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ORIGINAL ARTICLE

# A Cross-Cultural Examination of Blatant and Subtle Dehumanization of Autistic People

So Yoon Kim[1] · Jeong Eun Cheon[2] · Young-Hoon Kim[2]

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## Abstract

**Purpose** This cross-cultural study examined various domains of dehumanization, including both blatant (viewing autistic people as animal-like, child-like, or machine-like) and subtle (denying agency and experience capabilities) dehumanization, of autistic individuals by Koreans and Americans.

**Methods** A total of 404 Koreans and 229 Americans participated in an online survey, assessing blatant and subtle dehumanization, knowledge about autism, stigma toward and contact with autistic people, cultural factors, and demographic information. Robust linear mixed-effects regressions were conducted to examine the impact of the target group (autistic vs. non-autistic) and the country (South Korea vs. the US) on dehumanization. Additionally, correlations and multiple regressions were employed to identify individual variables associated with dehumanization.

**Results** Both Koreans and Americans exhibited more dehumanizing attitudes towards autistic individuals than non-autistic individuals across all domains. Koreans showed greater dehumanization of autistic individuals than Americans in all domains except for the machine-like domain. Stigma toward autistic people was associated with all dehumanization domains among Koreans and with some of the domains among Americans. Individual variables associated with dehumanization varied across countries and domains. Positive contact quality frequently predicted lower dehumanization in both cultures.

**Conclusions** Non-autistic individuals consistently rated autistic people as less human than non-autistic people. Future research examining how autistic characteristics or societal perceptions that influence the consideration of an autistic person's humanness vary across cultures is needed. Implementing interventions aimed at enhancing non-autistic people's understanding of autistic individuals' agency and experience capabilities and promoting high-quality contact opportunities with autistic individuals may help reduce dehumanizing attitudes.

**Keywords** Autism · Dehumanization · Stigma · Blatant · Subtle · Cross-cultural · Educational psychology

An increasing number of studies have reported that non-autistic[1] people stigmatize autistic people (Kim et al., 2023), engaging in labeling, stereotyping, separation between "us" and "them," and discrimination (Goffman, 1963; Link & Phelan, 2001). Stigma is influenced by societal norms and varies across cultures. Several cross-cultural studies have been conducted to understand the mechanisms underlying stigma toward autistic people (Kim & Gillespie-Lynch, 2022; Obeid et al., 2015; Someki et al., 2019).

For instance, a series of studies demonstrated that Koreans showed greater stigma toward autistic people than Americans (Kim & Gillespie-Lynch, 2022; Kim et al., 2021, 2022). Compared to the United States (US), Korea is a racially, ethnically, and culturally homogeneous society (Cumings, 2005). This homogeneity may contribute to heightened collectivism, which prioritizes group harmony, and cultural tightness, representing the perceived strength of societal norms (Triandis, 1989; Triandis & Gelfand,

✉ Young-Hoon Kim
solagratia72@gmail.com

[1] Department of Teacher Education, Duksung Women's University, 33, Samyang-ro 144-gil, Dobong-gu, Seoul 01369, Republic of Korea

[2] Department of Psychology, Yonsei University, 50, Yonsei-ro, Seodaemun-gu, Seoul 03722, Republic of Korea

[1] We used identity-first language (e.g., 'autistic individuals') to align with the preference of many self-advocates in the autistic community (Bottema-Beutel et al., 2018). We recognize the ongoing discourse about language choices and acknowledge that not everyone in the autistic community may endorse identity-first language.

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1998). These factors can make individuals with disabilities, who sometimes deviate from social norms, targets of discrimination and stigma (Kim-Rupnow, 2005). Greater cultural tightness and assimilation ideology, the belief that ethnic minority cultures should conform to majority norms (Rosenthal & Levy, 2010), were associated with increased stigma towards autistic individuals among Koreans, but not Americans (Kim et al., 2021, 2022). This study extends previous efforts by examining the country-level and individual-level differences in non-autistic Koreans' and Americans' dehumanization of autistic people, a phenomenon that has been shown to be associated with stigma toward autistic people (Cage et al., 2019).

## Dehumanization

Stigmatized groups are often subject to dehumanization, being denied full humanity and seen as "less human" (Goffman, 1990; Haslam, 2006). Research has found associations between dehumanizing attitudes and stigma toward mental illness or the use of stigmatizing language related to mental illness (Hinshaw & Cicchetti, 2000; Martinez et al., 2011; Krzyzanowski et al., 2019). Dehumanization has also been studied as a contributor to intergroup conflicts between majority groups and various stigmatized minority outgroups, including those related to race and religion (e.g., Native Americans, immigrants; Bruneau et al., 2020; Utych, 2017).

Previous research has demonstrated that non-autistic individuals dehumanize autistic people and those with mental disabilities (Botha, 2021; Botha & Cage, 2022; Boysen et al., 2020; Cage et al., 2019; Rasset et al., 2022). These dehumanizing attitudes may have a negative impact on autistic people, just as public stigma towards autistic individuals leads to adverse mental health outcomes and hinders the disclosure of diagnoses, resulting in reduced employment opportunities and social status (Botha & Frost, 2020; Johnson & Joshi, 2016). Indeed, an autistic autism researcher has highlighted the potential of dehumanization to inflict physical, psychological, emotional, and verbal harm on autistic individuals (Botha, 2021). Greater dehumanizing attitudes towards individuals with developmental disabilities are linked to reduced support for social policy beliefs benefiting them, such as funding for special education programs (Parker et al., 2020). Dehumanization literature also contends that dehumanization may contribute to the normalization of intimate and systemic violence against various outgroups, in the case, autistic individuals (Botha, 2021; Haslam & Loughnan, 2014).

### Theories and Forms of Dehumanization

To investigate how attitudes contributing to such violence can be mitigated, prior research on dehumanization has employed various assessment methods to measure the dehumanization of different outgroups. This variation in measurement arises because dehumanization is a complex and multifaceted phenomenon, entailing various theories and forms (Haslam, 2021). The following sections outline different theories and various forms of dehumanization explored in previous dehumanization literature.

First, we describe the dual model of dehumanization (Haslam, 2006) and mind perception theory (Epley & Waytz, 2010; Gray et al., 2007), both of which are frequently used to study dehumanization. In the dual model of dehumanization, Haslam (2006) proposed that perceptions of humanness are based on two dimensions: uniquely human (UH) and human nature (HN) traits. UH traits refer to characteristics that are distinctively human, setting humans apart from animals, and involving advanced cognitive abilities (e.g., broadmindedness, humility). HN traits are fundamental qualities associated with being human but may not distinguish humans from other animals (e.g., helpfulness, curiosity). Denying UH traits is linked to perceiving a social group as child-like or animal-like, whereas denying HN traits is associated with viewing a social group as machine-like.

Gray et al.'s (2007) mind perception theory expanded upon previous research by arguing that, unlike previous studies' (notably, the theory of mind studies of autistic individuals) conceptualization of mind perception as a single construct, individuals' perceptions of others' minds can be understood along two fundamental and independent dimensions: agency and experience. Agency refers to a higher cognitive capacity for planning and acting (e.g., self-control and morality), while experience refers to the capacity for desires and feelings (e.g., thirst and pain). Gray et al. (2007) found that humans were perceived to have higher agency than non-human animals and greater experience than inanimate objects (e.g., robots); compared to human adults and participants themselves, babies, chimpanzees, and dogs were rated as having less agency and similar experience.

In addition to different theories, dehumanization can manifest in subtle or blatant forms. Subtle dehumanization involves indirect, unintentional forms, where a group is evaluated based on the extent to which they display or have the ability to display human-associated traits rather than traits associated with non-humans (Haslam & Loughnan, 2014). For example, the dual model suggests that subtle child-like or animal-like dehumanization occurs when individuals rate a social group as lacking UH traits (e.g.,

rationality), while mechanic dehumanization occurs when a social group is seen as lacking HN traits (e.g., warmth) (Haslam, 2006). Applying Haslam's theory (2006), Cage et al. (2019) found that non-autistic individuals rated autistic people as having fewer UH traits compared to non-autistic people but rated autistic and non-autistic people similarly in terms of HN traits, suggesting a perception that autistic people are child-like or lack self-restraint. However, only greater denial of HN traits, but not UH traits, was associated with less openness toward autistic people.

In contrast to subtle dehumanization, blatant dehumanization involves overt, intentional denial of humanity, such as categorizing certain groups as "savage" or "animals" (Boysen et al., 2020; Kteily & Bruneau, 2017). Boysen et al. (2020) demonstrated that both American and Canadian participants blatantly dehumanize autistic people, and the level of blatant dehumanization was associated with various stigma-related measures, including anger, failure to help, and social distance.

## Cultural and Individual Factors Associated with Dehumanization

In addition to the multiplicity of theories and forms, understanding dehumanization requires consideration of various cultural and individual factors associated with dehumanization (Haslam, 2006). Individuals from individualistic cultures may consider individualistic traits, such as independence, as more essential to humanness, while individuals from collectivistic cultures may view collectivistic traits, such as humility, as more essential (Oyserman et al., 2002; Park et al., 2011). Haslam (2006) argued that UH traits, influenced by social learning and refinement, may vary among cultures, while HN traits, which may emerge early in development, tend to be universal across cultures. Park et al. (2011) empirically demonstrated that Australians, Japanese, and Koreans all view HN traits as essential, but only Koreans view UH traits as essential, indicating that culture may impact which traits are prioritized when evaluating the humanness of others.

Additionally, culture may influence how people from different countries respond to items measuring dehumanization. Due to the explicit nature of blatant dehumanization, researchers have raised concerns about the effect of social desirability biases (i.e., responding to research measures in a manner they believe to be more socially acceptable; Holtgraves, 2004) in measuring blatant dehumanization (Gawronski & De Houwer, 2014; Pesko et al., 2021). Individuals from collectivistic cultures such as Confucian Asian countries (e.g., Korea) may be more susceptible to social desirability concerns and not respond honestly to blatant dehumanization measures compared to individuals from more individualistic cultures such as Europe or the US. However, there is a lack of cross-cultural research examining the dehumanization of individuals with disabilities, including autism.

Among individual factors, intergroup contact experiences have been repeatedly studied in relation to dehumanization (Bruneau et al., 2020). In particular, positive quality, but not quantity, of intergroup contact was associated with less dehumanization of marginalized groups (e.g., people on welfare, Native Americans, Mexicans) across participants from five countries (the US, Hungary, Greece, Spain, and Israel). To our knowledge, no previous study has examined the association between the quality of contact and dehumanizing attitudes toward autistic people. However, Cage et al. (2019) found that a dichotomous contact quantity variable (i.e., whether participants had any connection to autism or not) did not predict subtle dehumanizing attitudes toward autistic people among English participants. In the same study, knowledge about autism was not associated with dehumanization of autistic people (Cage et al., 2019). Having accurate knowledge about autism may not necessarily indicate low dehumanizing attitudes, considering that dehumanizing attitudes, including dehumanizing language use, are pervasive in autism research written by researchers whose expertise is in autism (Botha, 2021).

The current study also explored whether essentialism, a variable that has not been studied in relation to stigma toward autistic people, is associated with dehumanization of autistic people. Essentialist understanding of social groups—viewing a social group as discrete, fixed, or as a "natural kind" rather than set apart by a human-created boundary—has been associated with dehumanization of outgroups (Leyens et al., 2001). Greater essentialist beliefs tend to lead to thinking that clear boundaries distinguish group members from non-group members, resulting in less regard for diversity and the complexity of humanness (Landry et al., 2022; Leyens et al., 2003). This categorical thinking may create a clear distinction between the ingroup and outgroup, leading to the attribution of attributes that make a target social outgroup (e.g., Africans and Blacks) a different natural kind with inherently different essences and makes them seem less human compared to the ingroup (Holtz & Wagner, 2009). Previous research has demonstrated that essentialist thinking is associated with blatant dehumanization of various national groups (Iranians, North Koreans, Somalis, and Chinese) and subtle dehumanization of immigrants and racial outgroups among Americans (Costello & Hodson, 2010, 2014). While heightened essentialism has been associated with stigma toward individuals with mental disorders or substance abuse (Howell et al., 2011), its relationship to dehumanization and stigma toward autistic people has yet to be studied.

## The Current Study

Given the scarcity of research on the dehumanization of autistic people, this study aimed to gain a cross-cultural understanding of dehumanization of autistic people by examining both blatant and subtle dehumanization among Koreans and Americans.

We adapted Haslam's dual model (2006) to measure blatant dehumanization, asking participants to rate the extent to which they perceived autistic people as animal-like or child-like (thus lacking UH traits) or machine-like (lacking HN traits). Additionally, applying mind perception theory, we assessed the extent to which participants attributed agency or experience capabilities to autistic people to measure subtle dehumanization. Because autism research has incorrectly, yet consistently, argued that autistic individuals have difficulties perceiving others' minds (Baron-Cohen, 1995), we aimed to explore how non-autistic individuals perceive the minds of autistic people. We refer to the types of dehumanization within blatant and subtle dehumanization as domains and examine five dehumanization domains in this study. Specifically, the study investigated the following pre-registered research questions (RQs):

*RQ1: Do non-autistic people blatantly and subtly dehumanize autistic people?* Based on the findings of Cage et al. (2019), which showed that non-autistic people viewed autistic people as having fewer UH traits but not HN traits, we hypothesized that participants would blatantly dehumanize autistic people by categorizing them as animal-like or child-like, but not machine-like. Similarly, we hypothesized that participants would subtly dehumanize autistic people by denying agency but not experience traits to autistic people.

*RQ2: Are there cross-cultural differences in the dehumanization of autistic people?* We hypothesized that Koreans would report less blatant dehumanization compared to Americans due to concerns about social desirability and that Koreans would express more subtle dehumanization of autistic people compared to Americans because Koreans report greater stigma toward autistic people than do Americans (Kim et al., 2021, 2022).

*RQ3: How are the individual variables of stigma toward autistic people, knowledge about autism, quality and quantity of previous contact with autistic people, cultural tightness, and essentialism associated with the dehumanization of autistic people?* Drawing on the dehumanization literature that has found an association between dehumanization and stigma (Haslam, 2006; Waytz & Schroeder, 2014), we hypothesized that greater levels of dehumanization would be associated with heightened stigma. Further, in line with the dehumanization literature that has found associations between the dehumanization of racial outgroups and contact quality and essentialism (e.g., Bruneau et al., 2020, and Costello & Hodson, 2010, 2014, respectively), we hypothesized that a more positive quality of contact with autistic people and less essentialism would predict less dehumanization of autistic people. Additionally, we hypothesized that knowledge about autism and contact quantity would not predict dehumanization, based on the findings of Cage et al. (2019). Furthermore, we hypothesized that heightened cultural tightness would predict greater dehumanization. Wang et al. (2022) found that people living in tight cultures tend to prioritize a person's instrumentality (i.e., usefulness for goal achievement) rather than their personhood. They explained that in tight cultures, unrestricted interactions among members that may easily generate deviations from norms are discouraged (Jackson et al., 2020). In such constrained interactions, people are likely to dehumanize others by prioritizing utility over their human qualities and feelings (Bostyn et al., 2016; Fowers, 2010).

## Methods

### Participants

A total of 641 Korean and 524 American adults (> 18 years old), recruited via Amazon Mturk and DataSpring (a Korean online panel similar to MTurk) completed the Qualtrics online survey. Amazon MTurk and DataSpring are online platforms through which researchers and businesses can hire and crowdsource a human workforce to complete discrete, on-demand tasks and surveys. Of the participants, 201 Korean participants and 65 Americans who failed one of the two attention check questions (Buchanan & Scofield, 2018) were excluded. We asked about participants' diagnostic status twice, and 3 Korean and 37 American participants who identified as autistic on one item but not on the other were excluded from the analysis. Three Korean and 193 American participants who self-identified as autistic in both questions were excluded because we aimed to examine non-autistic people's dehumanizing attitudes toward autistic people. A total of 229 American and 404 Korean participants' responses were included in the final analysis. Table 1 presents the detailed participant characteristics.

### Procedures

After agreeing to the online consent form, participants were informed that they would answer questions about their attitudes toward autistic and non-autistic individuals. Subsequently, Qualtrics randomly divided them into two

**Table 1** Participant characteristics

| Demographic variable | Mean (SD) | | *p*-values[a] |
|---|---|---|---|
| | United States ($n=229$) | South Korea ($n=404$) | |
| Age [Range] | 39.4 (11.3) [19, 68] | 40.1 (11.9) [19, 670] | .4 |
| Proportion of males | .5 | .5 | .6 |
| Explicit stigma | 2.1 (.8) | 3.2 (.9) | < .001 |
| Autism knowledge | 3.7 (.5) | 3.3 (.3) | < .001 |
| Contact quantity | 3.7 (1.5) | 2.2 (1.0) | < .001 |
| Positive contact quality | 5.3 (1.1) | 3.5 (1.2) | < .001 |
| Negative contact quality | 2.8 (1.7) | 2.7 (1.1) | .3 |
| Essentialism | 4.4 (.8) | 4.7 (.6) | < .001 |
| Essentialism—biological | 4.6 (1.3) | 5.0 (1.0) | < .001 |
| Essentialism—discreteness | 4.6 (1.4) | 4.6 (1.1) | .9 |
| Essentialism—informativeness | 4.9 (1.0) | 4.6 (1.2) | < .001 |
| Cultural tightness | 4.4 (.9) | 4.8 (.7) | < .001 |
| | *n* (%) | | |
| Have met an autistic person | 175 (76.4) | 222 (55.0) | < .001 |
| Ethnicity—American[c] | | | |
| White/Caucasian | 182 (79.5) | N/A | N/A |
| African-American | 15 (6.6) | N/A | N/A |
| Hispanic | 4 (1.8) | N/A | N/A |
| Asian | 16 (7.0) | N/A | N/A |
| Native American | 3 (1.3) | N/A | N/A |
| Other | 9 (3.9) | N/A | N/A |
| Ethnicity—Korean[c] | | | |
| Korean | N/A | 536 (100.0) | N/A |
| Multi-cultural | N/A | 0 (0) | N/A |
| Education | 3.8 (.9) | 3.6 (1.0) | .02 |
| Secondary School | 27 (11.8) | 84 (20.8) | |
| Vocational/Trade/Technical School | 35 (15.3) | 51 (12.6) | |
| College | 130 (56.8) | 215 (53.2) | |
| Advanced (Masters, Doctoral) | 37 (16.2) | 54 (13.4) | |

[a]*p*-values calculated from *t*-tests comparing the United States and South Korea; [b]Ethnicity variable was not mutually exclusive

*N/A* not applicable

groups: one starting with dehumanization-related questions about autistic people and then non-autistic people, and the other group starting with non-autistic people and then autistic people. Afterward, all participants, regardless of the group, completed the rest of the online survey, including the Social Distance Scale, Participatory Autism Knowledge-Measure (PAK-M), contact-related items, essentialist belief items, cultural tightness items, and a demographic questionnaire. All study procedures, including the online informed consent, were approved by the authors' institution review board.

## Measures

All instruments utilized showed sufficient reliability (See Supplementary Table S1 for the alpha values). Supplementary Material A presents the full list of items included.

The first and second authors, who are fluent in both English and Korean, were involved in the translation of the instruments measuring blatant and subtle dehumanization, previous contact, and essentialism (i.e., instruments that had not been previously translated to Korean). The second author initially translated the instruments from English to Korean, and the first author subsequently back-translated the items from Korean to English. The authors were then engaged in

a discussion to address any discrepancies and subsequently revised the Korean translation of the instruments.

#### Blatant Dehumanization

We assessed blatant animal-like dehumanization using the Ascent Scale (Kteily & Bruneau, 2017; Kteily et al., 2015), which displayed figures evolving through five stages from ape to human. Participants were instructed to indicate the level of evolution represented by the average member of two social target groups (autistic and non-autistic) by adjusting a slider on the screen, which ranged from 0 to 100. We reverse-scored the item; the closer the slider was placed to the ape figure, the higher the score, indicating a greater level of animal-like dehumanizing attitudes. Additionally, we asked participants to rate how they perceived the target group in terms of being child-like or machine-like using a 6-point Likert scale. A higher score on each child and machine question indicated a greater perception of the target group as being child-like or machine-like, respectively.

#### Subtle Dehumanization

We adapted Gray et al.'s (2007) instrument to measure subtle dehumanization. Participants rated each target group (autistic and non-autistic people) on 11 mental capacities representing the agency dimension (e.g., self-control, morality) and 7 mental capacities representing the experience dimension (e.g., desire, hunger) using a 5-point Likert scale. The scores were reverse-scored and averaged, with a higher score in each dimension indicating greater dehumanization (i.e., greater denial of agency and experience).

#### Social Distance Scale

We used a social distance scale (Gillespie-Lynch et al., 2019), adapted from Bogardus (1933) and frequently employed in previous cross-cultural studies of stigma toward autistic people (e.g., Kim et al., 2021, 2022; Someki, 2019), to measure stigma toward autistic people. The measure asked participants to indicate their willingness to interact with an autistic person in varying levels of intimacy and contexts using a 5-point Likert scale. Participants' responses were averaged, and higher mean scores indicated greater stigma.

#### PAK-M

We utilized the PAK-M, originally adapted from Stone's (1987) 13-item instrument and later revised in collaboration with autistic students (Gillespie-Lynch et al., 2022), to measure knowledge about autism. The version we employed asked participants to rate the 29 true-or-false statements on a 5-point Likert-type scale. The scores were averaged, with a higher score indicating more accurate knowledge about autism.

#### Previous Contact

To measure the quantity of previous contact with autistic people, we first asked if participants had any experience meeting an autistic person (labeled as the presence of contact). Those who responded "yes" to the first question were asked subsequent questions in which participants rated the extent of their contact with an autistic person as friends, family, or acquaintances, on a 7-point Likert scale (Islam & Hewstone, 1993). This variable was labeled as contact frequency. Instruments measuring the contact quality were only presented to participants who indicated that they had met an autistic person. The measure consisted of five items each representing positive and negative contact quality (e.g., unfairly criticized or feeling intimidated for negative quality items and cheerful and pleasant for positive quality items), adapted from Islam and Hewstone (1993) and Pettigrew (2008) and rated on a 7-point Likert scale. Higher average scores for the positive items represented a more positive quality, while higher average scores for the negative items represented a more negative quality of contact. We did not use a summary quality score by combining the positive and negative items because subsequent analyses revealed that positive and negative items had different relationships with dehumanization variables.

#### Cultural Tightness

We adapted Gelfand et al.'s (2011) Cultural Tightness Scale, which asked participants to rate the degree to which social norms within nations are clearly defined and enforced to measure cultural tightness. Instead of inquiring about the strictness of national social norms, we revised the measure and asked participants to rate the degree to which they personally believe it is important to comply with social norms. The revised 3-item instrument used a 5-point Likert scale, with a higher mean score indicating a stronger emphasis on social norms.

#### Essentialism

To measure essentialism, we used Bastian and Haslam's (2006) Essentialist Belief measure, which consists of three subscales: biological basis, discreteness, and informativeness. The biological basis scale evaluated beliefs that human attributes are biologically grounded; the discreteness scale assessed beliefs that people can be categorized into discrete categories; and the informativeness scale measured the beliefs that variations among individuals offer sufficient information to make inferences about them. The version

used in this study consisted of four items in each subscale, rated on a 7-point Likert scale. A higher average score in each subscale indicated stronger essentialist beliefs, and the scores of the subscales were averaged to represent the total essentialist index.

### Demographics

The demographic questionnaire included questions about participants' gender, age, race, education level, how long they had lived in the US or South Korea, and diagnostic status.

## Data Analysis

We conducted all data analyses using STATA. To address multiple hypotheses testing, we considered *p*-values less than 0.005 as significant, and between 0.05 and 0.005 as suggestive (Wasserstein et al., 2019). We performed exploratory independent *t*-tests for all variables by country and order (i.e., whether participants answered questions about autistic people first [$n = 323$] or non-autistic people first [$n = 310$]). The preliminary t-tests by country were conducted to examine and compare the cross-cultural variability of data and to understand participant characteristics in each country. Exploratory t-tests by order were conducted to examine whether we need to take the order variable into account when conducting further analyses. We also conducted exploratory zero-correlation analyses between all variables included by country and in the merged data set. See Supplementary File for the correlation matrices.

To address the first and second RQs, we used robust linear mixed-effects regression analysis[2] to predict each domain of dehumanization as the dependent variable. We included target group (autistic vs. non-autistic) as the within-subject variable and country (US vs. Korea) as the between-subject variable, controlling for the order as covariates. We conducted post-hoc simple-effects analyses for significant main effects and interaction effects.

The findings from the robust linear mixed-effects regression analyses and exploratory correlation analyses suggested that dehumanization may operate through different mechanisms in South Korea and the US. Therefore, we focused on separate analyses by country to address the third RQ. To investigate the third RQ, participants' ratings toward autistic people were subtracted from their ratings toward non-autistic people, resulting in a summary dehumanization score for each domain. To address the third RQ, we first conducted zero-order correlations between stigma and the scores in the five dehumanization domains, by country and in the combined sample, controlling for the order. Then, we conducted a set of regression analyses[3] predicting the five different domains of dehumanization by country, using variables (knowledge, presence of contact, contact frequency, positive and negative contact quality, essentialism, cultural tightness, age, gender, education level, and ethnicity) that showed suggestive correlations ($p < 0.05$) with dehumanization in zero-order correlations and controlling for the order. We conducted separate analyses to examine the association between stigma and dehumanization and excluded stigma from the regression model as a predictor to mitigate multicollinearity issues, considering that most of the included predictors had previously been identified as predictors of stigma in previous studies (e.g., Gillespie-Lynch et al., 2019; Obeid et al., 2015).

An initial examination of assumptions revealed that some of the regression models violated the assumptions of heteroscedasticity and normality. Please refer to Supplementary Table S2 for the results of the Swilk-Shapiro test, which assesses normality, the Breusch-Pagan test and White test, which assess heteroscedasticity, and the variance inflation factor test, which examines multicollinearity, for each regression. Therefore, we conducted robust regression, which corrects for minor violations of assumptions. We did not remove the outliers (i.e., studentized residuals > 3; UCLA, n.d.) because their removal did not improve the assumption violations and only resulted in minor changes in both regular and robust regressions. Across all models, we included autism-related variables first (knowledge and contact-related variables), followed by cultural variables (essentialism and tightness), and demographic variables.

Finally, we conducted sensitivity analyses in which order was not considered for all analyses addressing the three RQs. Minimal or no changes were observed in the coefficients and *p*-values, and the overall significance patterns remained the same.

[2] We did not utilize repeated-measure multivariate analysis of covariance (MANOVA) because our research focus was on understanding different associations of each predictor with various dehumanization domains, rather than examining the overall effect of a variable across different domains of dehumanization. Also, we assessed the assumptions related to MANOVA and found that Levene's test, commonly used for evaluating variance homogeneity, indicated violations of the assumption of equal variances across domains. Therefore, we chose to utilize robust linear mixed-effects regression analysis, which can account for unequal variances.

[3] We did not conduct multivariate regression because initial zero-order correlations revealed that different sets of variables were correlated with different domains of dehumanization, and the included predictors varied across dehumanization domains.

**Table 2** Summary result of robust mixed-effects linear regression predicting dehumanization with target and country

| Domains | Predictors | Coefficient | Robust *SE* | *z* | *p*-value |
|---|---|---|---|---|---|
| Animal: | | | | | |
| | Target Group[a] | −16.44 | 1.14 | −14.41 | <.0001 |
| | Country[b] | −7.22 | 1.85 | −3.91 | <.0001 |
| | I (Target Group * Country) | 8.82 | 1.82 | 4.85 | <.0001 |
| | Order [c] | 3.60 | 1.29 | 2.80 | .005 |
| Machinelike: | | | | | |
| | Target Group [a] | −.36 | .09 | −4.12 | <.0001 |
| | Country [b] | .35 | .12 | 2.96 | .003 |
| | I (Target Group * Country) | −.11 | .13 | −.89 | .37 |
| | Order [c] | .23 | .09 | 2.43 | .02 |
| Childlike: | | | | | |
| | Target Group [a] | −−1.88 | .09 | −20.84 | <.0001 |
| | Country [b] | −.34 | .11 | −3.11 | .002 |
| | I (Target Group * Country) | 1.07 | .14 | 7.70 | <.0001 |
| | Order [c] | .24 | .08 | 2.84 | .004 |
| Experience: | | | | | |
| | Target Group [a] | −8.77 | .05 | −18.65 | <.0001 |
| | Country [b] | −6.00 | .09 | −6.98 | <.0001 |
| | I (Target Group * Country) | .58 | .07 | 8.79 | <.0001 |
| | Order [c] | .07 | .06 | 1.12 | .26 |
| Agency: | | | | | |
| | Target Group [a] | −1.50 | .06 | −24.49 | <.0001 |
| | Country [b] | −1.11 | .08 | −13.10 | <.0001 |
| | I (Target Group * Country) | .70 | .10 | 6.97 | <.0001 |
| | Order [c] | .13 | .06 | 2.33 | .02 |

[a]Reference target group: autistic people; [b] reference group: South Korea. [c] reference order group: those asked about autistic people first

## Results

### Exploratory Comparisons Across Countries and Order

As reported in Table 1, independent samples' *t*-tests revealed that Koreans showed significantly greater stigma, less knowledge about autism, less frequent and positive contact with autistic individuals, and greater cultural tightness and essentialism ($p < 0.001$ for both), and, suggestively, higher education level ($p = 0.02$) than Americans. There was no order difference in age ($p = 0.4$), gender ($p = 0.6$), and low contact quality ($p = 0.3$).

In terms of order differences, among Koreans, those asked about non-autistic people first reported greater animal, machine, and child-like dehumanization than those asked about autistic people first. Among Americans, those asked about non-autistic people first reported greater animal-like dehumanization than those asked about autistic people first. Among Americans, Koreans, and the combined sample, there were no order differences in subtle dehumanization scores. See Supplementary Table S3 for the detailed results of *t*-tests.

### Dehumanization of Autistic People

The robust linear mixed-effects regression analysis revealed significant main effects of the target group variable (all $p < 0.0001$) and country ($p < 0.0001$ for animal-like, child-like, experience, and agency domain and $p = 0.003$ for child-like domain). Post-hoc analyses of target group showed that participants dehumanized autistic people compared to non-autistic people across all domains. Further, the post-hoc analysis of country showed that Koreans showed significantly greater dehumanization than Americans in the animal-like, experience, and agency domains (all $p < 0.0001$), while Americans showed more dehumanization than Koreans in the machine-and child-like domains. See Table 2 and 3 for the results of robust mixed-effect linear regressions and the post-hoc analyses of main effects, respectively.

**Table 3** Results of the post-hoc analysis of the main effect of target group on dehumanization

| Domains | Main effect | Contrast Coefficient | *z* | *p*-value |
|---|---|---|---|---|
| Animal | Target Group | − 12.03 | − 13.24 | < .0001 |
| | Country | − 2.82 | − 2.11 | .04 |
| Machine | Target Group | − 1.35 | − 19.40 | < .0001 |
| | Country | .30 | 2.87 | .004 |
| Childlike | Target Group | − .42 | − 6.70 | < .0001 |
| | Country | .20 | 2.07 | .04 |
| Experience | Target Group | − .59 | − 17.76 | < .0001 |
| | Country | − .31 | − 4.20 | < .0001 |
| Agency | Target Group | − 1.15 | − 22.97 | < .0001 |
| | Country | − .76 | − 12.41 | < .0001 |

The reference group of the target group was non-autistic people (i.e., the negative contrast coefficient indicates that autistic people were more dehumanized than non-autistic people). The reference group of the country was South Korea (i.e., the negative contrast coefficient indicates that the overall dehumanization score of Koreans was greater than that of Americans)

## Country-Level Differences in Dehumanization

The interaction effects were significant in all dehumanization domains (all $p$s $< 0.0001$) except in the machine-like domain ($p = 0.37$). Post-hoc simple effects analyses showed that Koreans exhibited greater animal-like dehumanization of autistic people than Americans ($p = 0.0002$), but there was no country difference when the target group was non-autistic people ($p = 0.22$). In the child-like dehumanization domain, while Americans reported greater dehumanization of non-autistic people than Koreans ($p < 0.0001$), Koreans reported greater dehumanization of autistic people than Americans ($p = 0.002$). Koreans attributed fewer experience capabilities toward autistic people than Americans ($p < 0.0001$), but there was no country difference when the target group was non-autistic people ($p = 0.81$). Finally, Koreans attributed significantly fewer agency capabilities toward both autistic and non-autistic people compared to Americans (both $p < 0.0001$). Figure 1 illustrates the mean ratings toward autistic and non-autistic people by country across all domains. See Supplementary Table S4 for the mean ratings of non-autistic and autistic people by country and in the merged dataset.

## Associations Between Stigma and Dehumanization

Among Koreans, stigma was positively correlated with all five domains of dehumanization ($p < 0.003$), controlling for the order. Among Americans, stigma was positively correlated with animal-like ($p = 0.0004$) and child-like ($p = 0.01$) dehumanization and the denial of experience to autistic people ($p = 0.0001$), controlling for the order. Table 4 presents the full results of partial correlations by country and in the combined dataset.

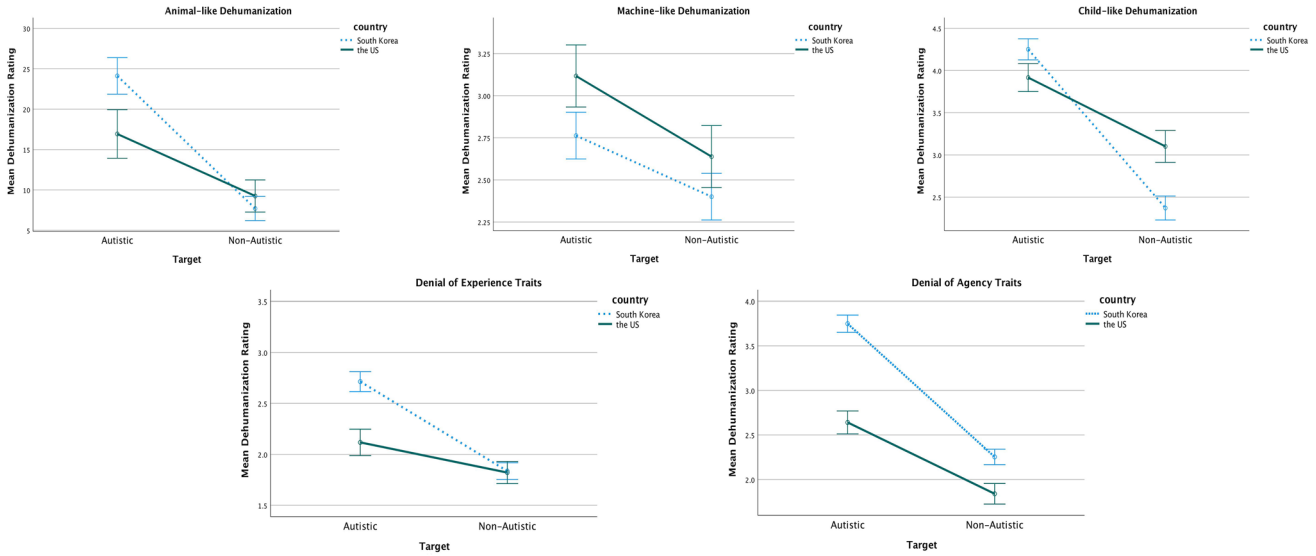
## Other Individual Factors Associated with Dehumanization

The regression results predicting domains of dehumanization in South Korea and the US are presented in Tables 5 and 6, respectively. Among Koreans, lower contact quality ($p = 0.005$) significantly predicted greater animal-like dehumanization and less cultural tightness ($p = 0.03$), greater essentialism ($p = 0.01$), and order ($p = 0.02$) marginally predicted greater animal-like dehumanization. None of the variables were correlated with child-like dehumanization; therefore, a regression analysis was not performed. Lower quality contact and order marginally predicted greater child-like dehumanization ($p = 0.02$ and 0.04, respectively). Less autism knowledge and lower contact quality marginally predicted greater dehumanization in the experience domain (both $p = 0.01$). Lower contact quality ($p < 0.001$) significantly predicted and greater cultural tightness ($p = 0.02$), greater essentialism ($p = 0.02$), and females ($p = 0.02$) marginally predicted greater dehumanization in the agency domain.

Among Americans, less knowledge ($p < 0.001$) significantly predicted heightened animal-like dehumanization; older age ($p = 0.01$) marginally predicted greater machine-like dehumanization. Less accurate autism knowledge and lower contact quality (both $p = 0.001$) significantly predicted greater child-like dehumanization. Less accurate knowledge ($p = 0.007$) marginally predicted greater dehumanization in the experience domain. Lower contact quality ($p = 0.04$) predicted greater dehumanization in the agency domain.

**Table 4** Results of partial correlation between different types of dehumanization and stigma, controlling for the order

| | Correlation Coefficient (*p*-value) | | |
|---|---|---|---|
| | Koreans | Americans | Combined |
| Animal-like | .29 (< .0001) | .23 (.0004) | .32 (< .0001) |
| Machine-like | .15 (.003) | .09 (.16) | .10 (.01) |
| Child-like | .33 (< .0001) | .17 (.01) | .38 (< .0001) |
| Experience | .20 (.0001) | .26 (.0001) | .33 (< .0001) |
| Agency | .39 (< .0001) | .12 (.06) | .38 (< .0001) |




*Note*. Error bars indicate 95% confidence interval.

**Fig. 1** Mean ratings for dehumanization by country

**Table 5** Regression analysis predicting dehumanization among Koreans

| Domains | Predictors | *B* | *SE B* | β | *t* | *p*-value |
|---|---|---|---|---|---|---|
| Animal-like: $F = 6.86$; $R^2 = .16$; $p < .0001$ | | | | | | |
| | **Positive Contact Quality** | **−4.14** | **1.49** | **−.20** | **−2.78** | **.005** |
| | Negative Contact Quality | 3.14 | 1.73 | .14 | 1.81 | .07 |
| | Contact Quantity | 1.30 | 6.52 | .01 | .20 | .84 |
| | Tightness | −5.42 | 2.49 | −.17 | −2.18 | .03 |
| | Essentialism | 1.59 | .62 | .17 | 2.54 | .01 |
| | Order[a] | 7.34 | 3.17 | .15 | 2.32 | .02 |
| Childlike: $F = 4.68$; $R^2 = .13$; $p = .0002$ | | | | | | |
| | Positive Contact Quality | −.34 | .15 | −.21 | −2.31 | .02 |
| | Negative Contact Quality | .08 | .15 | .04 | .51 | .61 |
| | Contact Quantity | −.12 | .13 | −.07 | −.97 | .33 |
| | Tightness | .18 | .21 | .07 | .82 | .41 |
| | Essentialism | .07 | .05 | .09 | 1.23 | .22 |
| | Order[a] | .71 | .25 | .19 | 1.89 | .04 |
| Experience: $F = 5.74$; $R^2 = .11$; $p = .0002$ | | | | | | |
| | Autism Knowledge | −−.82 | .31 | −.23 | −2.60 | .01 |
| | Positive Contact Quality | −.13 | .05 | −.16 | −2.58 | .01 |
| | Essentialism | .05 | .03 | .12 | 1.71 | .09 |
| | Order[a] | .05 | .12 | .02 | .37 | .71 |
| Agency: | $F = 11.17$; $R^2 = .26$; $p < .0001$ | | | | | |
| | Autism Knowledge | −.70 | .39 | −.14 | −1.79 | .08 |
| | **Positive Contact Quality** | **−.36** | **.08** | **−.33** | **−4.60** | **<.001** |
| | Negative Contact Quality | .07 | .09 | .06 | .71 | .48 |
| | Tightness | .30 | .13 | .18 | 2.43 | .02 |
| | Essentialism | .08 | .03 | .15 | 2.44 | .02 |
| | Gender[b] | .39 | .16 | .15 | 2.44 | .02 |
| | Order[a] | .21 | .16 | .08 | 1.36 | .17 |

Bolded items are significant predictors of stigma in each domain ($p < .005$)

[a]Reference group: those asked about autistic people first. [b] reference group: men

**Table 6** Regression analysis predicting dehumanization among Americans

| Domains | Predictors | *B* | *SE B* | β | *t* | *p*-value |
|---|---|---|---|---|---|---|
| Animal-like: $F = 6.86$; $R^2 = .16$; $p < .001$ | | | | | | |
| | **Autism Knowledge** | **−11.24** | **2.93** | **−.29** | **−3.83** | **<.001** |
| | Positive Contact Quality | −2.52 | 1.77 | −.14 | −1.43 | .16 |
| | Order[a] | 3.98 | 2.84 | .10 | 1.40 | .16 |
| Machinelike: $F = 6.01$; $R^2 = .07$; $p = .0006$ | | | | | | |
| | Contact Quantity | −.14 | .07 | −.15 | −1.97 | .05 |
| | Age | .02 | .01 | .19 | 2.47 | .01 |
| | Order[a] | .12 | .20 | .04 | .60 | .55 |
| Childlike: $F = 5.70$; $R^2 = .18$; $p < .0001$ | | | | | | |
| | **Autism Knowledge** | **.90** | **.27** | **.29** | **3.28** | **.001** |
| | **Positive Contact Quality** | **−.46** | **.13** | **−.33** | **−3.52** | **.001** |
| | Contact Quantity | −.12 | .10 | −.11 | −1.18 | .24 |
| | Age | −.0003 | .01 | −.002 | −.02 | .98 |
| | Order[a] | −.02 | .21 | −.006 | −.08 | .93 |
| Experience: $F = 4.07$; $R^2 = .06$; $p < .008$ | | | | | | |
| | Autism Knowledge | −.23 | .08 | −.17 | −2.73 | .007 |
| | Positive Contact Quality | −.08 | .04 | −.13 | −.19 | .06 |
| | Order[a] | .04 | .10 | .03 | .44 | .66 |
| Agency: $F = 3.45$; $R^2 = .04$; $p < .03$ | | | | | | |
| | Positive Contact Quality | −.19 | .09 | −.17 | −2.12 | .04 |
| | Order[a] | .25 | .18 | .09 | 1.34 | .18 |

Bolded items are significant predictors of dehumanization in each domain ($p < .005$)

[a]Reference group: those asked about autistic people first

## Discussion

### Dehumanization of Autistic People

Partially confirming our hypothesis, participants rated autistic people as less human compared to non-autistic people across all domains of dehumanization, suggesting that, regardless of cultural background, autistic individuals may face both blatant and subtle forms of dehumanization. Extending Cage et al.'s (2019) findings, which suggested that non-autistic people subtly dehumanize autistic individuals, viewing them as lacking in UH traits (attributing the child- or animal-like characteristics), participants in this study blatantly categorized autistic people as more animal-like and child-like than non-autistic people.

Furthermore, in contrast to Cage et al. (2019), who found that autistic people were not denied HN traits (suggesting no evidence of machine-like subtle dehumanization), participants in this study blatantly rated autistic people as more machine-like compared to non-autistic people and denied experience traits. This could be attributed to a popular image of autistic people as robots or machines in media representation (e.g., the robotic view of autistic thought processes in "Rain Man" (Draasima, 2009), resulting in a stereotype of low warmth in autism (Boysen et al., 2023). Boysen et al. (2023) also demonstrated that low warmth was correlated with heightened blatant animal-like dehumanization of individuals with various disabilities, including autism. Additionally, some autistic characteristics, such as preferring structured schedules and adherence to specific routines, may have contributed to the perception of autistic people as machine-like.

The findings about subtle dehumanization showed that non-autistic people reported an incorrect understanding of the agency and experience capabilities of autistic people, adding support for the double-empathy theory, which posits that autistic people's social interaction difficulties arise from a mismatch in communication and cognitive styles between autistic and non-autistic people and that non-autistic people struggle to understand and empathize with autistic people's experiences (Milton, 2012). Notably, robots and dead persons were rated as lacking both agency and experience traits in Gray et al. (2007). Gray et al. (2007) observed that the mind dimensions of agency and experience are related to people's morality evaluation. Individuals characterized by agency are seen as moral actors accountable for their actions, whereas individuals with experience are viewed as moral patients, entitled to ethical and moral treatment. For instance, Capozza and colleagues (2016) noted that denying patients' experience traits in medical settings may result in the neglect of patients' needs with detrimental effects on

their health outcomes, and that patient dehumanization may allow clinicians to attenuate the stress from perceiving patients' pain and diminish the feelings of guilt. Similarly, the denial of autistic people's agency and experience may relate to non-autistic people's justification for providing autistic people with fewer opportunities to responsibly exercise their rights or not providing the support that autistic people need, respectively. Promoting understanding among non-autistic individuals about the agency and experiences of autistic people could reduce dehumanization and stigma toward autistic people and foster recognition of their rights and support needs.

### Country-Level Differences in Dehumanization

Greater dehumanizing attitudes toward autistic individuals among Koreans, when compared to Americans, may originate from South Korea's higher cultural tightness (Gelfand et al., 2011), which potentially lowers the threshold for considering someone less than human. Notably, Koreans often use the phrase "saramdo anida" (i.e., 사람도 아니다, meaning "not even human") to demean individuals who deviate from socially expected behavior, lack reason, or commit heinous acts. Autistic individuals might be especially vulnerable to such evaluation, as their behavior can sometimes deviate from societal norms.

Insignificant cross-cultural differences in the machine-like domain suggest that Koreans and Americans may share a similar level of familiarity or exposure to specific autistic characteristics (e.g., repetitive behaviors) that contribute to the machine-like dehumanization of autistic people. Whether some of the autistic characteristics are perceived as machine-like may not be as influenced by cultural differences as dehumanizing attitudes in other domains, and future studies should examine the generalizability of these findings to different cultures.

### Associations Between Stigma and Dehumanization

Our hypothesis regarding the associations between stigma and dehumanization domains was confirmed among Koreans and partially confirmed among Americans. Among Americans, stigma was significantly linked to animal-like dehumanization and the denial of experience traits, marginally connected to child-like dehumanization, but not associated with machine-like dehumanization or the denial of agency traits. Meanwhile, stigma was significantly associated with all dehumanization domains among Koreans.

Mirroring previous studies' findings of associations between stigma and blatant animal-like dehumanization of minority race individuals or those with mental illness (Krzyzanowski et al., 2019; Kteily et al., 2015, 2016; Martinez et al., 2011), blatant animal-like dehumanization was associated with stigma toward autistic individuals in both cultures. Regarding machine-like dehumanization, as the US is a relatively individualistic culture that values uniqueness, possessing machine-like characteristics might have been seen as a unique aspect of individuality, and considering autistic people as machine-like may not have been related to stigma toward them. In contrast, South Korea's strong emphasis on collectivism may have led to the stigmatization of any type of non-socially conforming characteristics (including machine-like characteristics) that that could hinder harmonious relationships.

The insignificant association between the denial of agency traits and stigma among Americans aligns with the findings of Cage et al. (2019) and provides further evidence that the perceived high cognitive capacity of autistic people may not be linked to stigma toward them in Western cultures. On the other hand, in South Korea, where there is a high prioritization of academic and professional competitiveness (Grinker & Cho, 2013), the perceived lack of cognitive capabilities of autistic people may have been viewed as a threat to collective professional or academic success, thereby leading to an increased association with stigma toward autistic individuals, unlike in the American context. Finally, both Koreans and Americans who attributed greater experience traits to autistic individuals reported less stigma. When people perceived autistic individuals as sharing similar subjective experiences, they may have felt more emotionally connected and empathetic toward autistic individuals, leading to reduced stigma.

### Other Individual Factors Associated with Dehumanization

The variables predicting dehumanization varied across domains and between countries; therefore, our hypothesis was partially supported. Neither the presence or absence of contact or contact frequency were associated with any domain of dehumanization, similar to the findings of Cage et al. (2019). Meanwhile, more positive contact quality was frequently correlated with less dehumanization in both cultures. This finding is in line with several previous autism stigma studies that found an association between stigma toward autistic people and contact quality, but not contact quantity, and suggests that rather than just the existence of contact, it is the context of contact that matters (Bottema-Beutel et al., 2018; Cage et al., 2019; Gardiner & Iarocci, 2014; Gillespie-Lynch et al., 2019). Specifically, positive contact quality, but not negative quality, predicted less dehumanization. This could be due to differences in response styles when responding to questions asking about positively vs. negatively worded items or could suggest that positive and negative quality may be distinct constructs rather than

opposite ends of a single spectrum of contact experience. Aberson and Gaffney (2008) utilized separate instruments measuring negative contact experience with any outgroup member and the quality of contact with close out-group friends; the current findings highlight the importance of measuring different kinds or valence of contact to further contextualize the types of contact when examining dehumanization of autistic people.

Notably, greater knowledge significantly predicted less animal-like dehumanization, but greater child-like dehumanization only among Americans. Greater knowledge about autistic characteristics may have led participants to view autism from neurological or developmental perspectives rather than attributing autistic characteristics to primitive and instinctual behaviors, resulting in less animal-like dehumanization. Additionally, accurate knowledge may have prompted participants to recognize similarities between themselves and autistic individuals, making them less willing to blatantly categorize autistic people as non-human. Simultaneously, individuals with greater knowledge may also be more familiar with societal stereotypes or media portrayals that depict autistic individuals as dependent, vulnerable, or lacking adult-like characteristics. Jones (2022) argued that media portrayals of autism have led to both positive and negative outcomes, including increased societal awareness about autism and the reinforcement of stereotypes portraying autistic individuals as child-like and with "a heart of gold."

Cultural tightness and essentialism were not significant predictors of dehumanization domains, but the examination of correlation patterns suggested that these two variables may be culturally-specific variables, associated with dehumanization only in South Korea, but not the US. Cultural tightness, which was associated with stigma in Korea but not in the US in a previous study (Kim et al., 2021), was negatively correlated with animal-like dehumanization and positively correlated with child-like dehumanization and the denial of agency, but only among Koreans (and therefore were included as a predictor) and not among Americans. Koreans with greater cultural tightness may value self-restraint capacities that enable people to conform to social norms, leading them to rate autistic individuals, who often exhibit behaviors that deviate from social norms, as child-like or lacking in agentic capacity. Regarding the negative associations between cultural tightness and animal-like dehumanization, culturally tight individuals may have felt that explicitly classifying autistic people as animal-like was contrary to cultural norms. Consequently, they may have consciously or unconsciously suppressed such responses on the assessment scale to align with social expectations. Finally, greater essentialism[4] was correlated with all domains of dehumanization except for machine-like dehumanization among Koreans, but not Americans. This is the first study to identify cultural differences in associations between dehumanization of autistic people, cultural tightness, and essentialism, and the exact mechanism should be explored in future research.

## Implications

The findings of this study have several implications. First, different variables were associated with different domains of dehumanization in each culture, suggesting complexity and cross-cultural differences in the mechanisms of dehumanizing attitudes toward autistic individuals. Since different cultures define humanness in different ways (Vaes et al., 2012), the traits contributing to the formation of dehumanizing attitudes toward autistic individuals may also vary depending on the culture. Furthermore, machine-like dehumanization exhibited different analytical patterns compared to other domains in most analyses, indicating that machine-like dehumanization may operate via different mechanisms than other domains. We suggest the need for future cross-cultural research that focuses on the mechanisms of each dehumanization domain to better understand how non-autistic people form dehumanizing attitudes toward autistic individuals in different cultures. Additionally, more studies are needed to identify how autistic characteristics or societal perceptions that influence the consideration of an autistic person's humanness vary across cultures.

Second, participants who were asked about non-autistic people first reported higher blatant dehumanizing attitudes than those asked about autistic individuals first, but the order did not impact the subtle dehumanization items. When participants rated non-autistic people first, it may have triggered a greater contrast bias than when rating autistic individuals first. Contrast bias is an unconscious cognitive bias that occurs when people assess two subsequently or simultaneously appearing stimuli in comparison to each other, rather than evaluating them individually. This can result in the enhancement or diminishment of response to one stimulus (Pepitone & DiNubile, 1976). By being asked to consider non-autistic people first, participants may have set a specific anchor as a reference point for humanness, and consequently perceived heightened differences from the norm when considering autistic individuals later. Contrast bias may have been more pronounced when directly rating autistic and non-autistic people with three simple items than when rating a range of capacities of autistic and non-autistic people. More studies exploring the methodological complexities involved

[4] We conducted exploratory follow-up analyses to examine which subscales within the essentialism index are correlated with or predict dehumanization domains. There were no consistent patterns regarding which specific subscale was associated with dehumanization domains, and none of the subscale scores significantly predicted dehumanization domains.

in measuring different domains of dehumanization of autistic people are needed to examine the conscious and unconscious factors impacting participants' response patterns.

Finally, the high dehumanization of autistic people emphasizes the need to examine the impact of dehumanization on autistic individuals. While a few studies conducted by autistic researchers have shown that autistic people are aware of and negatively impacted by the dehumanization of autistic people (Botha, 2021), further research is needed to explore how different domains of dehumanization are perceived by and influence autistic individuals.

### Limitations

There are several limitations that need to be considered when interpreting the findings of this study. First, the agency and experience items used in this study primarily reflected prosocial qualities, and the measurement of subtle dehumanization may have been flawed, potentially reflecting participants' attribution of prosocial traits to the ingroup (i.e., non-autistic people). Over (2020) questioned the dehumanization hypothesis by arguing that because the items included in the measurement of subtle dehumanization are mostly related to prosocial emotions, what may appear to be dehumanization, in fact, could represent ingroup preference (i.e., attributing more prosocial attributes to the ingroup compared to the outgroup). Future studies should consider using both prosocial (e.g., compassion) and antisocial traits (e.g., hostility) when measuring subtle dehumanization to examine whether the findings can indeed be interpreted as subtle dehumanization of autistic people.

Second, similar to the limitations of previous cross-cultural studies (Kim et al., 2021, 2022; Someki et al., 2019), we categorized participants into simplistic groups as "Korean" or "American," essentially treating each country as a representation of a singular culture. However, this approach fails to consider the extensive diversity within countries, especially in the case of the US, a nation marked by significant ethnic, cultural, and racial heterogeneity. Also, there was a substantial difference in the final sample size between the American and Korean participants, which may have influenced the robustness of the observed patterns of the cross-cultural findings.

Third, this study did not investigate the potential association between the support needs of autistic individuals and dehumanizing attitudes toward them. Previous research has indicated that non-autistic individuals report different levels of stigma depending on the support needs of autistic individuals, and the patterns of this association differ across cultures (Kim & Gillespie-Lynch, 2022). This suggests that the perceived support needs may contribute to the dehumanization of the particular autistic individual or autistic people as a social group. Future studies should explore how the level of support needs is associated with both blatant and subtle dehumanization of autistic individuals while also considering the potential influence of cultural factors on these associations.

Finally, even though participants engaged in an anonymous online survey, there is a possibility that they may have been affected by social desirability bias. We suggest future research that utilizes a reliable social desirability measure or the Implicit Association Test (IAT) to mitigate the impact of social desirability bias. The IAT is a psychological tool designed to measure the strength of a person's unconscious associations between mental representations of stimuli by asking participants to rapidly categorize the stimuli into one of two categories (Greenwald et al., 1998). The broader literature on dehumanization has also employed the IAT to assess subtle dehumanizing attitudes toward different racial groups or females (Goff et al., 2008; Rudman et al., 2012).

## Conclusion

This was the first study to cross-culturally examine both blatant and subtle forms of dehumanization of autistic individuals. Non-autistic individuals consistently rated autistic people as less human than non-autistic people. Koreans reported heightened dehumanization of autistic people compared to Americans, but both Koreans and Americans attributed a similar level of machine-like qualities to autistic people. Given the complexity of the dehumanization constructs demonstrated in this study, future cross-cultural studies are needed to explore the autistic characteristics influencing the perception of humanness of autistic individuals and the associated conscious and unconscious cognitive processes in each dehumanization domain. The findings about subtle dehumanization also support the double-empathy theory by demonstrating that non-autistic people have inaccurate perceptions about autistic individuals' agency and experience capacities. Finally, interventions aimed at helping non-autistic people understand that autistic individuals possess the same level of agency and experience capabilities as non-autistic people, as well as increasing opportunities for high-quality contact with autistic individuals, may be helpful in reducing dehumanizing attitudes toward autistic individuals.

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## Declarations

**Competing Interests** The authors have no competing interests to declare that are relevant to the content of this article.

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