You'll change more than I will: Adults' predictions about their own and others' future preferences

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You'll change more than I will:

Adults' predictions about their own and others' future preferences

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Abstract

It has been argued that adults underestimate the extent to which their preferences will change over time. We sought to determine whether such mis-predictions are the result of a difficulty imagining that one's *own* current and future preferences may differ or whether it also characterizes our predictions about the future preferences of others. We used a perspective-taking task in which we asked young people how much they liked stereotypically-young-person items (e.g., Top 40 music, adventure vacations) and stereotypically-old-person items (e.g., jazz, playing bridge) now, and how much they would like them in the distant future (i.e., when they are 70 years old). Participants also made these same predictions for a generic same-age, same-sex peer. In a third condition, participants predicted how much a generic older (i.e., age 70) same-sex adult would like items from both categories today. Participants predicted less change between their own current and future preferences than between the current and future preferences of a peer. However, participants estimated that, compared to a current older adult today, their peer would like stereotypically-young items *more* in the future and stereotypically-old items *less.* The fact that peers' distant-future estimated preferences were different from the ones they made for "current" older adults suggests that even though underestimation of change of preferences over time is attenuated when thinking about others, a bias still exists.

Keywords: Future thinking, Projection bias, Presentism bias, Self, Other, Aging

Introduction

"It is always thus, impelled by a state of mind which is destined not to last, that we make our irrevocable decisions" (Marcel Proust, In Search of Lost Time, Vol. II: Within a Budding Grove).

Adults spend a considerable amount of time thinking about their futures (D'Argembeau, Renaud, & Van der Linden, 2011). Over the course of a typical day, we think about leisure activities, work, errands, and relationship issues that may occur both in our near and distant futures. Despite the prominence of these thoughts about the future in our daily lives, research consistently shows that adults mis-predict their future preferences and values (for reviews, see Gilbert & Wilson, 2007; Loewenstein, O'Donoghue, & Rabin, 2003). For example, in a recent study, Quoidbach, Gilbert and Wilson (2013) found that although adults reported that their personalities, values, and preferences had changed substantially in the past 10 years, they thought that they would change very little in the next 10 years. These authors proposed the term "end of history illusion" to capture adults' underestimation of the extent to which they would change in the future.

The mechanisms underlying this phenomenon are still debated. One possible mechanism is the "presentism bias", a tendency to interpret past and future selves in relation to present motives and knowledge (Cameron, Wilson, & Ross, 2004; Gilbert, Gill, & Wilson, 2002). A similar type of explanation is the "projection bias" (Loewenstein et al., 2003) which entails projecting our current preferences, values, or feelings into the future, even when these may no longer be relevant. Other explanations have focused on the characteristics of future simulations themselves, such as their unrepresentative, abbreviated, and decontextualized character (Gilbert & Wilson, 2007). Mis-predictions about the future are not trivial because they can lead people to make decisions in the present that are based on preferences, emotions, and

personality traits that may shift in the future. For example, the young person who gets a large neck tattoo today may, in 20 years, regret it.

An interesting question to ask is whether such biases are more prevalent – or appear exclusively – when considering one's own preferences, emotions, and personality traits, or whether these same biases also affect our judgments about others. This is of theoretical interest because it may explain the source of people's mis-predictions and also qualify the particular explanation given to account for these mis-predictions. For example, by the "end of history illusion" and "presentism bias" accounts, people have difficulty predicting change. However, is this difficulty situated solely in the context of self-predictions (i.e., predicting that one's *own* preferences will change), or is it situated in the context of predicting change more broadly (i.e., predicting that *everyone's* preferences will change)? To our knowledge, no previous study has directly compared how adults simultaneously predict their own and other people's changes in preferences in the future. Doing so will help to determine the parameters of "prediction" biases and may also shed light on their underlying mechanisms.

Research on perspective-taking has shown that, when thinking about others, we typically use our own perspective as a starting point or "judgmental anchor" (Davis, Hoch, & Ragsdale, 1986; Epley, Keysar, Van Boven, & Gilovich, 2004; Nickerson, 1999), and represent what others would think or feel in a situation by imagining ourselves in this same situation (Decety & Grezes, 2006; Goldman, 2002; Gordon, 1986). Nonetheless, certain future thinking biases like the optimism bias, by which we overestimate the likelihood of positive events in our future (Sharot, 2011), are attenuated when thinking about others (Baker & Emery, 1993; Grysman, Prabhakar, Anglin, & Hudson, 2013). Indeed, a vast body of research has shown that when comparing ourselves to others, we tend to think that we are better or less typical than average, and have a brighter future (reviewed in Chambers, 2008). In the case of preferences,

these “false uniqueness perceptions” may lead us to think that our own preferences are wise and therefore unlikely to change in the future. In contrast, the preferences of an average peer might be judged as less wise, and therefore more likely to change as he/she gets older.

Reviewing relevant neuroimaging research, Buckner and Carroll (2007; see also Hassabis and Maguire, 2007) proposed that a core brain network, including frontal, medial temporal and parietal cortices support various forms of self-projection: remembering our past, thinking about our future (i.e., prospection) and taking the perspective of others (i.e., theory of mind). Accordingly, if similar neurocognitive mechanisms are involved in projecting ourselves in the future and in taking another person‘s perspective, one might speculate that mis-predictions about the future will be similar when considering our own or someone else’s perspective.

However, some differences in the neural correlates of self-versus-other judgments have been observed, with a number of brain regions responding preferentially to self-relevant information. Among these brain regions, the ventro-medial prefrontal cortex is known to be important for future thinking, as patients with selective lesions in this area were reported to make decisions that illustrated “myopia for the future” (Bechara, Damasio, & Damasio, 2000) and an overestimation of self-monitoring abilities (Robinson, Calamia, Glascher, Bruss, & Tranel, 2014). Interestingly, a number of studies have reported evidence of a self-to-other gradient in this brain region: more ventral parts were shown to respond preferentially to information related to self, while more dorsal parts were more active when taking the perspective of others (D'Argembeau et al., 2007; Denny, Kober, Wager, & Ochsner, 2012; Murray, Schaer, & Debbane, 2012). Other brain regions like the insula and the caudate nucleus were also found to be more active for self- than other-related judgments (Denny et al., 2012).

Taken together, the evidence shows that the neurocognitive processes that allow us to consider our own versus another person’s perspective are largely - but not fully - overlapping.

Considering our own perspective may have unique additional properties, as shown by the contribution of brain regions involved in reward (i.e., caudate nucleus), interoceptive awareness (i.e., insula) and personal value (i.e., ventromedial prefrontal cortex). Interestingly, this set of brain regions is also associated with the most emotional, visceral aspects of decision-making processes or, the so-called "gut feeling" (Bechara & Damasio, 2005; Naqvi, Shiv, & Bechara, 2006). Accordingly, because of the specific properties of this self-relevance network, the projection bias that has repeatedly been described when projecting oneself in the future may manifest itself differently or be absent when thinking about others. For instance, the "presentism bias" observed during future thinking could be partly due to the inherent qualities of this network of brain regions, coding for the visceral, somato-sensory aspects of current self-relevance. Loewenstein (1996) has described how "immediately experienced visceral factors" may explain projection bias. However, specific characteristics of future simulations themselves such as their unrepresentative, abbreviated, and decontextualized character (Gilbert & Wilson, 2007) may be equally operative when thinking about one's own and others' futures. Accordingly, the projection bias may be attenuated, but still present, when thinking about another person's future as compared to thinking about one's own future. As noted above, such a pattern has been described for the optimism bias (Grysman et al., 2013).

The goal of the present study was to test this hypothesis. We investigated whether an underestimation of change of preferences over time is specific to self or is also present when making predictions about others. We used a perspective-taking task in which we asked young adults how much they liked stereotypically young-person things (e.g., Top 40 music, adventure vacations) and stereotypically old-person things (e.g., jazz, playing bridge) "now" and how much they will like them in the distant future (i.e., when they are 70). Participants also had to estimate how much a generic peer of their age and gender liked these same items now and in the future.

Finally, participants had to rate how much an older adult (aged 70) liked these items. We hypothesized that participants would underestimate how much their preferences would change over time and that they would predict less change for themselves than for their peers. In addition, we predicted that this underestimation of change, although attenuated, would still be present when estimating their peer's preferences; that is, we expected that participants would judge that their peers would like stereotypically-young items *more*, and stereotypically-old items *less,* in the future than a generic older adult does now.

Methods

Participants

134 participants (28 males) took part in the perspective-taking task. They were recruited via the Integrated System of Participation in Research (ISPR) of the School of Psychology at the University of Ottawa. Participants obtained course credit for their participation. Their mean age was 19 years (± 2.54, range: 18-33) and they had completed 14 years (± 2.17, range: 11-23) of education on average. All participants signed an online informed consent form accepted by the Ethics Board of the University of Ottawa.

Perspective-Taking Task

Selection of stimuli

We asked 22 young adults who did not participate in the experiment (4 males, mean age: 24 ± 4.27, range: 19-34; mean level of education: 17 years ± 3.01, range: 12-22) how much they liked 21 stereotypically-young-person things (e.g., Top 40 music, adventure vacations) and

21 stereotypically-old-person things (e.g., jazz, playing bridge) now, and how much they would like these items when they are 70 years old. In each trial, participants responded using a 7 point Likert scale: 1-Strongly dislike, 2-Dislike, 3-Dislike somewhat, 4-Neutral, 5-Like somewhat, 6-Like, 7-Strongly like. We then selected the items that differed most in ratings according to time (Now versus Future). Twelve stereotypically-young-person things and 12 stereotypically-old-person things were selected as differing significantly in their ratings (i.e., young items being preferred in the present relative to the future, and old items being preferred in the future relative to the present; see Appendix for the list of stimuli).

We subsequently verified that these items also showed this effect in the participants of our perspective-taking experiment (N=134; see details above). All items differed significantly in their preference ratings according to Time: Stereotypically young items were preferred in the present relative to the future, and stereotypically old items were preferred in the future relative to the present (all ps<.03).

Task design

In the perspective-taking task, we asked participants how much they liked stereotypically-young-person things (e.g., Top 40 music, adventure vacations) versus stereotypically-old-person things (e.g., jazz, playing bridge) now, and how much they would like them when they are 70 years old. We also asked them to rate these items for two generic same-sex adults: a same-age peer and an older adult. The same 7-point Likert scale as in the norming study was used (from 1-Strongly dislike to 7-Strongly like, see above). Participants completed the task online using an internet questionnaire (https://www.surveymonkey.com/). The following instructions were used: “In this experiment you are going to be asked about likes and dislikes. Sometimes you will be asked about your own likes and dislikes, and sometimes about

somebody else's. Some of the questions will be about right now, and some will be about the future. For each trial you will be told whose likes and dislikes you are being asked about, and whether we are asking you about right now or the future. You will be asked to rate the extent to which you or someone else would like something or not. For the trials in which you will have to judge the likes and dislikes of someone else, you will have to think about: someone else your age or a 70-year-old."

Separate male and female versions of the task were created. In trials in which participants were asked to take a perspective other than their own, the photograph of an unknown face from the same gender as the participant was presented: It was either "Someone else your age" or "a 70-year-old". There were 3 perspectives (self, peer, older adult), and 2 times (now versus future) that corresponded to 5 separate blocks of trials: Self-Now, Self-Future, Peer-Now, Peer-Future, Older adult-Now. Blocks were presented in random order. Within each block, items (stereotypically-young versus stereotypically-old) were also presented randomly.

Statistical analyses

To test the extent to which predictions about one's own and a peer's future preferences were similar/different, we conducted a repeated-measures ANOVA on preference ratings with Perspective (Self versus Peer), Time (Now versus Future) and Item type (stereotypically-young versus stereotypically-old-person things) as within-subject factors.

To test the extent to which predictions of self and peer's preferences would differ from an older adult's perspective, we conducted two additional repeated-measures ANOVAs. These ANOVAs included Perspective (Self versus Peer versus Older-adult) and Item type (stereotypically-young versus stereotypically-old-person things) as within-subject factors (time

was not included because the older adult was only asked about in the now condition). One of these analyses was conducted with the Now conditions, and the other with the Future conditions of Self and Peer. Sex of participants was added as a between-subjects factor in all analyses.

Partial eta-squared (η_p^2) is indicated as a measure of effect size in all analyses.

Insert Fig. 1 about here

Results

Main Analysis

The repeated-measures ANOVA on preference ratings revealed main effects of perspective ($F_{1,133}$ = 34.26, p<.001, η_p^2= .21), time ($F_{1,133}$ = 151.35, p<.001, η_p^2= .53) and a three-way interaction between perspective, time, and item type ($F_{1,133}$ = 79.10, p<.001, η_p^2= .37). No interaction with sex of participants was found (all ps<.2).

Analyses by Time period

Now Condition

Analyses for the now conditions showed main effects of perspective ($F_{1,133}$ = 30.71, p<.001, η_p^2= .19), and item type ($F_{1,133}$ = 440.76, p<.001, η_p^2= .77), as well as an interaction between perspective and item type ($F_{1,133}$ = 75.12, p<.001, η_p^2= .36). No interaction with sex of participants was found (all ps<.5). Subsequent analyses for stereotypically-young items revealed that participants attributed higher preference ratings to their peer (mean: 5.56) than to themselves (mean: 4.88; $F_{1,133}$ = 85.84, p<.001, η_p^2= .39). In contrast, for stereotypically-old

items, participants gave slightly higher preference ratings to themselves (mean: 3.81) than to their peer (mean: 3.58; $F_{1,133}$ = 15.06, p<.001, η_p^2 = .10).

These analyses thus suggest that participants rated themselves as liking "young" items less now than their peers, whereas they rated themselves as liking "old" items more (see Figure 1).

Future Condition

Analyses for the future conditions revealed main effects of perspective ($F_{1,133}$ = 15.59, p<.001, η_p^2 = .11), and item type ($F_{1,133}$ = 211.33, p<.001, η_p^2 = .61), as well as an interaction between perspective and item type ($F_{1,133}$ = 7.24, p=.008, η_p^2= .05). No interaction with sex of participants was found (all ps<.2). Further analyses for stereotypically-young items showed no significant difference in ratings between self (mean: 3.34) and peer (mean: 3.31). In contrast, for stereotypically-old items, participants gave slightly higher preference ratings to peer (mean: 4.9) than to themselves (mean: 4.5; $F_{1,133}$ = 20.69, p<.001, η_p^2 = .14).

Thus, although participants judged that both they and their peers would show similar preference levels for young items in the future, they judged that their peers would prefer old items more in the future than they would (Figure 1).

Analyses by Item Type

Stereotypically-young items

Analyses of preference ratings for stereotypically-young items revealed main effects of time ($F_{1,133}$ = 658.69, p<.001, η_p^2= .83), perspective ($F_{1,133}$ = 27.71, p<.001, η_p^2= .17), and an interaction between these 2 factors ($F_{1,133}$ = 16.75, p<.001, η_p^2= .31). Subsequent analyses showed that, as expected, young items were preferred now relative to the future both for self

($F_{1,133}$ = 447.24, p<.001, η_p^2= .77) and for a peer ($F_{1,133}$ = 514.97, p<.001, η_p^2= .79). Importantly, however, the difference in ratings was greater for peer (5.56 versus 3.31) than for self (4.88 versus 3.34). Thus, as predicted, participants predicted less change in their own future preferences, than they did for a same-age peer. No interaction with sex of participants was found for any of the variables (all ps<.3).

Stereotypically-old items

Analyses of preference ratings for stereotypically-old items revealed a main effect of time ($F_{1,133}$ = 261.21, p<.001, η_p^2 = .66), and an interaction between time and perspective ($F_{1,133}$ = 52.57, p<.001, η_p^2 = .28). Again, as expected, old items were rated as preferred in the future relative to now, both for self ($F_{1,133}$ = 138.05, p<.001, η_p^2= .51) and for a peer ($F_{1,133}$ = 236.78, p<.001, η_p^2= .64), but the difference in ratings was slightly greater for peer (4.9 versus 3.6) than self (4.5 versus 3.8), which again suggests that participants were predicting less change for self than another generic peer (see Figure 1). No interaction with sex of participants was found for any of the variables (all ps<.4).

Comparisons of young and older adults

Comparison between self, peer and older adult "Now"

To verify that participants did indeed judge that they and their peers would show higher preference ratings for young items now and, conversely, lower preference ratings for old-items now than an older adult would, we conducted a repeated-measures ANOVA comparing older adults, peer and self in the "Now" condition. This analysis revealed a main effect of perspective

($F_{2,266}$ = 80.98, p<.001, η_p^2= .38) and an interaction between perspective and item type ($F_{2,266}$ = 699.37, p<.001, η_p^2= .84).

Stereotypically-young items

For stereotypically-young items, there was a main effect of perspective ($F_{2,266}$ = 628.04, p<.001, η_p^2= .83). Follow-up analyses showed that, for these items, participants gave higher preference ratings to a peer (mean: 5.56; $F_{1,133}$ = 866.25, p<.001; η_p^2= .87) and to themselves (mean: 4.88; $F_{1,133}$ = 687.90, p<.001; η_p^2 = .84) as compared to an older adult (mean: 2.57).

Stereotypically-old items

For stereotypically-old items, there was also a main effect of perspective ($F_{2,266}$ = 335.02, p<.001, η_p^2= .72). Subsequent analyses showed that, for these items, participants attributed higher preference ratings to an older adult (mean: 5.40) as compared to a peer (mean: 3.58; $F_{2,266}$ = 418.29, p<.001, η_p^2= .76) and to themselves (mean: 3.81; $F_{1,133}$ = 406.42, p<.001, η_p^2= .75).

These analyses thus showed that participants judged that they and their peers currently liked young items better and old items less than an older adult (see Figure 1).

Comparison between older adult "Now", and self and peer in the Future

To determine whether the extent of predicted change of preferences of self and peer in the future were comparable to those of an older adult, we conducted a repeated-measures ANOVA comparing older adult "now" with peer and self in the Future condition. This analysis revealed main effects of perspective ($F_{2,266}$ = 8.16, p<.001, η_p^2= .06), item type ($F_{1,133}$ = 478.70,

p<.001, η_p^2= .78), and an interaction between perspective and item type ($F_{2,266}$ = 99.21, p<.001, η_p^2= .43) .

Stereotypically-young items

For stereotypically-young items, there was a main effect of perspective ($F_{2,266}$ = 65.54, p<.001, η_p^2= .33). Follow-up analyses showed that, for these items, participants gave higher preference ratings to self (mean: 3.34; $F_{1,133}$ = 111.212, p<.001, η_p^2= .46) and peer (mean: 3.31; $F_{1,133}$ = 99.77, p<.001, η_p^2= .43) as compared to an older adult (mean: 2.57).

Stereotypically-old items

For stereotypically-old items, there was also a main effect of perspective ($F_{2,266}$ = 82.91, p<.001, η_p^2= .38). Subsequent analyses revealed that, for these items, participants gave higher preference ratings to an older adult (mean: 5.40) as compared to a peer (mean: 4.86; $F_{1,133}$ = 73.66, p<.001, η_p^2 = .36) or themselves (mean: 4.52; $F_{1,133}$ = 161.19, p<.001, η_p^2= .55).

Together, these analyses suggest that even though participants estimated that their preferences and those of their peer would change in the future, these preferences would still differ from those of an older adult (see Figure 1).

Discussion

The goal of the present study was to test whether people's tendency to underestimate the extent to which their preferences will change in the future is specific to self or also present when making predictions about others. Participants predicted less change between their own

current and future preferences than between the current and future preferences of a generic same-sex peer. This was observed for preferences relating to stereotypically-old (e.g., jazz, playing bridge) as well as stereotypically-young (e.g., Top 40 music, adventure vacations) items.

However, differences in ratings between self and other were found both for current and future preferences. That is, participants thought that their peers currently liked stereotypically-young items more and stereotypically-old items less than themselves. They also reported that other young people would like more stereotypically-old items than themselves in the future. These findings are reminiscent of the "false uniqueness" bias in reasoning that has been repeatedly demonstrated when comparing oneself to others (reviewed in Chambers, 2008). False uniqueness is our tendency to think that we are 'better than average', unique, or in the present case less typical, with respect to our abilities and personalities. Here, we found that items that were most relevant in the present for our young participants (i.e., stereotypically-young items) were rated as more preferred by other young peers than self. Conversely, items that were more relevant in the future (i.e., stereotypically-old items) were rated as more preferred by others than self in the future. Our findings therefore indicate that false uniqueness biases are similar for judgments relating to the present and to the future.

Interestingly, our participants did not have a strict "end of history illusion" (Quoidbach et al., 2013), as they still believed that their preferences would change over time. Indeed, judgments about the present as compared to the future were characterized by qualitatively similar inverted ratings for self and other: In both cases, participants gave higher preference ratings to stereotypically-young items in the present and to stereotypically-old items in the future. This supports the observation that people generally understand qualitatively the direction in which their preferences and tastes will change in the future (Loewenstein et al., 2003). If participants had a strict presentism bias (Cameron et al., 2004) and only interpreted

future selves in relation to present motives, they would have predicted that their love of young items would be as strong in the future as in the present– though an important point, and one to which we return, is that we asked our participants to make predictions about a very distant future.

Participants predicted that their preferences would change less over time than those of a generic peer. This difference in the magnitude of estimated change suggests that distinct mechanisms may underlie people's judgments about their own and others' current and future preferences. Moreover, such mechanisms may already differ early in development given that a recent study showed that preschoolers are better at predicting that a peer's preferences will change in the future than they are at making this same prediction for self (Bélanger, Atance, Varghese, Nguyen, & Vendetti, 2014). Nevertheless, our findings do not imply that an underestimation of change of preferences over time is specific to self. When participants were asked to judge the current preferences of an older adult, we found that the difference in preferences between stereotypically old and young items was rated as much more pronounced than for self *and* for a peer. More specifically, older adults were considered to currently like stereotypically-old items more, and stereotypically-young items less, than both self and another young adult would in the future. These results therefore indicate that even though underestimation of change of preferences over time is attenuated when thinking about others, the phenomenon is still present as the estimated change in preferences of others does not bring them to the level of "current" older adults' preferences. However, another possible interpretation of these findings is that our participants anticipated differences in preferences for different generations (i.e., current older adults versus future older adults). While our design does not allow us to rule out this hypothesis, a generational change in preferences would likely have been associated with a global decrease in ratings for all items, as compared to current

older adults (as other types of items -yet unknown- would be preferred by the next generation). However, our participants reported that, compared to a current older adult, their peer would like stereotypically-young items *more* in the future and stereotypically-old items *less*. These findings therefore seem more compatible with an underestimation of change of preferences over time, such as a presentism bias, than with anticipated generational changes in preferences.

One important aspect of our experimental design is that we asked our young participants to think about a very distant future (i.e., when they, or a peer, are 70). This allowed us to compare preferences of distant selves (as an older adult) with preferences of current older adults. Prior research on future thinking and projection bias has tended to focus on the immediate (i.e., next day; e.g., Gilbert et al., 2002) or relatively near future (i.e., about 10 years forward; e.g., Quoidbach et al., 2013). Our results thus illustrate that adults underestimate the extent to which their preferences will change over time even in the distant future. If anything, thinking about a distant future should have resulted in participants experiencing "discontinuity in their senses of self" (Lampinen, Odegard, & Leding, 2004) and envisaging larger scale changes as they grow old. The fact that our participants still predicted less change for themselves than for their peers indicates that this projection bias is robust to these discontinuities. It will be interesting in future studies to use intermediate future conditions to see if participants predict a progressive change in preferences over time, even if the amount of change never matches that attributed to peers, as demonstrated here for projections into the distant future.

A few other studies have reported similar biases when thinking about the near or distant future. For instance, Remedios, Chasteen, and Packer (2010; see also Sharot, Korn, & Dolan, 2011) found an optimism bias when young adults (i.e., mean age: 19) had to describe themselves at the age of 70, consistent with past research on optimism bias about one's own future (Sharot, 2011; Weinstein, 1980). Broadly, as compared to temporally close future events,

distant future events are more abstract (Liberman & Trope, 1998; Trope & Liberman, 2000), contain less sensory and contextual details (D'Argembeau & Van der Linden, 2004), and are often represented in a third-, rather than in a first-, person perspective (D'Argembeau & Van der Linden, 2004, 2012). This is compatible with the idea that thinking about distant future events may often involve semantic rather than episodic forms of future thinking (Atance & O'Neill, 2001; Martin-Ordas, Atance, & Louw, 2012; Szpunar, Spreng, & Schacter, 2014).

In the present case, thinking about our future preferences may depend on subtypes of personal semantics such as self-knowledge and knowledge of autobiographical facts (reviewed in Renoult, Davidson, Palombo, Moscovitch, & Levine, 2012), whereas thinking about the preferences of a generic other may rely on general semantics. The fact that the presentism bias and the optimism bias (Remedios et al., 2010) appear to be observed for the distant as well as for the near future suggests that the reliance on episodic (i.e., near future) versus personal semantics (i.e., distant future) may not be the crucial factor at work. Both of these types of memory handle self-relevant information and involve partly overlapping neural networks, such as medial prefrontal, restrosplenial and temporo-parietal cortices (Renoult et al., 2012). It may thus be, both for near and distant future simulations, that it is the use of our own personal perspective (accompanied by our sense of uniqueness) as a "judgmental anchor" (Davis et al., 1986; Epley et al., 2004; Nickerson, 1999) that contaminates our attempts at future simulations. Accordingly, using general semantics to simulate the future of others results in a reduction of future simulation biases.

As such, it will be interesting in future studies to include a familiar-other condition. For example, Grysman et al. (2013) have reported that the optimism bias was attenuated when thinking about a non-close friend, but similar when considering ourselves or a close friend. Interestingly, a number of neuroimaging studies have reported that the magnitude of self-other

differentiation in the ventromedial prefrontal cortex depends on perceived similarity in personality traits (Benoit, Gilbert, Volle, & Burgess, 2010) or in-group membership (Morrison, Decety, & Molenberghs, 2012). It is thus likely that the strength of underestimation of change of preferences over time would be more similar between self and close-other than between self and a generic peer.

Taken together, our results indicate that people's underestimation of change in preferences over time is attenuated when thinking about others. However, bias still exists given that people's estimated change in others' preferences does not directly map onto their judgments about "current" older adults' preferences. These findings have practical implications for decision-making because they suggest that simulating the future perspectives of a typical peer or, even better, the current perspectives of an older adult, prior to making simulations for self may lead to improved decision-making (e.g., saving more money for retirement). Importantly, reported similarities in judgments between self and close others suggest that more realistic future simulations may be attained when considering unknown/generic others, for whom we are more likely to escape the visceral aspects of self-relevance that are associated with presentism biases.

Mis-predictions about the future are not trivial because they can lead people to make decisions in the present that are based on preferences, emotions, and personality traits that may shift in the future. Our results show that these mis-predictions of change are attenuated, but still present, when thinking about others, in turn suggesting both overlapping and distinct mechanisms in how we think about our own and others' futures.

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References

Atance, C. M., & O'Neill, D. K. (2001). Episodic future thinking. *Trends in cognitive sciences, 5*(12), 533-539. doi: Doi 10.1016/S1364-6613(00)01804-0

Baker, L. A., & Emery, R. E. (1993). When every relationship is above average. *Law and Human Behavior, 17*(4), 439-450.

Bechara, A., & Damasio, A. R. (2005). The somatic marker hypothesis: A neural theory of economic decision. *Games and Economic Behavior, 52*(2), 336-372. doi: DOI 10.1016/j.geb.2004.06.010

Bechara, A., Damasio, H., & Damasio, A. R. (2000). Emotion, decision making and the orbitofrontal cortex. *Cerebral Cortex, 10*(3), 295-307. doi: 10.1093/cercor/10.3.295

Bélanger, M. J., Atance, C. M., Varghese, A. L., Nguyen, V., & Vendetti, C. (2014). What Will I Like Best When I'm All Grown Up? Preschoolers' Understanding of Future Preferences. *Child Dev, 85*(6), 2419-2431. doi: 10.1111/cdev.12282

Benoit, R. G., Gilbert, S. J., Volle, E., & Burgess, P. W. (2010). When I think about me and simulate you: Medial rostral prefrontal cortex and self-referential processes. *NeuroImage, 50*(3), 1340-1349. doi: 10.1016/j.neuroimage.2009.12.091

Buckner, R. L., & Carroll, D. C. (2007). Self-projection and the brain. *Trends in cognitive sciences, 11*(2), 49-57. doi: 10.1016/j.tics.2006.11.004

Cameron, J. J., Wilson, A. E., & Ross, M. (2004). Autobiographical memory and self-assessment. In D. R. Beike, J. M. Lampinen, & D. A. Behrend (Eds.), *The Self and Memory* (pp. 207-226). New York: Psychology Press.

Chambers, J. R. (2008). Explaining False Uniqueness: Why We are Both Better and Worse Than Others. *Social and Personality Psychology Compass, 2*(2), 878-894.

D'Argembeau, A., Renaud, O., & Van der Linden, M. (2011). Frequency, Characteristics and Functions of Future-oriented Thoughts in Daily Life. *Applied Cognitive Psychology, 25*(1), 96-103. doi: Doi 10.1002/Acp.1647

D'Argembeau, A., Ruby, P., Collette, F., Degueldre, C., Balteau, E., Luxen, A., . . . Salmon, E. (2007). Distinct regions of the medial prefrontal cortex are associated with self-referential processing and perspective taking. *J Cogn Neurosci, 19*(6), 935-944. doi: 10.1162/jocn.2007.19.6.935

D'Argembeau, A., & Van der Linden, M. (2004). Phenomenal characteristics associated with projecting oneself back into the past and forward into the future: influence of valence and temporal distance. *Conscious Cogn, 13*(4), 844-858. doi: 10.1016/j.concog.2004.07.007

D'Argembeau, A., & Van der Linden, M. (2012). Predicting the phenomenology of episodic future thoughts. *Conscious Cogn*. doi: 10.1016/j.concog.2012.05.004

Davis, H. L., Hoch, S. J., & Ragsdale, E. K. E. (1986). An Anchoring and Adjustment Model of Spousal Predictions. *Journal of Consumer Research, 13*(1), 25-37. doi: Doi 10.1086/209045

Decety, J., & Grezes, J. (2006). The power of simulation: Imagining one's own and other's behavior. *Brain research, 1079*, 4-14. doi: DOI 10.1016/j.brainres.2005.12.115

Denny, B. T., Kober, H., Wager, T. D., & Ochsner, K. N. (2012). A meta-analysis of functional neuroimaging studies of self- and other judgments reveals a spatial gradient for mentalizing in medial prefrontal cortex. *J Cogn Neurosci, 24*(8), 1742-1752. doi: 10.1162/jocn_a_00233

Epley, N., Keysar, B., Van Boven, L., & Gilovich, T. (2004). Perspective taking as egocentric anchoring and adjustment. *Journal of personality and social psychology, 87*(3), 327-339. doi: Doi 10.1037/0022-3514.87.3.327

Gilbert, D. T., Gill, M. J., & Wilson, T. D. (2002). The future is now: Temporal correction in affective forecasting. *Organizational Behavior and Human Decision Processes, 88*(1), 430-444. doi: DOI 10.1006/obhd.2001.2982

Gilbert, D. T., & Wilson, T. D. (2007). Prospection: Experiencing the future. *Science, 317*(5843), 1351-1354. doi: DOI 10.1126/science.1144161

Goldman, A. A. (2002). Simulation theory and mental concepts. In J. P. J. Dokic (Ed.), *Simulation and Knowledge of Action* (pp. 1-19). Amsterdam: John Benjamins Publishing Company.

Gordon, R. M. (1986). Folk Psychology as Simulation. *Mind & Language, 1*(2), 158-171.

Grysman, A., Prabhakar, J., Anglin, S. M., & Hudson, J. A. (2013). The time travelling self: comparing self and other in narratives of past and future events. *Conscious Cogn, 22*(3), 742-755. doi: 10.1016/j.concog.2013.04.010

Hassabis, D., & Maguire, E. A. (2007). Deconstructing episodic memory with construction. *Trends in cognitive sciences, 11*(7), 299-306. doi: 10.1016/j.tics.2007.05.001

Lampinen, J. M., Odegard, T. N., & Leding, J. K. (2004). Diachronic Disunity. In D. R. Beike, J. M. Lampinen, & D. A. Behrend (Eds.), *The Self and Memory* (pp. 227-253). New York: Psychology Press.

Liberman, N., & Trope, Y. (1998). The role of feasibility and desirability considerations in near and distant future decisions: A test of temporal construal theory. *Journal of personality and social psychology, 75*(1), 5-18. doi: Doi 10.1037//0022-3514.75.1.5

Loewenstein, G. (1996). Out of control: Visceral influences on behavior. *Organizational Behavior and Human Decision Processes, 65*(3), 272-292. doi: DOI 10.1006/obhd.1996.0028

Loewenstein, G., O'Donoghue, T., & Rabin, M. (2003). Projection bias in predicting future utility. *Quarterly Journal of Economics, 118*(4), 1209-1248. doi: Doi 10.1162/003355303322552784

Martin-Ordas, G., Atance, C. M., & Louw, A. (2012). The role of episodic and semantic memory in episodic foresight. *Learning and Motivation, 43*(4), 209-219. doi: DOI 10.1016/j.lmot.2012.05.011

Morrison, S., Decety, J., & Molenberghs, P. (2012). The neuroscience of group membership. *Neuropsychologia, 50*(8), 2114-2120. doi: DOI 10.1016/j.neuropsychologia.2012.05.014

Murray, R. J., Schaer, M., & Debbane, M. (2012). Degrees of separation: a quantitative neuroimaging meta-analysis investigating self-specificity and shared neural activation between self- and other-reflection. *Neurosci Biobehav Rev, 36*(3), 1043-1059. doi: 10.1016/j.neubiorev.2011.12.013

Naqvi, N., Shiv, B., & Bechara, A. (2006). The role of emotion in decision making: A cognitive neuroscience perspective. *Curr Dir Psychol Sci, 15*(5), 260-264. doi: DOI 10.1111/j.1467-8721.2006.00448.x

Nickerson, R. S. (1999). How we know - and sometimes misjudge - What others know: Imputing one's own knowledge to others. *Psychological bulletin, 125*(6), 737-759. doi: Doi 10.1037//0033-2909.125.6.737

Quoidbach, J., Gilbert, D. T., & Wilson, T. D. (2013). The End of History Illusion. *Science, 339*(6115), 96-98. doi: DOI 10.1126/science.1229294

Remedios, J. D., Chasteen, A. L., & Packer, D. J. (2010). Sunny Side Up: The Reliance on Positive Age Stereotypes in Descriptions of Future Older Selves. *Self and Identity, 9*(3), 257-275. doi: Pii 913840139

Doi 10.1080/15298860903054175

Renoult, L., Davidson, P. S., Palombo, D. J., Moscovitch, M., & Levine, B. (2012). Personal semantics: at the crossroads of semantic and episodic memory. *Trends Cogn Sci, 16*(11), 550-558. doi: 10.1016/j.tics.2012.09.003

Robinson, H., Calamia, M., Glascher, J., Bruss, J., & Tranel, D. (2014). Neuroanatomical correlates of executive functions: a neuropsychological approach using the EXAMINER battery. *J Int Neuropsychol Soc, 20*(1), 52-63. doi: 10.1017/S135561771300060X

Sharot, T. (2011). The optimism bias. *Current Biology, 21*(23), R941-R945.

Sharot, T., Korn, C. W., & Dolan, R. J. (2011). How unrealistic optimism is maintained in the face of reality. *Nature neuroscience, 14*(11), 1475-U1156. doi: Doi 10.1038/Nn.2949

Szpunar, K. K., Spreng, R. N., & Schacter, D. L. (2014). A taxonomy of prospection: Introducing an organizational framework for future-oriented cognition. *Proc Natl Acad Sci U S A*. doi: 10.1073/pnas.1417144111

Trope, Y., & Liberman, N. (2000). Temporal construal and time-dependent changes in preference. *Journal of personality and social psychology, 79*(6), 876-889. doi: Doi 10.1037//0022-3514.79.6.876

Weinstein, N. D. (1980). Unrealistic Optimism About Future Life Events. *Journal of personality and social psychology, 39*(5), 806-820. doi: Doi 10.1037/0022-3514.39.5.806

Figure Legend

Figure 1: Average preference ratings. Mean preference ratings (with 95% confidence interval bars) for self and a same-sex peer "now" and in the future are represented, as well as mean current preferences of an older adult. Participants indicated their preferences using a 7-point Likert scale (from 1-strongly dislike to 7-strongly like) separately for stereotypically-young-items (e.g., Top 40 music, adventure vacations; here represented in red) and stereotypically-old items (e.g., jazz, playing bridge; in blue).

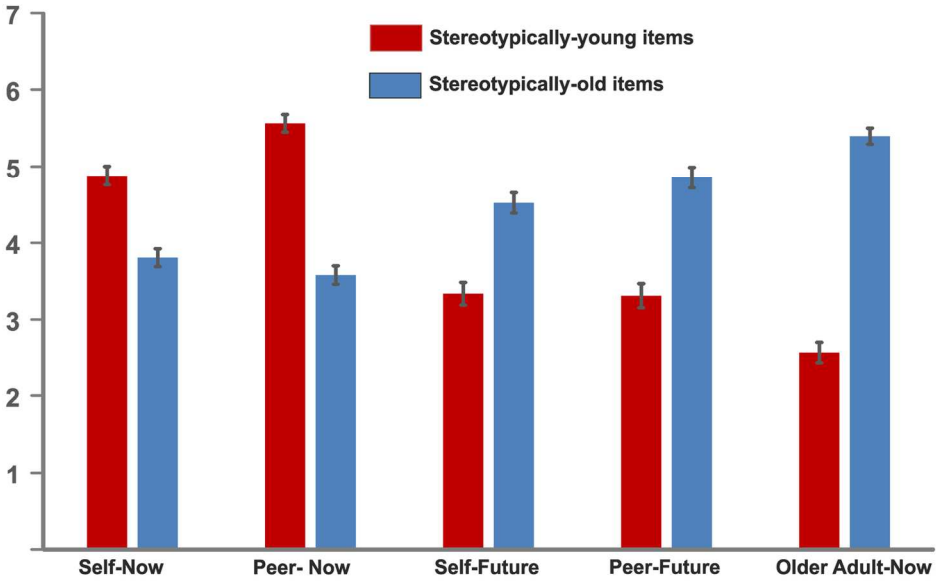
Appendix

Stereotypically-young-person things:

Energy Drinks
Adventure vacations
Canoe camping
Rollerblading
Converse sneakers
Top 40 music
American Eagle Outfitters
Facebook
Texting
Living downtown
Bungee jumping
Whitewater rafting

Stereotypically-old-person things:

Playing bridge
Dinner at 5
Jazz
Sears department store
Oldsmobile
Game shows
Suspenders
Scrapbooking
English breakfast tea
Living in the suburbs
Birdwatching
Gardening



Average preference ratings. Mean preference ratings (with 95% confidence interval bars) for self and a same-sex peer "now" and in the future are represented, as well as mean current preferences of an older adult. Participants indicated their preferences using a 7-point Likert scale (from 1-strongly dislike to 7-strongly like) separately for stereotypically-young-items (e.g., Top 40 music, adventure vacations; here represented in red) and stereotypically-old items (e.g., jazz, playing bridge; in blue).
139x99mm (300 x 300 DPI)