U.S. adults' beliefs and explanations about health disparities

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Abstract

Public health data highlight disease outcome disparities corresponding to age, social class, and race, which are due to biological, behavioral, and/or structural factors (depending on the disparity). We examined whether adults are aware of these disparities and how they explain them. This study recruited U.S. adults (N = 241) through Mechanical Turk and examined whether they thought that there was a relation between social categories and illness. We examined their judgments and explanations for transmitting and contracting COVID-19 or the common cold. We found that adults thought that older adults and poor people were more likely than younger adults and rich people to get sick, whereas younger adults were more likely than older adults to transmit disease. People relied on biological explanations for disparities due to age, and structural explanations for disparities due to social class. However, the results for race were more mixed, suggesting that people do not always assume that social categories are related to illness.

Keywords: social cognition; health disparities; structural reasoning

Introduction

The COVID-19 pandemic in the United States disproportionally affected older individuals (CDC, 2023) and Black, Latinx, Native American, and low-income communities (Clark, Fredricks, Woc-Colburn, Bottazzi, & Weatherhead, 2020; Tai, Shah, Doubeni, Sia, & Wieland, 2021). These health disparities show that social categories play a role in the spread of illness, as marginalized people throughout history have experienced the brunt of pandemics and mass disease events (Athni et al., 2021). In the case of the COVID-19 pandemic, an important source of these disparities are structural factors such as access to healthcare (Clark et al., 2020), or social categories (such as "the elderly") being use as a proxy for immune function (Fulop, Witkowski, Pawelec, Cohen, & Larbi, 2014). These disparities show that in order to make sense of how illness spreads, people need to consider both biological and social information. However, studies on how people think about illness have predominantly focused on their understanding of biology (Au & Romo, 1996; Labotka & Gelman, 2022), with relative little discussion of the role of social categories. In this study, we examined whether adults are aware of these disparities and whether they attribute this disparity to biological, structural and/or behavioral factors.

People might also assume that different social groups are more likely to transmit illness. People might assume that members of an outgroup are more likely to spread illness (Petersen, 2017). This was evidenced in the COVID-19 pandemic, when many people in the U.S. blamed Asian people for the spread of COVID-19. Therefore, people might also link social categories to the likelihood of transmitting illness. In this paper, we examine whether adults in the United States think that social categories play a role in illness transmission and contagion, and if so, what explanations they provide for this link.

Some work has explored how people incorporate social information when thinking about illness. For example, Raman and Gelman (2008) found that 4- to 8-year-old children thought that people were less likely to contract illnesses from someone they knew. However, this incorporation of social information decreased with age and was considered a less mature understanding of illness. Menendez, Labotka, Umscheid, and Gelman (2024) examined how 5- to 12-year-old U.S. children and their parents thought about health disparities. Researchers presented participants with two characters that differed only with regards to one social category (e.g., age, gender, race, social class), and asked them whether one of the characters was more likely to get sick with COVID, or if both were equally likely. Afterwards, participants were asked to explain their reasoning for their selection. They found that parents (and to a lessed degree children) thought that older adults and poor people were more likely to get sick with COVID-19. Parents thought that characters differing in other categories, such as gender, race and personality, would be equally likely to get sick, but if they thought there was a difference in terms of race, they tended to select the more vulnerable group. Other studies looking at the likelihood of serious illness have similarly found that adults are more aware of disparitied due to age than race or social class (Gollust et al., 2022). Thus, research so far suggests that people at different ages think that social categories play a role in getting (very) sick.

Another important aspect is how people explain health differences. Past work suggests that people might rely on three explanatory frameworks when thinking about differences between people: behavioral, biological and structural frameworks (Jayaratne et al., 2009; Meyer, Roberts, Jayaratne, & Gelman, 2020). Biological explanations refer to internal, inherent or innate causes (Gelman, 2003; Cimpian & Solomon, 2014). These causes are seen as internal to the individual, located inside of the body, and seen unchangeable. Behav-

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ioral explanations refer to individual choice. These explanations focus on internal factors (such as a person's desires), but are considered malleable (Meyer et al., 2020). Structural explanations refer to external (and often difficult to change) factors like social and cultural forces (Vasilyeva, Gopnik, & Lombrozo, 2018; Vasilyeva & Lombrozo, 2020; Amemiya, Mortenson, Heyman, & Walker, 2023). This explanation is of particular interest as social structures are a primary factor in certain health disparities (Clark et al., 2020). Prior work has shown that people use all of these frameworks when trying to explain health disparities (Menendez et al., 2024). Adults also use different frameworks for different disparities, attribute disparities involving age to biological factors, disparities involving social class to structural factors, and many other disparities to behavioral factors. Additionally, prior work also identified that people also rejected the idea that there are health disparities, often claiming that everyone is equally likely to get sick (Menendez et al., 2024). While this is not a framework for health disparities, it is still critical as these explanations downplay the influence of social categories (and possibly structural factors) in the process of illness.

Current study

In the current study, we examined how adults think about how social categories (gender, race, social class, personality and age) influence the likelihood of transmitting and acquiring an illness. Participants were randomly assigned to answering the questions either about COVID-19 (an illness where the health disparities have been widely publicized) or the common cold (an illness for which health disparity data are less accessible). These illnesses were selected because they are both respiratory viruses, but differ in how consequential and evident the health disparities are. Public health data show that in the United States people living in the poorest zipcodes, Black people, and older adults are more likely to get COVID-19 than people living in the richest zipcodes, white people, and younger adults (CDC, 2023). Similarly, public health data suggest that older adults are more likely to get the common cold than younger adults (CDC, 2020). Although prior research has shown that adults in the United States have a similar understanding of COVID-19 and the common cold (Labotka & Gelman, 2022), prior work has not examined how adults think similarly about health disparities in the context of the two illnesses. Additionally, prior work (Menendez et al., 2024) focused only on illness contagion, not illness transmission. We included illness transmission questions because of reports that Asian people in the U.S. were being blamed for the spread of COVID-19.

The research question, procedures, and analyses of this study were pre-registered in AsPredicted (56265). However, given the lack of relevant literature when the study was conducted, we did not pre-register any hypotheses. Given work by Menendez et al. (2024) we could expecte that adults would say that older adults and poor people are more likely to get sick than younger adults and rich people (respectively), and that they would explain age differences as due to biological factors and social class differences as due to structural factors.

Method

Participants

We pre-registered that we would 288 participants in order to achieve a desired sample size of 240 participants after exclusions (120 per illness condition). Given the lack of prior research in this area, it was difficult to ascertain the magnitude of the effect and therefore conduct an a priori power analyses. However, 240 participants would detect a medium effect size (d = 0.37) with 80% power. We recruited 288 participants from Amazon's Mechanical Turk, but several participants were excluded for providing nonsensical responses to our open-ended questions. Our final sample included 241 participants (92 women, 147 men, and 2 participants who did not answer; Age: $M = 38.63$, $SD = 10.66$, $Range = [21, 70]$). Self-reported race/ethnicity was 192 white (80%), 26 Black or African American (11%), 8 Asian or Asian American (3%), 5 Hispanic or Latinx (2%), 2 Native American (¡1%), 1 Middle Eastern (¡1%), and 5 bi- or multi-racial (5%). Additionally, 5 participants did not report race/ethnicity.

Materials and Procedure

Participants completed an online survey administered through Qualtrics, modeled after Menendez et al. (2024). Participants were randomly assigned to one of two illness conditions: COVID-19 or the common cold. All the questions were identical between the two conditions, except for the illness mentioned. The main task consisted of eight trials where participants saw two characters. The pair of characters differed in one social category (e.g, an older adult and a younger adult), and the images were labeled. All other categories were held constant (e.g., the older and younger adults were both men with light skin tones). Participants were asked, "Who is more likely to get sick with COVID: This one [the person on the left], this one [the person on the right], or are they the same?" The following comparisons were included: older adult versus younger adult, child versus adult, Black person versus White person, Asian person versus White person, Asian person versus Black person, poor person versus rich person, man versus woman, and mean person versus nice person. These comparisons included social categories for which there are known health disparities (i.e., age, race, and social class), and categories for which there are little to no disparities for COVID-19 and the common cold (i.e., gender and personality). It should be noted that the image that we selected for the mean person was blowing raspberries with visible saliva droplets. Some participants remarked on these droplets as increasing the likelihood that the character was going to get sick or could get someone sick. We report this comparison for completeness, but findings from this item should be interpreted with caution.

Across participants, we counterbalanced the side of the screen on which each character appeared, and the order in

which the comparisons were presented. After making a judgment, participants were asked to provide a written explanation for their choice. Participants completed this task twice: once for their beliefs about illness transmission and once for their beliefs about illness contagion (which we will refer to as question type). We counterbalanced which question participants saw first.

After completing the main task, participants completed other tasks examining how social relatedness influenced the likelihood of someone getting sick and their engagement on health-protective behaviors. However, we do not discuss these further as they are not related to this paper. Then participants completed a demographic form, and provided some information about their attitudes towards COVID-19.

Qualitative Coding

Participants' explanations were coded in line with prior work by Menendez et al. (2024) into six codes: Biological, Structural, Behavioral, Everyone equal, Generic claims, Transmission event. Biological explanations were those that attributed the difference to genetics, immune functioning, bodies being different, or pre-existing conditions (e.g., "In most cases I would think an elderly adult would have lower immune system capabilities to fight off colds."). Structural explanations attributed the difference to racism, poverty, working conditions, or differential access to healthcare or food (e.g., "Their living conditions and health care are much worse."). Behavioral explanations attribute the difference to the actions, or risky (or protective) behaviors people from different groups engage in (e.g., "Asians are usually more careful about hygiene already."). Everyone equal explanations mention how there are no differences because viruses do not discriminate among people or because the two characters are human (e.g., "They're both humans and germs don't discriminate."). These four codes were the primary ones to examine participants' reasoning for the disparities. The Generic claims code was included as a way to examine the linguistic form of the explanations, as prior work shows that people often use generic noun phrases when talking about social categories (Rhodes & Mandalaywala, 2017). We coded whether the explanation ever included a generic noun phrase (e.g., "Kids are less exposed"). The "transmission event" code was used for explanations that discuss how transmission occurs or mentions of how contact with someone who exhibits signs of illness can lead to getting infected (e.g., "They get closer to other people and more likely to spread germs."). Responses were coded into multiple categories when appropriate.

Two trained coders coded 20% of the responses to assess reliability (for the everyone equal code, there were three trained coders). Cohen's κ was used to assess reliability (except for the everyone equal code, because there were 3 coders, in this case we used Fleiss' κ). Reliability was deemed acceptable for every code ($\kappa \geq .75$). All disagreements were resolved through discussion.

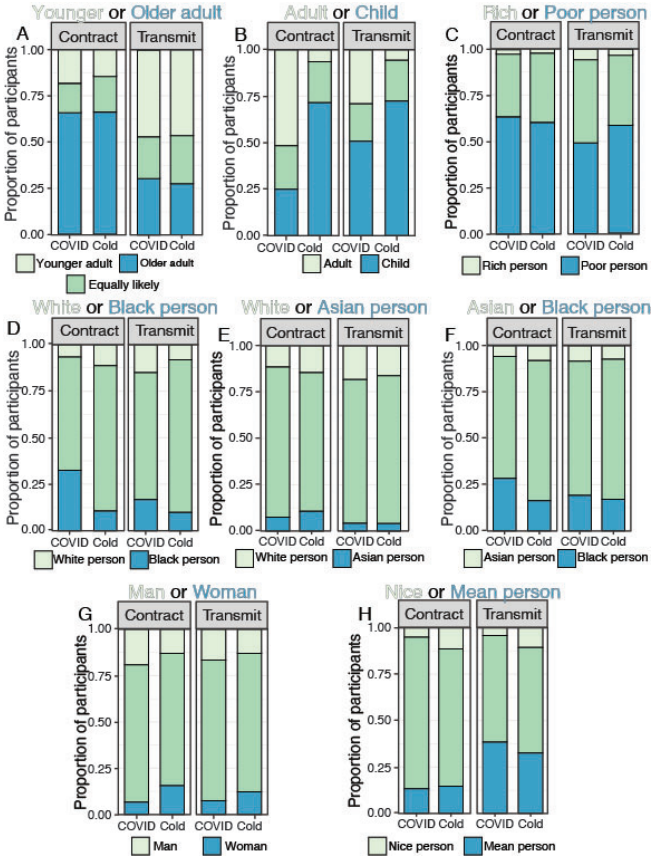

Figure 1: Proportion of participants that selected each choice for each comparison (different colors). Panels A-H show the results for the comparisons: younger and older adult, adult and child, rich person and poor person, white person and Black person, white person and Asian person, Asian person and Black person, man and woman, or nice person and mean person (respectively). Within each panel, the left bars show the results for the contract questions and the right bars the results for the transmit questions. The x-axis shows the different illness condition.

Results

We first present our pre-registered analyses examining whether people thought that one of the groups was more likely to get sick or transmit the illness than the other group. We then examine how illness condition (COVID-19 or common cold) or question type (transmission or contagion) influenced participants selections. Then, we examine the frameworks participants used to explain their selections.

Pre-registered analyses

Selection of group differences We conducted a series of t-tests against chance (33%) to see if participants thought that one of the groups was more likely to contract or transmit illness. As can be seen in Figure 1, the results for both contract and transmit were fairly similar for all but the older vs.

younger adult comparisons. For the older adult vs. younger adult comparison, participants thought that older adults were more likely to contract illness, but younger adults were more likely to transmit it. Participants also thought that children were more likely than adults to contract and transmit illness, and that poor people were more likely than rich people to contract and transmit illness. For all other comparisons (such as those involving race, gender, and personality), people mostly said that both were equally likely. We should note that participants reported that mean people were more likely to transmit illness. This may be due to the inclusion of with the image of the mean person having visible saliva droplets, and therefore might not be a reliable finding.

To examine the effect of illness condition and question type, we fit an ordinal logistic regression for each comparison with illness condition, question type, and their interaction as predictors and by-participant random intercepts. The outcome variable was participants' selections as ordinal, with the disadvantaged group as 1, the advantaged group as 3, and saying that both are equally likely as a 2. For comparisons like personality and gender where evidence does not support either group as consistently disadvantaged, we arbitrarily set the values. Below we discuss the significant effects for each predictor.

Effects of Illness Condition For the child/adult comparison, participants thought that children were more likely to contract or transmit a cold than COVID-19, $\chi^2(1, N = 241) = 59.51$, $p < .001$. For the White/Black comparison, participants thought that Black people were more likely to contract or transmit COVID-19 than a cold, $\chi^2(1, N = 241) = 4.47$, $p = .034$. For the man/woman comparison, participants thought that men were more likely to contract or transmit COVID-19 and women a cold, $\chi^2(1, N = 241) = 4.96$, $p = .026$.

Effects of Question Type For the older/younger comparison, participants reported that older adults were relatively more likely to contract than to transmit, $\chi^2(1, N = 241) = 85.76$, $p < .001$. For the child/adult comparison, participants selected children more often for the transmit than the contract questions, $\chi^2(1, N = 241) = 15.90$, $p < .001$. For the White/Black comparison, participants selected Black people more often for the contract than the transmit questions, $\chi^2(1, N = 241) = 8.95$, $p = .003$. For the White/Asian comparison, participants selected Asian people more often for the contract than the transmit questions, $\chi^2(1, N = 241) = 7.96$, $p = .005$. For the rich/poor comparison, participants selected poor people more often for the contract than the transmit questions, $\chi^2(1, N = 241) = 9.20$, $p = .002$. For the nice/mean comparison, participants selected mean people more often for the transmit than the contract questions, $\chi^2(1, N = 241) = 43.76$, $p < .001$.

Interactions For the chil/adult comparison, there were no differences by question type, but for COVID-19 participants thought that adults were more likely to contract a COVID-19 and children more likely to transmit it, $\chi^2(1, N = 241) = 12.99$, $p < .001$. For the White/Black comparison, the difference between contract and transmit was smaller for the common cold than for COVID-19, $\chi^2(1, N = 241) = 13.96$, $p = .003$. For the Asian/Black comparison,participants thought that Black people were more likely to contract COVID-19 than a cold (where more participants said Black and Asian people would be equally likely), $\chi^2(1, N = 241) = 4.45$, $p = .035$. For the rich/poor comparison, participants were less likely to say that poor people will transmit COVID-19, $\chi^2(1, N = 241) = 5.35$, $p = .021$.

Explanations Our qualitative coding showed that 34.0% of the explanations mentioned that everyone was equal, 25.6% mentioned behavioral factors, 15.7% mentioned biological factors, 7.4% mentioned structural factors, 32.7% included generic claims, and 9.3% mentioned transmission events. The frequency of difference explanations can be seen in Figure 2. Behavioral explanations were common for both question types, but they were provided very frequently for transmitting illness. Participants who said both people were equally likely, typically justified their selection by saying that everyone is equal. Everyone equal explanations were also more common for the contract than transmit questions. Structural explanations were provided almost exclusively in the comparisons involving race and social class, and typically by participants who said the disadvantaged group was more likely to get sick or get someone else sick. For the comparisons involving age, people tended to provide biological and behavioral explanations.

Discussion

Public health data highlight how there are health inequalities in terms of age, race, and social class, prompting the question of how people might reason about the relation between illness and social categories. We targeted this question by examining whether adults in the U.S. think that social categories influence the likelihood of contracting (getting sick) and transmitting (getting someone else sick) illness. We focused on two illnesses: COVID-19 (for which health disparities have received media attention in recent years), and the common cold (for which health disparities are less known). We show that many U.S. adults think that there is a relation between some social categories (primarily age and social class) and illness, and these tended to be in the direction of known health disparities. There were only a few differences between their responses about COVID-19 and the common cold. These findings are in line with prior work with children (Menendez et al., 2024). Given that disparities for the common cold are generally less known, these could reflect a generalization of known disparities for other illnesses, and might reflect the integration of their understanding of the social and biological world (i.e., thinking that the same factors that lead to disparities for COVID-19 might also create similar disparities for other illnesses). With a few notable exceptions for age comparisons (where the younger group was thought to transmit illness more), people thought that the same people were likely

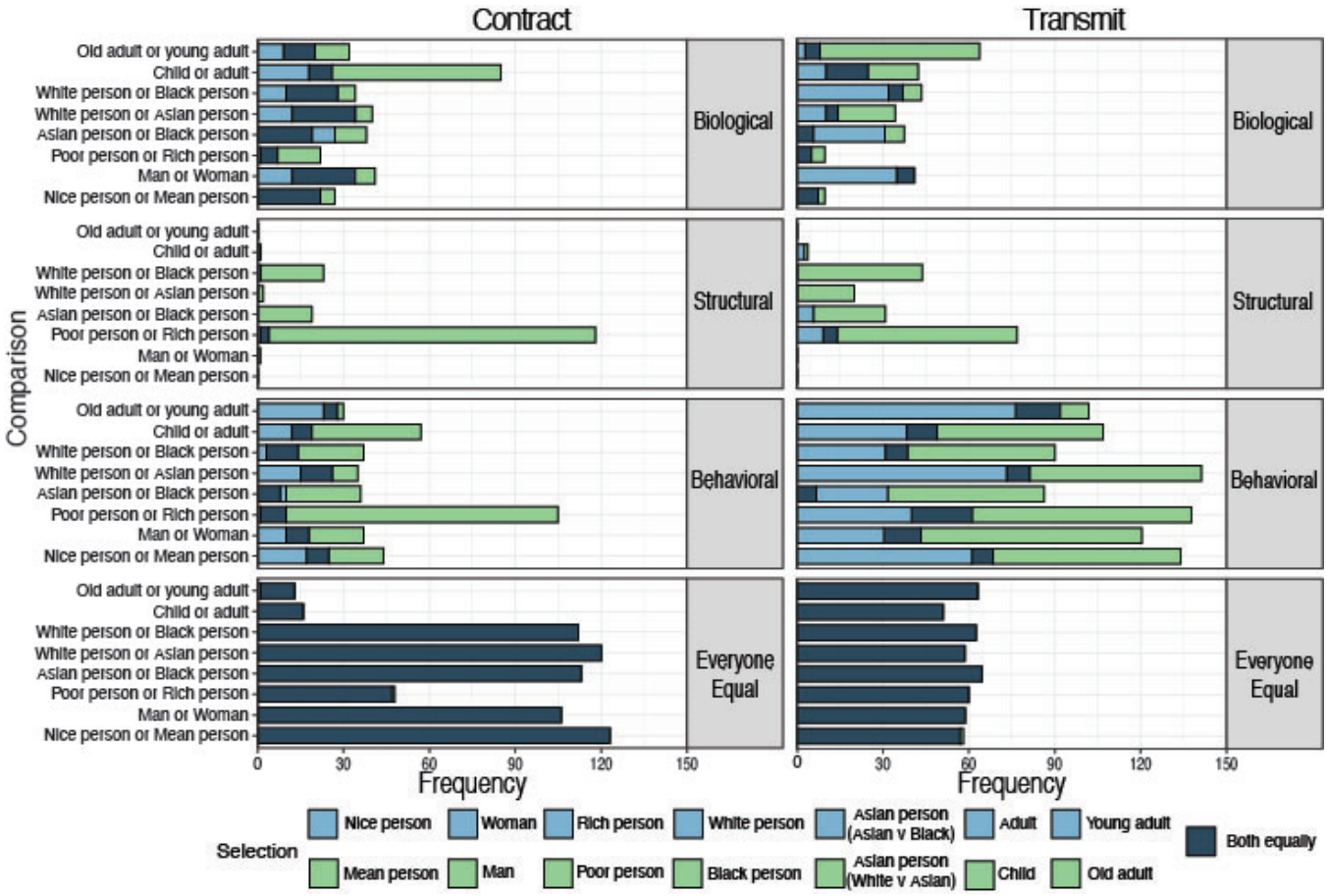

Figure 2: Frequency of participants in the giving a particular response type (color) who received each code for a given explanation (biological explanations in the top rows, then structural, behavioral, and everyone equal). Left panels show responses to the contract questions and right panels to the transmit questions.

to contract and transmit illness.

We found evidence that adults used the four types of explanatory frameworks proposed in prior work, but use them to justify different answers. Disparities involving age were often justified with biological explanations, particularly by appealing to immune function. Disparities involving race and social class were typically explained by appealing to structural factors. Behavioral explanations were very common when thinking about illness transmission. Finally, many adults said that social categories played no role and justified this be saying that there are no differences between people. Sometimes people stated that this was because their bodies are the same (a biological explanation), or because everyone can engage in protective behaviors (a behavioral explanation). This shows that people flexibly used different frameworks when thinking about different comparisons, and sometimes combined frameworks in their explanations.

This work also adds to the growing literature on structural thinking (Vasilyeva et al., 2018; Vasilyeva & Lombrozo, 2020; Menendez et al., 2024; Amemiya et al., 2023). While the fact that adults can reason about structural causes is not new, few prior studies have examined this in the context of real-life disparities. Models of structural reasoning have proposed that people attribute inequalities to structural causes when they believe that these external factors influence the outcome beyond internal factors (Amemiya et al., 2023). Our study found some support for this idea, as structural explanations were rarely used for comparisons that people attributed to biological causes. Additionally, although explanations that appealed to internal causes (i.e., biological or behavioral explanations) were sometimes used to explain a lack of difference, structural explanations were almost never used to explain a lack of difference. Therefore, it does appear as though people resort to structural explanations when there is a difference in outcomes, and this difference cannot be completely explained by internal factors. However, more work is needed to understand when and why people use structural explanations for group differences.

Of interest was the relatively few differences between thinking about contract and transmitting illness. Although these are two processes involved in illness transmission, their interpretation with regards to social groups could be very different. Thinking that a group is more likely to contract illness would suggest that they are more vulnerable, while thinking that they are more likely to transmit illness might be related to seeing them as a threat. However, people could also see transmission as an extension of contagion (if someone is more likely to get sick, then the same circumstances could make them also more likely to get someone else sick). While prior work had asked about contracting illness, the questions about transmission of illness are novel and were added due to reports that Asian people were blamed for the spread of COVID-19. In this study, however, we did not find that people thought that Asian people were more likely to transmit illness. We did find that younger adults and children were seen as more likely to transmit illness, and this was primarily explained by them being perceived as taking more risks and engaging in fewer protective behaviors.

It should be noted that people did not think all social categories played a role in illness transmission and contagion. Even though gender and race are a salient category for many U.S. adults, people rarely said that they influenced the illness processes. For race, a category where there are health disparities for COVID-19, people sometimes stated that there was a difference, and tended to explain it in terms of structural explanations. But for gender, people's explanations tended to be that everyone was equal or that any differences were due to the behaviors people decided to engage in. Similar results were found by Menendez et al. (2024), suggesting that people do not think that all social categories influence illness and are selectively applying this knowledge.

Limitations

This study has several limitations. First, the majority of participants identified as white, meaning that the results might not extend to other communities. Second, our categorical outcome measure might have not been sensitive to when people thought that social categories played a small role in the processes of illness, but not enough to definitively say that one person was more likely than the other. Fourth, participants could have interpreted the question as to referring to an ideal scenario where all factors are controlled for whether there is a difference, or whenther in present day there is a difference. Finally, we did not address the intersectionalities (e.g., someone who is both poor and Black vs. someone who is both rich and White), nor the fact that in the U.S. there are links between race and poverty.

Conclusions

We were interested in whether adults thought that social categories influence illness processes. We found that adults thought that age and social class played a role in the process of illness transmission and contagion. Biological explanations were often used to explain disparities related to age, while structural explanations were used to explain disparities related to race or social class. Overall, these results show that a mature understanding of illness involves incorporating knowledge about social categories.

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References

Amemiya, J., Mortenson, E., Heyman, G. D., & Walker, C. M. (2023). Thinking Structurally: A Cognitive Framework for Understanding How People Attribute Inequality

to Structural Causes. *Perspectives on Psychological Science*, *18*(2), 259–274. doi: 10.1177/17456916221093593

Athni, T. S., Shocket, M. S., Couper, L. I., Nova, N., Caldwell, I. R., Caldwell, J. M., ... Mordecai, E. A. (2021). The influence of vector-borne disease on human history: Socioecological mechanisms. *Ecology Letters*, *24*(4), 829–846. doi: 10.1111/ele.13675

Au, T. K.-f., & Romo, L. F. (1996). Building a coherent conception of HIV transmission. In D. L. Medin (Ed.), *Psychology of learning and motivation: Advances in research and theory* (Vol. 35, pp. 193–241). Academic Press. doi: 10.1016/S0079-7421(08)60576-9

CDC. (2020). QuickStats: Percentage of Persons Who Had a Cold in the Past 2 Weeks, by Age Group and Calendar Quarter — National Health Interview Survey, United States, 2018. *MMWR. Morbidity and Mortality Weekly Report*, *69*. Retrieved 2023-10-19, from https://www.cdc.gov/mmwr/volumes/69/wr/mm6914a5.htm doi: 10.15585/mmwr.mm6914a5

CDC. (2023, May). *COVID-19 Provisional Counts - Health Disparities.* Retrieved 2023-05-30, from https://www.cdc.gov/nchs/nvss/vsrr/covid19/health_disparities.htm

Cimpian, A., & Solomon, E. (2014). The inherence heuristic: An intuitive means of making sense of the world, and a potential precursor to psychological essentialism. *Behavioral and Brain Sciences*, *37*(05), 461–480. doi: 10.1017/S0140525X13002197

Clark, E., Fredricks, K., Woc-Colburn, L., Bottazzi, M. E., & Weatherhead, J. (2020). Disproportionate impact of the COVID-19 pandemic on immigrant communities in the United States. *PLOS Neglected Tropical Diseases*, *14*(7), e0008484. doi: 10.1371/journal.pntd.0008484

Fulop, T., Witkowski, J., Pawelec, G., Cohen, A., & Larbi, A. (2014). The immunological theory of aging. *Interdisciplinary topics in gerontology*, *39*, 163–76. doi: 10.1159/000358904

Gelman, S. A. (2003). *The essential child: Origins of essentialism in everyday thought*. Oxford University Press.

Gollust, S. E., Fowler, E. F., Vogel, R. I., Rothman, A. J., Yzer, M., & Nagler, R. H. (2022). Americans' perceptions of health disparities over the first year of the covid-19 pandemic: results from three nationally-representative surveys. *Preventive medicine*, *162*, 107135.

Jayaratne, T. E., Gelman, S. A., Feldbaum, M., Sheldon, J. P., Petty, E. M., & Kardia, S. L. R. (2009). The perennial debate: Nature, nurture, or choice? Black and white Americans' explanations for individual differences. *Review of General Psychology*, *13*(1), 24–33. doi: 10.1037/a0014227

Labotka, D., & Gelman, S. A. (2022). Scientific and folk theories of viral transmission: a comparison of COVID-19 and the common cold. *Frontiers in Psychology*, *13*.

Menendez, D., Labotka, D., Umscheid, V. A., & Gelman, S. A. (2024). The social aspects of illness: Children's and parents' explanations of the relation between social categories and illness in a predominantly white U.S. sample. *Child Development*, cdev.14110. doi: 10.1111/cdev.14110

Meyer, M., Roberts, S. O., Jayaratne, T. E., & Gelman, S. A. (2020). Children's beliefs about causes of human characteristics: Genes, environment, or choice? *Journal of Experimental Psychology: General*. doi: 10.1037/xge0000751

Petersen, M. B. (2017). Healthy out-group members are represented psychologically as infected in-group members. *Psychological Science*, *28*(12), 1857–1863.

Raman, L., & Gelman, S. A. (2008). Do children endorse psychosocial factors in the transmission of illness and disgust? *Developmental Psychology*, *44*(3), 801–813. doi: 10.1037/0012-1649.44.3.801

Rhodes, M., & Mandalaywala, T. M. (2017). The development and developmental consequences of social essentialism. *WIREs Cognitive Science*, *8*(4), e1437. doi: 10.1002/wcs.1437

Tai, D. B. G., Shah, A., Doubeni, C. A., Sia, I. G., & Wieland, M. L. (2021). The disproportionate impact of COVID-19 on racial and ethnic minorities in the United States. *Clinical Infectious Diseases*, *72*(4), 703–706. doi: 10.1093/cid/ciaa815

Vasilyeva, N., Gopnik, A., & Lombrozo, T. (2018). The development of structural thinking about social categories. *Developmental Psychology*, *54*(9), 1735–1744. doi: 10.1037/dev0000555

Vasilyeva, N., & Lombrozo, T. (2020). Structural thinking about social categories: Evidence from formal explanations, generics, and generalization. *Cognition*, *204*, 104383. doi: 10.1016/j.cognition.2020.104383