to the diagnostic status reported in Prolific and self-reported diagnostic status on the level of contact report, indicate that we had a sample of autistic participants and a sample of non-autistic participants.

Ratings of target autonomy by autistic and non-autistic participants

As Figure S4 shows, autistic participants gave similar autonomy ratings to autistic ($M = 5.22$, $SD = 0.83$) and non-autistic ($M = 5.29$, $SD = 0.88$) targets, but non-autistic participants gave lower autonomy ratings to the autistic target ($M = 4.47$, $SD = 1.16$) than to the non-autistic target ($M = 5.51$, $SD = 0.67$).

Figure S4

Target Autonomy Ratings by Autistic and Non-autistic Participants in Supplementary Study



Note. Error bars represent standard errors of the mean. Asterisks represent *p*-values. *** $p <$ .001.

To analyze whether autistic participants differed from non-autistic participants in their beliefs of how much decisional autonomy autistic and non-autistic targets should have, we conducted a multiple linear regression predicting target autonomy ratings by target neurotype, participant group, and the interaction between target neurotype and participant group. Model diagnostic plots showed that residuals were not normally distributed, and linearity assumption was violated. In a model where the dependent variable (target autonomy ratings) was reciprocal square-root transformed, the residuals were normally distributed and linearity assumption was met. Both models showed the same pattern of significant findings; here, we report the model with untransformed data for ease of interpretation.

As Table S6 shows, the autistic target was given lower autonomy ratings than the non-autistic target, β = -.28 [-.45, -.12], $p < .001$, $f^2 = 0.10$. Importantly, the effect of target neurotype was qualified by a significant target neurotype by participant group interaction, β = .25 [.08, .41], $p = .003$, $f^2 = 0.07$: Non-autistic participants gave the autistic target lower autonomy ratings than the non-autistic target ($t(49.67) = -4.37$, $p < .001$, $d = -1.09$), but autistic participants gave similar autonomy ratings to both targets ($t(61.76) = -0.33$, $p = 0.74$, $d = -0.08$).

Table S6

Multiple Regression Predicting Target Autonomy Ratings (Study 2a)

Predictor	β	*SE*	95% CIs	*t*	*p*	f^2
Target Neurotype[a]	**-.28**	**.08**	**[-.45, -.12]**	**-3.46**	**< .001**	**0.10**
Participant Neurotype[b]	.14	.08	[-.03, .30]	1.66	.099	0.02
Target Neurotype x Participant Neurotype	**.25**	**.08**	**[.08, .41]**	**3.02**	**.003**	**0.07**
F (3, 124) = 7.95, $p < .001$						
Multiple $R^2 = .16$						
Adjusted $R^2 = .14$						

Note. All variables were scaled to get standardized coefficients.
[a]Target Neurotype was coded such that 1 = Autistic target and -1 = Non-autistic target;
[b]Participant Neurotype was coded as 1 = Autistic participants and -1 = Non-autistic participants.

Discussion

We found that non-autistic adult participants believed that an autistic adult target should have lower autonomy to make their life decisions than a non-autistic adult target. This pattern is consistent with infantilization of autistic adults. Non-autistic people believe that autistic adults should have lower decisional authority than "default" non-autistic adults, which is a widely shared belief about children too. Importantly, autistic participants gave similar and high autonomy ratings to both targets: Even if non-autistic adults believe that restrictions on autistic adults' decision-making autonomy are appropriate, autistic adults themselves do not think so.

That this bias was not shared by autistic participants suggests that it is an outgroup belief indicative of negative infantilizing attitudes held by non-autistic people towards autistic people. As discussed in the main text, these attitudes may pose challenges to autistic people's self-determination opportunities, adversely impacting their sense of control and well-being.

References

Basargekar, A. R., Rodi, C. E., Swisher, V. S., & Jaswal, V. K. (2024). Autistic People Are Believed to Feel More Pain than Non-Autistic People. *Social Psychological and Personality Science*, 19485506231225993. https://doi.org/10.1177/19485506231225993

Eriksson, J. M., Andersen, L. M., & Bejerot, S. (2013). RAADS-14 Screen: Validity of a screening tool for autism spectrum disorder in an adult psychiatric population. Molecular Autism, 4(1), 49. https://doi.org/10.1186/2040-2392-4-49