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Is autism stigma higher in South Korea than the United States? Examining cultural tightness, intergroup bias, and concerns about heredity as contributors to heightened autism stigma

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Abstract

South Korea, a relatively collectivistic and homogeneous country with heightened cultural tightness, is believed to have particularly high levels of stigma toward autistic individuals, who sometimes engage in behaviors that diverge from social norms. This study investigated cross-cultural differences in autism stigma (assessed with a Social Distance Scale) in the United States and South Korea. Two-hundred and seventy-six American and 494 Korean participants who completed an online survey were included in the analysis. We conducted a multiple regression predicting autism stigma with variables that were correlated with stigma. Koreans reported greater autism stigma than Americans. Greater vertical individualism, lesser horizontal collectivism, less accurate autism knowledge, less pleasant and frequent previous contact with autism, concerns about the marriageability of family members, and higher cultural tightness predicted greater stigma. Cultural tightness, or an emphasis on social norms, which was heightened among Korean participants, contributed to greater autism stigma in South Korea. Findings highlight the need to increase autism knowledge and foster pleasant and frequent contact with autistic individuals, especially for those who accept inequality as a part of human interactions in both South Korea and the United States. Moreover, interventions that help Koreans understand the relativeness of social appropriateness may reduce autism stigma in South Korea.

Lay abstract

Misunderstandings about autism may be more common in South Korea than the United States. Koreans often have clear ideas about how people should act. Another way of saying this is that Korea has a tight culture. Americans are looser, meaning people are freer to act as they like. Autistic people often do not act as people expect them to. This makes autistic people stand out. Autistic people may stand out more in tight cultures like South Korea. We studied how people in South Korea and the United States feel about autism. We wanted to see *why* Korean people might reject autistic people more than people in the United States do. American and Korean people did online surveys. Koreans said they did not want to get close to autistic people more than Americans did. People who understood autism and had met and liked autistic people wanted to get closer to autistic people. We were surprised to learn that Americans said having an autistic brother or sister makes it harder to find a romantic partner more than Korean people did. People who believed that autism makes it harder for family members to find love did not want to get very close to autistic people. Koreans said people should act as expected more than Americans did. People who believed that acting as expected was important did not want to get very close to autistic people. Teaching people that there are many ways of being a good person may help them understand and appreciate autistic people.

Keywords

autism, cross-cultural differences, culture, desired social distance, intergroup, stigma

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Stigma is a multifaceted process which includes interpreting attributes as discrediting and discrimination (Goffman, 1963; Link & Phelan, 2001). Phelan et al. (2008) note that stigma and prejudice comprise a single concept with similar underlying mechanisms; prejudice is frequently studied by focusing on racism/ethnocentrism, while stigma research often focuses on people with disabilities. Stigma negatively impacts autistic individuals by limiting access to formal and informal social supports and instigating poor mental health and social exclusion (Botha & Frost, 2020; Dehnavi et al., 2011; Divan et al., 2012; Grinker & Cho, 2013; Mitchell et al., 2021). Given that autism stigma is shaped by societal norms, it is not surprising that it varies across cultures (Obeid et al., 2015; Someki et al., 2018).

Previous studies have shown that stigma toward autism (assessed with Social Distance Scale, which measures desired social distance from autistic people) tends to be greater in cultures that are commonly regarded as more collectivistic (i.e. focusing on social harmony and pursuit of group goals) such as Japan (Someki et al., 2018) or Lebanon (Gillespie-Lynch et al., 2019; Obeid et al., 2018) than in the United States, which is considered more individualistic (i.e. valuing distinctiveness and independence). Yet, country-level differences in desired social distance from autistic people between the United States and Lebanon were no longer apparent once the following individual differences that were associated with heightened social distance were accounted for: less positive past contact with autism, reduced autism knowledge, heightened acceptance of inequality, and less openness to experience (Gillespie-Lynch et al., 2019).

The aforementioned association between heightened acceptance of inequality, and *not* collectivism, and greater desired social distance from autistic people suggested that inconsistencies in observed associations between individualism-collectivism and stigma toward varied conditions in prior literature might be attributable to an often-overlooked dimension of the Culture Orientation Scale, which is commonly used to measure individualism-collectivism (Gillespie-Lynch et al., 2019). The vertical (acceptance of inequality and hierarchy) versus horizontal (emphasizing equality) dimension of this scale is orthogonal to the individualism–collectivism dimension, yielding four quadrants (Triandis & Gelfland, 1998). When these four quadrants were examined separately, heightened vertical individualism (seeing the self as autonomous within a justly hierarchical system) and reduced horizontal collectivism (seeing the self as part of a collective whose members should be equal) were associated with greater desired social distance from autistic people (Gillespie-Lynch et al., 2019).

Heightened acceptance of inequality is associated with reduced openness on a cultural level (Hofstede & McCrae, 2004). Openness to experience, or heightened intellectual curiosity, aesthetic sensitivity, unconventionality, and responsiveness to new information (McCrae & Costa, 1987), has been associated with heightened social distance toward autism and other forms of prejudice (e.g. homophobia and racism; Cullen et al., 2002; Sibley & Duckitt, 2008). People who are open to experience tend to be more appreciative of unconventional people and to be more responsive to information indicating that negative stereotypes about minorities are incorrect than people who are low in openness to experience (Flynn, 2005).

Both individual differences that contribute to stigma and variations across cultures in autism stigma can inform culturally relevant anti-stigma interventions. Therefore, we conducted a study examining stigma in a country that is believed to have particularly high levels of autism stigma, South Korea, and a country believed to have relatively low levels of autism stigma, the United States. The number of autistic children who are not identified as autistic is exceptionally high in South Korea, contributing to interest in the country as a potential example of heightened autism stigma (Kim et al., 2011; see Pantelis & Kennedy, 2016 for a statistical correction). Understanding factors that may lead to heightened autism stigma in South Korea may help undiagnosed autistic Korean individuals receive a diagnosis and the formal support they need.

South Korean culture and autism

Autism is often misdiagnosed as reactive attachment disorder, a diagnosis that is attributable to parenting failures rather than genetic factors, in South Korea (Kang-Yi et al., 2013). Qualitative research conducted solely in South Korea suggests that Korean mothers may reject the autism label to separate their children from a diagnosis that they believe is permanent and hereditary, thus protecting the marriageability of relatives and avoiding community concerns about how an autistic child might impact other children's academic productivity (Grinker & Cho, 2013). Viewing autism as highly hereditary may lead mothers of autistic children in South Korea to blame themselves for causing autism in their children, and thus impugning the family line with an "incurable disorder" (Grinker & Cho, 2013). Therefore, believing that autism is hereditary may both reduce the romantic prospects of the relatives of autistic people and contribute to heightened autism stigma in South Korea.

Compared to the United States, which is one of the most diverse and culturally heterogeneous countries in the world (Perez & Hirschman, 2009), South Korea is commonly viewed as a racially, ethnically, and culturally homogeneous society, sharing the same language, heritage, and traditions (Cumings, 2005; Kim & Kim, 2012). This homogeneity may foster collectivism, elevating the importance of harmony and interdependence in South Korea (Kim-Rupnow, 2005; Triandis & Gelfland, 1998). Koreans tend to value conformity and criticize individual differences; thus, those who diverge from social norms,

such as people with disabilities, often become targets of discrimination, stigma, and exclusion in South Korea (Kim-Rupnow, 2005). Indeed, a recent study revealed that openness toward an individual exhibiting characteristics of autism was higher among nursing students in Britain than South Korea (Mac Cárthaigh & Lopez, 2020). Self-reported autistic traits, which did not differ between participants in the United Kingdom and South Korea, were unrelated to attitudes toward autism. Given that collectivism did not explain cross-cultural differences in autism stigma (i.e. desired social distance) between participants in Lebanon and the United States, the key question our research seeks to address is *why* autism stigma (assessed with a Social Distance Scale) may be higher in South Korea than in the United States.

One possible cultural value that aligns with the aforementioned focus in South Korea on adapting to societal norms is cultural tightness. Cultural tightness refers to the strength of a society's norms and its rejection of deviant behaviors (Triandis, 1989). Cultures tend to tighten when faced with ecological threats such as warfare or disease outbreaks to better coordinate social regulations and defeat threats (Jackson et al., 2019). As tightness necessitates agreement about norms, it can be influenced by heterogeneity (Triandis, 1989). Due to variability among members of heterogeneous societies, defining what constitutes social norms and deviance is less clear. Consequently, heterogeneous groups tend to be more culturally loose, or lenient toward deviant behaviors. The reverse mechanism applies to homogeneous groups, which tend to have more clearly defined norms. Jackson et al. (2019) found that heightened cultural tightness predicted heightened prejudice toward a range of minority identities, including race, religion, nationality, sexuality, and general disability status. Cultural tightness is greater in South Korea than in the United States (Uz, 2015) and has not been examined in relation to autism stigma previously. We hypothesized that greater cultural tightness might contribute to more desired social distance from autistic individuals in South Korea relative to the United States, as autistic individuals often deviate from societal norms.

Like cultural tightness, intergroup bias, or the tendency to evaluate one's in-group more positively than an out-group, is another factor that varies across cultures, contributes to prejudice, and has not been examined in relation to autism stigma (Dotsch et al., 2008; Fischer & Derham, 2016; Fiske, 1998; Hewstone et al., 2002). Intergroup bias is generally understood in terms of in-group favoritism (i.e. positive evaluation or preferential treatment of a member of one's own group) and out-group derogation (i.e. expression of disfavor and negative evaluation of out-group members). According to the Social Identity Theory, as people categorize themselves as in-group members, they incorporate the in-group into their sense of self, assimilate the in-group's characteristics, and start to favor the in-group (Tajfel & Turner, 1986). The trust and positive regard that are extended to in-group but not out-group members result in in-group favoritism. Triandis et al. (1988) contend that collectivists tend to identify strongly with their in-groups, resulting in an increased desire for social distance from non-group members and heightened in-group favoritism. However, more recent research suggests that people from more collectivistic cultures may exhibit in-group bias favoring stable in-groups (like race or neurotypicality) while people from more individualistic cultures may, longing for some form of connection, exhibit heightened in-group bias toward arbitrarily defined in-groups (discussed by Fischer & Derham, 2016).

The current study

We conducted a cross-cultural comparison of autism stigma in South Korea and the United States to address the following research questions (RQs):

> *RQ1.* Do autism stigma, autism knowledge, and beliefs about autism identified in prior qualitative research conducted solely in South Korea (i.e. that autism negatively influences the marriageability of relatives and the productivity of groups) differ between Koreans and Americans?

Relative to Americans, we hypothesized that Korean participants would report greater autism stigma, less accurate knowledge about autism, and stronger beliefs that autism is hereditary, that having an autistic sibling negatively impacts marriageability, and including an autistic person harms group productivity.

> *RQ2.* Which variables explored in past autism stigma research uniquely predict autism stigma?

As in past research (Gillespie-Lynch et al., 2015, 2019; Obeid et al., 2015), *we expected that being female, greater autism knowledge, more pleasant and frequent previous contact with autistic individuals, more openness to experience, less vertical individualism, and more horizontal collectivism would be associated with lower autism stigma. In accordance with* Grinker and Cho's (2013) qualitative findings, we hypothesized that believing autism is *hereditary and concerns about autism's impacts on the marriageability of relatives and group productivity would lead to higher autism stigma. We did not have specific hypotheses regarding age or education level because of the lack of existing literature.*

> *RQ3.* Which variables identified in the broader prejudice literature but not previously explored in relation to autism uniquely predict autism stigma?

We hypothesized that greater cultural tightness, in-group enhancement, and out-group derogation would be associated with heightened autism stigma.

In line with previous cross-cultural autism stigma studies (Gillespie-Lynch et al., 2019; Obeid et al., 2018; Someki et al., 2018), we utilized non-autistic individuals' desired social distance from autistic individuals, which constitutes a portion of the construct of autism stigma, to index autism stigma.

Method

Participants

Two-hundred and seventy-six American and 494 Korean participants who completed online Qualtrics surveys for compensation were included in the final analysis. American and Korean participants were recruited via Amazon's MTurk and Data Spring (a Korean online panel similar to MTurk), respectively. Among the 570 American individuals who clicked the link to the survey, 36 did not consent to participate, 110 failed the two attention check items (i.e. please mark strongly disagree for this item; Buchanan & Scofield, 2018), 62 failed the manipulation check in the Dot Estimation Task (i.e. asking participants to choose their perception type after randomly assigning participants to either "detailed perceiver" or "global perceiver"), and 24 did not complete the survey. A detailed description of the Dot Estimation Task is presented in section "Measures." In addition, we eliminated the data from 62 Americans who self-identified as autistic, as we aimed to examine the autism stigma of non-autistic individuals. Data collected from participants who identified themselves as autistic will be explored in a subsequent study. Among the 868 Korean individuals who initially clicked the link to the survey, 17 did not consent to participate, 166 failed the attention check, 67 failed the manipulation check, and 124 did not complete the survey. None of the Korean participants identified themselves as autistic.

We did not include the data from participants who failed to complete the survey because we specified in the consent form that participants could withdraw from the survey at any time and their data would not be used. The proportion of participants who failed the manipulation check, which was calculated from the participant sample consisting of those who gave consent, did not fail the attention check, and completed the survey, differed between Korean (12%) and American (18%) participants ($p=0.008$). Supplementary Table S1 presents the results of *t*-tests exploring differences in participant characteristics depending on whether participants failed the manipulation check. Table 1 presents the characteristics of participants whose data were included in analyses.

Procedures

The online consent form informed participants that the purpose of the study was to measure their cognitive tendencies, attitudes, and experiences regarding disability and to validate survey instruments. We did not specify that we would be measuring in-group bias. After completing the consent form, participants completed an online survey including (in the following order) a Social Distance Scale, a Dot Estimation Task, Participatory Autism Knowledge-Measure (PAK-M), items assessing previous contact with autistic individuals, cultural tightness items, three items inspired by qualitative work by Grinker and Cho (2013) in Korea, an item assessing openness to experience, items assessing cultural orientation, age, gender, education level, and ethnicity.

A professional translator translated all surveys included from English into Korean. The first author back-translated the surveys into English. Subsequently, the second author and corresponding author independently reviewed the translation and made necessary revisions. All authors who were involved in the translation of the surveys are fluent in both English and Korean. The last page of the survey included a debriefing statement describing the purpose of the study in general and the Dot Estimation Task specifically. The Institutional Review Board (IRB) office of Yonsei University (IRB#: 7001988-202007-HR-938-02) approved all study procedures.

Measures

Social Distance Scale. See Supplementary Materials A for the full list of items used in this study. To measure stigma, we used a Social Distance Scale, which was originally developed by Bogardus (1933) and has been adapted and utilized in previous cross-cultural studies (Gillespie-Lynch et al., 2015, 2019; Obeid et al., 2015; Someki et al., 2018). The scale, measuring willingness to engage with an autistic person at varying levels of intimacy, has demonstrated evidence of internal consistency and validity (Gillespie-Lynch et al., 2015, 2019; Link et al., 2004). The version used in this study most resembles that of Gillespie-Lynch et al. (2019), but we eliminated three items that were designed for students (e.g. asking about the willingness to take a class taught by a professor with autism). Participants responded to eight items scored on a 5-point Likert-type scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), with higher mean scores indicating greater stigma. Three items were reverse-scored. The adapted Social Distance Scale demonstrated acceptable internal consistency in the current sample, with an overall alpha coefficient of 0.82 and Kaiser–Meyer–Olkin (KMO) value of 0.83 ($\alpha=0.72$ and 0.81 and KMO value = 0.75 and 0.83 for the United States and South Korea, respectively).

PAK-M. To measure autism knowledge, we used an adaptation of the Autism Awareness Survey (Stone, 1987) developed through collaboration with autistic students (PAK-M (PAKS-M)). The same version of this instrument was recently found to have acceptable internal consistency in

Table 1. Participant characteristics.

Demographic variable	Mean (SD)		*p*-values[a]
	The United States (*n* = 276)	South Korea (*n* = 494)	
Age [age range]	36.50 (10.02) [20, 68]	43.55 (12.53) [19, 69]	<0.0001 N/A
Proportion of male	0.61	0.49	0.002
Education[b]	3.05 (0.76)	3.53 (0.92)	<0.0001
Stigma	2.52 (0.64)	3.24 (0.67)	<0.0001
Tightness	4.37 (0.78)	4.73 (0.61)	<0.0001
In-group enhancement	4.87 (0.2)	4.72 (0.66)	0.011
Out-group derogation	3.41 (0.85)	3.47 (0.61)	0.29
Autism knowledge	3.42 (0.38)	3.33 (0.28)	0.0003
Concerns about autism being hereditary	53.59 (23.54)	47.68 (24.13)	0.0011
Concerns about marriageability of relatives	3.36 (0.93)	3.09 (1.1)	0.0005
Concerns about productivity	2.66 (0.82)	3.49 (0.72)	<0.0001
Openness to experience	3.67 (0.88)	3.30 (0.95)	<0.0001
Pleasantness of previous contact	4.93 (1.24)	3.39 (1.12)	<0.0001
Quantity of previous contact	2.99 (0.95)	1.34 (0.67)	<0.0001
Vertical individualism	4.92 (1.10)	4.69 (0.87)	0.0016
Horizontal collectivism	5.37 (0.88)	4.89 (0.93)	<0.0001
	n (%)		
Ethnicity—American participants[c]			
European-American	186 (67.39)	N/A	N/A
African-American	50 (18.12)	N/A	N/A
Latino/Mexican	15 (5.43)	N/A	N/A
Asian-American	11 (3.99)	N/A	N/A
Other	16 (5.80)	N/A	N/A
Ethnicity—Korean participants[c]			
Korean	N/A	494 (100)	N/A
Multi-cultural	N/A	0 (0)	N/A
Proportion of manipulation check failure	0.18	0.12	0.008

SD: standard deviation; N/A: not applicable.
[a]*p*-values calculated from *t*-tests comparing the United States and South Korea.
[b]1, less than high school; 2, received high school diploma/GED; 3, vocational/trade/technical school; 4, bachelor's degree; 5, advanced degree (MA, PhD).
[c]Ethnicity variable was not mutually exclusive.

the United States and Lebanon (Gillespie-Lynch et al., 2019). Participants responded to 29 true-or-false statements (e.g. "Autistic children grow up to be autistic adults.") on a 5-point scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Higher mean scores represent more accurate knowledge. The PAK-M was developed to address concerns about existing autism knowledge measures, including the often low internal consistency of commonly used measures like the adapted Autism Awareness Survey (Gillespie-Lynch et al., 2015) and the Autism Stigma and Knowledge-Questionnaire (developed by Harrison et al., 2017; see Obeid et al., 2020 and Saade et al., 2021 for evidence of low internal consistency), lack of autistic input in how autism knowledge is defined in these measures, and potential inaccuracies in existing measures (e.g. interpreting the belief that autism is caused by God as evidence of stigma in the ASK-Q). The PAK-M had an alpha coefficient of 0.71 ($\alpha = 0.79$ for the US and $\alpha = 0.68$ for South Korea) and an overall KMO value of 0.90 (0.88 and 0.80 for the United States and South Korea, respectively). We also included one attention check within the PAK-M.

Items assessing previous contact. We assessed the pleasantness of participants' previous contact with autistic individuals with an item "In the past, were your overall experiences with individuals with ASD pleasant?" adapted from Gardiner and Iarocci (2014). Participants rated this item from 1 ("strongly disagree") to 7 ("strongly agree"). In addition, participants responded to the item "How often do you spend time with an individual with ASD?" (Brown et al., 1999) on a 5-point Likert-type scale ranging from 1 ("don't spend time") to 5 ("very often"). Finally, participants indicated their relationships to those with autism (e.g. your sibling is autistic, your acquaintance is autistic, or you have never met an autistic person).

Beliefs about autism based on Grinker and Cho (2013). We created three items based on the qualitative findings of Grinker and Cho (2013): (1) "If a person with autism has a child, how likely is it that his or her child will also have autism?" (2) "If a person in your community learns that his or her romantic partner has an autistic sibling, he or she may become less interested in marrying the person," and (3) "If an autistic person joins a group, the productivity of the group will increase." Participants responded to the first item by selecting a number between 0% and 100%, and the remaining two items utilized 5-point Likert-type scales ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Each of the three items captured distinct and specific constructs about autism. We did not incorporate these items into our autism knowledge scale because they represent attitudes rather than knowledge (e.g. they lacked a clear correct answer).

Openness to experience. One item assessing aesthetic chills from the openness subscale of the NEO Five-Factor Inventory-3 (NEO FFI-3; McCrae & Costa, 2007) measured openness to experience. We used this particular item ("Sometimes when I'm reading poetry or looking at a work of art, I feel a chill or wave of excitement") because McCrae (2007) showed that this item captured openness to experience most accurately in most of the 51 cultures examined. Participants rated their agreement with the statement on a 5-point Likert-type scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), with higher scores representing greater openness to experience.

Cultural orientation. Vertical individualism and horizontal collectivism, which comprise two subscales from Triandis and Gelfland (1998)'s Culture Orientation Scale, assessed participants' cultural orientations. We selected these two subscales because Gillespie-Lynch et al. (2019) found that they contributed to variation in desired social distance toward autism between the United States versus Lebanon. Each subscale comprised four items, to which participants responded on a 5-point Likert-type scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), with higher mean scores representing higher levels of vertical individualism and horizontal collectivism, respectively. The alpha coefficients for the vertical individualism and horizontal collectivism items were 0.71 and 0.80, respectively (vertical individualism: $\alpha = 0.75$ for the United States and $\alpha = 0.68$ for South Korea; horizontal collectivism: $\alpha = 0.74$ for the United States and $\alpha = 0.81$ for South Korea). The KMO values for the vertical individualism and horizontal collectivism items were 0.72 and 0.75, respectively (vertical individualism: 0.73 and 0.69 for the United States and South Korea, respectively; horizontal collectivism: 0.74 and 0.73 for the United States and South Korea, respectively). We also included one attention check among items measuring cultural orientation.

Cultural tightness. To measure cultural tightness, we used four items from Gelfand et al. (2011) assessing the degree to which social norms within nations are clearly defined and pervasively enforced. Participants responded on a 5-point Likert-type scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"), with higher mean scores representing stronger social norms and less tolerance of deviance. Gelfand et al. (2011) reported excellent reliability and validity for their six-item measure. The briefer scale used in this study had an alpha coefficient of 0.66 ($\alpha = 0.63$ for the United States and $\alpha = 0.68$ for South Korea) and an overall KMO value of 0.66 (0.69 and 0.68 for the United States and South Korea, respectively).

Dot Estimation Task. We used the Dot Estimation Task to measure in-group favoritism and out-group derogation in a minimal group paradigm (Gerard & Hoyt, 1974; Jetten et al., 1996). This study set out as an exploratory investigation on the relationship between generalized attitudes toward in-/out-groups and autism stigma, considering that generalized intergroup biases have implications on people's beliefs about social groups (Dunham, 2018). Moreover, a significant association between autism stigma and generalized intergroup biases would imply that efforts to make autistic individuals a part of the in-group may be a means through which autism stigma can be reduced.

Participants viewed five images, each showing black dots of different sizes at different locations on a white background. The computer displayed each image for 5 s, and participants estimated the number of dots in each image. Then, Qualtrics randomly assigned participants to one of two conditions ("detailed perceiver" or "global perceiver"). "Detailed perceivers" were told that they were classified as such because their responses to the task reflected their tendency to focus on the number of smaller dots, while "global perceivers" were told that they tended to focus on the number of larger dots. Participants were told that detailed and global perceivers differ in how they assess information in their daily lives. At this point, participants were asked to choose their perception type ("I am a detailed/global perceiver"), which served to filter those who failed the manipulation check. Considering that some participants may not have chosen the classified perception type because they do not agree with the type they were assigned, we decided that the manipulation check would be only applied to data analysis and interpretation of analyses including intergroup bias variables.

Participants then rated various characteristics of detailed perceivers and global perceivers. Participants evaluated eight positive (considerate, intelligent, trustworthy, sincere, friendly, creative, ambitious, and motivated) and eight negative (rude, stupid, boring, uninformed, self-centered, insensitive, incompetent, and apathetic) traits of in-group and out-group members on a 7-point Likert-type scale ranging from 1 ("do not agree at all") to 7 ("completely agree"; Crocker et al., 1987). As in previous studies measuring group

favoritism (e.g. Crocker et al., 1987; Rubin et al., 2010), we subtracted the mean score for negative trait evaluations from the mean score for positive trait evaluations for both in-groups and out-groups. We computed in-group favoritism by subtracting the in-group negative trait ratings from the mean score of in-group positive trait ratings. The more positive (vs negative) ratings participants confer on the in-group, the more favorable they are toward the in-group (i.e. in-group favoritism). We computed out-group derogation by subtracting the mean score for out-group negative trait ratings from the mean score for out-group positive trait ratings. The more positive (vs negative) ratings participants confer on the out-group, the more favorable they are toward the out-group, indicating less out-group derogation. The alpha coefficients and KMO values ranged from 0.85 to 0.92 and 0.79 to 0.86, respectively, for both South Korea and the United States.

Data analysis

First, we computed exploratory zero-order correlations in the combined sample and by country with an alpha level set at 0.05. Subsequently, we conducted independent *t*-tests to examine country differences for all variables (Table 1).

To identify variables to be included in the final regression model, we took the following steps:

1. A regression analysis predicting Social Distance from predictors examined for RQ2 (variables explored in past autism stigma research) that were correlated with Social Distance was conducted. The country variable was entered first because this is a cross-cultural comparison study, followed by the PAK-M, pleasantness and quantity of contact (variables frequently examined in general autism attitude literature), cultural orientation variables, openness to experience (variables examined in previous cross-cultural autism stigma studies), three items measuring beliefs about autism based on qualitative findings in Korea, and the demographic variables. Participants who failed the manipulation check were included in this analysis (Supplementary Table S2).
2. A regression analysis predicting Social Distance with predictors examined for RQ3 (variables identified in the broader prejudice literature but not previously explored in relation to autism) that were correlated with Social Distance was conducted. We also included key demographic variables included in Step 1. The country, cultural tightness, and intergroup bias variables were entered in the order listed, followed by the rest of the demographic variables. Participants who failed the manipulation check in Dot Estimation Task were excluded (Supplementary Table S3).
3. Potential predictors that significantly predicted Social Distance in Steps 1 and 2 were included in the final regression model. Participants who failed the manipulation check were excluded because in-group favoritism and out-group derogation were included in the final model. Country was entered first, followed by PAK-M, pleasantness and quantity of contact, cultural orientation variables (variables from RQ2), cultural tightness, and out-group derogation (variables from RQ3). Demographic variables (i.e. age, gender, and education level) were excluded from the model because they did not predict Social Distance in Steps 1 and 2.[1] The final model met the assumptions pertaining to multicollinearity, linearity, and normality of residuals after we eliminated five observations with studentized residuals larger than 3, following the recommendations of STAT 462 (Pennsylvania State University, 2018). To avoid Type 1 errors, we applied Holm–Bonferroni corrections with a target alpha level of 0.05 and 10 tests (there were 10 predictors in the final model) in the interpretation of the final model (Holm, 1979).

Community involvement

A Korean autistic adult who has lived both in the United States and South Korea provided feedback on the list of surveys included and suggested the particular importance of social norms in South Korea, which encouraged us to include the cultural tightness measure.

Results

Preliminary analysis showed that all variables were correlated with social distance toward autism. When examining zero-order correlations by country, social distance among American participants was negatively associated with concerns that an autistic person would hurt the productivity of a group ($r=-0.12$, $p=0.02$), whereas this association was positive for Korean participants ($r=0.34$, $p<0.001$). Cultural tightness was positively associated with social distance among Korean participants ($r=0.11$, $p=0.009$), while no such association occurred among American participants ($r=0.02$, $p=0.75$). Meanwhile, in-group favoritism ($r=-0.31$, $p<0.001$) and out-group derogation ($r=0.37$, $p<0.001$) were negatively and positively associated with social distance, respectively, among American participants; but there were no associations among Korean participants ($r=-0.08$, $p=0.05$ and $r=-0.06$, $p=0.14$ for in-group favoritism and out-group derogation, respectively). All other variables showed similar associations with social distance across countries (see Supplementary Tables S4 to S6 for the correlation matrices for the combined sample, American participants, and Korean participants, respectively).[2]

Koreans reported greater desired social distance from autistic people ($p<0.0001$), less accurate knowledge

Table 2. Summary of regression analysis for predicting stigma toward autism (excluding participants who failed the manipulation check).

Predictors	*B*	SE *B*	β	*t*	*p*-value
Country[a]	**0.22**	**0.06**	**0.15**	**3.53**	**<0.0001**
Vertical individualism	**0.08**	**0.02**	**0.10**	**3.43**	**0.001**
Horizontal collectivism	**−0.06**	**0.02**	**−0.08**	**−2.60**	**0.009**
Autism knowledge	**−0.34**	**0.07**	**−0.16**	**−4.83**	**<0.0001**
Concerns about autism being hereditary	0.001	0.0009	0.05	1.67	0.10
Concerns about marriageability of relatives	**0.12**	**0.02**	**0.17**	**5.95**	**<0.0001**
Pleasantness of previous contact	**−0.15**	**0.02**	**−0.28**	**−7.88**	**<0.0001**
Quantity of previous contact	**−0.12**	**0.03**	**−0.19**	**−4.61**	**<0.0001**
Tightness	**0.09**	**0.03**	**0.09**	**2.81**	**0.005**
Out-group derogation	0.03	0.01	0.05	−2.06	0.04
F	56.33				
R^2	0.45				

SE: standard error.
Bolded items are significant after applying the Holm–Bonferroni correction.
[a]The reference group was the United States.

about autism ($p = 0.0003$), and stronger belief that including an autistic person would hurt the productivity of a group ($p < 0.001$) than did Americans. In contrast, Americans more strongly believed that autism is hereditary ($p = 0.0005$) and that having an autistic sibling negatively impacts marriageability ($p < 0.0001$).

The results from the selection Steps 1 and 2 are presented in Supplementary Tables S2 and S3, respectively. Openness to experience was not included in the final model because it did not predict social distance in Step 1. In the final model, Korean nationality, less accurate autism knowledge, stronger belief that having an autistic sibling negatively impacts marriageability, less pleasant and frequent previous contact (all ps < 0.0001), greater vertical individualism ($p = 0.001$), and lower horizontal collectivism ($p = 0.009$) predicted greater stigma (Table 2).

In addition, cultural tightness predicted social distance toward autistic people ($p = 0.005$), while in-group enhancement and out-group derogation were not associated with social distance. The regression model predicting social distance explained 47% of the variance.[3] As a sensitivity test, we repeated the final model after including participants who failed the manipulation check, and out-group derogation became significant ($\beta = -0.08$; $p = 0.005$), in addition to the above-mentioned predictors (Supplementary Table S7).

Discussion

To our knowledge, this study is the first to directly compare autism stigma (assessed with a Social Distance Scale) in South Korea and the United States. We showed that Koreans and Americans have different levels of stigma, knowledge, and beliefs about autism, and we identified factors associated with autism stigma within and across the two countries. Our findings shed new light on prior cross-cultural autism stigma research by suggesting that more culturally tight cultures, like South Korea or Japan, foster greater stigma toward autism, than less culturally tight countries, like the United States (Gillespie-Lynch et al., 2019; Obeid et al., 2018; Siomeki et al., 2018).

Differences in stigma, knowledge, and beliefs about autism in South Korea and the United States

As hypothesized, Korean participants reported greater desired social distance from autistic people and less accurate knowledge about autism, similar to the differences in openness toward and knowledge about autism recently documented between British and Korean students (Mac Cárthaigh & Lopez, 2020). However, unexpectedly, Americans more strongly viewed autism as hereditary and negatively impacting marriageability than did Koreans. The variables assessing these constructs were inspired by Grinker and Cho (2013)'s qualitative work in just Korea. Our findings highlight the importance of cross-cultural comparisons for situating culture-specific patterns.

Americans were more concerned with how autism would influence personal matters such as marriageability while Koreans were more concerned with productivity, which is more salient in professional or educational contexts. Koreans are living in a highly academically and professionally competitive society (Kim-Rupnow, 2005) where high-quality education is often viewed as essential (Grinker & Cho, 2013). Intriguingly, our findings, albeit unexpected, align with prior research demonstrating heightened essentialist beliefs (i.e. that intelligence is inborn) in adults from the United States relative to adults from Korea (Kim, 2013). Kim speculated that reduced

essentialism, or believing that people are highly shaped by their experiences, may contribute to the heightened emphasis on education in Korea.

Variables examined in previous autism stigma research

Buttressing qualitative findings highlighting factors believed to contribute to autism stigma in South Korea, all three items inspired by Grinker and Cho's (2013) work were positively correlated with desired social distance from autistic people in South Korea. However, unexpectedly, concern about the marriageability of relatives was the only one of these variables inspired by prior qualitative work in just South Korea to predict autism stigma in the main regression model (and it was heightened in the United States). It is important to note that the concepts about and responsibilities that come with marriage may differ between two cultural groups as well as across individuals with different sexual preferences and religious beliefs. Future studies should examine how these individual or cultural variables influence the concepts of marriage and consequently the association between desired social distance from autistic people and concerns about the marriageability of relatives.

Greater autism knowledge, more pleasant and frequent previous contact with autistic individuals, heightened vertical individualism, and reduced horizontal collectivism also predicted greater autism stigma. This pattern of associations mirrors findings from student samples in the United States and Lebanon (e.g. Gillespie-Lynch et al., 2015, 2019; Obeid et al., 2015), suggesting that efforts to foster positive contact with autistic individuals and to increase autism knowledge may be helpful in reducing autism stigma across varied cultural contexts. Associations between heightened vertical individualism and lower horizontal collectivism and reduced autism stigma observed in this study and recent comparisons of the United States and Lebanon, strengthen evidence that acceptance of inequality contributes to stigma toward individuals who are considered different in terms of disability status, sexuality, or immigration status (Craig & Richeson, 2014; Gillespie-Lynch et al., 2019).

Contrary to prior work (e.g. Gillespie-Lynch et al., 2019), openness to experience and gender were *not* associated with autism stigma, nor were age and education. Although we used an openness to experience item that has been shown to be representative of openness cross-culturally (McCrae, 2007), this single item may not have captured aspects of the construct of openness to experience that are associated with autism stigma. McCrae (1993) contends that openness to experience can be factored into the domains to which people are open (e.g. fantasy, aesthetics, feelings, actions, ideas, and values). These findings suggest that autism stigma is associated with openness to domains other than the aesthetics domain assessed here. Limited variance of the education variable may account for a lack of associations between education level and attitudes toward autism. Most cross-cultural studies on autism stigma (Gillespie-Lynch et al., 2015, 2019, 2020; Obeid et al., 2015; Someki et al., 2018) have sampled college students with limited age and education level range; we urge that more studies examining potential associations between autism stigma, age, and education level are needed.

Variables examined in previous prejudice research

As hypothesized, cultural tightness predicted autism stigma. Cultural tightness was positively correlated with autism stigma among Koreans but not Americans, and Korean participants reported higher cultural tightness than American participants, indicating that an emphasis on social norms may contribute to the heightened autism stigma in South Korea. Interventions to help Koreans understand and appreciate diverse ways of *being*, such as those grounded in the neurodiversity framework (Singer, 2017), may reduce autism stigma in South Korea. Moreover, cross-cultural research exploring why cultural tightness is a more important predictor of autism stigma in some cultural contexts than in others is needed.

It is important to note that participants in this study completed the survey in August 2020 during the COVID-19 outbreak. As cultural tightness may be activated by ecological catastrophes (Jackson et al., 2019), it is possible that the results would have differed if the study had been conducted when participants were not facing such unprecedented ecological threats. Longitudinal studies examining relationships among the presence of ecological threats, cultural tightness, and autism stigma in diverse cultural contexts are needed for a more comprehensive understanding of how historical and cultural factors shift autism stigma.

Contrary to our hypothesis, in-group favoritism and out-group derogation, which were measured from a minimal group paradigm, did not predict autism stigma in the final model. Interestingly, in-group favoritism and out-group derogation were negatively and positively associated with autism stigma, respectively, among American but not Korean participants. In-group favoritism was greater among American than Korean participants. While this contradicts the common belief that collectivistic individuals tend to show more in-group favoritism (Yamagishi et al., 1998), more recent research suggests that people from more collectivistic cultures may only exhibit in-group bias toward stable in-groups while people from more individualistic cultures may exhibit heightened in-group bias toward arbitrarily defined in-groups like the manipulation used in this study (Fischer & Derham, 2016).

Further, when participants who failed the manipulation check were included, out-group derogation predicted

heightened desire for social distance from autistic people, suggesting participants with heightened out-group derogation negatively judge an autistic individual as a member of an out-group. Some participants who failed the manipulation check may have failed because they did not agree with the classification they were assigned. In particular, those who failed the manipulation check reported lower in-group favoritism, and it is possible that these participants may not have considered the members of the arbitrarily assigned group as their true in-group. Different patterns may have emerged had we measured bias toward real groups instead of instructing participants to evaluate members from a randomly assigned, artificial group.

Limitations and implications for future studies

Findings should be interpreted while considering the following limitations; these limitations also suggest directions for future studies. First, this study adopted a rather simplistic approach in dichotomizing cultures as Korean and American. Someki et al. (2018) have cautioned that treating each country as a proxy for a single culture ignores the cultural diversity within countries. This is particularly important to consider because the United States is an ethnically, racially, and culturally diverse country. Regrettably, we did not inquire about the regions or cities within the United States that American participants are from although there is some evidence that spatial factors (e.g. rural vs urban) are associated with stigma toward sexual minorities and cultural homogeneity (Swank et al., 2013). We also did not ask about the countries from which the 11 Asian-American participants in the United States or their parents had immigrated, and it is possible that people with Korean heritage who may have been influenced by Korean culture may have been included among the American participants. Future studies should examine how regions within a country, country of origin, and cultural influences during childhood relate with autism stigma.

Second, participants' responses on the Social Distance Scale may not accurately represent how they would behave in real-life situations for various reasons. Although participants completed an anonymous online survey, participants may have been influenced by social desirability bias, responding in a way that they deemed more socially appropriate (Holtgraves, 2004). It would be appropriate for future studies to utilize a scale that measures social desirability bias and, ideally, to include observations of participants' behaviors in a natural setting to reduce this social desirability effect. In addition, some measures, such as our shortened measure of cultural tightness, exhibited low internal consistency, suggesting that the full measure should be used in future work.

Third, to shorten the length of the survey, we had to use several single-item measures (i.e. openness to experience, pleasantness and quantity of contact, and autism-specific beliefs), which admittedly lack content validity and indicate that findings should be interpreted with caution. Constructs underlying concerns about the heredity of autism, marriageability of relatives, and group productivity should be explored in future studies to fully operationalize their association with autism stigma and/or knowledge. We also omitted two items from Cultural Tightness Scale, which may have lowered the alpha and KMO values, and selectively chose two subscales of the Culture Orientation Scale. We urge that future studies should examine these constructs with complete instruments.

Fourth, while we used one instrument to measure autism stigma (a Social Distance Scale), stigma is influenced by multiple contextual factors. For instance, some individuals would be more willing to engage in a personal relationship but would like to keep social distance with respect to work-related matters. Moreover, these contextual factors may differ across cultures, age, or gender. Future research with representative samples should address these contextual factors by conducting in-depth semi-structured interviews to better capture participants' judgment processes or by utilizing behavioral observations to understand how situational factors influence stigma.

Relatedly, we only used a single measure of knowledge. Kuzminski et al. (2019) have shown that specific types of autism knowledge (i.e. knowledge about how autistic individuals experience their social world) predicted autism attitudes, while other types of knowledge (i.e. knowledge about specific characteristics of autism) did not. Whether there are cross-cultural differences in participants' levels of different types of knowledge and how different types of knowledge are associated with autism stigma should be explored in future studies. Fifth, it is important to note that back-translation from Korean to English was conducted by the first author who was not blind to the measures.

Finally, all participants who self-identified as autistic and thus were eliminated from the analysis[4] were American. Since we did not use a screening instrument for autistic traits, we cannot rule out the possibility that some of the Koreans were in fact autistic; this suggests the importance of including an autistic trait screening instrument when conducting studies in countries with particularly high autism stigma instead of asking participants to self-identify as autistic.

Conclusion

Korean participants reported greater autism stigma (assessed with a Social Distance Scale) compared to American participants. Individual characteristics such as autism knowledge, the belief that having an autistic sibling would influence marriage potential, pleasantness and quantity of previous contact with autistic individuals, and vertical individualism also contributed to autism stigma.

Cultural tightness, a variable correlated with autism stigma only among Korean participants, was associated with autism stigma. Heightened emphasis on social norms may be contributing to heightened autism stigma in South Korea relative to the United States. Thus, efforts to increase autism knowledge by fostering pleasant and frequent contact with autistic individuals are needed for individuals who accept inequality. In particular, Koreans reported less pleasant and frequent contact with autistic individuals, and this may be due to less inclusive special education contexts in South Korea compared to that in Western countries (Kwon, 2005) and the highly competitive nature of Korean education settings (Kim-Rupnow, 2005). More inclusive education settings that allow non-autistic students to spend quality time and cooperate with autistic students in natural settings may lead to more pleasant and frequent contact, resulting in reduced autism stigma in South Korea. Moreover, recent research works noted the heightened importance of *nunchi* (i.e. the perceptiveness and instinctive sense to read, understand, and follow social rules) in Korean society (e.g. Bong et al., 2021; Mac Cárthaigh & Lopez, 2020), which may be associated with cultural tightness and may contribute to high autism stigma in South Korea. We suggest that interventions that emphasize diverse ways of *being* and the fact that social appropriateness is contextually defined rather than absolute may reduce autism stigma in South Korea.

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Supplemental material

Supplemental material for this article is available online.

Notes

1. Including age, gender, and education level in the final model did not change the significance pattern, and none of these demographic variables predicted social distance.
2. Eliminating participants who failed the manipulation check did not change the significance patterns in all zero-order correlations.
3. A follow-up sensitivity analysis showed that removing the five outliers did not change the significance pattern of the final model.
4. Including participants who self-identified as autistic in the data analysis did not change the significance patterns for all variables except for the horizontal collectivism, which did not survive the Holm–Bonferroni corrections with the *p*-value of 0.023.

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