What Goes Down When Advice Goes Up:

Younger Advisers Underestimate their Impact

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ABSTRACT

Common wisdom suggests that older is wiser. Consequently, people rarely give advice to older individuals—even when they are relatively more expert—leading to missed learning opportunities. Across six studies (N = 3,445), we explore the psychology of advisers when they are younger (reverse advising), the same age (peer advising), or older (traditional advising) than their advisees. Study 1 shows that advisers avoid reverse advising interactions because they perceive that their relative youth makes them less effective. However, when compared to advisees' actual perceptions, reverse advisers are misguided as they underestimate their effectiveness when giving general life advice (Study 2a-2b) as well as tactical advice (Studies 3-4). This misperception is in part driven by advisers' beliefs about their own competence and others' receptivity. Finally, we demonstrate an intervention that mitigates advisers' misguided beliefs (Study 5). Contrary to advisers' own perceptions and popular belief, these findings illustrate that being relatively young can also mean being an impactful adviser.

Keywords:

advice, reverse advising, age, expertise, intergenerational dynamics, preregistered, open data

Wunderkind Wisdom: Younger Advisers Underestimate their Impact

Common wisdom suggests that older is wiser (Grossmann et al., 2012). When we seek advice and knowledge, we typically go to someone older with more wisdom and expertise (e.g., Bonaccio & Dalal, 2006; Feldon et al., 2011; Rader, Larrick, & Soll, 2017; Schaerer, Tost, Huang, Gino, & Larrick, 2018). These tendencies reinforce our intuition that expertise, wisdom, and advice flow from older individuals to younger ones. Consequently, we overlook opportunities in which advice stemming from expertise and wisdom flows in the opposite direction: from younger to older individuals.

Nevertheless, younger individuals—despite their relative youth—have unique insights to offer based on their own relative expertise. For example, due to the rapid pace of technological change, younger generations often adopt unique cutting-edge knowledge more quickly, providing unprecedented opportunities for younger generations to teach older generations (North & Fiske, 2012; Twenge, 2006). In some cultures (e.g., Eastern cultures), younger individuals are associated with greater use of wise-reasoning strategies (Grossmann et al., 2012). Furthermore, burgeoning cases of "reverse mentoring" programs, in which younger employees advise older ones, question our reliance on traditional age-based advising structures (Murphy, 2012).

Although there are growing opportunities for younger individuals to give advice based on their relative expertise and wisdom, we know little about the dynamics, and particularly the challenges, of these *reverse advising* interactions, relative to more familiar forms of advice exchange from older experts to younger novices (Bonaccio & Dalal, 2006), or amongst peers (Eskreis-Winkler, Fishbach, & Duckworth, 2018). Reverse advising is a context where being a younger adviser is counter to what is expected. Because age drives expectations and prejudices

for the self and others (Kang & Chasteen, 2009; North & Fiske, 2012), we posit that age plays a critical role in how individuals undervalue these dynamics.

Prior research on interactions between younger and older individuals has documented younger individuals' ageist attitudes and behaviors towards older others (Garstka, Hummert, & Branscombe, 2005; North & Fiske, 2013, 2015). These negative, age-based stereotypes have also yielded detrimental effects for the self—that is, internalizing feeling "too old" based on negative old-age stereotypes from the self or from others (Hess, Auman, Colcombe, & Rahhal, 2003; Levy, Slade, & Kunkel, 2002; von Hippel, 2007)—and performance benefits of feeling relatively young (Hess et al., 2003).

In contrast to existing research showing the downsides of being perceived as or feeling "too old," we consider the potential downsides of feeling "too young" to fulfill a key role. In particular, advice exchange is a domain in which relative age affects self-perceptions such that individuals who feel "too young" might underestimate their own impact. In doing so, we integrate growing lines of research on subjective age (i.e., how old one feels, independent of chronological age; Rubin & Berntsen, 2006) and age perception (i.e., how we perceive individuals and ourselves based on age; North, 2019) to study how relative age can influence individuals' self-perceptions in advice-exchange interactions.

Why might younger advisers feel too young and underestimate their abilities to give advice, despite their relative expertise? Because prior research has demonstrated that interpersonal perceptions are based on dimensions of competence and warmth (Fiske, Cuddy, Glick, & Xu, 2002), we unpack how reverse advisers underestimate their own impact across these two dimensions applied to the advising domain: advisers' perception of their own capability and advisees' receptiveness towards learning from them.

In particular, because knowledge in reverse advising domains flows in the opposite direction of how knowledge typically travels (i.e., from older to younger individuals), we hypothesize that younger individuals, when in the presence of an older individual, will discount their own expertise, even with the knowledge that the older individual actually has less expertise. More specifically, relative age is a salient characteristic that is oftentimes visible, measurable, and fundamental (Finkelstein, Burke, & Raju, 1995; North & Fiske, 2012), whereas relative *expertise* is likely more difficult to evaluate. When advisers have limited information about their advisees, advisers may rely more on their relative youth as a signal of their (lack of) expertise. Consequently, reverse advisers may perceive themselves as less capable of giving advice than they actually are.

Although younger advisers may feel that their relative youth makes them ill-equipped to give advice, research demonstrates that experience over time is distinct from expertise (Larrick & Feiler, 2015; Neale & Northcraft, 1990). In particular, expertise is actually a better predictor of performance than age (Avolio, Waldman, & McDaniel, 1990; McDaniel, Schmidt, & Hunter, 1988), suggesting that age serves as an imperfect proxy for performance. Thus, although advisers might be fixated on how relative age influences their capability to give advice, advisees may be less focused on the relative age of the individual. Instead, advisees may be more focused on the content of the exchange to determine effectiveness of advice, which would make the younger advisers' relative expertise apparent.

Additionally, because giving advice up the age hierarchy is uncommon, we predict that younger advisers would perceive giving advice to older individuals as less socially appropriate and that older individuals would be less receptive to their advice, despite their relative expertise (Effron & Miller, 2015). However, older individuals may be interested to (re)discover the

perspectives of their younger selves (Zhang, Kim, Brooks, Gino, & Norton, 2014). Additionally, they may be curious to learn more about the unique perspectives from younger generations based on the content of what they learn from these interactions. Taken together, we predict that because reverse advisers will underestimate their own capability and their advisee's receptiveness to receiving advice, reverse advisers will be more likely to underestimate the actual effectiveness and impact of their advice.

Six experiments explored the psychology of reverse advisers, relative to peer and traditional advisers. Study 1 investigated individuals' preferences for being advisers in traditional, peer, and reverse advising contexts. In Studies 2a-2b, we tested how being a younger, peer, or older adviser influences *advisers' perceptions* of their effectiveness as compared to *advisees'* ratings of their *actual* effectiveness across a wide range of advice topics. In Study 3, we tested these predictions in a more specific domain that entailed MBA students advising novices on negotiation strategies. In Study 4, we tested whether our predictions extend to actual advice uptake in an incentivized context. Finally, Study 5 explored an intervention to mitigate advisers' misguided beliefs about the impact of their relative age on their advising effectiveness. Through this intervention, we tested advisers' perceptions of their own competence and their advisees' receptiveness as drivers of advisers' misguided views.

Study 1: Advice Giving Preferences

In Study 1, individuals were presented with the opportunity to send advice to someone about 10 years younger, about the same age, and about 10 years older. Advisers then predicted their effectiveness in giving advice to individuals across three different age groups. We predicted that advisers would be more willing to give advice to a peer or someone younger than someone

older, and that these decisions would be driven by their expectations of how effective they would be in giving advice to these individuals.

Method

For all experiments, we report how we determined our sample size, all data exclusions, all manipulations, and all measures. Data from all studies can be found on Open Science Foundation at this link: https://osf.io/yb87h. We aimed to recruit 150 advisers in a within-subjects design based on recommendations to conduct studies with large samples (Simmons, Nelson, & Simonsohn, 2011).

Participants: Advisers. One hundred sixty-three individuals between the ages of 28 and 55 (M_{age} = 40.77, SD = 8.32; 55.8% female) completed an online Mechanical Turk study in exchange for $0.75, a standard market rate at the time of the experiment. Twenty-nine participants failed the attention checks and were therefore excluded from the analyses. The attention check questions asked participants to calculate (2+2)/8 and then choose the second to last option provided which was a "9," regardless of the actual answer, and to count the number of people standing on railroad tracks in an image. There was not a significant correlation between age of the participant and likelihood of failing the attention checks, $z = 0.65$, $p = .51$.

Design and procedure: Advisers' predictions. Advisers learned that they ostensibly could send advice to another individual about anything in which they felt relatively expert. Participants were given the choice to send their advice to any number of the following three individuals presented in random order: advisees "about 10 years older," "the same age," and "about 10 years younger."

After making a decision on who they would want to give advice to, advisers predicted how their advisees would perceive their advice based on how "effective" and "helpful" advisees

would perceive the content of their advice, how "interested" their advisee would be in their advice, how likely their advisee would take their advice, how likely their advisee would continue going to them for advice (1 = *not at all*, 7 = *extremely*), and how advisees would rate the overall quality of the advice (1 = *poor*, 7 = *very good*; $\alpha = .94$). Advisers also rated how capable they felt about giving advice to this individual ("capable," "confident," "competent," "skilled," and "qualified" ; $\alpha = .96$) and how receptive their advisee would be to their advice ("warm," "receptive," "open" ; $\alpha = .93$).

Results

Advisers' behaviors. We found a significant difference in individuals' propensity to send advice to an individual 10 years older (18.4%, 30/163), the same age (52.2%, 85/163), and 10 years younger (69.3%, 113/163), Cochran's $Q(2) = 79.84$, $p < .001$. Central to our hypothesis, a post-hoc McNemar Chi-Square with Bonferroni correction revealed that a greater proportion of advisers preferred sending their advice to someone 10 years younger or to a peer than someone 10 years older, $\chi^2_{traditional\ vs.\ reverse}$ $(1, N = 163) = 72.52$, $p_{traditional\ vs.\ reverse} < .001$, $OR_{traditional\ vs.\ reverse} = 14.83$, $\chi^2_{peer\ vs.\ reverse}$ $(1, N = 163) = 46.54$, $p_{peer\ vs.\ reverse} < .001$, $OR_{peer\ vs.\ reverse} = 12.00$. Individuals also preferred sending advice to someone 10 years younger than a peer, $\chi^2_{traditional\ vs.\ peer}$ $(1, N = 163) = 7.26$, $p_{traditional\ vs.\ peer} = .007$, $OR_{traditional\ vs.\ peer} = 1.70$. These results did not differ when controlling for the age of the adviser (see Supplementary Materials).

We conducted a repeated measures analysis of variance (ANOVA) with anticipated effectiveness as the dependent measure and advising context (traditional, peer, and reverse) as the within-subjects independent variable. There was a significant difference in effectiveness ratings across the different types of advising interactions, $F(2, 324) = 60.65$, $p < .001$, $\eta_p^2 = 0.13$. Post-hoc pair-wise comparisons revealed that advisers believed they would be more effective as

peer advisers (M = 4.57, SD = 1.13; 95% CI[4.37, 4.76]) and traditional advisers (M = 4.66, SD = 1.17; 95% CI [4.47, 4.85]) than reverse advisers (M = 3.60, SD = 1.40; 95% CI[3.41, 3.79]), Tukey $t_{peer\ vs.\ reverse} = 9.06$, $p_{peer\ vs.\ reverse} < .001$, Tukey $t_{traditional\ vs.\ reverse} = 9.96$, $p_{peer\ vs.\ reverse} < .001$.

We conducted a similar analysis with perceived competency as the dependent measure. There was a significant difference in competency ratings across the different types of advising interactions, $F(2, 324) = 91.70$, $p < .001$, $\eta_p^2 = 0.15$. Post-hoc pair-wise comparisons revealed that advisers believed they were more competent as peer advisers (M = 5.07, SD = 1.29; 95% CI[4.86, 5.29]) and as traditional advisers (M = 5.51, SD = 1.15; 95% CI [5.30, 5.72]) than as reverse advisers (M = 4.13, SD = 1.66; 95% CI[3.92, 4.35]), Tukey $t_{peer\ vs.\ reverse} = 9.06$, $p_{peer\ vs.\ reverse} < .001$, Tukey $t_{traditional\ vs.\ reverse} = 13.25$, $p_{traditional\ vs.\ reverse} < .001$, Tukey $t_{traditional\ vs.\ peer} = 4.19$, $p_{traditional\ vs.\ peer} < .001$.

We conducted a similar analysis with perceived receptiveness as the dependent measure. There was a significant difference in receptivity ratings across the different types of advising interactions, $F(2, 324) = 32.52$, $p < .001$, $\eta_p^2 = 0.06$. Post-hoc pair-wise comparisons revealed that advisers believed their advisees would be more receptive to learning from them as peer advisers (M = 4.62, SD = 1.23; 95% CI[4.42, 4.82]) and as traditional advisers (M = 4.36, SD = 1.26; 95% CI [4.16, 4.56]) than as reverse advisers (M = 3.82, SD = 1.36; 95% CI[3.62, 4.01]), Tukey $t_{peer\ vs.\ reverse} = 7.90$, $p_{peer\ vs.\ reverse} < .001$, Tukey $t_{traditional\ vs.\ reverse} = 5.37$, $p_{traditional\ vs.\ reverse} < .001$, Tukey $t_{traditional\ vs.\ peer} = 2.53$, $p_{traditional\ vs.\ peer} = .03$.

Mediation analysis. We conducted a multi-level Bayesian mediation using logistic analysis (Yuan & MacKinnon, 2009), with adviser as a random intercept, decision to send advice as the dependent variable, effectiveness ratings as the mediator, and dummy coded variables for the independent variable such that reverse advising was the reference group: peer advising (1 =

adviser is same age as adviser; 0 = other conditions), traditional advising (1 = adviser is older than advisee; 0 = other conditions).

Compared to reverse advisers, advisers in both traditional and peer advising contexts were more likely to send advice ($B_{peer\ vs.\ reverse} = 0.97$, $t = 9.06$, $p < .001$; $B_{traditional\ vs.\ reverse} = 1.07$, $t = 9.96$, $p < .001$). When including advisers' perceptions of their own effectiveness, perceived effectiveness ($B = 0.28$, $z = 3.31$, $p < .001$) significantly predicted advisers' propensity to send advice. Additionally, advisers' propensity to send advice was significantly reduced (from $B_{peer\ vs.\ reverse} = 1.57$, $z_{peer\ vs.\ reverse} = 6.16$, $p_{peer\ vs.\ reverse} < .001$ to $B_{peer\ vs.\ reverse} = 1.35$, $z_{peer\ vs.\ reverse} = 5.12$, $p_{peer\ vs.\ reverse} < .001$; from $B_{traditional\ vs.\ reverse} = 2.30$, $z_{traditional\ vs.\ reverse} = 8.73$, $p_{traditional\ vs.\ reverse} < .001$ to $B_{traditional\ vs.\ reverse} = 2.07$, $z_{traditional\ vs.\ reverse} = 7.63$, $p_{traditional\ vs.\ reverse} < .001$).

A 95% Bayesian confidence interval for the proportion of the total effect that the indirect mediated (95% $CI_{peer\ vs.\ reverse}$ [.05, .23], 95% $CI_{traditional\ vs.\ reverse}$ [.03, .15]) excluded zero, suggesting that younger advisers avoided advising interactions in part because they did not perceive themselves as effective (Bullock, Green, & Ha, 2010; Fiedler, Schott, & Meiser, 2011; Green, Ha, & Bullock, 2010; Yuan & MacKinnon, 2009).

Discussion

Study 1 demonstrates that advisers are more prone to giving advice to peers and younger individuals than older individuals, in part because they perceive themselves as being less effective in advising someone older. In follow-up studies, we test whether advisers are accurate in their perceptions of advising effectiveness.

Study 2a: General Advice Giving

In Study 2a, advisers predicted their effectiveness in giving advice to individuals across three different age groups: those who are 10 years younger, the same age, and 10 years older. A

sample of advisees matched based on their age rated their adviser's effectiveness. We predicted that advisers who are younger than their advisees would underestimate their effectiveness more than peer or older advisers.

Method

We pre-registered this experiment on AsPredicted.org: https://aspredicted.org/ct9u2.pdf. We aimed to recruit at least 150 advisers to be paired with 10 different advisees, based on recommendations to conduct studies with large samples (Simmons et al., 2011).

Participants: Advisers. One hundred fifty-four individuals between the ages of 28 and 55 (M_{age} = 35.79, SD = 6.74; 46% female) completed an online Mechanical Turk study in exchange for $0.75, a standard market rate at the time of the experiment. Five participants (3% of those recruited) failed an attention check and were excluded from the analyses. The attention check question asked participants to calculate (2+2)/8 and then choose the second to last option provided which was a "9," regardless of the actual answer.[1]

Design and Procedure: Advisers' predictions. Advisers contemplated giving advice to each of the following three groups presented in random order: advisees "about 10 years older," "the same age," and "about 10 years younger."

Advisers were informed that if they should choose to send their advice, individuals in the targeted age group would have the chance to read their advice. Prior to giving advice, advisers predicted how their advisees would perceive their advice based on how "effective" and "helpful" advisees would perceive the content of their advice, how "interested" their advisee would be in their advice, how likely their advisee would take their advice (1 = *not at all*, 7 = *extremely*), and the overall quality of the advice (1 = *poor*, 7 = *very good*; α = .91). Advisers then provided their advice on "any topic you have learned in your work or personal life."

Participants: Advisees. Nine-hundred fifty-three individuals between the ages of 18 and 65 (M_{age} = 35.48, *SD* = 10.19; 54% female) completed an online MTurk study in exchange for $0.50. Forty individuals (4% of the individuals recruited) failed the same attention check that advisers answered and were excluded from the analyses. We aimed to recruit approximately 900 individuals, such that each piece of advice collected would be rated by about 10 advisees who fit the target age demographic. More specifically, we segmented each piece of advice into different age categories (e.g., 18-20, 21-25, 26-30…61-65) based on the targeted age of the advice recipient. We aimed to recruit twice the number of advisees as the number of advisers given for each age category.

Design and Procedure: Advisees' Perceptions. Based on the consensual assessment technique (Amabile, 1982; Zhang, Gino, & Margolis, 2018), participants rated five randomly selected pieces of advice intended for their age demographic (Milkman, Rogers, & Bazerman, 2009). For example, 125 raters between the ages of 31 and 35 were randomly assigned five different pieces of advice that were randomly selected from the pool of 56 pieces of advice intended for the target age group. On average, 10 advisees (*SD* = 1.25) rated each piece of advice. Prior to reading each piece of advice, advisees learned that their adviser was about 10 years older, the same age, or 10 years younger. Advisees then rated the effectiveness of each piece of advice based on the same dimensions that advisors did (α = .96).

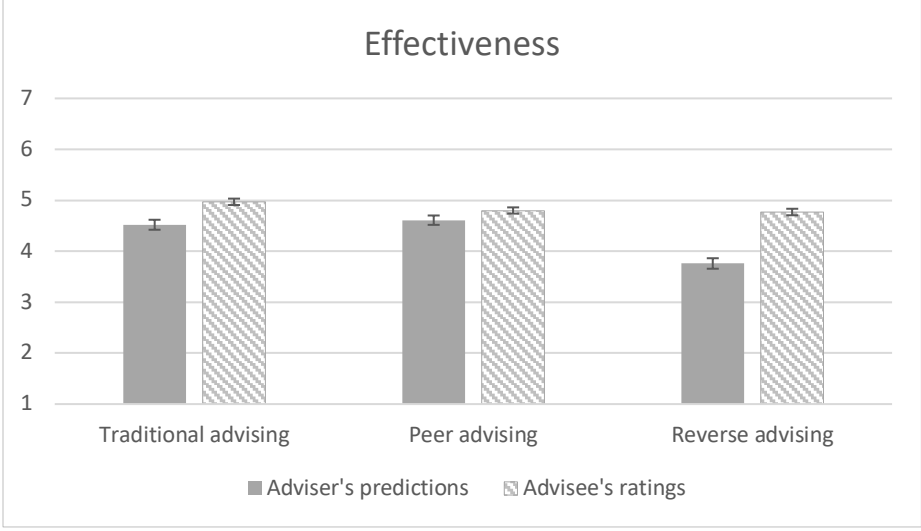
Results

A mixed-model ANOVA revealed a main effect of advisers' role (adviser vs. advisee), $F(1, 1419.2) = 38.11$, $p < .001$, advising style (reverse vs. peer vs. traditional advising), $F(2, 4{,}538.3) = 29.11$, $p < .001$, and the interaction between the two, $F(2, 4{,}538.3) = 13.63$, $p < .001$. Because we predicted that advisers would underestimate their effectiveness more in the reverse

advising conditions than in the peer and traditional advising conditions, we report more details about the interaction and include statistics about the main effects in the supplementary materials.

To unpack the interaction between role and advising context, we conducted a multi-level linear regression with each unique piece of advice and participant as random intercepts and effectiveness ratings as the dependent variable. To compare peer and traditional advising against reverse advising as the reference category, we used the following independent variables: role (0 = advice giver; 1 = advice recipient), peer (1 = adviser is same age as advisee; 0 = other conditions), traditional advising (1 = adviser is older than advisee; 0 = other conditions), the interaction between role and peer condition, and the interaction between role and traditional advising condition. To compare reverse and traditional advising against peer advising, we used peer advising as the reference category with reverse (1 = adviser is younger than advisee; 0 = other conditions), traditional advising (1 = adviser is older than advisee; 0 = other conditions). We also used the emmeans packages in R to conduct simple slopes analyses, testing whether advisers' predictions differed from advisees' actual perceptions. See Table 1 and Figure 1 for a summary of the results.

Figure 1. Predicted and actual effectiveness ratings by condition with standard error bars



We found a significant interaction between role and peer vs. reverse advising (B = -0.75, t(4,354.7) = -5.15, p < .001), suggesting that advisers underestimated their effectiveness more in the reverse advising condition than in the peer advising condition. Advisers also underestimated their effectiveness more in the reverse advising condition than in the traditional advising condition as revealed in a significant interaction between role and traditional vs. reverse advising (B = -0.51, t(4,931.0) = -3.40, p < .001). We also found a marginally significant interaction between the peer vs. traditional advising conditions and role (B = -0.24, t(4,358.8) = -1.65, p = .10), suggesting that advisers directionally underestimated their effectiveness more in traditional advising contexts than in peer advising contexts.

Table 1. Means (and 95% Confidence Intervals) for Dependent Measures in Studies 2a-2b

Dependent Measures	Predicted	Actual	Actual - Predicted	*t*-value	*p*-value
Study 2a					
Effectiveness					
Traditional	4.52 [4.28, 4.76]	4.97 [4.84, 5.11]	0.46 [0.11, 0.81]	3.72	.003
Peer	4.61 [4.37, 4.86]	4.80 [4.70, 4.96]	0.22 [0.13, 0.56]	1.79	.47
Reverse	3.76 [3.52, 4.01]	4.77 [4.59, 4.86]	0.96 [0.61, 1.32]	6.70	<.001
Study 2b					
Effectiveness					
Traditional	4.63 [4.30, 4.96]	4.81 [4.64, 4.98]	0.18 [-0.29, 0.65]	1.10	.88
Peer	4.29 [3.96, 4.63]	4.84 [4.68, 5.01]	0.55 [0.25, 0.83]	3.34	.01
Reverse	3.51 [3.19, 3.83]	4.58 [4.42, 4.75]	1.07 [0.62, 1.53]	6.70	<.001
Capability					
Traditional	5.12 [4.78, 5.46]	5.15 [4.99, 5.31]	0.03 [-0.47, 0.53]	0.15	.99
Peer	5.14 [4.80, 5.48]	4.93 [4.77, 5.08]	-0.22 [-0.71, 0.28]	-1.24	.82
Reverse	3.89 [3.56, 4.22]	4.41 [4.25, 4.56]	0.52 [0.03, 1.00]	3.05	.03
Receptivity					
Traditional	4.63 [4.28, 4.98]	4.94 [4.78, 5.10]	0.31 [-0.20, 0.82]	1.73	.51
Peer	4.55 [4.21, 4.90]	4.91 [4.75, 5.07]	0.36 [-0.15, 0.87]	2.01	.34
Reverse	3.71 [3.37, 4.05]	4.54 [4.38, 4.69]	0.83 [0.33, 1.32]	4.76	<.001

Discussion

Study 2a demonstrates that advisers overestimated how much their age would influence how their advice would be perceived. In particular, reverse advisers underestimated the effectiveness of their advice more than peer and traditional advisers did.

There are two possible explanations for these findings: the first is the *relative* direction that the advice is traveling (to someone older, same age, or younger), whereas the other is due to advisers' expectations based on the *absolute* age of the advice recipient. As advice recipients in Study 2a's reverse-advising condition were older than recipients in the traditional advising condition, Study 2a cannot disentangle between these two distinct explanations, which prior research has shown to yield differential perceptual effects (Montepare & Zebrowitz-McArthur, 1988). In Study 2b, we recruit advisers of varying ages, but keep the age of the advisee constant to disentangle whether relative age or absolute age explained these advisers' (mis)predictions.

Study 2b: General Advice-Giving

To test whether relative or absolute age better explained these findings, Study 2b recruited advisers from three different age groups (reverse advisers: 18-22, peer advisers: 28-32, and traditional advisers: 38-42), and regardless of their age, advisers gave advice to individuals between 28 and 32 years old, who then rated the effectiveness of the advice provided. If absolute age of advisees explains our results in Study 2a, then we would not expect advisers' predictions across the three different age groups to differ as advice recipients are within the same 28-32 age window. However, if relative age explains our results in Study 2a, then we would expect reverse advisers who are 18-22 years old would still perceive their advice as less effective as compared to peer advisers (28-32 years old) and traditional (38-42 years old) advisers, suggesting that the relative direction in which individuals transfer advice—not the absolute age of the advisee—

influences advisers' predictions. As in Study 2a, we compare advisers' predictions of their effectiveness to advisees' ratings of actual effectiveness and expect a greater underestimation in reverse advising contexts as compared to peer and traditional advising contexts. Based on results from Studies 1-2a, we predict that these results would be mediated by how much advisers underestimate their own competence in giving advice and their advisees' receptiveness towards learning from them.

Method

We aimed to recruit at least 80 advisers per condition based on recommendations to conduct studies with large samples (Simmons et al., 2011).

Participants: Advisers. Two hundred fifty-nine individuals (90 individuals between the ages of 18-22, 85 individuals between the ages of 28-32, and 84 individuals between the ages of 38-42) (M_{age} = 29.15, SD = 7.96; 49% female) completed an online Mechanical Turk study in exchange for $1.00, a standard market rate at the time of the experiment. We excluded twenty-four participants from the analyses after they failed an attention check that asked participants to determine the meaning of the word period in the following sentence "It was a difficult period." There was not a significant correlation between age of the participant and likelihood of attrition, $z = 0.71$, $p = .48$.

Design and Procedure: Advisers' predictions. Advisers between 18 and 22 years of age predicted the effectiveness of advice they would provide to individuals "about 10 years older" (between 28 and 32), advisers between 28 and 32 years of age made the same predictions for individuals "about the same age," and advisers between 38 and 42 years of age made predictions for those "about 10 years younger."

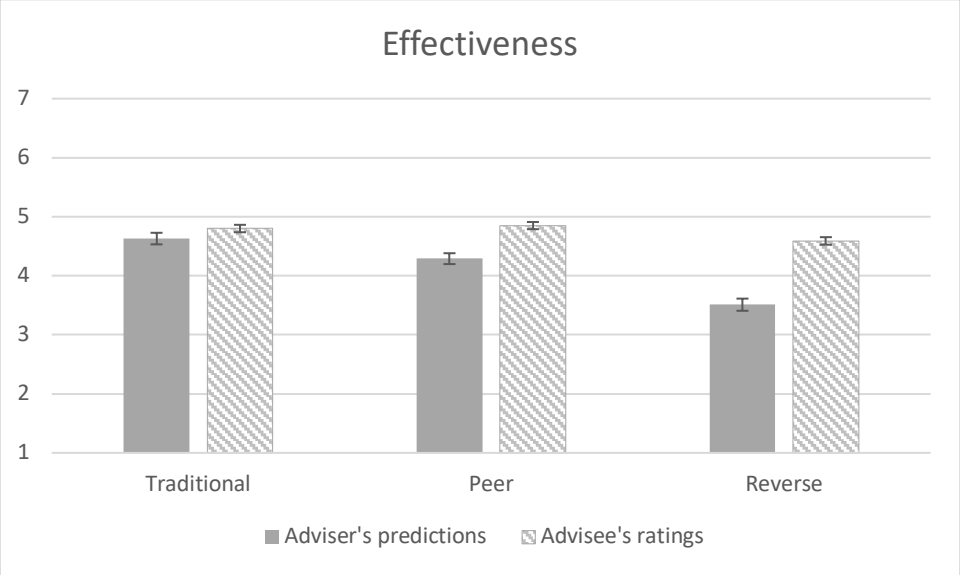
Advisers were informed that individuals in the targeted age group would have the chance to read their advice. Prior to giving advice, advisers predicted how their advisees would perceive their advice based on how "effective" and "helpful" advisees would perceive the content of their advice, how "interested" their advisee would be in their advice, how likely their advisee would take their advice (1 = *not at all*, 7 = *extremely*), and the overall quality of the advice (1 = *poor*, 7 = *very good*; α = .90). Advisers also rated the extent to which they felt "capable of giving advice to their advisee" and "advisees would be open to receive their advice" (1 = *not at all*, 7 = *extremely*). Advisers then provided their advice on "any topic you have learned in your work or personal life."

Participants: Advisees. Five hundred twelve individuals between the ages of 28 and 32 (M_{age} = 28.72, *SD* = 0.95; 50% female) completed an online MTurk study in exchange for $1.50. We aimed to recruit approximately 500 individuals, such that each piece of advice collected would be rated by about 10 advisees about the age of 30 (between 28 and 32) who fit the target age demographic. Fifty-one individuals were excluded from the analyses after failing the same attention check that advisers completed. There was not a significant correlation between age of the participant and likelihood of attrition, $z = 0.12$, $p = .91$.

Advisees read five randomly selected pieces of advice, drawn from the pool of 259 pieces of advice intended for the target age group. On average, each piece of advice was rated by 10 different advisees (*SD* = 1.25). Prior to reading each piece of advice, advisees learned that their adviser was about 10 years older, the same age, or 10 years younger. Advisees then rated the effectiveness of each piece of advice based on the same dimensions (α = .95). Additionally, they also rated the extent to which they were "open to receiving advice from this person" and "the adviser was capable of giving advice."

Advisers' perceptions vs. advisees' actual ratings of effectiveness. A linear mixed-model ANOVA revealed a main effect of advisers' role (adviser vs. advisee), $F(1, 1{,}955.8) = 38.65$, $p < .001$, advising style (reverse vs. peer vs. traditional advising), $F(2, 685.3) = 11.77$, $p < .001$, and the interaction between the two, $F(2, 2{,}400.5) = 7.77$, $p < .001$. Because we predicted that advisers would underestimate their effectiveness more in the reverse advising conditions than in the peer and traditional advising conditions, we report more details about the interaction and include statistics about the main effects in the supplementary materials.

Figure 2. Predicted and actual advice effectiveness by condition in Study 2b



To unpack the interaction between role and advising context, we conducted a multi-level linear regression with each unique piece of advice and participant as random intercepts and effectiveness ratings as the dependent variable. To compare peer and traditional advising against reverse advising as the reference category, we used the following independent variables: role (0 = advice giver; 1 = advice recipient), peer (1 = adviser is same age as advisee; 0 = other conditions), traditional advising (1 = adviser is older than advisee; 0 = other conditions), the interaction between role and peer condition, and the interaction between role and traditional

advising condition. To compare reverse and traditional advising against peer advising, we used peer advising as the reference category with reverse (1 = adviser is younger than advisee; 0 = other conditions), traditional advising (1 = adviser is older than advisee; 0 = other conditions). We also used the emmeans packages in R to conduct simple slopes analyses to test whether advisers' predictions differed from advisees' actual perceptions. Figure 2 depicts the mean predicted and actual effectiveness ratings across conditions with standard error bars.

We found a significant interaction between role and peer vs. reverse advising (B = -0.52, t(2400.5) = -2.31, p = .02), suggesting that advisers underestimated their effectiveness more in the reverse advising condition than in the peer advising condition. Advisers also underestimated their effectiveness more in the reverse advising condition than in the traditional advising condition as revealed in a significant interaction between role and traditional vs. reverse advising (B = -0.89, t(2,401) = -3.91, p < .001). There was not a significant interaction between the peer vs. traditional advising conditions and role (B = -0.37, t(2,399.9) = -1.60, p = .11).

Advisers' perceptions vs. advisees' actual ratings of adviser capability. A linear mixed-model ANOVA revealed a main effect of advising style (reverse vs. peer vs. traditional advising), F(2, 844.6) = 28.73, p < .001 and an interaction between advising style and role, F(2, 2,377) = 4.88, p = .008.

More specifically, we found a significant interaction between role and peer vs. reverse advising (B = -0.73, t(2,377) = -3.06, p = .002), suggesting that advisers underestimated their capability more in the reverse advising condition than in the peer advising condition. Advisers also underestimated their capability more in the reverse advising condition than in the traditional advising condition as revealed in a significant interaction between role and traditional vs. reverse

advising (B = -0.49, t(2,377.6) = -2.04, p = .04). There was not a significant interaction between the peer vs. traditional advising conditions and role (B = 0.24, t(2,376.4) = 0.99, p = .32).

Advisers' perceptions vs. advisees' actual ratings of advisee receptivity. A linear mixed-model ANOVA revealed a main effect of advising style (reverse vs. peer vs. traditional advising), F(2, 879.6) = 12.94, p < .001, a main effect of role (adviser vs. advisee), F(1, 1,907.1) = 22.51, p < .001, and an interaction between advising style and role, F(2, 879.6) = 12.94, p < .001.

We found a marginally significant interaction between role and peer vs. reverse advising (B = -0.47, t(2,371.9) = -1.91, p = .06), suggesting that advisers directionally underestimated their advisee's receptivity more in the reverse advising condition than in the peer advising condition. Advisers also underestimated their advisee's receptivity more in the reverse advising condition than in the traditional advising condition, as revealed in a significant interaction between role and traditional vs. reverse advising (B = -0.52, t(2,372.5) = -2.10, p = .04). No significant interaction emerged between the peer vs. traditional advising conditions and role (B = -0.05, t(2,371.4) = -0.19, p = .85).

Mediation. In a multi-level mediation, we examined whether perceptions of advisers' competence and advisers' receptiveness to learning from the adviser would mediate whether advisers underestimated their effectiveness more in reverse advising contexts relative to peer and traditional advising contexts. Compared to traditional advising and peer advising conditions, advisers in reverse advising contexts underestimated their capability in giving advice ($B_{traditional\ vs.\ reverse*role}$ = -0.49, $t_{traditional\ vs.\ reverse*role}$ = -2.04, $p_{traditional\ vs.\ reverse*role}$ = .04; $B_{peer\ vs.\ reverse*role}$ = -0.73, $t_{peer\ vs.\ reverse*role}$ = -3.06, $p_{peer\ vs.\ reverse*role}$ = .002) as well as their advisees' receptiveness to

learning from them ($B_{traditional\ vs.\ reverse*role}$ = -0.52, $t_{traditional\ vs.\ reverse*role}$ = -2.10, $p_{traditional\ vs.\ reverse*role}$ = .04; $B_{peer\ vs.\ reverse*role}$ = -0.47, $t_{peer\ vs.\ reverse*role}$ = -1.91, $p_{peer\ vs.\ reverse*role}$ = .06).

When both capability and receptivity were included in the model, the interaction between condition and role was significantly reduced (from $B_{traditional\ vs.\ reverse*role}$ = -0.89, $t_{traditional\ vs.\ reverse*role}$ = -3.91, $p_{traditional\ vs.\ reverse*role} < .001$ to $B_{traditional\ vs.\ reverse*role}$ = -0.44, $t_{traditional\ vs.\ reverse*role}$ = -3.69, $p_{traditional\ vs.\ reverse*role} < .001$; from $B_{peer\ vs.\ reverse*role}$ = -0.52, $t_{peer\ vs.\ reverse*role}$ = -2.31, $p_{peer\ vs.\ reverse*role}$ = .02 to $B_{peer\ vs.\ reverse*role}$ = -0.02, $t_{peer\ vs.\ reverse*role}$ = -0.13, $p_{peer\ vs.\ reverse*role}$ = .89).

Using a bootstrap analysis on multilevel data with 5,000 iterations (Slepian, Masicampo, & Galinsky, 2016), we found that the 95% bias-corrected confidence interval for the size of the indirect effect of the interaction between role and reverse vs. traditional advising conditions via perception of advisers' own capability (-0.01, -0.31) and advisees' receptiveness (-0.07, -0.45) excluded zero, suggesting misperceptions of advisers' capability and advisees' receptivity in part contribute to reverse advisers' tendency to underestimate their effectiveness relative to traditional advisers (Bullock et al., 2010; Fiedler et al., 2011; Green et al., 2010; MacKinnon, Fairchild, & Fritz, 2007).

Additionally, a similar analysis for the size of the indirect effect of the interaction between role and reverse vs. peer advising conditions via perception of advisers' own capability (-0.11, -0.40) and advisees' receptiveness (-0.03, -0.46) excluded zero, suggesting misperceptions of advisers' capability and advisees' receptivity in part contribute to reverse advisers' tendency to underestimate their effectiveness relative to peer advisers (MacKinnon et al., 2007).

Taken together, these findings demonstrate that relative to peer and traditional advisers, reverse advisers underestimate their effectiveness in part because they underestimate how

capable they are in giving advice and also how receptive their advisee would be in receiving advice from them.[2]

Study 3: MBA Field Study

Whereas Studies 1-2b explored advice across a wide range of topics, Study 3 focused on advice in a more specific domain. In particular, MBA students with negotiation training advised those without any training on effective negotiation strategies. We measured advisers' expectations of their effectiveness prior to these face-to-face advising sessions and advisees' perceptions of effectiveness after these interactions. Similar to Studies 2a-2b, we expected advisers to predict they would be less effective when advising someone older than when advising peers and younger individuals; however, we predicted that relative age would not affect perceptions of advice to the same degree. In particular, we expected that younger advisers would underestimate their effectiveness more than peer or older advisers.

Participants

Three hundred forty-four individuals completed this study: 172 MBA students taking a negotiations course ($M_{age} = 29.59$, $SD = 2.55$; 35% female) gave negotiations advice to a different individual less familiar with the topic, based on the eligibility requirement of not having prior formal training in negotiation. We removed two dyads who did not complete the study. We aimed to recruit at least 150 adviser-advisee pairs and removed two dyads who did not complete the study.

Design and Procedure

Advisers identified an individual who had no formal training in negotiation and guided their naïve advisees through one of their previously-completed negotiation cases. After giving advice, participants estimated how helpful they were and how much their partner would learn

from them (1 = *not at all*, 7 = *extremely/very much*). Advisees rated their advisers on the same items: how helpful their partner was and how much they learned from their partner. Because these items were highly correlated (αs > .83), we averaged them together to form measures of predicted and actual effectiveness.

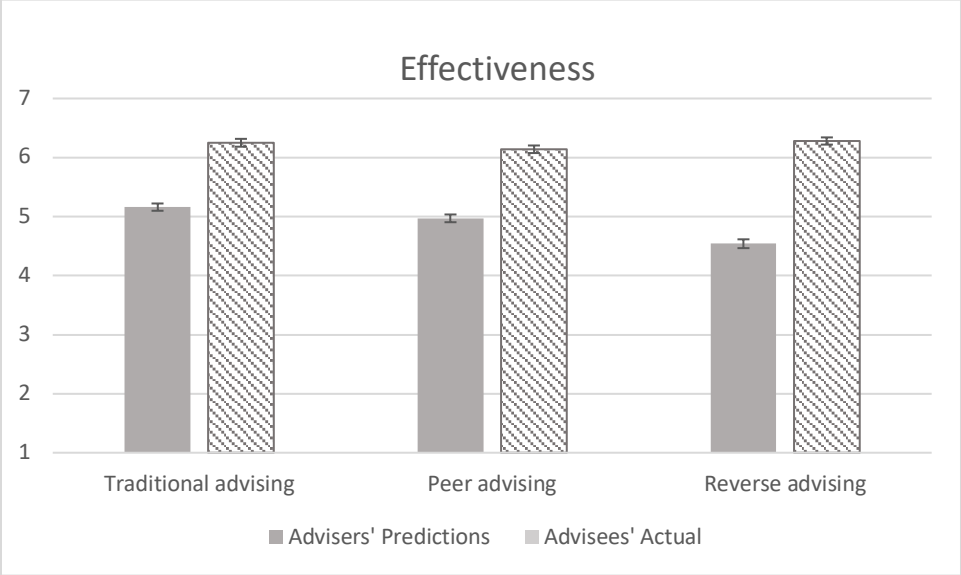
Results

Advising context distribution. Of the 172 dyads, 73% (125/172) comprised peer advising relationships (adviser within five years of advisee), 13% (22/172) encompassed traditional advising relationships (adviser more than 5 years older than advisee), and the remaining 15% of the groups (25/172) were reverse advising relationships (adviser more than 5 years younger than advisee). Advisers determined the category of the individual based on their knowledge of the individual in which they advised.[3]

Perceived effectiveness. We conducted a mixed-model analysis of variance (ANOVA) with perceived effectiveness as the dependent measure, role as the within-subjects factor (adviser vs. advisee), and advising context as the between-subjects factor (traditional, peer, or reverse).

As predicted, a significant interaction between advising context and role emerged, $F(2, 169) = 3.80$, $p = .02$, $\eta_p^2 = 0.04$. Based on post-hoc analyses using Tukey corrections, advisers expected to be less helpful in reverse advising contexts ($M = 4.54$, $SD = 0.98$, 95% CI [4.20, 4.88]) than in peer ($M = 4.97$, $SD = 0.86$, 95% CI [4.82, 5.12]), $p = .03$, or traditional advising contexts ($M = 5.16$, $SD = 0.81$, 95% CI [4.80, 5.52]), $p = .016$. However, advising context was not associated with differences in advisee's actual perceptions of effectiveness ($M_{reverse} = 6.28$, $SD_{reverse} = 0.80$, 95% $CI_{reverse}$ [5.94, 6.62]; $M_{peer} = 6.14$, $SD_{peer} = 0.84$; 95% CI_{peer} [5.99, 6.29]; $M_{traditional} = 6.25$, $SD_{traditional} = 0.87$; 95% CI_{peer} [5.89, 6.61]), ps > .44.

Figure 3. Predicted and actual advice effectiveness by condition in Study 3



Put differently, although traditional advisers (M_{diff} = 1.09, SE = 0.21, 95% CI [0.48, 1.70]) and peer advisers (M_{diff} = 1.16, SE = 0.09, 95% CI [0.91, 1.42]) underestimated their effectiveness based on comparisons of advisers' self-assessments to advisees' actual ratings, ps < .001, reverse advisers underestimated their effectiveness more (M_{diff} = 1.74, SE = 0.20, [1.17, 2.31]), p < .001.

We also found a main effect of participant role, $F(1, 169) = 174.10$, $p < .001$, $\eta_p^2 = 0.51$. That is, advisers underestimated how effective they would be (M = 4.93, SD = 0.84; 95% CI [4.72, 5.07]) relative to advisees' actual perceptions of effectiveness (M = 6.17, SD = 0.84; 95% CI [6.05, 6.39]). A main effect of advising context did not emerge, $F(2, 169) = 1.04$, $p = .36$.

Discussion

Although reverse-advisers predicted they would be less effective than traditional- or peer-advisers, advisees' perceptions of advice quality did not differ based on the relative age of the adviser. In particular, reverse-advisers underestimated their effectiveness more than did peer and traditional advisers. Because participants self-selected more frequently into peer advising

relationships, our ability to draw causal inferences is limited. Therefore, Study 4 randomized advisers into reverse, peer, and traditional advising contexts with a larger sample.

Study 4: Advice Uptake in an Incentivized Experiment

Study 4 employed a more tightly controlled design such that advisers were randomized to be older, the same age, or younger than their advisees, and provided the same advice to each group. To extend beyond mere perceptions of advice quality, Study 4 measured advisees' actual uptake behaviors, relative to advisers' expectations of advice uptake. Additionally, advisers were incentivized to accurately predict how much advisees would take their advice into account.

Method

We targeted a recruitment of 800 participants (400 advisers and 400 advisees) based on recommendations to conduct studies with large samples (Simmons et al., 2011).

Because we controlled for the content of the advice, we first recruited advisees to assess how much they would take their advisers' advice into account. Participants were randomly assigned knowledge that their adviser was either approximately 10 years older, the same age, or 10 years younger. Then, each advisee was matched to an adviser based on the relative age of the adviser. In the subsequent explanation of our methods, we first describe participant demographics and methodology for *advisees* and then *advisers*.

Participants: Advisees. Four hundred twenty-nine individuals between the ages of 28 and 55 ($M_{age} = 36.99$, $SD = 6.77$; 58% female) without negotiation training completed an online MTurk study in exchange for $0.75. We excluded nineteen participants who did not qualify because they had negotiation experience buying a car. There was not a significant correlation between age of the participant and the likelihood of attrition, $z = 0.93$, $p = .35$.

Design and Procedure: Advisees. Advisees were randomly assigned to receive advice from someone "about 10 years older than you" in the traditional advising condition, "the same age as you" in the peer advising condition, or "about 10 years younger than you" in the reverse advising condition.

Advisees read information about a car they were seeking to purchase (a 2017 Hyundai Sonata Hybrid) and were informed that they would be asked to make a decision about an opening offer to buy the car. Prior to receiving advice, all advisees made an initial decision about the opening offer they would use to begin their negotiation with the seller. Participants were then informed they were paired with an adviser, who was "about [10 years older, the same age, or 10 years younger]." Advisees then received the following advice: "I recommend that you open at $15,650 so that there is some room for the both of you to concede." After reading this advice, advisees indicated on a slider what their opening offer would be with the end points set at $15,650 and the initial opening offer. The lower of the two values was presented on the left and the higher value on the right.

Participants: Advisers. Four hundred twenty-nine full-time and part-time employees between the ages of 18 and 65 (M_{age} = 36.83, SD = 10.82; 48% female) completed an online MTurk study in exchange for $1.00. An initial filter at the beginning of the study excluded 38 participants who indicated that they had no negotiation experience buying a car, and we excluded four participants who did not complete the study. We aimed to recruit the same number of advisers as advisees, such that for each dyad, we can compare advisees' actual behavior of advice uptake to advisers' predictions. More specifically, we segmented adviser recruitment in general age brackets (e.g., 18-20, 21-25, 26-30…61-65) and used the age of the advisee and the targeted age of the adviser to determine the targeted number of advisers needed for each

category. There was not a significant correlation between age of the participant and likelihood of attrition, $z = 1.09$, $p = .28$.

Design and Procedure: Advisers. Based on their age, advisers were matched with an advisee and read that their advisee was either "10 years younger" in the traditional advising condition, "the same age" in the peer advising condition, or "10 years older" in the reverse advising condition. Advisers read the same information about a car purchase and learned about the opening offer that their advisee planned to make in their negotiations. Then, advisers read that their advisees received a message from them recommending an opening offer of $15,650 and then would have the opportunity to revise their opening offer based on the advice provided.

Advisers then predicted how much advisees would factor their advice into the revised decision. To measure advisers' predictions of advice uptake, we presented advisers with a scale in which the end points contained the advisee's initial opening offer and adviser's recommendation of $15,650, ordered from lower to higher. Advisers then indicated on the scale where they thought their advisee would make their opening offer after reading their recommendation. The top 10 percent of advisers who were the most accurate in guessing their advisee's revised offer (i.e., based on the smallest percentage deviation between the predicted offer and the actual offer) received an additional $1 bonus.

Advice uptake. We measured advisers' predicted and advisees' actual advice uptake based on a "weight on advice" (WOA) measure, which gauges the extent to which individuals take their adviser's recommendation into account (Harvey & Fischer, 1997; Soll & Larrick, 2009). Actual WOA was based on how much advisees revised their opening offer relative to how much they could have revised their offer if they were to take their advisers' advice into account entirely. A WOA number of 1 indicates that the person being advised changed their mind to what

their adviser suggested; conversely a WOA of 0 indicates that the advisee ignored their adviser's estimate (Gino & Moore, 2007).

$$WOA_{advisee's\ actual} = \frac{|(revised\ offer - initial\ offer)|}{|(advice - initial\ offer)|}$$

To compare advisees' actual advice uptake to advisers' predictions, we also calculated advisers' predicted WOA based on how much advisers thought advisees would revise their offer relative to how much they could have revised their offer.

$$WOA_{adviser's\ prediction} = \frac{|(predicted\ revised\ offer - initial\ offer)|}{|(advice - initial\ offer)|}$$

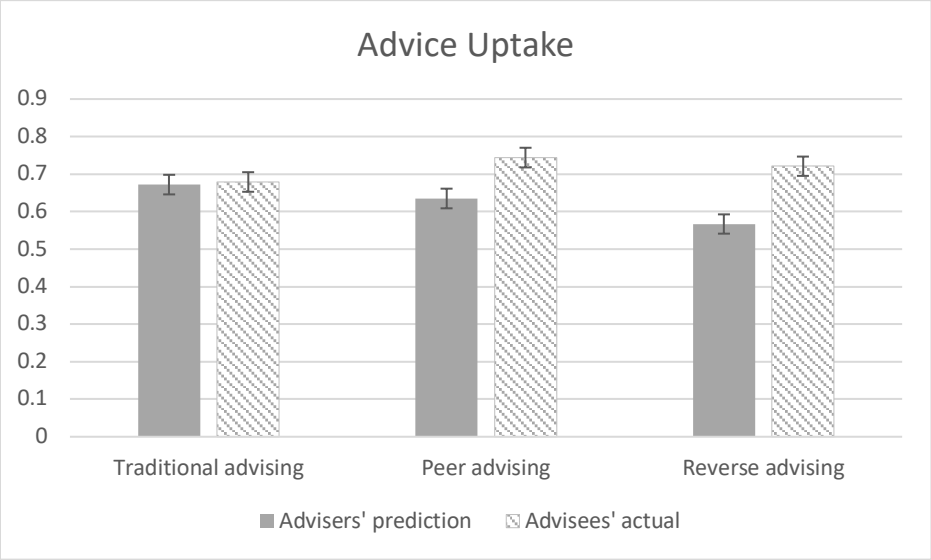
Results

Advisers' predicted vs. advisees' actual advice uptake. To compare advisers' predictions of advice uptake relative to advisees' actual advice uptake, we conducted a linear mixed-model ANOVA with WOA as the dependent measure, role as the between-subjects factor (adviser's predictions vs. advisee's actual behavior), condition as the between-subjects factor (adviser is older, peer, or younger), and dyad as a random intercept. We found a main effect of role, $F(1, 426) = 18.79$, $p < .001$, condition, $F(2, 426) = 1.53$, $p = .007$, and a significant interaction between role and condition, $F(2, 426) = 4.39$, $p = .01$. Controlling for age generated similar results, and conducting a three-way interaction between age, role, and condition revealed that the adviser's age does not moderate these results (see Supplementary Materials for additional details).

To unpack the interaction between role and advising context, we conducted a multi-level linear regression with dyad as a random intercept and WOA measure as the dependent variable. To compare peer and traditional advising against reverse advising as the reference category, we used the following independent variables: role (0 = advice giver; 1 = advice recipient), peer (1 = adviser is same age as advisee; 0 = other conditions), traditional advising (1 = adviser is older

than advisee; 0 = other conditions), the interaction between role and peer condition, and the interaction between role and traditional advising condition. To compare reverse and traditional advising against peer advising, we used peer advising as the reference category with reverse (1 = adviser is younger than advisee; 0 = other conditions), traditional advising (1 = adviser is older than advisee; 0 = other conditions). We also used the emmeans package in R to conduct simple slopes analyses to test whether advisers' predictions differed from advisees' actual perceptions.

Figure 4. Predicted and actual weight on advice (WOA) by condition in Study 4



We found a significant interaction between role and reverse vs. traditional advising (B = -0.15, $t(426)$ = -2.90, p = .004), suggesting that advisers underestimated their effectiveness more in the reverse advising condition ($M_{actual\text{-}prediction}$ = 0.15, $SE_{actual\text{-}prediction}$ = 0.04, $t_{actual\text{-}prediction}$ = 4.33, $p_{actual\text{-}prediction}$ < .001), than in the traditional advising condition ($M_{actual\text{-}prediction}$ = 0.01, $SE_{actual\text{-}prediction}$ = 0.04, $t_{actual\text{-}prediction}$ = 0.20, $p_{actual\text{-}prediction}$ > .99). Advisers also underestimated their effectiveness more in the peer advising condition ($M_{actual\text{-}prediction}$ = 0.11, $SE_{actual\text{-}prediction}$ = 0.04, $t_{actual\text{-}prediction}$ = 3.01, $p_{actual\text{-}prediction}$ = .03) than in the traditional advising condition as revealed in a significant interaction between role and peer vs. traditional advising (B =

0.10, $t(426) = -1.99$, $p = .047$). We did not find a significant interaction between the peer vs. reverse advising conditions and role ($B = -0.04$, $t(426) = -0.89$, $p = .38$), suggesting that advisers in both peer and reverse advising conditions also underestimated their effectiveness.

Put differently, post-hoc analyses revealed that advisers believed their advisees would take their advice into account less in reverse advising contexts ($M = 0.57$, $SD = 0.30$, 95% CI [0.52, 0.62]) than in traditional ($M = 0.67$, $SD = 0.30$, 95% CI [0.62, 0.72]), $t(426) = 2.94$, $p = .01$, but not peer advising contexts ($M = 0.64$, $SD = 0.31$, 95% CI [0.58, 0.69]), $t(426) = 1.89$, $p = .14$. Peer advisers did not predict a difference in advice uptake from traditional advisers, $p = .55$.

However, advisees were not less likely to take advice in the reverse advising condition ($M = 0.72$, $SD = 0.30$, 95% CI [0.67, 0.77]) than in the peer ($M = 0.74$, $SD = 0.31$, 95% CI [0.69, 0.80]), $t(426) = 0.61$, $p = .82$) or traditional advising conditions ($M = 0.68$, $SD = 0.35$, 95% CI [0.62, 0.74]), $t(426) = 1.11$, $p = .51$.

Discussion

Study 4 demonstrated that younger advisers not only underestimated their own effectiveness—as shown in Studies 1-3—but also their advisees' advice uptake. In other words, although advisers perceived that older individuals would be less likely to take their advice, actual advisee uptake behaviors show that younger advisers are no less valuable in the minds of advice recipients than peer or older advisers. We note that across all three conditions, advisees decreased their initial offers (from $M_{pre\ advice}$ = \$20,298.79; $SD_{pre\ advice}$ = 4,593.97 to $M_{post\ advice}$ = \$16,889.69; $SD_{post\ advice}$ = 2,751.92, $t(432) = -20.99$, $p < .001$), following recommended approach to open with a reasonable extreme offer in order to anchor the negotiation in the opener's favor (Galinsky, Ku, Mussweiler, 2009).

Unlike in Studies 1-3, Study 4 did not find a statistically significant difference in the amount of underestimation between reverse and peer advisers, despite previous studies showing that reverse advisers underestimated themselves more than did peer advisers. One contributing factor may be that all advisers in this study had to provide the same advice, whereas advisers in previous studies could choose the advice they wanted to offer. Consequently, advisers may have been less optimistic about the impact of their advice in non-traditional advising contexts, including both peer and reverse advising contexts. Additional research is needed to understand the conditions in which peer advisers are likely to underestimate their impact, relative to reverse and traditional advisers.

Study 5: Intervention and Mechanism

Studies 1-4 found evidence that younger advisers underestimated their effectiveness more than peer or older advisers did. We sought to develop an intervention to mitigate these misguided reverse-advising beliefs of reduced effectiveness. Because traditional advising tends to involve an individual imparting knowledge, skills, or advice to those younger, we flipped the script in our intervention by asking individuals to consider what specifically they might be able to teach someone older than them. We expected that contemplating their own expertise would reduce the extent to which individuals downplay their competence in reverse advising contexts. We benchmarked this treatment against a control group, in which individuals contemplate what they could teach someone younger than them. Because the control condition confirms individual's existing mental model of advising as that of an older adviser to a younger one, we expected advisers in the control condition would discount their effectiveness in reverse advising contexts, similar to reverse advisers in Studies 1-4.

Methods

Using G*Power, we aimed to recruit 200 participants to detect an effect size of $f = .2$ at a power level of 95% for a mixed-model 2 (between-subjects) x 3 (within-subjects) design.

Participants. Two hundred two full-time employees between the ages of 28 and 65 ($M_{age} = 40$, $SD = 10.13$; 51% female) completed an online MTurk in exchange for $0.75.

Design and Procedure. We conducted a 2 (between-subjects: intervention vs. control) x 3 (within-subjects: traditional, peer, and reverse advising) experiment. To encourage contemplation of what individuals could contribute to older generations, advisers in the intervention condition wrote 3-5 sentences reflecting on what they could teach someone 10 years older. In contrast, those in the control condition wrote about what they could teach someone 10 years younger.

Advisers answered a series of questions about giving advice to someone "about 10 years younger" (traditional advising condition), "about the same age" (peer advising condition), and "about 10 years older" (reverse advising condition). Participants imagined they could give advice to individuals in each of the three groups and predicted for each age group how effective they would be based on the following items: "How helpful do you think your advice would be to this person?", "How effective do you think your advice would be to this person?", "To what extent do you think this person would be interested in your advice?", "To what extent do you think this person would take your advice?", "How do you think this person would rate your advice?" (1 = *not at all*, 7 = *extremely, very much*; $\alpha = .94$). We randomized the ordering of the advising context as well as the ordering of questions.

To explore social perception mechanisms driving these findings, participants also rated their own competence (1 = *not at all*, 7 = *extremely*): To what extent do you feel "capable of giving advice to this individual?" Additionally, participants also rated their perceptions of

advisers' receptiveness: "how warmly do you think this person would react to learning from you?"

Additional items and results are reported in the Supplementary Materials.

Results

Table 2 contains a summary of means and 95% confidence intervals by condition.

Perceived effectiveness. We conducted a mixed-model ANOVA with perceived effectiveness as the dependent measure, intervention condition as the between-subjects factor (treatment vs. control), and advising context as the within-subjects factor (traditional, peer, and reverse advising). A significant interaction emerged between advising context and treatment, $F(2, 400) = 15.54$, $p < .001$, $\eta_p^2 = 0.07$. Relative to the control condition, the treatment increased effectiveness perceptions in the peer advising ($M_{diff} = 0.44$, $SE_{diff} = 0.18$), $t = 2.45$, $p = .01$, and reverse advising conditions ($M_{diff} = 1.05$, $SE_{diff} = 0.20$), $t = 5.80$, $p < .001$, but not in the traditional advising condition ($M_{diff} = 0.07$, $SE_{diff} = 0.18$), $t = 0.40$, $p = .69$. These results and subsequent reported results did not differ when age of the adviser was included as a control variable (see Supplementary Materials).

Self-perception of adviser competence. We conducted a mixed-model ANOVA with self-perceptions of competency as the dependent measure, our intervention as the between-subjects factor (treatment vs. control), and advising context as the within-subjects factor (traditional, peer, and reverse advising context). A significant interaction emerged between advising context and treatment, $F(2, 400) = 7.39$, $p = .001$, $\eta_p^2 = 0.04$. The intervention increased advisers' perceptions of competency in reverse advising contexts ($M_{diff} = 1.07$, $SE_{diff} = 0.22$), $t = 4.96$, $p < .001$, and peer advising contexts ($M_{diff} = 0.70$, $SE_{diff} = 0.22$), $t = 3.24$, $p = .001$, but not traditional advising contexts ($M_{diff} = 0.18$, $SE_{diff} = 0.22$), $t = 0.83$, $p = .41$.

Table 2. Predicted effectiveness, advisers' perceptions of own competence, and advisees' receptiveness by condition in Study 5

	Control			Treatment		
	Traditional advising	Peer advising	Reverse advising	Traditional advising	Peer advising	Reverse advising
Predicted Effectiveness	4.69 [4.45, 4.92]	4.50 [4.26, 4.74]	3.58 [3.28, 3.88]	4.76 [4.50, 5.01]	4.95 [4.71, 5.18]	4.63 [4.39, 4.86]
Adviser Self-perceptions of Competency	5.51 [5.24, 5.78]	5.02 [4.70, 5.32]	4.16 [3.79, 4.53]	5.69 [5.43, 5.93]	5.72 [5.47, 5.95]	5.23 [4.93, 5.49]
Perceptions of Advisee Receptiveness	4.69 [4.42, 4.97]	4.39 [4.08, 4.68]	3.98 [3.66, 4.30]	4.71 [4.44, 4.97]	5.01 [4.76, 5.27]	4.76 [4.49, 5.03]

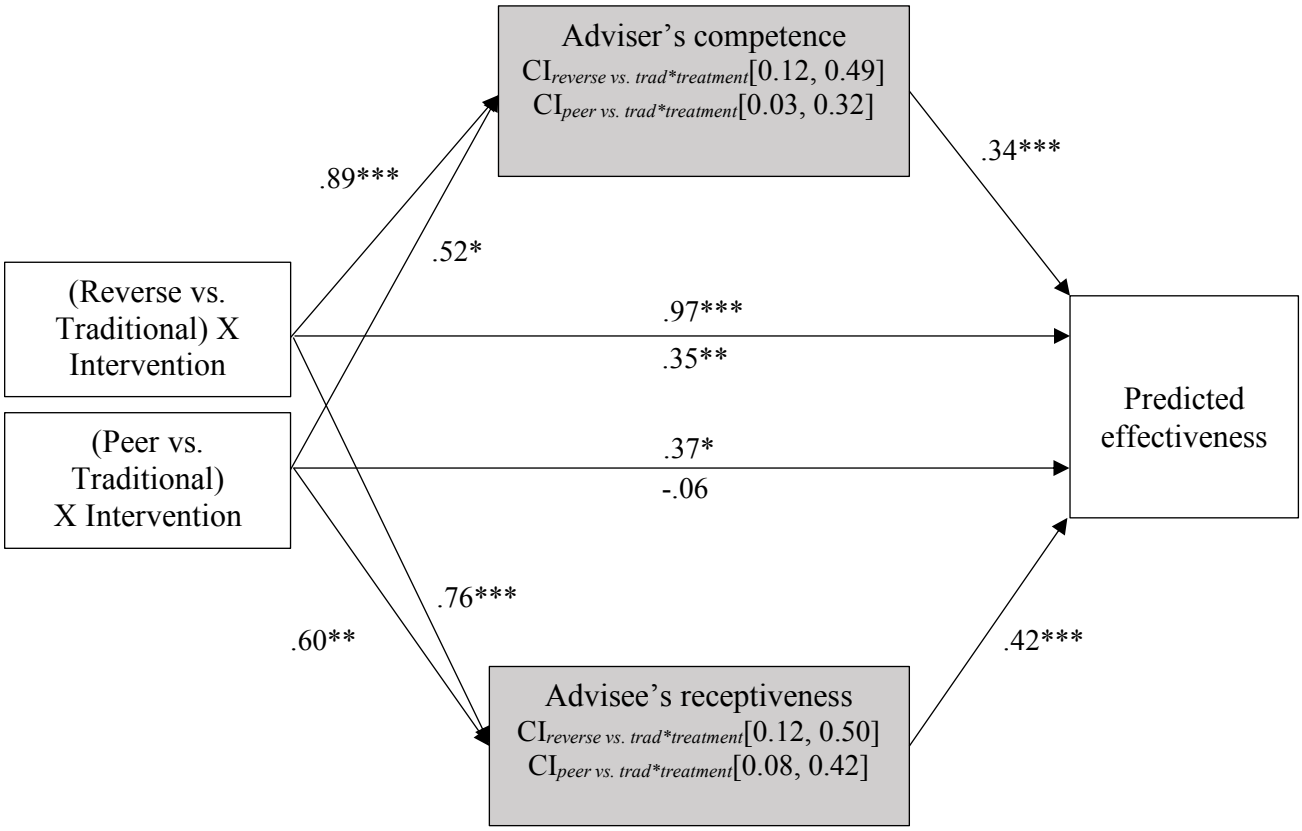
95% confidence intervals are reported in brackets.

Perception of advisee receptiveness. We conducted a mixed-model ANOVA with perceptions of how warmly advisees would receive advice as the dependent measure. We found an interaction between advising context and treatment, $F(2, 400) = 7.58$, $p = .001$, $\eta_p^2 = 0.04$. The intervention increased advisers' perceptions of how receptive their advisee would be in reverse advising ($M_{diff} = 0.78$, $SE_{diff} = 0.21$), $t = 3.78$, $p < .001$, and peer advising contexts ($M_{diff} = 0.62$, $SE_{diff} = 0.21$), $t = 3.03$, $p = .002$, but not in traditional advising contexts ($M_{diff} = 0.02$, $SE_{diff} = 0.21$), $t = 0.11$, $p = .92$.

Mediation analysis. In a multi-level mediation, we examined whether perceptions of advisers' competence and advisees' receptiveness to learning from the adviser would mediate the impact of the treatment in reverse and peer advising contexts relative to that in traditional advising contexts. Compared to traditional advising, the treatment increased perceptions of one's own competence in both the reverse and peer advising conditions ($B_{traditional\ vs.\ reverse*treatment} = 0.89$, $t_{traditional\ vs.\ reverse*treatment} = 3.83$, $p_{traditional\ vs.\ reverse*treatment} < .001$; $B_{traditional\ vs.\ peer*treatment} = 0.52$, $t_{traditional\ vs.\ peer*treatment} = 2.24$, $p_{traditional\ vs.\ peer*treatment} = .03$) and advisees' receptiveness ($B_{traditional}$

*vs. reverse*treatment* = 0.76, $t_{traditional\ vs.\ reverse*treatment} = 3.69$, $p_{traditional\ vs.\ reverse*treatment} < .001$; $B_{traditional\ vs.\ peer} = 0.60$, $t_{traditional\ vs.\ peer} = 2.93$, $p_{traditional\ vs.\ peer*treatment} = 0.004$).

Figure 5. Mediation analysis in Study 5



Note. Brackets contain 95% CI for the unstandardized indirect effect. Unstandardized coefficients for each variable are represented in the figure.

**p < .05, **p < .01, ***p < .001*

When both competence and receptivity were included in the model, the interaction between advising conditions and treatment was significantly reduced (from $B_{traditional\ vs.\ reverse*treatment} = 0.97$, $t_{traditional\ vs.\ reverse*treatment} = 5.52$, $p_{traditional\ vs.\ reverse*treatment} < .001$, $B_{traditional\ vs.\ peer} = 0.37$, $t_{traditional\ vs.\ peer} = 2.10$, $p_{traditional\ vs.\ peer*treatment} = 0.04$ to $B_{traditional\ vs.\ reverse*treatment} = 0.36$, $t_{traditional\ vs.\ reverse*treatment} = 2.72$, $p_{traditional\ vs.\ reverse*treatment} = .007$, $B_{traditional\ vs.\ peer} = -0.06$, $t_{traditional\ vs.}$

$_{peer}$= -0.44, $p_{traditional\ vs.\ peer*treatment}$ = .66). A bootstrap analysis indicated that the 95% bias-corrected confidence interval for the size of the indirect effect of the interaction between treatment and conditions via perception of advisers' own capability (95% CI $_{traditional\ vs.\ reverse*treatment}$ [0.12, 0.49], 95% CI $_{traditional\ vs.\ peer*treatment}$ [0.03, 0.32]) and advisees' receptiveness (95% CI $_{traditional\ vs.\ reverse*treatment}$ [0.12, 0.50], 95% CI $_{traditional\ vs.\ peer*treatment}$ [0.08, 0.42]) excluded zero, suggesting misperceptions of advisers' capability and advisees' receptivity are two possible contributing factors that explain reverse and peer advisers' tendency to discount their effectiveness relative to traditional advisers (Bullock et al., 2010; Fiedler et al., 2011; Green et al., 2010; MacKinnon et al., 2007).[4]

Discussion

Study 5's findings on full-time employees replicate results from Studies 1-4: Advisers discount their effectiveness due to their age relative to their advisees. Critically, an intervention in which individuals contemplate what they could teach someone older—compared to an intervention that reinforces traditional forms of learning—mitigates this age-centric perception of advising effectiveness. We find evidence that this intervention increased advisers' perceptions of their own competence as well as their perceptions of advisees' receptiveness, explaining advisers' increased perceptions of their effectiveness in both peer and reverse advising conditions. Future work is needed to better understand interventions that can broaden peoples' default assumptions about sources of learning and advice.

General Discussion

Across six experiments, we demonstrate that individuals avoid giving advice to older people in part because potential advisers discount their effectiveness, even if they have relatively more expertise. These patterns hold when individuals have the opportunity to select the domain

in which they give advice (Studies 2a-2b) or when asked to give advice on a specific tactical topic (Studies 3-4). Advisers' beliefs that their relative age determines their effectiveness is driven by perceptions of their own competence and their advisees' receptivity (Study 5). Finally, by encouraging advisers to contemplate what they could teach someone older, we show that a contemplation-based intervention reduces advisers' misguided, age-centric self-perceptions.

Reverse advisers may be prone to discounting their effectiveness and impact in part due to two possible explanations: advisers underestimate their capability of providing helpful advice and discount advisees' receptivity towards the advice provided. Because age is often a visual, salient characteristic compared to relative knowledge or expertise, advisers may infer they are less competent at providing advice to older individuals as compared to peers or younger individuals, even if all advisers in these contexts have relatively more expertise than their advisees. Furthermore, because cases where knowledge flows from older to younger individuals are more frequent, people may perceive older advisees as less receptive to advice. In contrast, advisees may be more focused on the content of the advice provided, which reflects the relative expertise of the adviser, rather than the relative age of the provider—leading advisees to be more receptive to adopting the advice than advisers anticipate.

These findings offer a number of key contributions. In the area of social age perception, a growing body of work on subjective age (i.e., how old one feels) has identified benefits of feeling young, and detrimental consequences of feeling old, on health and performance outcomes (Hess et al., 2003; Hughes, Geraci, & De Forrest, 2013). In contrast, we demonstrate a unique challenge of feeling relatively younger. Additionally, we show that ageism is not only confined to negative attributes towards the elderly: Building on research showing that older individuals self-stereotype and consequently self-handicap (Levy, 2009), we implicate advice exchange as a

context in which younger individuals, due to their age, undervalue their own ability to give effective advice. The current findings open up new lines of inquiry concerning prejudices targeting the young and their self-handicapping consequences, demonstrating that internalized ageism is not merely an older adult challenge.

Additionally, the findings expand research in the domain of advice-giving. Although prior research has investigated the factors that influence advisees' perception of advice quality (Gino, Brooks, & Schweitzer, 2012; Sah & Loewenstein, 2015), the current findings unpack the factors that underlie *advisers'* perceptions of their advice. Moreover, whereas prior research has shown that advisers and advisees tend to feel overconfident about their own judgments (Sniezek & Van Swol, 2001), the current paper demonstrates reverse advising as a domain in which advisers feel *under*confident about their own effectiveness—even in situations when possessing more expertise than their advisees. We demonstrate that under-confidence about one's effectiveness and impact as advisers is due to advisers' underestimation of their capability in giving advice as well as advisees' receptivity towards learning from them.

Our investigation suggests several other future research opportunities. Although advisers' self-perceptions of their own capability and perceptions of their advisees' receptiveness are two possible explanations underlying advisers' underestimation if their effectiveness in reverse advising contexts, additional research is needed to disentangle these mechanisms further. For example, future research can further explore whether advisers are underestimating their *relative expertise* on the subject matter and/or underestimating their *ability to communicate* their advice effectively. In the former account, advisers do not believe they have the knowledge base to provide advice—that is, being younger impedes these advisers from perceiving themselves as relative experts. Based on the latter account, advisers do perceive themselves as relative experts,

but believe they cannot convey the advice in a compelling way for advisees. Thus, future research is needed to investigate how perceptions of content and/or relational competence influence reverse advising interactions.

Moreover, additional research is needed to understand how larger age gaps may differentially affect advisers' assessments. Based on a pilot study in which 120 individuals between the ages of 28 and 32 years old (M_{age} = 29.04, SD = 1.06; 45% female) predicted their effectiveness in giving advice to someone "about 30," "about 40," or "about 80," we find that advisers expect to be less effective when giving advice to 80-year-olds (M = 2.87, SD = 1.36) than other 30-year-olds (M = 4.98, SD = 1.21), $t(245.2) = -15.87$, $p < .001$, and 40-year-olds (M = 3.75, SD = 1.19), $t(236.3) = 6.70$, $p < .001$. These results are not due to perceptions of advisees who are 30 and 80 as more rigid or overconfident, but rather due to advisers perceiving themselves as less competent, advisees as less warm, and the overall interaction as less appropriate. These findings suggest that current reverse-advising misperceptions may magnify as the age gap between advisers and advisees widens, but future research should confirm these effects more directly.

One of the main limitations in Studies 1-2b and 4 is that in order to cleanly test the effects of age, advisers and advisees were aware of one another's age as a distinguishing characteristic. Although we replicate these findings in Study 3, in which age was less salient across these face-to-face interactions, additional research is needed to understand the intersectionalities between age, gender, race, as well as other important demographic characteristics in which individuals may stereotype others (Martin, North, & Phillips, 2019).

Future research is also needed to explore how advice content influences the effectiveness of advice exchange. Although the current research context spanned both general and domain-

specific advice, more research is needed to understand when and how individuals provide advice differently across contexts. Furthermore, across our studies, the experimenter created an external reason for advisers to provide advice; additional research might compare the experience of giving and receiving advice depending on whether the adviser or the advisee solicited the advice, or whether the advice was unsolicited in nature. We suspect that in unsolicited advice contexts, advisees in reverse advising contexts may be more resistant to receiving advice from younger advisers. Moreover, more work is needed to understand how these findings may differ if the individual providing advice were instead proving feedback that involved evaluations of advisees. In these more evaluative contexts, advisees may be less welcoming of input in these "reverse feedback" contexts.

Finally, additional research should investigate how age intersects with power and status. For example, future research can investigate how younger advisers feel when they have higher power, status, or authority over their older advisees (Anderson, Kraus, Galinsky, & Keltner, 2012; Blader & Chen, 2012; Magee & Galinsky, 2008)—a situation that is becoming increasingly common (Collins, Hair, & Rocco, 2009). In addition to encouraging younger advisers to reflect upon a productive reverse-advising experience (Study 5), other factors might attenuate how much younger advisers discount their effectiveness, such as knowledge that older individuals requested their advice. Ultimately, removing these self-imposed barriers to reverse advising provides individuals access to more opportunities to advise and learn in all possible directions.

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Footnotes

[1] We could not analyze whether attrition in the study was linked to participants' age as participants were exited out of the study if they did not pass the filter questions. However, in Studies 1, 2b, and 4, we collected this information and report correlations between attrition and participant age.

[2] We note that whereas in Study 2a, peer advisers underestimated their effectiveness more than did traditional advisers, traditional advisers in Study 2b underestimated their effectiveness more than did peer advisers. Thus, additional research is needed to understand when traditional and peer advisers are likely to underestimate their effectiveness.

[3] We determined this 5-year cutoff based on results from a prior study, in which we asked students to recall interacting with someone older or younger. On average, the age difference recalled was 5.21 years.

[4] Additionally, we measured advisers' perceptions of their advisees' status and power—these did not mediate advisers' self-perceptions of their advising effectiveness.