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Prosocial speech acts: links to pragmatics and ageing

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Abstract

This study investigated how adults over the lifespan flexibly adapt their use of prosocial speech acts when conveying bad news to communicative partners. Experiment 1a (N=100 Scottish adults aged 18-72 years) assessed whether participants’ use of prosocial speech acts varied according to audience design considerations (i.e., whether or not the recipient of the news was directly affected). Experiment 1b (N=100 Scottish adults aged 19-70 years) assessed whether participants adjusted for whether the bad news was more or less severe (an index of general knowledge). Younger adults displayed more flexible adaptation to the recipient manipulation, while no age differences were found for severity. These findings are consistent with prior work showing age-related decline in audience design but not in the use of general knowledge during language production. Experiment 2 further probed younger adults (N=40, Scottish, aged 18-37 years) and older adults’ (N=40, Scottish, aged 70-89 years) prosocial linguistic behavior by investigating whether health (vs non-health-related) matters would affect responses. While older adults used prosocial speech acts to a greater extent than younger adults, they did not distinguish between conditions. Our results suggest that prosocial linguistic behavior is likely influenced by a combination of differences in audience design and communicative styles at different ages. Collectively, these findings highlight the importance of situating prosocial speech acts within the pragmatics and ageing literature, allowing us to uncover the factors modulating prosocial linguistic behavior at different developmental stages.

Keywords: ageing, pragmatics, audience design, prosociality

Public Significance Statement: Prosocial speech acts (i.e., those in which the aim is to protect the listener’s feelings/self-image) are ubiquitous in everyday speech, enabling people to build and maintain relationships. This study investigates the use of prosocial speech acts over the adult lifespan, advancing scientific knowledge of how pragmatic skills and stylistic differences in communication across generations influence prosocial linguistic behavior.
Introduction

Humans are remarkably prosocial, cooperating with kin and non-kin alike for the benefit of others (Jensen et al., 2014). When considering what it means to be “prosocial”, lying is probably not the first term that comes to mind, however, it is one of the most prevalent ways that people engage in cooperative behavior. Indeed, prosocial lying, or lying for the benefit of others, is a phenomenon so frequent it is estimated that individuals do so numerous times on a daily basis (DePaulo & Kashy, 1998). Unlike self-serving lies, in which the use of deception is often harmful (Iñiguez et al., 2014), prosocial lies are motivated by the desire to spare others from emotional harm (Levine & Lupoli, 2021), protect others’ self-image (Argo et al., 2011), and provide interpersonal support (Brown & Levinson, 1987; Goffman, 1967).

In its simplest form, prosocial lying involves making small but deliberate modifications to speech (such as using statements of uncertainty as hedges rather than expressions of likelihood). For example, you may choose to tell your co-worker it is possible they will be made redundant – i.e., lose his or her job - when you know it is likely (Youmans, 2001). Similarly, indirect language offers a form of “nuanced truth”, ranging from outright withholding knowledge (e.g., not mentioning any redundancy plans when the topic is brought up) to leaving out critical information (e.g., indicating that redundancies are expected, but not that your co-worker is the one likely to go).

Together, telling prosocial lies and nuanced truths can be viewed as prosocial speech acts, in which the aim is to protect the other person’s feelings/self-image, at the cost of misleading them. As such, prosocial speech acts lie at the intersection of two competing social goals (Yoon et al., 2020): On the one hand, misleading others goes against the classic Gricean view of communication, whereby language is meant to be efficient, informative, and accurate (Grice, 1975). On the other hand, prosocial speech acts are an accepted social convention allowing us to support others’ sense of positive identity and public self-esteem in social interactions (Lakoff, 1973).

Due to this trade-off between social goals, prosocial speech acts are used strategically across conversations rather than uniformly (as outlined by Brown & Levinson (1987) in their
classic Politeness Theory framework). Under this framework, speakers (as ‘rational agents’) weigh the potential social payoffs gained through prosocial linguistic behavior in a given situation to determine whether it is appropriate (i.e., serves the intended social goal). Prosocial speech acts are thus highly context-sensitive, such that their use varies according to factors such as the significance of the topic being discussed and the listener’s perceived mental state (Holtgraves & Perdue, 2016; Lorson et al., 2021; Yoon et al., 2016).

To illustrate, let’s revisit the workplace redundancy example from above. Imagine having to break the news about impending redundancies in your office to two different recipients: (i) a co-worker (who may lose his or her job) vs. (ii) a neighbor (who is completely removed from the situation). Whereas in the former context, prosocial speech acts serve the purpose of sparing the co-worker from emotional harm (e.g., by downplaying the likelihood it will happen), the same social goal is not relevant in the latter context as the neighbor is unaffected by the news. Thus, the trade-off between being informative vs telling a good-intentioned lie is non-existent in the latter context, as there is nothing to be gained by lying to the neighbor.

The above hypothetical scenario demonstrates why, as rational agents, one’s choice of when to use prosocial speech acts should vary as a function of one’s communicative partner and situational context, given that the impact of the news inherently differs from one person and circumstance to another. As such, the flexible use of prosocial speech acts can be viewed as a form of pragmatic competence (Fraser, 2010) in which effective communication relies on linguistic adaptability (for a recent overview of work in experimental pragmatics, see Cummins & Katsos, 2019).

A lifespan approach to prosocial speech acts

Given the importance of linguistic adaptability for the development of interpersonal relationships (DePaulo & Jordan, 1982) researchers have focused on the emergence of prosocial speech acts during childhood, uncovering a link between prosocial speech acts and enhanced theory of mind (i.e., the ability to take into account another individual’s mental state)
and executive function skills (i.e., the cognitive skills associated with goal-directed behavior). More specifically, researchers have found an association between children’s flexible use of prosocial lies and higher working memory and inhibitory control as well as more advanced theory of mind understanding (Leduc et al., 2017; Talwar et al., 2017; Williams et al., 2016). These findings are thought to reflect the fact that prosocial lying entails reasoning about others’ minds, including their thoughts, beliefs, and emotions (to weigh the potential social benefits gained in a given scenario) and subsequently updating one’s linguistic goal (i.e., deciding whether or not to produce a prosocial lie) (e.g., Popliger at al., 2011). Further complementing these findings, developmental work has shown an increase in the use of prosocial lies in older children compared to younger children (Findlay et al., 2006; Newcombe & Huttenlocher, 1992), following the same upward trajectory as the development of theory of mind and executive function skills over the course of childhood (Sai et al., 2021). This suggests a concurrent emergence of these skills as well as a potential concomitant relationship.

Together, the aforementioned body of work offers a window into the time-course with which humans acquire prosocial speech acts in their communicative repertoire and what the underlying mechanisms may be. However, despite the expansive literature on children’s acquisition of prosocial speech acts, no prior work has examined how individuals at the other end of the lifespan use prosocial speech acts. This is somewhat surprising given that older adults’ exhibit substantial variability in socio-cognitive skills (including declines in theory of mind and executive function skills; Celsis et al., 1997; Charlton et al., 2009; Henry et al., 2013) as well an increased acceptance of ‘blunt honesty’ over prosocial linguistic behavior (O’Connor et al., 2022). Based on these findings, it is reasonable to predict that older adults use prosocial speech acts less frequently than younger adults. However, seemingly at odds with older adults’ increased acceptance of ‘blunt honesty’ is their tendency to exhibit more prosocial behavior than younger adults (such as helping out and giving to others) (Bailey et al., 2021; Freund & Blanchard-Fields, 2014; Mayr & Freund, 2020), likely due to their perception of time as limited. This in turn may lead older adults to shift their social goals: i.e., by prioritizing
emotional goals (such as social connectedness) over knowledge-related goals (such as the acquisition of knowledge) (Carstensen et al., 1999; Charles & Carstensen, 2010).

In light of these distinct set of findings, two critical questions follow:

i) Is older adults’ increased favorability towards ‘blunt honesty’ reflected in their choice of utterances (i.e., compared to younger adults, are they more likely to use direct truths over good-intentioned lies)? Or does their tendency towards greater prosocial behavior offset this?

ii) To what extent do older adults’ modulate their use of prosocial speech acts according to contextual constraints (i.e., different recipients and situational contexts)? In other words, to what extent are prosocial speech acts used to achieve a social goal (as an index of pragmatic competence)?

With regards to the first question, a general preference for directness over prosocial linguistic behavior could be attributable to stylistic differences in communication across generations, whereby older adults place a lower premium on nuanced vs. direct truths. Supporting this notion, recent work has shown that older adults evaluate dishonesty more harshly than younger adults, even when it is well-intentioned (O’Connor et al., 2022). Interestingly, this pattern holds across populations whose cultures vary in collectivism and individualism, which suggests harsher evaluations of well-intentioned lies (and likewise more favorable evaluations of ‘blunt truths’) may be attributable to generational rather than cultural norms. Based on these findings, the following prediction can be made: due to stylistic differences in communication, there will be a general decrease in the use of prosocial lies with advanced age (i.e., compared to younger adults, older adults will use prosocial speech acts at significantly lower rates across the board).

As a counter hypothesis, it is also possible that no age-related differences will emerge in the frequency with which prosocial speech acts are used. Perhaps older adults’ increased favorability towards direct truths does not transfer to the actual use of direct truths in language
production (i.e., lower rates of prosocial speech acts), or this favorability is offset by a general inclination to engage in prosocial behavior (e.g., Bailey et al., 2021; Freund & Blanchard-Fields, 2014; Mayr & Freund, 2020). Results of this nature would suggest that general politeness strategies are preserved in old age, and that age-related differences in communicative styles (as previously documented e.g., James et al., 1998; Long et al., 2020; Trunk & Abrams, 2009) do not affect prosocial linguistic behavior, a finding equally relevant for linguistic theory.

An important question remains, however, as to the role of pragmatic competence (or linguistic adaptability) on the use of prosocial speech acts. To address this, our study will not only examine younger and older adults’ overall use of prosocial speech acts (as an index of general communicative styles; question i), but also more specific patterns of linguistic behavior that reflect adaptability to changing contextual cues in the environment (question ii), which directly ties into pragmatic competence.

For question ii, informed predictions can be made by drawing on insights from the rich literature on theory of mind and audience design at different stages of development. To date, a large body of work has revealed that children and older adults are less likely to represent the mental states of others than younger adults (i.e., recruit theory of mind skills, which are related to the rise and fall of executive control over the lifespan) (Charlton et al., 2009; Henry et al., 2013; Moran et al., 2012; Rakoczy et al., 2012). In a similar vein, work in linguistics has revealed that older adults are less likely to adjust their utterances based on partner-specific information such as their communicative partner’s age (Kemper et al., 1995; Kogan and Jordan, 1989; Schubotzet al., 2019), whether their partner is naïve or knowledgeable (Horton & Spieler, 2007; Hupet et al., 1993), and whether information is available to their partner (i.e., common vs. privileged ground) (Healey & Grossman, 2016; Long et al., 2018). Applying these findings to the use of prosocial speech acts, the following prediction can be made: if older

1 Note that while theory of mind and audience design are two related concepts, they differ in meaning: the former refers to the ability to attribute mental states to others and the latter refers to the act of adapting one’s choice of utterance according to others’ mental states.
adults are less attentive to their communicative partner’s perspective, they will be less likely to adjust their utterances according to listener considerations, i.e., whether or not the recipient is directly affected by the news (recall the redundancy example at the start).

Interestingly, while ageing impacts some pragmatic abilities, such as audience design, it does not affect all pragmatic abilities equally. Indeed, the more basic, early acquired pragmatic abilities are often less susceptible to decline, perhaps because they are less dependent on cognitive control and become largely automatic with increased experience (e.g., Hendriks et al., 2014; Long et al., 2023). For example, when making meta-linguistic judgements based on external knowledge (e.g., the severity of an outcome, such as health conditions and medication side effects) older adults’ fine-tune their responses appropriately, and their behavior is consistent with that of younger adults (Ligneau-Hervé & Mullet, 2005). It is therefore reasonable to predict that because older adults make informed inferences centered around pre-existing knowledge of common events (e.g., that taking over the counter medicine is less severe than having an operation), they would likely make appropriate prosocial linguistic adjustments according to the severity of the outcome.

Against this background, our study investigated whether general age-related differences in prosocial linguistic behavior would emerge at different stages of adult development, and whether these differences would vary as a function of contextual manipulations critical to everyday life (i.e., whether the recipient was directly affected by the bad news, whether the bad news was severe, and whether the bad news was health-related). In turn, our findings shed light on which contextual cues younger and older adults are more sensitive to when formulating their utterances, and to what degree their use of prosocial speech acts is pragmatically-appropriate (i.e., used in contexts in which a social goal could be achieved), which is highly relevant for the development and maintenance of interpersonal relationships (Beltrama & Papafragou, 2023; Holtgraves & Bonnefon, 2017; Lubben & Gironda, 2003).
Current study

In the current study, we examined the use of prosocial speech acts across three experiments. In Experiment 1a we examined how younger and older adults communicated severe bad news to their interlocutor by manipulating who the Recipient was (i.e., whether the interlocutor was affected by the news or not). Because we held severity constant (i.e., all scenarios involved severe negative consequences), our Recipient manipulation allowed us to directly test for evidence of audience design (i.e., whether younger and older adults’ use of prosocial speech acts varied as a function of listener considerations). As such, any age-related differences would be driven by the independent variable (Recipient) and not the controlled variable (Severity of the news, which remained constant throughout the task).

In contrast, in Experiment 1b, we held perspective constant (i.e., the Recipient was always directly affected by the bad news), while manipulating the Severity of the news (Low vs High Severity). Here our controlled variable was Recipient, while our independent variable was Severity. This experimental design allowed us to test whether the integration of general knowledge would modulate the use of prosocial speech acts across ages (i.e., whether younger and older adults would distinguish between more and less severe outcomes). While the integration of general knowledge in language production is not associated with age-related decline (e.g., Baltes et al., 1984), audience design is (e.g., Long et al., 2018). It was therefore an empirical question as to whether Experiments 1a-b would reveal different developmental patterns in the ability to adapt prosocial linguistic behavior according to these contextual manipulations.

Experiment 2 probed this question further by examining whether general knowledge that may be more relevant to the life experiences of a particular generation would reveal age-related differences in the use of prosocial speech acts. Here we held both perspective and severity constant (i.e., the recipient was always directly affected by severe bad news), testing

\[\text{Note that here and throughout the paper we use the term ‘general knowledge’ to refer to the ability to retrieve relevant knowledge about common types of events and use that knowledge to reason about a given hypothetical scenario (e.g., make the calculation that a house burning down would lead to more severe consequences than misplacing a pair of eyeglasses) (see e.g., Peccei, 2002; Politzer, 2004).}\]
whether younger and older adults flexibly adjusted their responses according to whether the bad news was health-related or not. We hypothesized that since older adults are more susceptible to disease and disability (World Health Organization, 2022) and generally experience poorer health than younger adults (Scottish Government, 2022), their life experience would increase sensitivity to these conditions compared to younger adults. Indeed, prior work has revealed that older adults are considerably more worried about health matters than younger adults (Hunt et al., 2003).

Under an alternative hypothesis, adults of all ages would be expected to show equal sensitivity to health issues (or even more sensitivity than older adults) given that the study was conducted during the global pandemic. Since younger adults were not as accustomed to worrying about personal health issues prior to the pandemic (Hunt et al., 2003), the pandemic may have heightened their sensitivity to that subject matter. Supporting this notion, a recent study found that younger adults have been at a greater risk of poor mental health due to COVID-19 than older adults, even though older adults are more vulnerable to the effects of the virus (Varma et al., 2021). It is therefore an open and topical question as to how adults of varying ages demonstrate prosocial linguistic behavior when presented with health-related vs. non-health-related matters in the present climate.

With regards to the set-up for each experiment, participants were instructed to communicate bad news to the listener through multiple choice probability statements (e.g., this outcome is highly unlikely to happen, or there’s a good chance this outcome will happen) and open text responses, the latter of which were evaluated according to the frequency and manner with which participants expressed Indirectness and Uncertainty (forms of prosocial speech acts). While our primary aim was to assess the use of prosocial lies and nuanced truths, our rich naturalistic dataset also lent itself to the exploration of patterns of empathic speech in ageing. Since questionnaire data shows that older adults’ cognitive empathy declines with age (i.e., imaging how another person may feel) (for a review see Beadle & De La Vega, 2019), we were interested in whether age differences would emerge in the use of empathetic statements. As such, in addition to evaluating prosocial speech acts, we also
evaluated participants' open text responses based on use of Emotional Language (an index of empathy). In what follows, we present the background and results for the first pair of experiments (Experiments 1a-b), before moving on to the background and results for Experiment 2.

Experiments 1a and 1b

Our first experiments were inspired by recent work on young adults’ linguistic strategies when conveying bad news to different interlocutors (Holtgraves & Perdew, 2016; Juanchich & Sirota, 2013; Sirota & Juanchich, 2015). In a recent study, Holtgraves and Perdew assessed whether speakers' level of communicative uncertainty varied depending on (a) the severity of the bad news (which was measured through participants' selection of probability expressions), and (b) the degree to which the recipient’s face was threatened (i.e., the degree to which the bad news would lead to feelings of embarrassment, shame and/or guilt by the recipient of the news) measured through open text responses. The authors replicated and extended previous work (e.g., Juanchich & Sirota, 2013; Sirota & Juanchich, 2015), as they found that participants chose probability statements that expressed greater uncertainty for more severe events and used more indirect language when the recipient’s face was threatened.

The present study expanded on these findings by testing a large sample of adults varying widely in age to assess whether the same type of prosocial linguistic adjustments reported for young adults were consistent across the adult lifespan. We made the following general predictions for the relationship between age and prosocial linguistic behavior based on previous empirical findings: (1) In line with the audience design literature described in the previous section (e.g., Kemper et al., 1995; Kogan & Jordan, 1989; Long et al., 2018; Schubotzet al., 2019), we predicted that younger adults would be more sensitive to the Recipient manipulation in Experiment 1a (i.e., whether or not a recipient’s face is threatened), and would flexibly adjust their use of prosocial speech acts and emotional language to a greater extent than older adults. (2) Consistent with the notion that the integration of general...
knowledge during language production is not negatively impacted by cognitive ageing (Baltes et al., 1984), we predicted that participants of all ages would use prosocial speech acts and emotional language to the same degree according to the Severity manipulation in Experiment 1b, revealing no age-related differences. Across both experiments we predicted an effect of age due to stylistic differences in communication, such that older adults would use prosocial speech acts less than younger adults, irrespective of the condition manipulation.

**Experiment 1a: Recipient manipulation**

*Transparency and openness*

All de-identified data, analysis code and research materials from this study are available at the Open Science Framework (OSF) link reported in the Author Note. The data were analyzed using R statistical software (R Core Team, 2021).

*Participants*

A total of 100 native English speakers from Scotland (aged 18-72 years) were recruited from Prolific (an online crowdsourcing platform). This sample size was determined by conducting a prospective power analysis using the WebPower package in R. To calculate this, we specified that 2 predictor variables and their interaction (age by condition) would be tested and set the parameters for $\alpha=.05$ with a large effect size of .8 (using Cohen’s d) based on prior work on risk communication (Hayakawa & Marian, 2022). To ensure an even distribution of ages, 20 participants were recruited from each of the following age bins: 18-28, 29-39, 40-50, 51-61, and 62-72 years. Informed consent was obtained prior to testing. Due to the global pandemic, our task was administered online, and we were unable to screen each individual participant for cognitive/neurological impairment. Nevertheless, we included control trials to screen for participants who were either unable to complete the task or were not paying
attention. Before analysis, 10 participants were removed and replaced for getting the control trials wrong.

Materials/Procedures

Communication task

Using a communication task (based on Holtgraves & Perdew, 2016), we examined how participants conveyed bad news to different interlocutors. Before starting the task, participants were presented with two control trials in which they were asked to select the term that was most and least probable out of the following: highly unlikely, somewhat unlikely, possible, good chance, and almost certain. These terms were pre-tested prior to the experiment (for the results of the pre-test, see Figure A in Supplementary Materials). After correctly identifying the two extreme ends of the probability scale, participants proceeded to the task.

In the task, participants were presented with 20 scenarios with severe consequences (for full list see: https://osf.io/4wqcv/?view_only=41be253cda6a4d20aecd601e21bb10560). Two versions of each scenario were created such that the recipient of the bad news was either directly affected (face-threat) or not (non-face-threat), for a total of 40 items. These items were used to build two lists of materials (20 scenarios each, half of which were face-threatening), which were evenly distributed among participants. To ensure the scenarios were not disproportionately biased towards a particular age group, each set of materials included 12 scenarios applicable to both younger and older adults (e.g., something happened to one’s sister), 4 that apply more to younger adults (e.g., something happened to one’s aunt), and 4 that apply more to older adults (e.g., something happened to one’s adult son). During the task, items were presented in a random order (see Fig. 1 for a sample scenario).

In each scenario, participants were told they were either scared, anxious, worried, frightened, or fearful of a particular outcome and had to convey the news to the listener (see Fig. 1 for example scenarios/text). These five terms were ranked the strongest in terms of the
emotion they conveyed based on a pre-test of ten emotive terms on a separate set of 75
Scottish adults via Prolific (ages 18-73 years) (see Figure B Supplementary Materials). No
age-related differences were found in the ranking of these terms (all ps>.05).

Each of these five emotive terms was used a total of four times. While Holtgraves and
Perdew (2016) used percentages in their scenarios (e.g., there’s a 20% / 50% / 80% chance
of a particular outcome), we used strong emotive terms for all scenarios to reduce the cognitive
load for older adults. This decision was based on research demonstrating that emotion
comprehension remains stable in old age (Bailey & Von Hippel, 2008) whereas numeracy
skills are susceptible to decline and can significantly impact task performance (Taha et al.,
2014).

<table>
<thead>
<tr>
<th>The scenario</th>
<th>Open text</th>
<th>Multiple choice</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experiment 1a</strong>&lt;br&gt;Recipient&lt;br&gt;Imagine that the company you work for has not been doing well financially. After a meeting with your boss, you are anxious that your co-worker will be made redundant. Later that day your co-worker (face-threat) / someone from a different department (non-face-threat) asks how the meeting went.&lt;br&gt;You tell your co-worker / the person from the other department:</td>
<td>It is ___ that you / my co-worker will be made redundant.&lt;br&gt;• highly unlikely&lt;br&gt;• somewhat unlikely&lt;br&gt;• possible&lt;br&gt;• there’s a good chance&lt;br&gt;• almost certain</td>
<td></td>
</tr>
<tr>
<td><strong>Experiment 1b</strong>&lt;br&gt;Severity&lt;br&gt;Imagine that the company you work for has not been doing well financially. After a meeting with your boss, you are anxious that your co-worker will be made redundant (severe) / receive a salary decrease (less severe). Later that day your co-worker asks how the meeting went.&lt;br&gt;You tell your co-worker:</td>
<td>It is ___ that you will be made redundant / receive a salary decrease.&lt;br&gt;• highly unlikely&lt;br&gt;• somewhat unlikely&lt;br&gt;• possible&lt;br&gt;• there’s a good chance&lt;br&gt;• almost certain</td>
<td></td>
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</tbody>
</table>

Figure 1. Sample scenarios and prompts for the manipulations from Experiment 1a (Recipient context) and
Experiment 1b (Severity context).

Participants were asked to convey how they would communicate the bad news to the
recipient, first through open text, and then via multiple choice. Eliciting both response types
(rather than just one or other, as in previous work) was advantageous in two ways: the open
text responses were an insight into what participants would naturally say in a given scenario,
while the multiple choice was a controlled measure which provided us with comparable data
across participants. Open text responses were assessed by three independent coders based
on the extent to which statements expressed Uncertainty, Indirectness, and Emotion, which are among the most common prosocial linguistic strategies used in everyday speech (Brown & Levinson, 1978; Leech, 1983; Youmans, 2001). The coders were blind to participant age and the inter-rater agreement rate was 98%. The coders met to discuss their choices and reached a mutual decision when coding differences emerged. See Table 1 for coding scheme.

Table 1. Coding scheme for open text responses.

<table>
<thead>
<tr>
<th>Coding</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirectness</td>
<td>1= Relay the bad news and give the reason for the bad news, 2= Relay the bad news only, 3= Give the reason in a way that requires an inference, 4= Withhold the bad news or lie</td>
</tr>
<tr>
<td>Uncertainty</td>
<td>1= Convey uncertainty (e.g., might, could, possibly), 0= Don’t convey uncertainty</td>
</tr>
<tr>
<td>Emotion</td>
<td>1= Convey emotions (e.g., I feel awful), 0= Don’t convey emotions</td>
</tr>
</tbody>
</table>

In addition to assessing open text responses, we ranked multiple-choice responses by likelihood on a 5-point scale (1=highly unlikely, 2=somewhat unlikely, 3=possible, 4=good chance, 5=almost certain). These probability terms were pre-tested on a separate set of 100 Scottish adults via Prolific (ages 19-73 years). No age-related differences were found with regards to the scale formed by these terms (all ps>.05; see Figure A in Supplementary Materials), making it suitable for the purposes of this study.

Results

Descriptive statistics by age for participants’ use of Indirectness, Uncertainty, and Emotion and their choice of probability statements in the multiple-choice responses are shown in Fig. 2.
Using linear mixed effects regression, we modelled the outcome variable of Indirectness with Recipient (Face-threat, Non-face-threat) and Age as fixed effects and the maximal random effect structure. Age was entered as a scaled continuous predictor and deviation coding was used for Recipient (Face-threat=-0.5, Non-face-threat=0.5).

Results revealed a main effect of Recipient (p=.033), whereby indirectness appropriately increased when the listener's face was threatened (for full model output see Table 2). This mirrors results from the multiple-choice responses (which were analyzed using an analogous model) whereby lower probabilities were selected in the face-threatening context (p<.001). For both models, no age effects were found (see Fig. 2), which suggests
that stylistic differences in communication across generations does not impact the overall rate with which prosocial speech acts are used.

Modelling the binary outcome variable of Uncertainty using logistic mixed effects regression (with the same fixed and random effects structure as above), we again found a main effect of Recipient (p=.003), with greater uncertainty expressed in the face-threatening contexts. Supporting our prediction, there was a Recipient x Age interaction (p=.036), whereby younger adults appropriately distinguished between the two Recipient conditions by expressing greater uncertainty when the recipient’s face was threatened than when it was not threatened. Older adults, on the other hand, did not distinguish between the two conditions (as shown in Fig. 2).

Finally, our logistic mixed effects regression model of Emotion revealed a main effect of Recipient (p<.001), with less emotion conveyed when the recipient’s face was threatened (perhaps to mitigate the discomfort of the situation). Similar to the Uncertainty model, a Recipient x Age interaction (p=.048) revealed that younger adults modulated their use of emotion based on the recipient’s face, unlike older adults (see Fig. 2). There was no main effect of Age for either of the latter two models, which again suggests that stylistic differences (i.e., approval of ‘blunt honesty’ in older age) does not influence the frequency with which older adults produce prosocial speech acts.

Table 2. Model outputs for Experiment 1a (Recipient context):

<table>
<thead>
<tr>
<th>Indirectness</th>
<th>Fixed effect</th>
<th>Coefficient</th>
<th>SE</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recipient</td>
<td>-0.0992</td>
<td>.0431</td>
<td>0.0326</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-0.0312</td>
<td>.0335</td>
<td>0.3541</td>
<td></td>
</tr>
<tr>
<td>Recipient x Age</td>
<td>.0019</td>
<td>.0383</td>
<td>0.9619</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Uncertainty</th>
<th>Fixed effect</th>
<th>Coefficient</th>
<th>SE</th>
<th>P-value</th>
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<tbody>
<tr>
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<td>.1729</td>
<td>.0032</td>
<td></td>
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<tr>
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<td>.0833</td>
<td>.2251</td>
<td></td>
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<tr>
<td>Recipient x Age</td>
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<td>.0358</td>
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<th>P-value</th>
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<tr>
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<td></td>
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<td>P-value</td>
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<td></td>
</tr>
<tr>
<td>Recipient</td>
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<td>.0328</td>
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<td>Recipient x Age</td>
<td>-.0182</td>
<td>.0402</td>
<td>.6562</td>
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</tr>
</tbody>
</table>

**Experiment 1b: Severity manipulation**

**Participants**

A separate group of 100 native English speakers from Scotland (aged 19-70 years) was recruited from Prolific. In line with Experiment 1a, a prospective power analysis determined that this sample size would provide sufficient power. To calculate this, we again specified that 2 predictor variables and their interaction (age by condition) would be tested and set the parameters for $\alpha=.05$ with a large effect size of .8 (using Cohen’s $d$) based on prior work on risk communication (Hayakawa & Marian, 2022). To ensure an even distribution of ages, 20 participants were recruited from each of the following age bins: 18-28, 29-39, 40-50, 51-61, and 62-72 years. Informed consent was obtained prior to testing. Before analysis, eight participants were removed and replaced for getting the control trials wrong.

**Materials/Procedures**

**Face-saving task**

The same materials and procedure from Experiment 1a were used for Experiment 1b with small adjustments made for the Severity context. Here participants were presented with the 20 scenarios from Experiment 1a, only this time all of the scenarios were face-threatening. Two versions of each scenario were created such that the severity of the bad news was either severe or less severe, for a total of 40 items. These items were used to build two lists of materials (20 scenarios each, half of which were severe), which were evenly distributed among participants. Items were presented in a random order (see Fig. 1 for a sample scenario).
Results

Descriptive statistics by age for participants’ use of Indirectness, Uncertainty, and Emotion as well as their choice of probability statements in the multiple-choice responses are shown in Fig. 3.

![Fig 3](image)

Fig 3. Participants’ responses for Indirectness, Uncertainty, Emotion, and Multiple Choice probability statements by Age in Experiment 1b (Severity context). Indirectness and Multiple Choice responses were coded on a scale from 1 (direct) to 4 (indirect) and from 1 (highly unlikely) to 5 (almost certain) while Uncertainty and Emotion were binary (0=no, 1=yes) (for full coding scheme see Method section). Regression lines reflect the best fit of data and points reflect mean rate of response for each age tested. The shaded bands around the regression lines represent a 95% confidence region for the regression fit.

We conducted a linear mixed effects regression model of Indirectness, this time with Severity (Severe, Less Severe) and Age as fixed effects and maximal random effect structure. Age was entered as a scaled continuous predictor and deviation coding was used for Severity (Severe=-0.5, Less Severe=0.5). Our model revealed no main effects or interactions (all...
ps>.05\(^3\); for full model output, see Table 3.) These results are in contrast to the multiple-choice responses (analyzed with an analogous model), where a main effect of Severity (p=.001) revealed that participants selected lower probability statements for the severe outcomes.

For the logistic mixed effects regression model for Uncertainty (with the same fixed and random effects structure as above), we also found a main effect of Severity (p=.047), with greater uncertainty conveyed for the severe outcomes.

Finally, the model for Emotion revealed a main effect of Severity (p=.027), whereby more emotional language was used for the severe outcomes seemingly to convey greater empathy/sympathy. Notably, no age differences were found in any of the four models (see Fig. 3), which suggests that potential stylistic differences in communication at different stages of development (i.e., greater acceptance of ‘blunt truths’ in old age) do not play a role in the rate with which prosocial speech acts are used.

Table 3. Model outputs for Experiment 1b (Severity context):

<table>
<thead>
<tr>
<th>Indirectness</th>
<th>Coefficient</th>
<th>SE</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
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<td>Fixed effect</td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>.2560</td>
</tr>
<tr>
<td>Age</td>
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<td>.0362</td>
<td>.2570</td>
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<tr>
<td>Severity x Age</td>
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<td>.0469</td>
<td>.7850</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Uncertainty</th>
<th>Coefficient</th>
<th>SE</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
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<td>Fixed effect</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity</td>
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<td>.1415</td>
<td>.0468</td>
</tr>
<tr>
<td>Age</td>
<td>.0158</td>
<td>.0933</td>
<td>.8656</td>
</tr>
<tr>
<td>Severity x Age</td>
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<td>.1082</td>
<td>.3592</td>
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</table>

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Coefficient</th>
<th>SE</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed effect</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity</td>
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<td>.2765</td>
<td>.0274</td>
</tr>
<tr>
<td>Age</td>
<td>.0400</td>
<td>.1705</td>
<td>.8147</td>
</tr>
<tr>
<td>Severity x Age</td>
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<td>.9405</td>
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</table>

<table>
<thead>
<tr>
<th>Multiple choice</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Fixed effect</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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\(^3\) We followed up on the observed absence of Age x Severity interactions (which we predicted) by conducting equivalence tests for each model (Lakens et al., 2020). None of the tests reached significance, however the interaction coefficients were not completely within the region of practical equivalence: Indirectness \(p=.172, 95\%\) CI: [-0.06, 0.09]; Uncertainty \(p=.228, 95\%\) CI: [-0.08, 0.28]; Emotion \(p=.383, 95\%\) CI: [-0.33, 0.36]; Multiple Choice \(p=.140, 95\%\) CI: [-0.01, 0.11]. Equivalence therefore remains 'undecided', as specified in each of the model outputs. Thus, claims that completely falsify the presence of these interactions should be tempered, as only modest evidence exists to suggest this.
## Experiment 2: Health context

Following from the results of Experiments 1a-b, where older adults were less flexible than younger adults at adjusting their use of prosocial speech acts based on listener considerations, but not general knowledge, we were interested in further exploiting areas of general knowledge. To do so, we focused on generationally relevant life experiences – specifically health-related matters (vs all other matters) – to test whether older adults would be more sensitive to this distinction than younger adults, or conversely, whether younger adults are equally or more sensitive (due to the study being conducted during the global pandemic).

### Participants

Eighty native English speakers from Scotland (40 younger adults aged 18-37 years, and 40 older adults aged 70-89 years) who did not take part in the previous experiments were recruited from Prolific and the Volunteer Panel at the University of Edinburgh. Informed consent was obtained prior to testing. Here we specifically targeted two groups – younger and older adults – to emphasize the distinction between generationally relevant contexts. Our sample size (N=80) was determined through an a priori power analysis (for an effect size of .7 using Cohen’s d), based on prior work on risk communication (Hayakawa & Marian, 2022) and language production in younger vs older adults (e.g., Saryazdi & Chambers, 2021). Similar to the previous experiments, we were unable to assess each individual for cognitive/neurological impairment online, however control trials were used to screen for those unable to complete the task. Before analysis, six participants were removed and replaced for getting the control trials wrong.
Materials/Procedures

Face-saving task

The same procedure from the previous two experiments was used, however major adjustments were made to the materials. While 10 of the non-health-related scenarios from Experiments 1a and b were used, 10 new scenarios were added related to health. In line with the previous experiments, we ensured the scenarios were not disproportionately biased towards a particular age group by including 12 scenarios applicable to both younger and older adults (e.g., something happened to one’s sibling), 4 that apply more to younger adults (e.g., something happened to one’s uncle), and 4 that apply more to older adults (e.g., something happened to one’s granddaughter).

Results

Descriptive statistics by age group for participants’ use of Indirectness, Uncertainty, and Emotion as well as their choice of probability statements in the multiple-choice responses are shown in Fig. 4. (Note that these graphs differ from those in Experiments 1a and 1b since Experiment 2 tested two age groups: young and old.)
Here we conducted a linear mixed effects regression model of Indirectness with Health (Health-related, Non-health-related) and Age Group (Young, Old) as fixed effects and maximal random effect structure. Deviation coding was used for both Health (Health-related=0.5, Non-health-related=-.05) and Age Group (Young=-0.5, Old=0.5). Results revealed a main effect of Age Group (p=.032), in which older adults were more indirect than younger adults (for full model output, see Table 4). This is in contrast to the multiple-choice responses (analyzed with an analogous model), where there were no main effects or interactions (all ps>.05), and is in
contrast to the results from Experiments 1a-b where no age differences were found in the rate of prosocial speech acts (see General Discussion for more on this finding).

For the logistic mixed effects regression model for Uncertainty (with the same fixed and random effects structure as before), there was a main effect of Health (p<.001) whereby greater uncertainty was expressed in the health-related scenarios, but no effect of Age (p=.446). For the Emotion model, there were no effects of Health (p=.864) or Age (p=.054).

Table 4. Model outputs for Experiment 2 (Health context):

<table>
<thead>
<tr>
<th>Indirectness</th>
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<th>Coefficient</th>
<th>SE</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td></td>
<td>Age</td>
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<td>.1215</td>
<td>.0317</td>
</tr>
<tr>
<td></td>
<td>Health x Age</td>
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<td>.6252</td>
</tr>
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</table>

<table>
<thead>
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<th>Uncertainty</th>
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<th>Coefficient</th>
<th>SE</th>
<th>P-value</th>
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</thead>
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<td>.2397</td>
<td>.0003</td>
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<td></td>
<td>Age</td>
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<td>Health x Age</td>
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<th>P-value</th>
</tr>
</thead>
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<td></td>
<td>Age</td>
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<td>Health x Age</td>
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<td>.9976</td>
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<table>
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<th>SE</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
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<td>Health</td>
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<td></td>
<td>Age</td>
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</tr>
<tr>
<td></td>
<td>Health x Age</td>
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<td>.1301</td>
<td>.1090</td>
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General Discussion

Our study addressed two critical questions related to the use of prosocial speech acts over the adult lifespan. The first question was whether younger and older adults' overall use of prosocial speech acts varied as a function of stylistic differences (i.e., whether older adults'
preference for ‘blunt honesty’ vs their inclination towards prosocial behavior affected the frequency with which they used prosocial speech acts compared to younger adults). The second question was whether age differences emerged as a function of contextual cues important to everyday life (i.e., who the recipient of the bad news was, the severity of the bad news, and whether or not it was health-related), which directly relates to pragmatic competence.

Regarding the first question, we predicted a general decrease in older adults’ use of prosocial speech acts, compared to younger adults, based on recent cross-cultural work which revealed a communicative preference for direct truths in old age (O’Connor et al., 2022). Regarding the second question, we made specific predictions according to each situational context such that in Experiments 1a-b, we anticipated younger adults to adapt more to the recipient manipulation (given that it requires the use of audience design; Long et al., 2018) but predicted that no age differences would emerge for the severity manipulation (since the integration of general knowledge appears to be stable over the adult lifespan; Ligneau-Hervé & Mullet, 2005). In Experiment 2, we predicted that older adults would show greater prosocial linguistic behavior in the health scenarios due to the prevalence of health-related issues in old age (World Health Organization, 2022).

Results from the first set of experiments (1a-b) revealed no differences in the frequency with which younger and older adults produced prosocial speech acts. This suggests that a stylistic preference for directness in old age does not lead to a marked decrease in prosocial speech acts, as predicted. Instead, our results support the alternative hypothesis: that general politeness strategies are preserved in old age. Why would that be? One possibility is that older adults’ propensity for prosocial behavior (as extensively documented in the literature; e.g., Mayr & Freund, 2020) may offset a cross-cultural favorability towards direct truths in old age (O’Connor et al., 2022). That is, while older adults may prefer information to be given to them directly (as it is easier to process; e.g., Pomareda et al., 2019) they may also prefer to stick to politeness strategies with others to create or maintain social connectedness, which is highly sought after in old age (Carstensen et al., 1999; Charles & Carstensen, 2010).
Notably, while no stylistic differences were found in the first pair of experiments, other differences emerged: Specifically, younger adults adjusted their use of prosocial speech acts to a greater extent than older adults based on listener considerations (i.e., whether or not the recipient was directly affected by the news) (Exp 1a). Here we found the predicted Age x Recipient interaction for two of the four outcome measures, with younger adults expressing greater Uncertainty and Emotion when listeners were directly affected. As shown in the graphs from Figure 1, older adults did not distinguish between conditions for those measures, while the distinction was more subtle (but consistent across all ages) for the Multiple Choice and Indirectness. One interpretation of these findings is that sensitivity to perspective differences remains stable across adulthood, but the ability to adapt utterances in real time according to listener considerations is cognitively costly (as documented in the pragmatics and ageing literature; e.g., Healey & Grossman, 2016; Horton & Spieler, 2007; Long et al., 2018). This would explain why younger adults made appropriate adjustments across each of the four measures, whereas older adults only did so for two of the measures.

While it is possible that other factors are at play here, the key differences found are unlikely to be stylistic given that younger and older adults used prosocial speech acts at similar rates across the four measures (i.e., younger and older adults were equally polite). To illustrate this point, let’s presume, for example, that older adults had relied on a stylistic strategy of ‘consistency’ – that is, relaying bad news exactly the same to everyone so as not to risk communicating different messages to different interlocutors (i.e., get caught in a lie). If that were the case, we would expect to find distinct age differences in the overall rates of prosocial speech acts, such that older adults would have used more direct language across the board. This, however, was not the case as reflected by the results (nor did participants deliver the same news to different interlocutors; instead, they were presented with completely unrelated scenarios). As such, the age differences are more likely related to linguistic adaptability, a key element of pragmatic competence in which a speaker flexibly adapts their utterances in real-time according to the intended social goal (in this case preventing listener embarrassment by using more prosocial speech acts when the listener’s face is threatened).
While we have speculated that age-related declines in executive functions may prevent older adults from being as linguistically adaptable as younger adults, it is important to acknowledge that our data alone cannot adjudicate between the underlying source of these differences. As such, we leave it to future work to address this question by assessing younger and older adults’ use of prosocial speech and executive functions skills as well as their responses to a post-task questionnaire about their communicative goals during the task (for more on this topic, see section below on future directions).

In Experiment 1b, our prediction was confirmed regarding Severity, as no age interactions were observed (though note this finding should be interpreted with caution given that results from the equivalence tests were undecided). One way of cautiously interpreting the absence of Age x Severity interactions is that perhaps the integration of general knowledge (i.e., making the distinction between more or less severe outcomes) remains stable over the adult lifespan (Ligneau-Hervé and Mullet, 2005). It may be that this skill relies less on executive functions, becoming largely automatic with increased experience, as is the case with a number of pragmatic abilities that are acquired early in life (e.g., Hendriks et al., 2014; Long et al., 2023). This would also help to explain why no age differences were found here as opposed to those found in Experiment 1a: Computing whether an event is more or less severe may be less computationally difficult for older adults than computing whether the listener will be personally threatened by the bad news. Indeed, calculating Severity does not require the use of socio-cognitive skills such as audience design, as it can be calculated from one’s own perspective. The Recipient manipulation, on the other hand, likely requires some degree of mentalizing (i.e., reasoning about whether the listener would be offended and adjusting one’s utterances accordingly).

With regards to Experiment 2, we found that stylistic differences were at play, with higher rates of prosocial speech acts for older adults than younger adults. Although this finding may appear to be in direct opposition to the findings from Experiments 1a-b (where no stylistic differences were found), we attribute this to contextual factors that give rise to stylistic differences in speech. That is, the inclusion of health-related scenarios in this experiment may
have appealed to older adults’ natural tendency towards greater prosocial behavior, given that health-related issues are a sensitive topic. Another possibility is that because we targeted the two extreme age groups in this experiment (i.e., youngest vs oldest adults), we are more likely to find significant stylistic differences in speech. After all, advanced age is associated with a general increase in prosocial behavior (e.g., Freund & Blanchard-Fields, 2014), thus comparing adults from two opposite ends of the adult lifespan may result in more pronounced differences.

Notably, no age-related differences were found in the ability to distinguish between health vs non-health-related scenarios which suggests that although older adults’ general communicative style may have been affected, their ability to adapt utterances according to the experimental conditions was not equally affected. One explanation for this is that the ability to monitor for health and non-health-related scenarios and shift between prosocial linguistic strategies may have been too cognitively costly for older adults, who instead used prosocial speech acts more frequently across the board.

Taken together, our results offer new insight into the use of prosocial speech acts over the adult lifespan, highlighting the importance of studying both stylistic and pragmatic differences in linguistic behavior at different stages of development. As with all new lines of research enquiry, our results open the door for a variety of future avenues of research, and opportunities to improve upon our study limitations. Below we outline ways in which researchers can continue to move the field forward in this domain.

Limitations and future directions

With regards to the limitations of our study, it is worth discussing a methodological one brought about by the global pandemic: our study was conducted online rather than in person. This raises an intriguing possibility that older adults might have demonstrated more effective audience design (relevant for Experiment 1a) had they been placed in an interactive setting where they could benefit from richer contextual cues. A recent study by Yoon and Stine-
Morrow (2019) argued this point to explain why their results (which suggest that audience design is preserved in older adults) contradict other findings. Specifically, Yoon and Stine-Morrow claim that their results differ from those of Horton and Spieler (2007) (in which older adults showed less evidence for audience design) because Yoon and Stine-Morrow’s task was carried out in an interactive environment rather than remotely. While this is an important methodological point, most studies showing age-related decline in audience design have been carried out in-person in similar interactive settings as those used in Yoon and Stine-Morrow (2019) (e.g., Hupet et al., 1993; Kemper et al., 1995; Kogan & Jordan, 1989; Long et al., 2018; Lysander & Horton, 2012; Schubotzet al., 2019). Furthermore, even though Yoon and Stine-Morrow found that older adults adjusted their utterances in appropriate ways, the younger adults in their study tailored their speech to a greater extent to meet the needs of their partner’s knowledge state. Based on these findings, it seems unlikely that discrepant findings across studies are the result of differences in online vs in-person results, however future work should test this by attempting to replicate the present results in an interactive environment.

On another methodological note, the novel use of both multiple-choice and open text responses proved advantageous for this study in that it allowed us to conduct controlled research while also collecting ‘naturalistic’ data. In turn, our findings raise new and important questions for future work. For example, we found differences in the Severity and Health contexts when comparing multiple choice probability statements to participants’ statements of uncertainty in open text. On the one hand, this might call into question the use of multiple-choice if it does not reflect how probabilities are used in natural speech. On the other hand, multiple-choice provides insight into whether participants actually noted the difference between conditions, above and beyond whether they choose to convey that information when formulating their utterances. In this way, including both response types offers a more complete window into the mind of speakers, providing a better understanding of the linguistic choices they make. Even so, it should be acknowledged that in-person real-time data would be preferable to both methods, given that it would provide more ecologically valid data. While it
is unlikely researchers could obtain spontaneous verbal responses on health-related matters (as one cannot eavesdrop or record private conversations), we invite future work to replicate our findings in a lab setting where participants’ responses are recorded and thus less likely to be censored or edited.

Furthermore, we invite future work to directly examine how the degree of social closeness between speaker and recipient influences prosocial linguistic behavior. This would be particularly interesting in the context of Experiment 2, where health-related issues are discussed with individuals both close and distant to the speaker (the latter of which is much less likely to happen in everyday life). Continuing to improve the ecological validity of this task (while being mindful of ethical considerations/the use of sensitive material) will enable future studies to further shed light on the use of prosocial speech acts in health-related scenarios.

Finally, based on the main findings from our contextual manipulations (whereby we pinpointed the specific conditions under which younger and older adults’ prosocial linguistic behavior diverged), we recommend for future work three methodological approaches to directly test what underlies this divergence:

i) Regarding the Recipient context, two alternative explanations were presented to account for younger and older adults’ distinct patterns of prosocial linguistic behavior: a) differences in cognitive control vs b) differences in communicative strategies. To fully tease apart these competing accounts we recommend future studies assess younger and older adults’ executive functions skills (e.g., attention switching as face-saving likely involves perspective shifts) as well as their responses to a post-task questionnaire about their communicative strategies during the task. Entering these predictor variables into a regression model would provide a direct test of the extent to which executive functions, communicative goals, or a combination of the two predict the flexible use of prosocial speech acts at different ages.

ii) To rule out the possibility that age-related differences in response to the Recipient manipulation were due to participants making default assumptions about how the recipients preferred to receive the news (i.e., that all recipients would prefer to receive the news directly),
future studies should manipulate the preference of the recipient (e.g., Person A prefers to be
told things directly whereas Person B prefers to receive bad news gently). This could provide
stronger evidence as to the source of age-related differences (i.e., whether age-related
differences in audience design underlie the results, since the recipient’s preferences have
been explicitly stated).

iii) Regarding the Health context (where age-related differences emerged in the overall
rate with which prosocial speech acts were used, suggesting stylistic differences in
communication) two plausible explanations exist: a) cultural differences in communicative
styles or b) generational differences in communicative styles. In order to fully tease apart these
possibilities, we recommend that future studies employ a cross-cultural design (see O’Connor
et al., 2022) as well as a longitudinal design, to test whether prosocial linguistic behavior is
better predicted by cultural factors or by different stages of development.

In sum, our findings demonstrate that by situating prosocial speech acts within the
pragmatics and ageing literature researchers can begin to pinpoint which contextual factors
modulate prosocial linguistic behavior at different developmental stages. This new and
exciting line of research is particularly important for the growing older adult population as
interpersonal relationships are critical for social wellbeing (Lubben & Gironda, 2003), and are
built on a mutual consideration of one another’s beliefs and feelings during interactive
discourse. As such, this work not only makes an empirical contribution, but also advances
scientific knowledge of pragmatics at different stages of development, shining light on an
understudied area of linguistic behavior where younger and older adults’ patterns diverge.
Since evidence shows that listeners encode prosocial linguistic adjustments (such as
politeness) in memory (Holtgraves, 1997; Slugoski, 1995) and use that to form perceptions of
others (Holtgraves & Bonnefon, 2017), it is important that any developmental changes in this
area are thoroughly studied.
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Nagar, P. M., Caivano, O., & Talwar, V. (2020). The role of empathy in children’s costly prosocial lie-telling behaviour. Infant and Child Development, 29(4), e2179.


