

Contextual effects on attributing minds to older adults

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ARTICLE INFO

Keywords:

Older adults
Mind perception
Dehumanization
Rehabilitation
Social environments

ABSTRACT

Elder abuse is a growing worldwide problem. The dehumanization of older adults likely contributes to elder abuse as it relates to a lower standard of care afforded to them as well as perpetuates negative attitudes and institutional policies affecting them. Here, we examined mind attributions of older adults receiving care given that mind denial relates to the perpetuation of harm against human agents. We show that living situation is a potent contextual cue affecting mind attributions toward older adults. Older adults receiving more external support and care in their overall living situations were attributed less mind, an effect due to their being attributed limited attributed agentic relative to experiential mental capacities (Experiment 1). Limited attributed agentic versus experiential capacities also emerged for older adults in care facilities to receive cognitive, but not physical, rehabilitation after acute medical emergencies (Experiments 2 and 3). This cognitive rehabilitation effect generalized to younger adults, although older adults were attributed less mind overall (Experiment 3). Showing consequences of limited inferred mental agency, attributed agentic capacities positively related to beliefs that rehabilitation would be successful (Experiment 3). All effects emerged when controlling for variability in aging-related prejudice, suggesting a broad emergence that could substantially affect older adults' lives. These findings suggest that older adults in need of care are attributed limited agentic capacities that are necessary for people to believe in the efficacy of their care.

Elder abuse is a worldwide problem (Laumann et al., 2008; Tatara et al., 1998). Elder abuse negatively affects older adults' well-being (Comijs et al., 1999) to the extent that they face increased mortality rates versus those who do not experience mistreatment (Lachs et al., 1998). The increasing population of older adults (Anderson and Hussey, 2000) begets a growing number of people at risk for health issues requiring caregiver support (Feder et al., 2000). Positively related to increasing eldercare rates is caregiver burden (e.g., Keidel, 2002), which increases the likelihood of elder abuse (Goodridge et al., 1996; Schiamborg and Gans, 1999). One consequence of caregiver burden is the acceptance of dehumanization (Głębocka, 2019), which decreases care quality. Indeed, when doctors dehumanize patients, they spend less time addressing their problems (Redelmeier and Tversky, 1990). One conceptualization of dehumanization is mind denial (Kozak et al., 2006). From this lens, dehumanization is examined via the extent of mind attributions (Gray et al., 2007). Although older adults are dehumanized (Boudjemadi et al., 2017), no work has examined this topic from a mind perception lens. Gauging mind attributions toward older adults is important to gain a fuller picture of the dehumanization targeted in efforts to reduce elder abuse (E.-S. Chang et al., 2022).

The dual model of dehumanization asserts that humans are unique from animals given their refinement and cognitive capacities, and unique from machines given their emotionality and warmth (Haslam, 2006). Complementing this model, people attribute mind across two dimensions (Gray et al., 2007; Waytz et al., 2010). Whereas mental agency confers cognitive capacities separating humans from animals (e.g., thought and self-control), mental experience confers experiential capacities separating humans from machines (e.g., feeling pain and fear). Dehumanization via this lens is conceptualized as denying mind across one or both dimensions (Kozak et al., 2006), which perpetuates harm toward human (Monroe and Plant, 2019) and non-human (Bastian et al., 2012) agents. Manipulating social context often more strongly affects attributed mental agency versus experience (e.g., Deska et al., 2018). Indeed, whereas people think many animals sense basic feelings, some cues more strongly infer human-like capacities to reason and act (e.g., gaze direction; Khalid et al., 2016). Identifying mind attribution across dimensions is thus important to understand the function of contextual cues in mind perception.

People behave toward older adults in ways suggesting that they deny their mental agency. For example, people with dementia are

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dehumanized because they are perceived as low in autonomy and control (Iliffe et al., 2003). People also often engage in patronizing behaviors toward older adults (Hummert et al., 1998) such as using baby-talk toward them (Ryan et al., 1995). These behaviors suggest people view older adults as mentally unrefined, a trait reflecting less attributed mental agency. These behaviors are also consistent with agency-related aging stereotypes of incompetence (Abramson and Silverstein, 2006; de Paula Couto and Koller, 2012; Hummert, 1993; Kite and Johnson, 1988; but see Hummert, 1999) influenced by media portrayals (Williams and Giles, 1998) and that are described by the stereotype content model (Nelson, 2004; Nicolas et al., 2022). Suggesting that attributed mental agency versus experience is more strongly impacted by aging, older adults are targets of animalistic, but not mechanistic, dehumanization (Boudjemadi et al., 2017; but see Saito et al., n.d.). Extending this work, we assessed mind attributions of older adults across a variety of care settings in which dehumanization-related (e.g., Redelmeier and Tversky, 1990) elder abuse could occur.

Behavior suggesting people view older adults as mentally unrefined certainly aligns with work showing older adults to be animalistically dehumanized (Boudjemadi et al., 2017). Yet, one could argue that people view older adults as mentally unrefined simply based on their assumptions about aging and without an explicit intent to dehumanize. Indeed, about 40 % of people over age 65 in the United States have some kind of memory impairment (Small, 2002), which is important to mental agency (Gray et al., 2007). Yet, assuming that older adults need help in the memory domain, for example, overlooks over half of American older adults do not have such an impairment. Such assumptions ignore large swaths of this population and also positive aspects of aging related to mental agency. For example, older versus younger adults can have advantaged decision-making when decisions depend on past experience (Masunaga and Horn, 2001; Worthy et al., 2011). Behaviors toward older adults that tacitly deny these capacities suggest a stereotyped view of older adults that can be, ultimately, dehumanizing. Indeed, challenging social stereotypes decreases dehumanization (Prati et al., 2015).

Core to negative aging stereotypes are beliefs that older adults require help (e.g., Coudin and Alexopoulos, 2010; Levy et al., 2014). As external support negatively relates to perceptions of independent and “successful” aging (Anton et al., 2015; Lowry et al., 2011), we reasoned that older adults’ living situations are contextual cues affecting attributions of their minds. We examined whether living situations affect the extent to which older adults are attributed mental agency, but not experience. Indeed, agentic versus experiential capacities better reflect the intentions of an independent mind (Gray et al., 2007). We expected similar attributed mental experience to older adults living independently, in assisted living, or in nursing homes. We expected attributed mental agency to decrease from older adults living independently, to those in assisted living, and those in nursing homes.

Simply living in these environments, however, does not indicate *why* older adults do so. Older adults move into care facilities for many reasons (Marshall et al., 2022). Some, for example, need physical (e.g., for mobility) or cognitive (e.g., for memory) rehabilitation after a medical emergency (see Kane et al., 1996). An open question regards whether varying reasons for care affect mind attributions toward older adults. We focused on attributions toward older adults living in care facilities to receive cognitive or physical rehabilitation. To the extent that cognitive disabilities may affect a sense of the cognitive capacities reflective of mental agency (Waytz et al., 2010), we expected people to attribute more mental experience than agency to older adults receiving cognitive rehabilitation.

Two hypotheses emerged for mind attributions toward older adults receiving physical rehabilitation. Like those receiving cognitive rehabilitation, people could attribute more mental experience than agency to those receiving physical rehabilitation. Indeed, people infer limited mental agency to those they perceive as having limited physical capacities (Kunst et al., 2019; Sim et al., 2022; Sitruk et al., 2023). Contrasting older adults receiving cognitive rehabilitation, however, people

could attribute more mental agency than experience to those receiving physical rehabilitation. Indeed, attributions made about people (albeit not specifically older adults) with physical disabilities suggest hypermentalization to the extent that these people are perceived as overcoming hardship (Sim and Hugenberg, 2022), something that may characterize this rehabilitation context. Examining people’s attributions about older adults receiving these care types can reveal how people conceptualize older adults receiving care. Identifying differences between attributed mental experience and agency is important because people’s attributions of mental agency affect their subsequent prosocial behavior toward agents (Sim and Hugenberg, 2022). As such, we expected attributed mental agency to positively relate to beliefs that older adults would benefit from care. Knowing when limited agency is attributed may be important for efforts to humanize older adults and thus enable better care provided by a younger generation (for a review, see North and Fiske, 2012).

Experiment 1 showed similar attributions of older adults’ mental experience across several living situations but decreasing attributions of mental agency in externally supportive situations. Experiment 2 examined whether care type affected mind attributions. More attributed mental experience than agency emerged only for older adults receiving cognitive rehabilitation. Experiment 3 tested whether this effect generalized to anyone receiving rehabilitative care and revealed consequences of these attributions. Here, a robust relation emerged between attributed mental agency and beliefs that people would be rehabilitated.

Experiment 1

Experiment 1 served as an initial test of whether older adults’ living situations affect attributions of their minds. People attributed experiential and agentic capacities to older adults living independently, in assisted living, in nursing homes, and an unknown situation, using a widely-used measure (Gray et al., 2007). We expected the extent of mental capacities attributed would decrease toward older adults living independently to assisted living, and to nursing homes. We anticipated this pattern to emerge more strongly in attributed mental agency than experience.

Method

Participants

We targeted 100 participants based on work examining the dehumanization of older adults (e.g., Boudjemadi et al., 2017). We recruited 200 from MTurk, oversampling to account for online participant loss. We excluded 29 for inattention (see below), and one for responding to <75 % of task items, yielding 170 analyzed participants ($M_{age} = 39.22$ years, $SD = 10.77$, range = 25–75, $M_{years\ of\ education} = 15.17$ years, $SD = 2.29$; 63 identifying as female). Although our sample has a wide range, it is skewed (0.94) in that younger participants are overly represented. Thus, the below findings better reflect how younger adults think about older adults versus how *all* adults think about older adults. Of this sample, there were 131 White, 16 Black, 12 Asian, nine multiracial, and two American Indian/Alaska Native participants. Eleven identified as Hispanic. The University of North Carolina at Greensboro IRB approved all experiments. All participants provided informed consent.

Procedure

Participants completed four randomly presented and self-paced trials. Trials described older adults as capable of living in their homes without any personal or medical assistance (i.e., independent living), in their homes with some personal assistance and without medical assistance (i.e., assisted living), in clinical home-like settings that provide daily personal and medical assistance (i.e., nursing home), or as having an unknown living situation. On each trial, participants evaluated older

adults on eight items, selected from a larger collection of 18 items (Gray et al., 2007), assessing mind attribution that have been used in work on attributing minds to stigmatized group members. Four items measured mental experience via the extent to which older adults were capable of “feeling hungry,” “feeling fear,” “feeling pain,” and “feeling pleasure.” Four items measured mental agency via the extent to which older adults were “capable of exercising self-control,” “have good memory,” “capable of acting morally,” and “capable of recognizing emotions.” Like prior work (e.g., Deska et al., 2018), these items were selected because they loaded most strongly on the mental agency and experience dimensions identified for the original scale (Gray et al., 2007). Because participants would be completing the items multiple times for different groups, we used the streamlined adapted scale to maintain participants’ attention. After the main task, participants indicated task attention by indicating their response randomness from 1 (*not at all random*) to 5 (*completely random*). We excluded those not responding “1.”

Participant characterization

Participants indicated the percentage of older adults living independently, in assisted living, and in nursing homes. Responses equaled 100. We measured ageism using the Fraboni Scale of Ageism (Fraboni et al., 1990). Responses were on a 1 (*strongly disagree*) to 4 (*strongly agree*) scale. We summed responses ($M = 55.86$, $SD = 14.02$; Cronbach’s $\alpha = 0.86$). Higher scores reflect more ageism. We measured beliefs about how older adults should behave using the Prescriptive Intergenerational-Ageism Scale (North and Fiske, 2013). Responses were on a 1 (*strongly disagree*) to 6 (*strongly agree*) scale. We summed responses ($M = 48.31$, $SD = 19.90$; Cronbach’s $\alpha = 0.84$). Higher scores reflect more prescriptive ageism.

Results

Living situation beliefs

People believed 50.72 % ($SD = 18.12$ %) of older adults lived independently, 26.77 % ($SD = 12.28$ %) in assisted living, and 22.39 % ($SD = 11.18$ %), in nursing homes.

Contextual effects of living situation and mind dimension

Across experiments, we used the lme4 package (Bates et al., 2014) to test mixed effects models. Model p -values were calculated using lmerTest (Kuznetsova et al., 2017). We regressed mind attribution on Mind Dimension (experience = -1 , agency = 1), Living Situation (effects coded such that Unknown was the reference level relative to Independent Living, Assisted Living, and Nursing Home), and their interactions (see Table 1). The model also controlled for Ageism and Prescriptive Ageism (both standardized) and allowed intercepts to vary by participant and by mind attribution item. We used the ageism measures as control variables in the model (and in subsequent experiments’ models) because our primary goal was to identify broad differences in mind attributions about older adults. By controlling for individual differences in ageism, we provide evidence that broad effects may emerge that are non-specific to people who explicitly make ageist statements. However, we acknowledge that individual differences in many factors, including explicit and implicit ageism, likely complicate our results and will be important for future work to consider. Note that correlations of participant age with Ageism, $r(168) = -0.27$, $p < .001$, and with Prescriptive Ageism, $r(168) = -0.23$, $p = .003$ do not suggest that these ageism simply reflects age effects. Future work using a sample where participant age is normally distributed across a lifespan sample may also benefit from further exploring age effects.

Treating participants and items as random effects in a mixed model offers several advantages over designs that do not. (for details, see Judd et al., 2012). Perhaps most relevant here, designs that rely on averaging

Table 1
Effects of Living Situation and Mind Dimension on Mind Attribution, controlling for Ageism, in Experiment 1.

Predictors	Mind Attribution			
	Estimates	std. Error	Statistic	p
(Intercept)	6.19	0.16	38.73	<0.001
Living Situation [Independent]	−0.21	0.03	−6.80	<0.001
Living Situation [Assisted]	0.39	0.03	12.37	<0.001
Living Situation [Nursing Home]	0.08	0.03	2.52	0.012
Mind Dimension [Agency]	0.38	0.15	2.46	0.014
Ageism (standardized)	−0.30	0.07	−4.28	<0.001
Prescriptive Ageism (standardized)	−0.05	0.07	−0.73	0.467
Living Situation [Independent] × Mind Dimension [Agency]	0.11	0.03	3.63	<0.001
Living Situation [Assisted] × Mind Dimension [Agency]	−0.27	0.03	−8.46	<0.001
Living Situation [Nursing Home] × Mind Dimension [Agency]	−0.08	0.03	−2.38	0.017

Notes. Living situation is effects coded with Unknown as reference. Mind Dimension (Agency/Experience) is effects coded.

across items do not account for systematic variation between items. This choice means that emergent differences may not generalize to experiments that use different items. Mixed effects models that include a random effect for item avoid this problem by partitioning the error term to explicitly account for potential systematic differences among items. Here, the predicted values in the model are adjusted for each level of each random effect (e.g., for each participant and for each item). Any emergent fixed effects occur beyond variance accounted for by differences among items, such that one item cannot be able to unduly influence findings. We make this point given that the mind attribution items include “have good memory,” which, given age-related memory stereotypes (e.g., Chasteen et al., 2005), may seem especially applicable to older adults relative to other items. By using mixed models across experiments, we rule out the possibility that emergent fixed effects occurred *because* of some items over others.

Living situation affects mind attributions

A Living Situation effect showed more mind attributed to older adults in independent living ($Estimate = 6.51$, 95 % CI [6.20, 6.83]) versus assisted living ($Estimate = 6.20$, 95 % CI [5.89, 6.52]; $z = 9.86$, $p < .001$), unknown situations ($Estimate = 6.12$, 95 % CI [5.81, 6.44]; $z = 12.37$, $p < .001$), and nursing homes ($Estimate = 5.91$, 95 % CI [5.59, 6.22]; $z = 19.18$, $p < .001$). Older adults in assisted living were attributed more mind than those in nursing homes ($z = 9.32$, $p < .001$), but not in unknown situations ($z = 2.52$, $p = .06$). Older adults in unknown situations were attributed more mind than those in nursing homes ($z = 6.80$, $p < .001$). A Mind Dimension effect showed that older adults were attributed more mental experience ($Estimate = 6.57$, 95 % CI [6.12, 7.00]) than agency ($Estimate = 5.81$, 95 % CI [5.37, 6.24]).

Living Situation and Mind Dimension interacted (Fig. 1). Older adults living in nursing homes were attributed more mental experience ($Estimate = 6.46$, 95 % CI [6.02, 6.90]) than agency ($Estimate = 5.36$, 95 % CI [4.92, 5.79]), $z = 3.55$, $p = .009$. This difference did not emerge for those residing independently ($Estimate_{experience} = 6.68$, 95 % CI [6.24, 7.12]; $Estimate_{agency} = 6.34$, 95 % CI [5.90, 6.78]), $z = 1.09$, $p = .96$, in assisted living ($Estimate_{experience} = 6.56$, 95 % CI [6.12, 7.00]; $Estimate_{agency} = 5.84$, 95 % CI [5.40, 6.28]), $z = 2.33$, $p = .28$, or in unknown situations ($Estimate_{experience} = 6.56$, 95 % CI [6.12, 7.00]; $Estimate_{agency} = 5.69$, 95 % CI [5.25, 6.12]), $z = 2.81$, $p = .09$.

Characterized another way, Living Situation effects were more pronounced for attributed mental agency than experience. Older adults residing independently were attributed more mental agency than older adults in assisted living, $z = 11.27$, $p < .001$, nursing homes, $z = 22.11$, $p < .001$, and unknown situations, $z = 14.73$, $p < .001$. Older adults in assisted living were attributed more mental agency than those in nursing

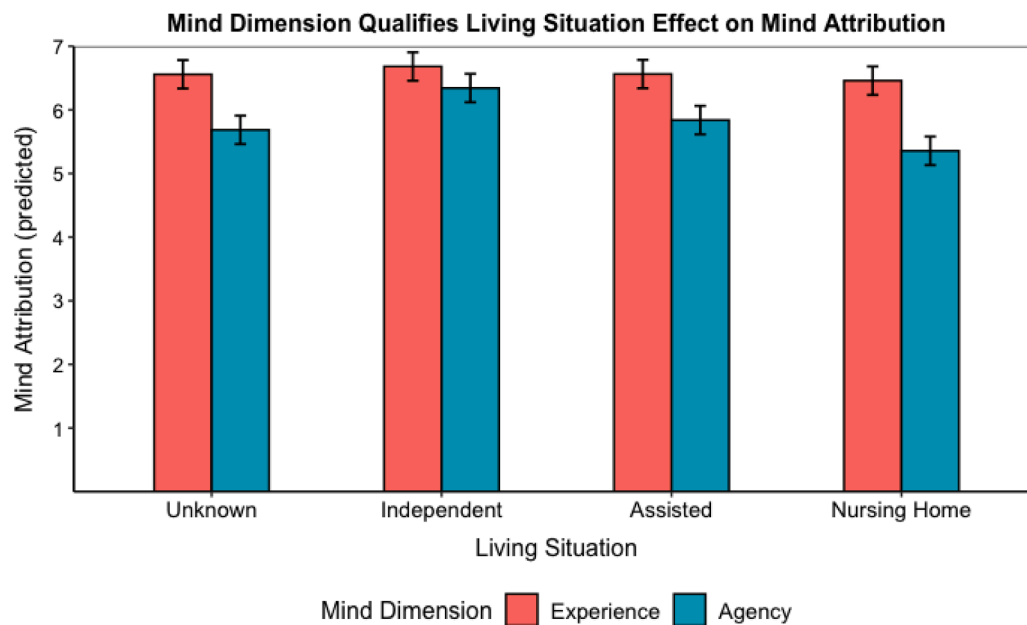


Fig. 1. In Experiment 1, older adults were only attributed more mental experience than agency when they resided in nursing homes. *Note:* Error bars reflect standard error.

homes, $z = 10.84$, $p < .001$, and unknown situations, $z = 3.46$, $p = .01$. Older adults in unknown situations were attributed more mental agency than those in nursing homes, $z = 7.38$, $p < .001$. Only older adults residing independently were attributed more experience than those in nursing homes, $z = 2.77$, $p < .001$. All other z s < 2.77 , $ps > 0.10$.

Discussion

Driven by attributed agentic capacities, older adults were attributed less mind in externally supportive living situations. As “successful” older adults are perceived as independent (Anton et al., 2015; Lowry et al., 2011), these findings build on these perceptions by showing that older adults who “successfully age” are attributed more mind. These patterns emerged controlling for ageism, suggesting they are robust to prejudice affecting mind attribution (Saito et al., n.d.). It may seem reasonable to think this pattern reflects that people in nursing homes, for example, simply lack independence. Lower mind attributions oft-related to dehumanization (Cuddy et al., 2007b), however, bear consequences. Indeed, because dehumanized people receive a lower standard of care (e.g., Redelmeier and Tversky, 1990), these findings suggest that older adults needing the most care are especially vulnerable to this lower standard. Supporting this possibility, a specific deficit in attributed agentic relative to experiential capacities only emerged for older adults living in nursing homes.

Even though people believed more older adults lived independently than in other situations, this pattern does not indicate independent older adults being a baseline for thinking about the group. Indeed, older adults with unknown living situations were attributed less agency than those living independently or in assisted living. One possibility is that acknowledging living situations is not enough to overcome pervasive negative aging stereotypes relating to mental agency (e.g., incompetence; Levy et al., 2014). Another possibility is that people may believe that some older adults live independently but should not. Indeed, many older adults have negative beliefs about nursing homes that prevent their consideration (M Y Tse, 2007).

Experiment 2

Older often adults often live in facilities to receive rehabilitative care (e.g., Kane et al., 1996). Experiment 2 extended Experiment 1 by

examining mind attributions toward older adults living in facilities to receive such care. People attributed experiential and agentic capacities (Gray et al., 2007) to older adults receiving cognitive and physical short- and long-term care. Because cognitive capacities reflect mental agency (Waytz et al., 2010), we expected more attributed experiential than agentic capacities to older adults receiving cognitive rehabilitation. Whether physical rehabilitation would elicit dementalization or hypermentalization was unclear. If people perceive older adults with limited physical capacities as lacking agency (e.g., Sim et al., 2022), they should attribute more experiential than agentic capacities to older adults being physically rehabilitated. If people perceive older adults receiving physical rehabilitation as overcoming hardship (e.g., Sim and Hugenberg, 2022), they should attribute more agentic than experiential capacities. We expected these tendencies to be exacerbated given long-versus short-term care. Indeed, people often believe older adults in long-term care display behaviors associated with symptom management challenges (Buhr and White, 2006).

Method

Participants

We targeted 100 participants and collected data from 200 MTurk participants. We excluded 33 for inattention and 24 for not responding to 75 % of task items, yielding 143 analyzed participants ($M_{age} = 39.66$, $SD = 10.80$, range = 22–72, $M_{years\ of\ education} = 15.32$, $SD = 2.35$; 68 identifying as female). The sample age was again skewed toward younger adults (0.86). Of this sample, 112 identified as White, 13 as Black, 15 as Asian, one as multiracial, one as Native Hawaiian or Pacific Islander, and one as American Indian/Alaska Native. Nine identified as Hispanic.

Procedure

Experiment 2 replicated Experiment 1 with the following changes. Participants completed five trials. Four manipulated Care Type (physical or cognitive rehabilitation) and Care Duration (short-term or long-term). Participants read, “Many senior citizens experience medical emergencies that require them to seek some form of rehabilitation and care. Depending on the medical emergency, senior citizens may require

a form of short-term rehabilitation or long-term rehabilitation. Short-term rehabilitation is any form of rehabilitation that has a minimum duration of 2 weeks and a maximum duration of 8 weeks. Long-term rehabilitation is any form of rehabilitation that has a minimum duration of 8 weeks and no maximum duration. Depending on the medical emergency, senior citizens may require either cognitive or physical rehabilitation. Cognitive rehabilitation focuses on only restoring senior citizens' mental capabilities like memory. Physical rehabilitation focuses on only restoring senior citizens' physical capabilities like walking." Each trial read, "Some senior citizens stay in [memory care centers/nursing homes] and receive [short-term/long-term] [cognitive/physical] rehabilitation after a medical emergency. [Memory care centers/Nursing homes] specialize in treating senior citizens with [memory/physical] deficits and provide different [cognitive/physical] therapies like [habilitation therapy, reality monitoring, and validation therapy/occupational therapy, geriatric therapy, orthopedic therapy, and cardiopulmonary therapy]."

For the other trial, participants read, "Sometimes senior citizens do not require cognitive and/or physical rehabilitation for any duration. In these instances, senior citizens may return to their lives without additional medical care. We refer to these as non-care settings." This trial provided baseline data on how people think about older adults after medical emergencies.

Participants indicated the percentage of older adults in long-term memory care centers, short-term memory care centers, long-term nursing homes, short-term nursing homes, or none. The total of their responses equaled 100. We summed ageism ($M = 58.96$, $SD = 15.01$; Cronbach's $\alpha = 0.83$) and prescriptive ageism ($M = 52.98$, $SD = 21.74$; Cronbach's $\alpha = 0.94$) responses.

Results

Living situation beliefs

People believed 14.37 % ($SD = 9.22$ %) of older adults were in long-term memory care, 11.91 % ($SD = 8.32$ %) were in short-term memory care, 26.50 % ($SD = 15.96$ %) were in long-term nursing home care, 14.54 % ($SD = 10.51$ %) were in short-term nursing home care, and 32.23 % ($SD = 25.59$ %) received no care.

Mind attributions of older adults requiring no rehabilitative care

We averaged mental experience (Cronbach's $\alpha = 0.88$) and agency (Cronbach's $\alpha = 0.83$) responses in the "no care" condition ($M_{experience} = 6.56$, $SD = 0.78$; $M_{agency} = 6.18$, $SD = 0.88$). Those receiving no care were attributed more mental experience than agency, $t(142) = 6.23$, $p < .001$, $d = 0.52$.

Contextual effects of care type, care duration, and mind dimension

We regressed attributions on Mind Dimension (experience = 1, agency = -1), Care Type (cognitive = 1, physical = -1), Care Duration (long-term = 1, short-term = -1) and their interactions as fixed effects, using the same controls and random effects as in Experiment 1 (see Table 2). This random effects structure accounts for systematic differences among participants and mind attribution items. Nevertheless, the below-reported findings maintained direction and significance even when excluding responses to the "have good memory" item from analyses.

Mind Dimension, Care Type, and Care Duration effects as well as all two-way interactions were qualified by the higher-order interaction (Fig. 2a). We examined Mind Dimension effects for each Care Duration in each Care Type. Older adults in short-term cognitive rehabilitation were attributed more mental experience ($Estimate = 6.18$, 95 % CI [5.69, 6.66]) than agency ($Estimate = 4.91$, 95 % CI [4.43, 5.40]), $z = 3.75$, $p = .005$. This difference was exacerbated for long-term cognitive care

Table 2
Effects of Care Type, Care Duration, and Mind Dimension on Mind Attribution, controlling for Ageism, in Experiment 2.

Predictors	Mind Attribution			
	Estimates	std. Error	Statistic	p
(Intercept)	5.80	0.18	32.67	<0.001
Care Type [Physical]	-0.41	0.02	-26.02	<0.001
Mind Dimension [Agency]	0.48	0.17	2.88	0.004
Care Duration [Short-term]	-0.11	0.02	-6.99	<0.001
Ageism (standardized)	0.09	0.11	0.83	0.404
Prescriptive Ageism (standardized)	-0.02	0.11	-0.21	0.835
Care Type [Physical] × Mind Dimension [Agency]	0.24	0.02	15.08	<0.001
Care Type [Physical] × Duration [Short-term]	-0.04	0.02	-2.53	0.011
Mind Dimension [Agency] × Duration [Short-term]	0.05	0.02	3.14	0.002
Care Type [Physical] × Mind Dimension [Agency] × Care Duration [Short-term]	0.04	0.02	2.28	0.022

Notes. Care Type (cognitive/physical), Care Duration (long-term/short-term), and Mind Dimension (agency/experience) are effects coded.

($Estimate_{experience} = 6.05$, 95 % CI [5.56, 6.53], $Estimate_{agency} = 4.44$, 95 % CI [3.96, 4.92]), $z = 4.76$, $p < .001$. This exacerbated difference was driven by more mental agency, $z = 7.48$, $p < .001$, and not experience, $z = 2.05$, $p = .045$ attributed to older adults in short- versus long-term cognitive care.

For older adults in physical rehabilitation, no Mind Dimension effects emerged in long-term ($Estimate_{experience} = 6.40$, 95 % CI [5.92, 6.88], $Estimate_{agency} = 5.89$, 95 % CI [5.41, 6.37]), $z = 1.51$, $p = .080$, or short-term ($Estimate_{experience} = 6.51$, 95 % CI [6.03, 7.00], $Estimate_{agency} = 6.06$, 95 % CI [5.57, 6.54]), $z = 1.35$, $p = .088$, care.

Discussion

Older adults receiving cognitive rehabilitation were attributed more experiential than agentic capacities. This pattern was exacerbated in long- versus short-term care contexts and driven by attributed agency. These patterns reflect that cognitive rehabilitation (Willis et al., 2006) addresses agentic capacities (Gray et al., 2007). That this pattern was exacerbated for long-term care is consistent with perceived difficulty in treating older adults with long-term cognitive challenges (e.g., Buhr and White, 2006). This finding suggests that older adults in long-term cognitive care may be least likely be perceived as having uniquely human minds (e.g., Miron, McFadden, Hermus, et al., 2017), which could negatively impacting the quality of their care (Redelmeier and Tversky, 1990). Indeed, because people perceive older adults with cognitive deficits as having lost personhood, interventions to improve their lives have focused on increasing a sense that they are unique humans (Miron, McFadden, Nazario, et al., 2017). Our findings suggest that this sense extends from older adults receiving care after a period of decline (e.g., dementia; Farhana et al., 2023) to those receiving care after medical emergencies.

People attributed similar experiential and agentic capacities to older adults receiving short- and long-term physical rehabilitation. Older adults in facilities to receive physical rehabilitation were thus not dementialized like those in facilities with no perceived end date or older adults overall (see Experiment 1). Here, people had no knowledge about older adults' overall living situations. One possibility is that limited agency attributed to older adults (see Boudjemadi et al., 2017) prohibited their hypermentalization. Experiment 3 was designed, in part, to address this possibility.

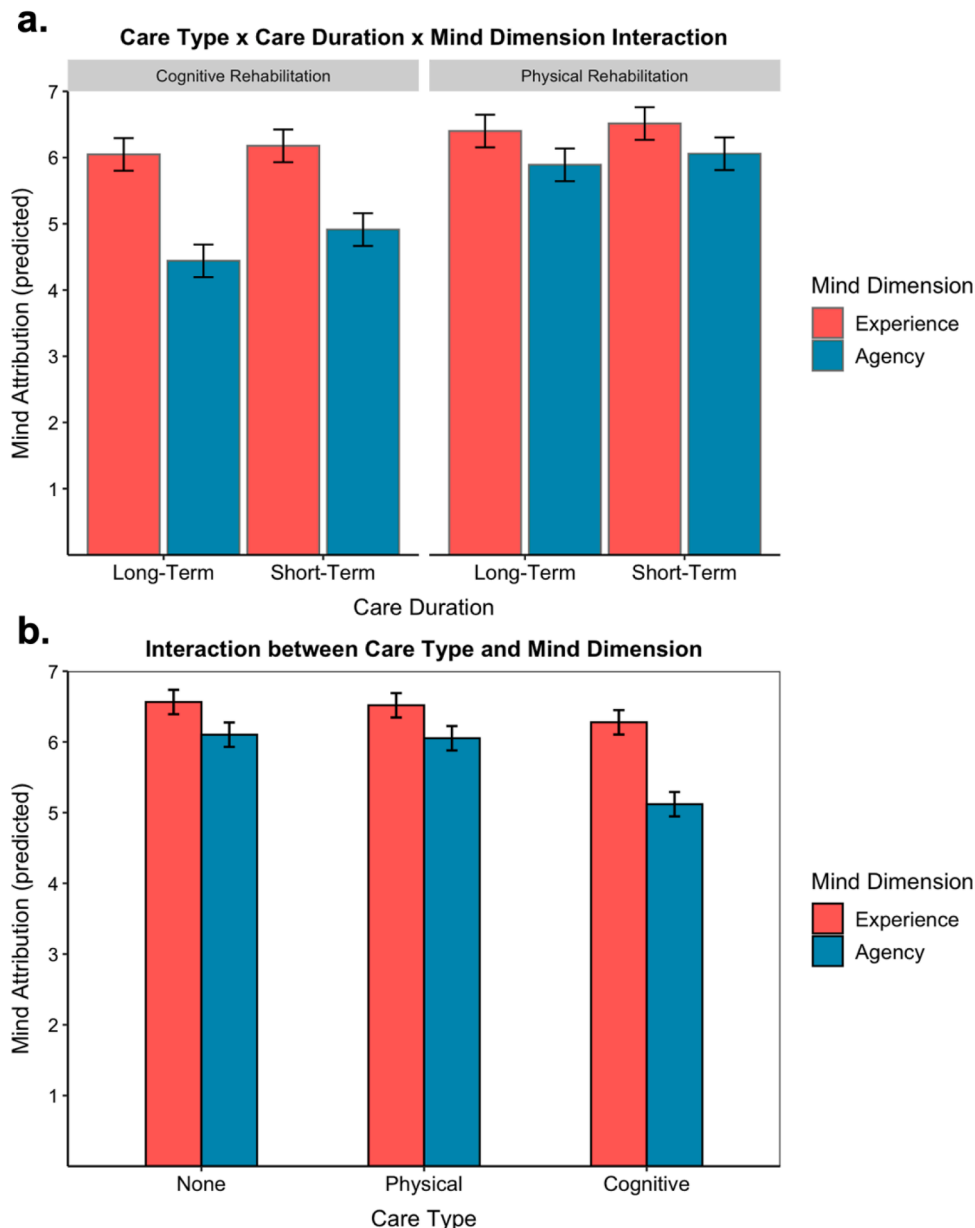


Fig. 2. In Experiment 2, older adults were attributed more mental experience than agency when receiving short- versus long-term cognitive rehabilitation (a). No differences emerged for older adults in physical rehabilitation. In Experiment 3, more mental experience than agency was only attributed to people receiving cognitive rehabilitation (b). *Note:* Error bars reflect standard error. <AuQuery: Please check, Part designations in figure legends should be in normal typeface (not bold face).>

Experiment 3

We next tested whether attributing less mind to older adults receiving cognitive, but not physical, rehabilitation generalized to younger adults being rehabilitated or was specific to older adults. Consistent with aging stereotypes (North and Fiske, 2012), we expected less mind attributed to older versus younger adults. Older versus younger adults, however, are specifically denied cognitive capacities consistent with animalistic dehumanization (Boudjemadi et al., 2017). If cognitive rehabilitation and age group effects interact, the tendency to attribute more experiential than agentic capacities to those receiving cognitive rehabilitation could be *exacerbated* for older versus younger adults. Because work on mind denial specific to attributed agentic capacities has used younger agents (e.g., Khalid et al., 2016), however, the cognitive rehabilitation effect could also be general. Thus, even though older versus younger adults may be attributed less mind overall,

cognitive rehabilitation effects could be similar across age groups.

Using younger and older agents allowed us to explore potential hypermentalization toward those receiving physical rehabilitation. The hypermentalization of younger agents would conceptually replicate past work (Sim and Hugenberg, 2022). If this hypermentalization does not extend to older adults, it may reflect the broad denial of older adults' agentic capacities (Boudjemadi et al., 2017). Even if hypermentalization of younger agents did not emerge, we did not expect support for dementialization. If older agents are not dementialized in this context, relatively more humanized groups (e.g., younger agents) should not be either.

Experiment 3 also identified a potential consequence of mind attributions toward people living in facilities to receive rehabilitative care. Perceived humanness relates to positive intentions toward agents (Cuddy et al., 2007a), and attributed agentic capacities may be especially important in facilitating them (Sim and Hugenberg, 2022). We

assessed whether mind attributions related to beliefs in the likelihood that agents can successfully rehabilitate. We expected a robust positive relation between attributed mental agency and these beliefs.

Method

Participants

We targeted 100 participants and collected data from 200 MTurk participants. We excluded 38 for inattention, yielding 162 analyzed participants ($M_{age} = 40.62$, $SD = 11.50$, range = 20–78, $M_{years\ of\ education} = 15.57$, $SD = 2.37$; 82 identifying as female). The sample age was again skewed toward younger adults (0.85). Of this sample, 136 identified as White, 14 as Black, eight as Asian, one as multiracial, two as American Indian/Alaska Native, and one as having an unknown race. Thirteen identified as Hispanic.

Procedure

Experiment 3 replicated Experiment 1 with the following changes. Four trials manipulated Age Group (younger or older) and Care Type (physical or cognitive rehabilitation). Participants read, “Both young adults and senior citizens experience medical emergencies that require them to seek some form of rehabilitation and care. Young adults are people between the ages of 18 and 28 years old. Senior citizens are people above the age of 65 years old. Depending on the medical emergency, both young adults and older adults may require either cognitive or physical rehabilitation. Cognitive rehabilitation focuses on only restoring a person’s mental capabilities like memory. Physical rehabilitation focuses on only restoring a person’s physical capabilities like walking. Text for each trial mirrored Experiment 2 with the following changes. The text began, “Some [young adults/senior citizens] stay in [cognitive care centers/physical rehabilitation centers] and receive [cognitive/physical] rehabilitation after a medical emergency.” Subsequent text referring to Age Group varied by trial. For each trial, participants indicated the likelihood that a 26 [75] year old would successfully rehabilitate their cognitive [physical] abilities using a slider ranging from 0 % likely to 100 %. There was one “no care” trial for each Age Group.

Participants indicated the percentage of older adults in cognitive rehabilitation centers, physical rehabilitation centers, and non-care settings. Responses equaled 100. We summed ageism ($M = 51.98$, $SD = 14.80$; Cronbach’s $\alpha = 0.83$) and prescriptive ageism ($M = 57.55$, $SD = 22.32$; Cronbach’s $\alpha = 0.94$) responses. Participants also completed adapted versions of the Instrumental Activities of Daily Living Scale (Morrow, 1999) for each age group on an exploratory basis.

Results

Living situation beliefs

People believed 17.77 % ($SD = 14.79$ %) of young adults were in cognitive rehabilitation centers, 27.28 % ($SD = 17.96$ %) in physical rehabilitation centers, and 54.20 % ($SD = 27.02$ %) were in non-care settings after medical emergencies. People believed 28.18 % ($SD = 14.73$ %) of older adults were in cognitive rehabilitation centers, 40.55 % ($SD = 16.05$ %) in physical rehabilitation centers, and 31.27 % ($SD = 21.19$ %) in non-care settings after medical emergencies.

Contextual effects of care type, age group, and mind dimension

We regressed attributions on Mind Dimension (experience = 1, agency = -1), Care Type (effects coded such that none was the reference level relative to cognitive and physical), Age Group, (younger adults = 1, older adults = -1) and their interactions as fixed effects, including the same ageism controls and random effects as in Experiment 1 (see

Table 3
Effects of Care Type, Age Group, and Mind Dimension on Mind Attribution, controlling for Ageism, in Experiment 3.

Predictors	Mind Attribution			
	Estimates	std. Error	Statistic	p
(Intercept)	6.11	0.13	48.82	<0.001
Care Type [Physical]	-0.05	0.02	-1.95	0.051
Care Type [Cognitive]	-0.64	0.02	-25.72	<0.001
Mind Dimension [Agency]	0.35	0.12	2.97	0.003
Age Group [Older]	0.13	0.01	12.76	<0.001
Ageism (standardized)	-0.38	0.07	-5.11	<0.001
Prescriptive ageism (standardized)	-0.07	0.07	-0.94	0.349
Care Type [Physical] × Mind Dimension [Agency]	0.00	0.02	0.08	0.938
Care Type [Cognitive] × Mind Dimension [Agency]	0.35	0.02	14.09	<0.001
Care Type [Physical] × Age Group [Older]	-0.01	0.02	-0.48	0.628
Care Type [Cognitive] × Age Group [Older]	0.01	0.02	0.41	0.685
Mind Dimension [Agency] × Age Group [Older]	-0.08	0.01	-7.99	<0.001
Care Type [Physical] × Mind Dimension [Agency] × Age Group [Older]	0.01	0.02	0.23	0.815
Care Type [Cognitive] × Mind Dimension [Agency] × Age Group [Older]	0.01	0.02	0.34	0.731

Notes. Care Type (cognitive/physical/none), Age Group (younger adult/older adult), and Mind Dimension (agency/experience) are effects coded.

Table 3). Again, this random effects structure accounts for systematic differences among participants and mind attribution items.

A Mind Dimension effect showed more attributed mental experience ($Estimate = 6.45$, 95 % CI [6.12, 6.79]) than agency ($Estimate = 5.76$, 95 % CI [5.42, 6.09]). An Age Group effect showed more mind attributed to younger adults ($Estimate = 6.23$, 95 % CI [5.99, 6.48]) than older adults ($Estimate = 5.98$, 95 % CI [5.73, 6.22]). Age Group and Mind Dimension interacted (Fig. 3). Older adults were attributed more mental experience ($Estimate = 6.40$, 95 % CI [6.07, 6.74]) than agency ($Estimate = 5.55$, 95 % CI [5.21, 5.89]), $z = 3.65$, $p = .002$. No difference emerged for younger adults ($Estimate_{experience} = 6.50$, 95 % CI [6.16, 6.84], $Estimate_{agency} = 5.97$, 95 % CI [5.63, 6.30]), $z = 2.28$, $p = .10$. Characterized another way, a tendency for younger adults versus older adults to be attributed more mental experience, $z = 3.37$, $p = .004$, was exacerbated for mental agency, $z = 14.67$, $p < .001$.

A Care Type effect showed more mind attributed to people with no rehabilitation ($Estimate = 6.33$, 95 % CI [6.09, 6.58]) relative to cognitive ($Estimate = 5.70$, 95 % CI [5.45, 6.94]), $z = 25.71$, $p < .001$, but not physical ($Estimate = 6.28$, 95 % CI [6.04, 6.53]), $z = 1.93$, $p = .12$, rehabilitation. People in physical versus cognitive rehabilitation care were attributed more mind, $z = 23.76$, $p < .001$. Care Type and Mind Dimension interacted (Fig. 2b). We examined the Mind Dimension effect for each Care Type. No effect emerged for people receiving no rehabilitation ($Estimate_{experience} = 6.56$, 95 % CI [6.23, 6.90], $Estimate_{agency} = 6.10$, 95 % CI [5.76, 6.44]), $z = 1.96$, $p = .37$, or physical rehabilitation ($Estimate_{experience} = 6.52$, 95 % CI [6.18, 6.86], $Estimate_{agency} = 6.05$, 95 % CI [5.71, 6.39]), $z = 1.98$, $p = .36$. People receiving cognitive rehabilitation were attributed more mental experience ($Estimate = 6.28$, 95 % CI [5.94, 6.61]) than agency ($Estimate = 5.12$, 95 % CI [4.78, 5.46]), $z = 4.91$, $p < .001$.

Relations between mind attribution and believed likelihood of rehabilitation success

We regressed the likelihood of rehabilitation success on Care Type (physical rehabilitation = 1, cognitive rehabilitation = -1), Age Group (older adults = 1, younger adults = -1), Attributed Mental Experience (standardized around the mean for each participant), Attributed Mental

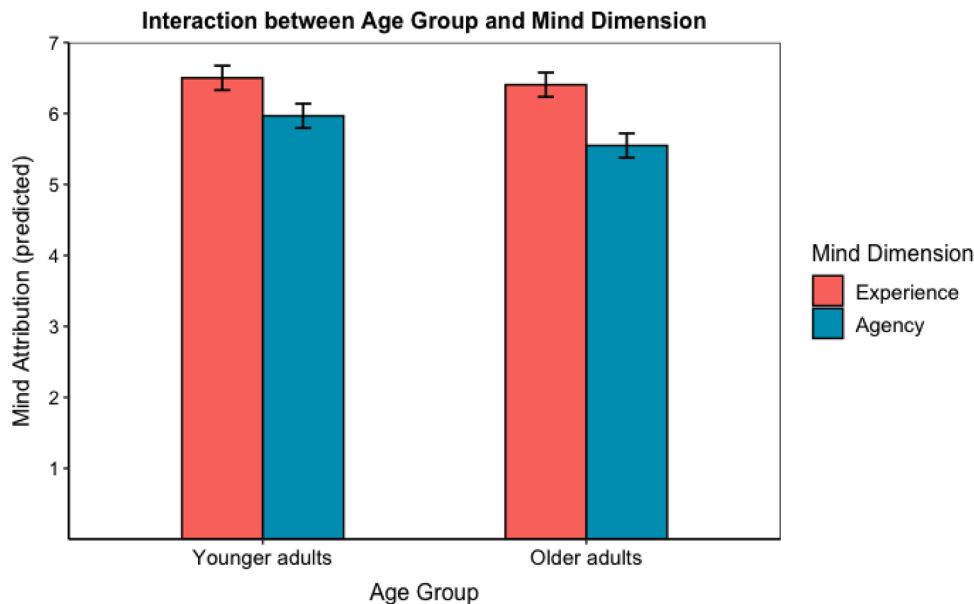


Fig. 3. In Experiment 3, older, but not younger, adults were attributed more mental experience than agency. *Note:* Error bars reflect standard error.

Agency (standardized around the mean for each participant), and the interactions of the continuous variables with the categorical variables as fixed effects (see Table 4). The model controlled for Ageism (standardized around the overall mean) and allowed intercepts to vary by participant.

An Age Group Effect showed that young adults (*Estimate* = 78.50 %, 95 % CI [76.00, 80.90]) versus older adults (*Estimate* = 53.10 %, 95 % CI [50.60, 55.50]) were believed as more likely to be rehabilitated. Attributed mental experience and agency each positively related to the believed likelihood of rehabilitation.

Discussion

Across rehabilitation settings, a tendency to attribute older versus

younger adults less mind was exacerbated for agentic versus experiential capacities. This exacerbation was due to older adults' stronger decrease in attributed mental agency than experience. This pattern aligns with work showing the specific animalistic dehumanization of older versus younger adults (Boudjemadi et al., 2017), suggesting it extends to extends to mind denial. This pattern may also reflect beliefs that older adults cannot act independently or require more assistance than do younger adults, thus aligning with stereotypes about older adults' incompetence (Nicolas et al., 2022). To the extent that stereotyping elicits dehumanization (Prati et al., 2015), however, even having belief-aligned attributions of older adults' agency may tacitly dehumanize them in ways that potentially affect the quality of their care. Indeed, consistent with aging stereotypes (e.g., Hummert, 1999), people believed older versus younger adults were less likely to be rehabilitated. To examine the connection between these possibilities, it would be worthwhile for future work to test if challenging stereotypes about older adults affects both attributions of their minds as well as the likelihood that they can benefit from care.

Moreover, that older relative to younger adults were attributed limited experiential capacities suggests that, in some contexts, people not only deny older adults' ability to cogitate, but their ability to feel. This pattern contrasts work showing people attribute more emotional capacities to older versus younger adults (Saito et al., n.d.). One possibility is that positive aging stereotypes related to experiential capacities (Cuddy et al., 2005) are less accessible when evaluating older adults across different rehabilitative contexts. Attributing minds to individual older adults versus older adults as a group could also affect mind attributions because individuation begets humanization (Swencionis and Fiske, 2014).

Attributing more experiential than agentic capacities emerged similarly across younger and older adults receiving cognitive rehabilitation. At first blush, this pattern might seem on the nose. If people need cognitive rehabilitation, something awry must be happening with cognitive capacities related to mental agency. Being rehabilitated, however, means that an agent has the capacity for restored agency. Inherent to restoring that agency is the ability to act intentionally to restore it. Thus, even the agent in rehabilitation must retain some semblance of agency. Indeed, agents were indeed conferred some agentic capacities in the rehabilitative context (see Fig. 3). Future work may benefit from assessing beliefs in agency at a given moment versus the potential for agency, to better understand how this nuance may

Table 4
Effects of Care Type, Age Group, Mental Experience, and Mental Agency on the Likelihood of Rehabilitation Success, controlling for Ageism, in Experiment 3.

Predictors	Likelihood of Rehabilitation Success			
	Estimates	std. Error	Statistic	p
(Intercept)	65.76	1.06	62.19	<0.001
Care Type [Physical]	0.82	0.63	1.29	0.198
Age Group [Younger]	-12.71	0.64	-19.73	<0.001
Mental Experience (standardized)	1.84	0.88	2.09	0.037
Mental Agency (standardized)	4.43	0.80	5.55	<0.001
Ageism (standardized)	-5.12	0.96	-5.34	<0.001
Care Type [Physical] × Age Group [Younger]	-0.68	0.67	-1.01	0.311
Care Type [Physical] × Mental Experience	-0.37	1.03	-0.35	0.723
Care Type [Physical] × Mental Agency	-0.62	0.98	-0.63	0.526
Age Group [Younger] × Mental Experience	-1.20	1.01	-1.19	0.236
Age Group [Younger] × Mental Agency	0.77	0.92	0.83	0.406
(Care Type [Physical] × Age Group [Younger]) × Mental Experience	0.14	0.97	0.14	0.889
(Care Type [Physical] × Age Group [Younger]) × Mental Agency	-1.62	0.86	-1.88	0.060

Notes. Care Type (cognitive/physical) and Age Group (younger adult/older adult) are effects coded.

complicate the current findings.

Similarly attributing more experiential than agentic capacities across younger and older adults receiving cognitive rehabilitation also suggests a rehabilitation effect generalizable across targets of different ages. That this effect emerged for younger agents is consistent with limited agentic capacities based on manipulations of younger agents (e.g., [Khalid et al., 2016](#)). Here, people inferred limited agentic capacities to agents receiving cognitive rehabilitation. Older relative to younger agents are not at a disproportionate disadvantage here in terms of the rehabilitation effect on mind attributions. Rather, older adults are disadvantaged by simply starting at a lower baseline. That is, they are denied mind more overall. Like attributions toward people receiving no care, no hypermentalization emerged toward those receiving physical rehabilitation. One possibility is that attributions about agents that suggest hypermentalization may require evidence of those agents overcoming adversity (e.g., [Sim and Hugenberg, 2022](#)). Future work should assess mind attributions after completing rehabilitation to varying degrees of success.

Attributing more mind positively related to rehabilitation beliefs across care types. These patterns extend past work ([Cuddy et al., 2007a](#)) by suggesting mind perception is also framework for predicting beliefs about agents requiring care. This relation was stronger with agentic than experiential capacities, reflecting beliefs that attributed agency is core to overcoming health challenges ([Sim and Hugenberg, 2022](#)). Future work should examine whether interactions with people needing rehabilitation varies by the extent of their attributed mental agency. For example, it could be that paternalistic behavior toward people attributed lower mental agency prohibits actual rehabilitation efficacy. Indeed, people believe that paternalistic care is more beneficial to people perceived as lower than higher in mental agency ([Sim and Hugenberg, 2022](#)).

General discussion

We show that living situation is a potent contextual cue affecting mind attributions toward older adults. Older adults receiving more external support in their overall living situations were attributed less mind, an effect driven by limited inferred mental agency (Experiment 1). Attributions of limited inferred agentic versus experiential capacities also emerged for older adults receiving cognitive, but not physical, rehabilitation after medical emergencies (Experiments 2 and 3). This cognitive rehabilitation effect reflected an effect generalizable to younger adults, although older adults were attributed less mind overall (Experiment 3). Showing consequences of limited inferred mental agency, attributed agentic capacities positively related to beliefs that agents could benefit from rehabilitation (Experiment 3). All effects emerged when controlling for variability in prejudice known to affect attitudes (see [North and Fiske, 2012](#)) and mind attributions ([Saito et al., n.d.](#)) toward older adults, suggesting a broad emergence that could substantially affect older adults' lives.

These findings appear consistent with work using the dual model of dehumanization ([Haslam, 2006](#)) to evince older adults as being more animalistically than mechanistically dehumanized ([Boudjemadi et al., 2017](#)). These findings extend that work by using a mind perception framework. Mind perception is theorized to precede the canonical trait attributions characteristic of person perception ([Epley and Waytz, 2010](#)). Understanding when agents are afforded minds is important to consider because these agents are conferred abilities to be moral ([Gray et al., 2012](#)), and, more broadly, conferred moral worth and value ([Haslam, 2006](#)). The current work suggests that attributions of mind are limited in contexts where those attributions are likely critical to success. Indeed, whereas lower standards of care are afforded to dehumanized people ([Redelmeier and Tversky, 1990](#)), high quality support begets rehabilitation success ([Chronister et al., 2008](#)). Even if people were merely applying aging-related stereotypes about needing help and care to older adults in the present work, the application of stereotypes often begets dehumanization ([Prati et al., 2015](#)). One possibility derived from

the current work is that attributing lower agentic and, sometimes, experiential capacities, to older adults relative to other populations denies them the worth that might heighten enthusiasm for their care. Supporting this possibility, dehumanization toward older adults relates to hostility in their work environments ([Wiener et al., 2014](#)). Effects emergent when older adults can work are likely exacerbated when they require help. Future work may examine whether the activation of aging-related stereotypes facilitates mind attributions related to care quality.

Although limited inferred agentic versus experiential capacities consistently emerged for older adults, it is important to note the subtlety of these effects. These limited inferred capacities were *relative* in nature, and not egregious (e.g., [Gray et al., 2011](#)). Yet, subtle or even tacit dehumanization can have dire consequences. Here, we show that these subtle differences robustly related to beliefs in rehabilitation efficacy. Since positive attitudes toward care complement efforts to reduce elder abuse ([Chang et al., 2015](#)), inferring limited agentic capacities of older adults may impede those efforts to an extent. Subtle dehumanization in care contexts is also important to consider because it can generalize to more broadly prejudicial attitudes against and institutional policies affecting older adults ([Drury et al., 2017](#)). One possibility worthy of examination by future work is that well-intentioned people may not recognize their subtle dehumanization of older agents, and thus do not acknowledge a potential for elder abuse.

Core to the present work was not simply identifying rehabilitation effects on mind attributions but identifying consequences of these attributions. We showed positive relations between mental agency and experience and the perceived likelihood that agents would be rehabilitated. These effects were robust to agent age and the type of rehabilitation received. Although these relations suggest that mind attributions are highly consequential to beliefs about *all* agents receiving rehabilitation, we focus on explaining their relevance to older adults. For example, if people do not believe older adults are likely to be rehabilitated (given lower attributed mental agency), this may affect living recommendations for older adults. Indeed, people may recommend that older adults' live contexts where they are cared for rather than seek out rehabilitation needed to retain their independence. It may also be compelling to examine these relations to the extent that they affect beliefs about more blatant forms of harm toward older adults. The financial exploitation of older adults, for example, has been recognized as a serious public health problem by the government (e.g., [Burnes et al., 2015](#)). It could be that beliefs about older adults' mental agency affect the types of interventions developed to combat this exploitation, or, more broadly, beliefs that interventions may be effective in reducing it. The current work provides an empirical baseline for such endeavors.

Here, we did not consider whether the participants were past or current caregivers of older adults. This limitation should be addressed by future work for a few reasons. First, limited mind attributions toward older adults may be exacerbated among caregivers experiencing caregiver burden ([Głębocka, 2019](#)). One possibility is that caregivers experiencing substantial burden attribute limited agentic versus experiential capacities toward older adults in both cognitive and physical rehabilitation contexts, thereby broadening mind denial toward these agents. Second, examining mind attributions among caregivers would allow researchers to determine the role of intergenerational contact toward mind attributions. Indeed, contact in and of itself may not be enough to humanize older agents ([Drury et al., 2017](#)). It could be that perspective taking ([Miron, McFadden, Hermus, et al., 2017](#)) is necessary to humanize older agents by restoring senses of their agentic and experiential capacities.

We present novel evidence that where older adults live overall or to receive rehabilitative care after medical emergencies are powerful contextual cues affecting the extent to which they are attributed mind. Beyond applied implications for this work for the standard of care afforded to older adults residing in these settings, the current work theoretically advances mind perception research by showing the

potentially transient nature of when people are afforded or denied mind. That is, people may be subtly denied mind simply because they experience health challenges requiring care to overcome them. Identifying these contexts is important because mind denial has negative consequences for empathy and helping behavior (e.g., Cuddy et al., 2007). Denying mind may perpetuate harm (e.g., Monroe and Plant, 2019) by creating a barrier to the care that agents need.

Declaration of competing interest

The authors declare no conflicts of interest.

Data availability

Data will be made available on request.

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