Back or to the future? Preferences of time travelers

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Abstract

Popular culture reflects whatever piques our imagination. Think of the myriad movies and books that take viewers and readers on an imaginary journey to the past or the future (e.g., *Gladiator*, *The Time Machine*). Despite the ubiquity of time travel as a theme in cultural expression, the factors that underlie people's preferences concerning the direction of time travel have gone unexplored. What determines whether a person would prefer to visit the (certain) past or explore the (uncertain) future? We identified three factors that markedly affect people's preference for (hypothetical) travel to the past or the future, respectively. Those who think of themselves as courageous, those with a more conservative worldview, and—perhaps counterintuitively—those who are advanced in age prefer to travel into the future. We discuss implications of these initial results.

Keywords: time travel; preferences; age; individual differences; conservative Weltanschauung.

1 Introduction

1.1 Hypothetical time traveling: A ubiquitous yet little understood activity

"I drew a breath, set my teeth, gripped the starting lever with both hands, and went off with a thud" (p. 20). So the time-traveling protagonist in H. G. Wells' (1985/2002) *The Time Machine* begins his journey to the future. For a moment, picture yourself as the traveler. In which direction would you push the lever? Would you want to travel to the past to witness, for instance, a milestone in the history of mankind or of our planet? Or to the future to catch a glimpse of life in, say, the year 2525?

Perhaps because of the ephemerality of the present, we are all constantly time traveling in our minds. We simulate the future (e.g., tomorrow's meeting with a new client, next week's date with a love interest) and revisit the past (e.g., yesterday's botched meeting with the client, last night's romantic dinner). But our time traveling extends beyond our personal past and future. Although we cannot travel through time physically, filmmakers and novelists allow us to experience both the (imagined) future and the (reimagined) past. Not only movies of the sword-and-sandal genre, such as *Troy*, *Spartacus*, and *Gladiator*, but also historical novels such as Umberto Eco's *The Name of the Rose* and Sir Walter Scott's *Ivanhoe* offer glimpses of the past. The *Star Trek* and the *Star Wars* franchises and dystopian novels such as Aldous Huxley's *Brave New World,* in contrast, provide visions

of the future. But what determines whether the cultural time machine's lever is pushed forward to an unknown future or back to a more certain past?

Little is known about the factors that determine people's preferences with regard to the "direction" of time travel. Past investigations of mental time travel have typically not asked about preferences: Either they dictated the direction of the journey in time (e.g., D'Argembeau & Van der Linden, 2004) or they assessed the spontaneously occurring thoughts about the past and the future (e.g., Summerville & Roese, 2008; for a comparison of the two types of mental time travel, voluntary vs. involuntary, see Berntsen & Jacobsen, 2008). Moreover, Zimbardo and Boyd (1999) introduced time perspective as an individual difference variable. However, none of these approaches probed people's preference directly by asking people to identify their favored temporal direction. The scarcity of knowledge about people's time-traveling preferences is curious in light of ardent public consumption of stories that offer visions of the past or the future.

The goal of the present exploratory investigation is to take first steps toward identifying people's preferences in time traveling. Specifically, we aim to identify factors that determine people's time orientation (past vs. future). To this end, we put people in hypothetical time-travel scenarios and recorded a number of factors that could plausibly determine their preferences. Suddendorf and Corballis (2007) theorized about the human capacity to mentally time travel and about the evolution of foresight. Furthermore, a number of findings suggest that past and future mental time travel likely involves similar cognitive capacities (e.g., Botzung, Denkova, & Manning, 2008; for an overview see Schacter, Addis, & Buckner, 2007). Although these are interesting observations, they are orthogonal to our concern; namely, the factors that determine

people's preference for (hypothetical) travel to the past or future. Because there is no psychological theory of time traveling per se that suggests specific determinants of time-travel preferences, we began by identifying existing research and psychological constructs that could shed light on these preferences.

1.2 Factors determining preferences for the past and future

In what follows, we derive several hypotheses with regard to preferences in the direction of time travel. The first concerns age.

1.2.1 Age

Technological progress is relentless, and not everyone can easily keep up with it. Indeed, many older adults are overwhelmed by modern technology (Fuchs, 2010). Data collected by the Swiss Federal Statistical Office, for instance, showed that, although more and more elderly people regularly use the Internet, there is still a huge age gap: 23% of people in Switzerland aged 70 or older used the Internet between October 2009 and March 2010, relative to 94% of teenagers aged 14 to 19 years (Swiss Federal Statistical Office, 2010). Relatedly, older people are reluctant to use other modern technologies, such as ATMs, ticket machines, and telephone cards (Marcellini, Mollenkopf, Spazzafumo, & Ruoppila, 2000). In addition to viewing new technologies as too complex and difficult to use, the elderly often have sensory, motor, and cognitive deficits that present further obstacles to the adoption of new technologies (e.g., Marcellini et al., 2000).

Assuming that technological progress does not decelerate (e.g., see Marcellini et al., 2000), the future is likely to bring technologies that are even more demanding in the above respects than those we know today. Older adults may be hesitant to expose themselves to such a future world. By the same token, younger adults may be particularly keen to learn—via time travel—about new technologies as well as future cultural and scientific progress. Indeed, according to socioemotional selectivity theory (Carstensen, Isaacowitz, & Charles, 1999), knowledge-acquisition goals are more salient for young adults, who see an expansive future life for themselves, than for older adults. Relatedly, Fingerman and Perlmutter (1995) showed that although older adults think about the future as often as younger adults, they think less about the distant future (see also Tonn & Conrad, 2007). Drawing on these results, what we call the *future-overtaxes* hypothesis suggests that because of the perception that the challenges of the future could overtax the cognitive abilities of older people, their preferred direction of time travel is

more likely to be toward the past than is that of younger people.

One could, however, argue for the opposite possibility. As we move through life, our future time horizon grows ever shorter. Reviewing the effects of diminishing lifetime on people's motives, Carstensen et al. (1999) concluded that older adults are aware "that they do not have 'all the time in the world' left to pursue their goals" (p. 168). Others have highlighted the human desire to triumph over death (Kastenbaum & Costa, 1977). Lifton (1986), for instance, described five ways to achieve such a triumph: the biological way (continuance through family), the theological way (afterlife), the creative way (continuance through art), the natural way (infinity of space and time), and the way of experiencing transcendence (mysticism). The desire hypothesis suggests—counter to common expectation ("Since Aristotle... theorists have spoken of the tendency of the old to 'dwell on the past' "; Cameron, 1972, p. 117)—that, aware of their limited time and spurred by the desire to transcend the inevitable biological barriers to experiencing the future, older people are more likely to want to travel to the future than are younger people. The very awareness of the nearness of the end of life may make mental travel to the future more enticing than travel to the past: After all, we always want what we cannot have.

1.2.2 Personal sense of courageousness and risk propensity

The past and the future harbor an inescapable asymmetry that Miller (2008) described as follows: "What is definitive of the past is that the past events are fixed. What is definitive of the future is that future events are not fixed" (p. 173). High school history books describe the past in black and white and may leave the impression of certainty. But even the past can offer surprises because of our less than perfect knowledge of it and the fact that past events are neither uniformly certain nor associable with known probabilities (e.g., what is the probability that Alexander the Great was in fact assassinated at the age of 32?). But it is undeniable that we are more ignorant about the future than the past and that the former is therefore less predictable than the latter. Owing to this asymmetry in knowledge and predictability, pondering the decision to travel into the future or the past may tap into one's personal sense of courageousness. The *courageousness* hypothesis posits that, given the difference in the predictability of the past versus the future, the more courageous people think of themselves as being, the more likely they are to prefer traveling to the future than to the past.

Possibly (but not necessarily) related to their sense of courageousness is people's actual risk propensity. Unlike

sense of courageousness, which we measured by probing people's self-perception, risk propensity can be measured behaviorally. The *risk* hypothesis suggests that the more pronounced people's propensity to take risks, the more likely they are to prefer to travel to the less known and predictable future, relative to the more familiar and more predictable past.

1.2.3 Weltanschauung

The German concept *Weltanschauung* (literally, "world-view") refers to "a comprehensive conception or apprehension of the world especially from a specific standpoint" (*Merriam-Webster's Online Dictionary*). One's political Weltanschauung implies specific appraisals of the past, present, and future. Consider conservatism and liberalism (Jost, Nosek, & Gosling, 2008; Wilson, 1973). In addition to acceptance of inequality, conservatism has been found to be associated with fear of and resistance to change (Jost, Glaser, Kruglanski, & Sulloway, 2003; Jost et al., 2008). Liberalism, in contrast, is characterized by an endorsement of progressive social change and egalitarian ideals (Jost et al., 2008). Jost et al. (2003) hypothesized that people adopt conservative ideologies—at least in part—in an effort to reduce fear, anxiety, and uncertainty (see also Wilson's, 1973, dynamic theory of conservatism). Furthermore, they suggested that embracing a conservative attitude might reflect an attempt to avoid change, disruption, and ambiguity. Supporting evidence came from their meta-analysis, which revealed that more conservative people scored higher on measures of intolerance of ambiguity and uncertainty avoidance and lower on openness to experience than did less conservative people (Jost et al., 2003). Conservatives are thus expected to prefer the good old days to the future because "conservatives know the world is a dark and forbidding place where most new knowledge is false, most improvements are for the worse" (Will, 1998, p. 21, as cited in Jost et al., 2003). Based on these results and observations, the *Weltanschauung* hypothesis predicts that more conservative people are more likely to prefer a journey to the past than to the future.

In sum, we will test age, a personal sense of courageousness, risk propensity, and a conservative Weltanschauung as possible determinants of people's preference for (hypothetical) travel to the past or future. We test the predictions of these hypotheses in an online study. Before we turn to the study, let us point out that we also measured two personality traits taken from the Big Five framework (McCrae & Costa, 1997), namely, *openness to experience* and *extraversion*. It is not obvious whether and to what extent these dimensions should be related to a time traveler's temporal preference. One could, however, speculate that openness to experience (and a preference for novelty) may be related to a person's sense of courageousness, and thus, by extension, be associated with the preference to travel to the future (courageousness hypothesis). Recently, Quoidbach, Hansenne, and Mottet (2008) investigated the possible link between extraversion and mental time travel (i.e., the ability to remember the past and to project oneself into the future) and found no relationship. We expect this lack of relationship to generalize to our context.

2 Method

2.1 Participants

Three hundred and thirty-five participants participated in the online study; 301 (186 of them female) completed all questions relating to the factors under consideration (see Table 1) and only these will be included in the following analyses. Information on the distribution of their ages is provided in Table 1.

2.2 Materials

To avoid the paradox of time travel known in philosophy as autoinfanticide (Horwich, 1987), participants were informed that the starting premise of the subsequent questions is that neither the past nor the future could be altered. They were then given the opportunity to choose a journey either to the past or to the future *as a time traveler in the role of an observer*. Participants were asked to imagine their journey in some detail, that is, they should imagine the place they wanted to visit or the people they wanted to see and the year they wanted to travel to. After answering the time travel-related questions, participants completed the tasks and scales assessing the variables pertaining to the hypotheses. They ranked themselves according to their subjectively perceived courageousness (compared with a representative group of 100 people; see Appendix A for the exact phrasing of the courageousness item). Risk propensity was assessed with the devil's task (Hoffrage, Weber, Hertwig, & Chase, 2003) first introduced by Slovic (1966). In this adapted and computerized version (see Gianotti et al., 2009, for a similar version of the task) participants were presented with the images of ten wooden boxes and they were informed that nine of them hid rewards, but that one contained a "devil". The devil was randomly assigned to one of the boxes. The participants were instructed to open as many boxes as they wanted to in order to gather points that would increase their chances of winning a lottery[1]. However, if they opened the box containing the devil, the trial ended

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[1] Participants could win one out of five breakfast vouchers or one out of five iPod shuffles.

Table 1: Descriptive statistics for independent variables.

Measure	N_{total}	M_{total} (SD)	Mdn_{total}	Range$_{total}$
Age	301	33.00 (16.08)	25	14–77
Subjective courageousness	301	42.38 (24.05)	40	1–90[a]
Risk propensity	286	4.90 (1.47)	5	1–9[b]
Conservatism	301	51.75 (8.49)	52	29–76[c]
Openness	301	33.95 (5.91)	34	17–46[d]
Extraversion	301	28.83 (5.33)	29	12–41[e]

Note. [a] Maximum possible range: 1–100.

[b] Maximum possible range: 1–9; participants who never opened a box or never stopped before encountering the devil were not included. Trials in which no box was opened were excluded before calculating a participant's mean score.

[c] Maximum possible range: 21–105.

[d] Maximum possible range: 0–48.

[e] Maximum possible range: 0–48.

and all points accrued during that trial were lost. Each participant completed five trials by opening boxes in a sequence from left to right. Participants' score was calculated as the average number of boxes opened per trial in those trials in which they had stopped before encountering the devil.

To assess conservatism, an updated version of Schiebel, Riemann, and Mummendey's (1984) Conservatism Scale was applied (adapted and previously applied by Stössel, Kämpfe, & Riemann, 2006).[2] This measure, which addresses several aspects of conservatism with a focus on resistance to change (Jost et al., 2003; Schiebel et al., 1984), consists of 21 statements about topics related to politics and society in general (e.g., respect for authorities, status differences between different groups of people, same-sex marriage, women as superiors). Answers were indicated on a five-point scale that ranged from *strongly disagree* to *strongly agree*. Openness to experience and extraversion were measured with the respective subscales of the NEO-FFI (Borkenau & Ostendorf, 2008), encompassing a total of 24 items. Participants responded on a five-point scale, ranging from *strongly disagree* to *strongly agree*. Finally, participants indicated their subjective life expectancy by responding to the following question used by Johns (2004): "If you had to take a guess about how old you will be when you die, what would you say?", before they provided demographic information. Our study included a few other scales and tasks (e.g., religiousness). They will not be reported here and proved to be unrelated to time-traveling preferences. A full correlation matrix of the factors pertaining to our

hypotheses can be found in Appendix B.

2.3 Procedure

Participants were recruited via e-mail and via advertisements at the University of Basel, Switzerland, and the link for the online study was posted on electronic platforms provided by the university.

3 Results

Participants were fairly equally split between a preference for journeying to the past and a preference for journeying to the future, $N_{Past} = 142$ (47%), $N_{Future} = 159$ (53%), $\chi^2(1) = 0.96$, $p = .327$. The temporal distance of the hypothetical journeys from the present was larger for participants who preferred the past ($Mdn = 157.5$ years) than for those who preferred the future ($Mdn = 40$ years), $N = 297$ (four missing values), $U = 6488.50$, $z = -6.08$, $p < .001$, $r = -0.35$[3].

One interpretation of this nearly equal split in the preferred direction of time travel in the aggregate is that people truly have no strong directional preference, and the observed distribution thus reflects random choice. In that case, properties such as age, courageousness and Weltanschauung should not be predictive of people's choices. In fact, they are predictive. To analyze these factors' association with the preference for traveling to the past or the future (henceforth, *time-travel preference*), they were entered in a binary logistic regression with time-travel

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[2]To obtain the items, please contact the authors of the scale.

[3]Effect size *r*: $r = \pm.10$ indicates a small effect, $r = \pm.30$ indicates a medium effect, $r = \pm.50$ indicates a large effect (Field, 2009).

Table 2: Time-travel preference: binary logistic regression; parameter estimates.

| | N | B (SE) | p | 95% CI for Odds Ratio | | |
				LL	Odds Ratio[b] Exp(B)	UL
Complete model:						
Age	301	0.01 (0.01)	.083	1.00	1.01	1.03
Subjective courageousness[a]	301	−0.02 (0.01)	< .001	0.97	0.98	0.99
Conservatism	301	0.03 (0.02)	.084	1.00	1.03	1.06
Openness	301	−0.02 (0.02)	.377	0.94	0.98	1.03
Extraversion	301	−0.02 (0.02)	.436	0.94	0.98	1.03
Individual Models:						
Age	301	0.01 (0.01)	.140	1.00	1.01	1.03
Subjective courageousness[a]	301	−0.02 (0.01)	.001	0.97	0.98	0.99
Risk propensity	286	0.02 (0.08)	.795	0.87	1.02	1.20
Conservatism	301	0.04 (0.01)	.008	1.01	1.04	1.07
Openness	301	−0.03 (0.02)	.093	0.93	0.97	1.01
Extraversion	301	−0.01 (0.02)	.579	0.95	0.99	1.03

Note. CI = confidence interval, LL = lower limit, UL = upper limit. Coding of time-travel preference (dependent variable): past = 0, future = 1. Forced entry model (complete model): $N = 301$, $\chi^2(5) = 23.12$, $p < .001$, $R^2_{Nagelkerke} = .10$. As the risk propensity score was not a relevant factor when tested individually, it was omitted in the complete model in order to prevent further loss of cases.

[a] Lower values indicate higher subjective courageousness.

[b] Odds ratios: see footnote 4.

preference as the dependent variable (complete model). Additionally, each independent variable was entered as an individual predictor, again with time-travel preference as the dependent variable (individual models). The former model captures each variable's link to the time-travel preference given that the other variables' relationship with the dependent variable is factored in. The second model shows the individual relationship (descriptive statistics of the independent variables are included in Table 1; the results for the complete model and for the individual models are listed in Table 2). The results for the complete model revealed that if the rank for subjective courageousness increased by 1 (i.e., a *drop* in courageousness), the odds of preferring a journey to the future dropped by a factor of 0.98.[4] In other words, the more

courageous someone believed himself to be, the more likely he was to prefer to travel to the future. Our behavioral measure of risk propensity, in contrast, was not predictive of time-travel preference. But we observed a trend for Weltanschauung in the complete model, and this factor reached significance as an individual predictor. Surprisingly, more conservative people were more likely to prefer journeying to the future than to the past. An increase of the conservatism score by 1 point increased the odds for preferring the future to the past by a factor of 1.03. As mentioned above, however, the effect of conservatism did not reach significance when courageousness, age, and the personality variables were factored in.

[4]The odds of an event occurring are represented by the quotient of the probability of the event occurring (here: choosing future) and of the probability of that event not occurring (here: not choosing future, i.e., choosing past): odds = P(event occurs) / P(event does not occur). The

odds ratio indicates the change in odds that results from a unit change in the predictor (e.g., from a change of one year of age): odds ratio = odds after a unit change in the predictor/original odds. Odds ratios can take values between 0 and +∞. An odds ratio of 1 indicates that the odds of the event occurring are not changed by a unit change in the predictor (Backhaus, Erichson, Plinke, & Weiber, 2008; Field, 2009).

Figure 1: Respondents' average age as a function of the journey's temporal distance (i.e., within or beyond participants' subjective expected lifespan).*

Time travel destination
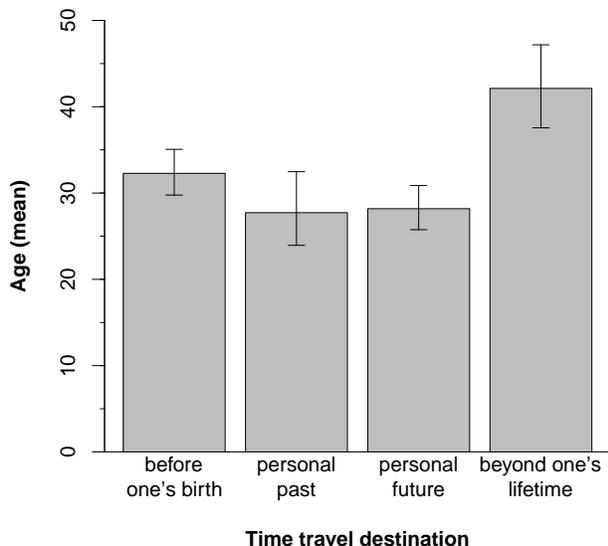
* *N*s = 109, 32, 90, 66; *M*s (*SD*s) = 32.3 (14.7), 27.7 (12.0), 28.2 (11.7), 42.1 (20.0); *Mdn*s = 24, 23.5, 23.5, 39; for *before one's birth*, *personal past*, *personal future*, and *beyond one's lifetime*, respectively. For the classification, the year participants indicated as the destination of their journey was compared to age and subjective life expectancy for past and future time travelers, respectively (four participants could not be classified due to missing values). Error bars represent bootstrapped 95% confidence intervals (1000 samples). Details of the statistical analysis can be found in Appendix C.

Furthermore, we observed a trend for age. Consistent with the desire hypothesis, the older a participant was, the more likely she was to choose a journey to the future. One additional year of age increased the odds of a future time-travel preference by a factor of 1.01. In both the complete model and the individual model, there was only a trend for older adults to be more likely to prefer the future. However, young people were highly overrepresented in the sample, in which the median age was 25. The desire hypothesis, however, not only posits a preference for the future among older adults; it also implies that older adults desire to transcend the inevitable finiteness of human life by visiting the future beyond their own lifetime. Figure 1 plots respondents' average age as a function of the journey's temporal distance (i.e., within or beyond participants' subjective expected lifespan). Consistent with the desire hypothesis, people who desired to travel beyond their assumed lifetime were substantially older, relative to the other groups. Importantly, it is not the case that everybody indicated similar temporal distances and therefore age in the beyond-one's-lifetime category was higher simply because older people's remaining lifespan

tends to be shorter than that of younger people. Rather, age was positively related to the number of years people wished to travel to the future, $N = 156$ (future time travelers), Kendall rank-order correlation $\tau = .12$, $p = .03$.

Neither openness nor extraversion proved to be predictive of people's time-travel preferences. A trend for people with lower openness scores to more likely prefer the future (individual model) seemed to stem from the negative relationship between conservatism and openness, $r = −.39$, $p < .001$ (a negative relationship that was previously observed; see Jost et al., 2003). Indeed, when conservatism was factored in (complete model), openness proved no longer related to time-travel preference.

Last but not least, we also analyzed people's self-reported motive behind their time-travel preferences. Based on the chosen place and the reasons they reported for their choice, we categorized participants' motives into one of four categories: "reliving one's past," "gain of strategic information," "kin's future," "intellectual and religious curiosity." Table 3 lists these motives, the goals that they embody, and gives specific illustrations. A small group (11%) desired to relive an episode of their own past, and an even smaller group (5%) wanted to drop in on their descendants' future. Nearly a third of people wanted to travel to the past *or* to the future (29%) in order to gain strategic information (or to disambiguate their personal past). Finally, the great bulk of journeys centered on historical events, past eras, religious milestones, future technologies, and the future of mankind (41%).

In sum, we found a tendency for older people to prefer to travel to the future (consistent with the desire hypothesis) and that self-ascribed courageousness is predictive of an orientation toward the future. Respondents' Weltanschauung was related to time-travel preferences, but contrary to the hypothesis, more rather than less conservative people revealed a preference to venture into the future.

4   Discussion

Even though time travel is not physically possible—at least not yet—humans are able to move through time using their mind as a kind of time machine. Suddendorf and Corballis (2007) emphasized the evolutionary advantage of this capacity to relive or "prelive" events by mentally projecting oneself backward or forward in time, respectively. People not only profit strategically from their mental time-travel abilities (e.g., in planning for the future; Suddendorf & Corballis, 2007); they also appear to enjoy this evolved capacity, as evidenced by the popularity of novels and movies that, like *The Time Machine* and *Back to the Future,* entertain audiences with time-travel adventures. But interest in time travel is not restricted to fiction: Philosophers have explored the paradoxes that arise with

Table 3: Time travel motives for the choice of the journey in time.

Motive	N (%)[a]	Goal	Illustrations and temporal distance
Reliving one's past	32 (11%)	Visiting a particular episode of one's past	"To experience the best moment of my life once more"—1 year "To revisit formative life events"—15 years
Gain of strategic information	88 (29%)	Gaining personally relevant *new* information or information that can be exploited in the present	"Because of a biographical ambiguity"—65 years to the past "To become a millionaire"—90 years to the future "To learn whether today's decisions will prove of value in the future..."—15 years to the future
Kin's future	16 (5%)	Learning about the future of one's children or grandchildren	"I'm interested in what we, and especially our descendants, will have to deal with"—36 years "I want to find out about my descendants' lives and what I can do to make their lives easier."—290 years
Intellectual and religious curiosity	124 (41%)	Experiencing events of historical and religious significance and scouting out future of mankind	"I would like to travel to Jerusalem in the year 33 to observe … crucifixion"—1977 years to the past "… Will humanity survive …"—240 years to the future "I often read books about the Middle Ages. It would be interesting to see whether the descriptions are accurate..."—560 years to the past "... it is interesting to find out what the world used to look like and what life was like."—260 years to the past "Observe progress (new technologies, medicine, etc.), ..."—30 years to the future "...to see a world that I will not be able to experience anymore. A lot is known about the past."—212 years to the future

[a] Percent is percent of total. Forty-one (14%) responses could not be classified into one of these motives.

the possibility of traveling through time (e.g., Horwich, 1987), and since Einstein proposed his theory of relativity, physicists have also grappled with the possibilities of time travel (Arntzenius & Maudlin, 2009).

Little is known about people's temporal preferences as time travelers. By sending participants on a hypothetical trip through time, we found that they split fairly equally between a past and a future time-travel preference. This is surprising in the light of the finding that people tend to value their future more than their past (Caruso, Gilbert, & Wilson, 2008) and that their representations of the future tend to be more positive than those of the past (Berntsen & Jacobsen, 2008). Moreover, corresponding to the observation that future mental time traveling tends to take place less far away in time than past time traveling (e.g., Berntsen & Jacobsen, 2008), participants who chose the future favored shorter temporal distances than those who chose the past. Most importantly, we showed that time-travel preferences are a function of self-ascribed courageousness, Weltanschauung, and age. Specifically, con-

sistent with the courageousness hypothesis, we found that the more courageous a person sees herself as being, the more likely she is to prefer to travel to the future. One interpretation is that people are well aware of the inherent asymmetry between the past and the future in one's certainty and knowledge about what one will find there and that this asymmetry evokes people's sense of courageousness. It is worth pointing out that this sense of courageousness cannot be simply reduced or measured in terms of risk propensity using a classic tool, the devil's task (see Hoffrage et al., 2003). In our sample, behavioral risk propensity proved to be unrelated to time-travel preferences.

Concerning the impact of age, we found no support for the future-overtaxes hypothesis, which—focusing on the reality of technological progress and the psychological goal of knowledge acquisition—posited that younger adults would show a stronger future time-travel preference than would older adults. Instead, we found that the older a person is, the more she or he tended to travel to

the future. Relatedly, people who desired to travel beyond their subjective expected life-expectancy were older than those who preferred to travel to the past or to locations in their personal future. Older people's future time-travel preference is especially striking because it stands in contrast to popular age stereotypes and contradicts the common finding that older adults think less about the future than younger adults (Cameron, 1972; Tonn & Conrad, 2007). Older adults' preference for future time travel may have several reasons. A shorter future lifetime may spur the desire to overcome the biological barrier, thereby catching a glimpse of a world that one would otherwise never experience. Moreover, grandparenthood and concern about the fate of one's descendants appear to fuel the desire to see the future. Last but not least, we found the surprising result that more conservative people were less keen on revisiting the "good old days" than were less conservative ones. One possible (and speculative) reason is that the more conservative people are, the more they tend to side with Simon in the famous Simon-Ehrlich wager. In this wager, the conservative economist Julian Simon, advocating an optimistic view of future resource availability and population growth, challenged Paul Ehrlich, a biologist and author of *The Population Bomb*, who warned against what he anticipated to be the disastrous consequences of overpopulation and resource depletion (McClintick & Emmett, 2005). This wager can also be seen as a role reversal between progressives and conservatives. Conservatives' postulated fear of and resistance to change, paradoxically, manifests in optimism about the future whereas progressives dread the future. In Simon's view, the new global challenges (e.g., overpopulation, resource scarcity and global warming) do not require a drastic economic and political reset. Markets and individuals' power to innovate will master those challenges. Less conservative people may be less inclined to believe in the current system's self-healing powers, and therefore, and in opposition to past centuries, be more pessimistic about the future.

Our investigation was a first exploratory examination of people's preferences in time traveling and factors that determine people's time orientation. Future investigations need to replicate our findings and address the mechanisms behind their impact. Moreover, there are several other factors that may codetermine people's preferences. One such factor may be future self-continuity (see Hershfield, 2011). In older adults, the future self-concept may, for instance, include children and grandchildren (see Aron, Aron, Tudor, & Nelson, 1991, for inclusion of close relatives in the self-concept). Their (anticipated) presence may represent a key motivation for parents and grandparents to visit the future beyond their own lifetime if future self-continuity is high.

Last but not least, future research needs to consider the possibility of order effects and the directionality of our effects: That is, do participants who perceive themselves as courageous choose the future, or do people use their time preference (e.g., future) as a cue to infer their subjective courageousness? Experimental designs can help to reveal the direction of this and other causal relationships. Future investigations may also explore practical (and, admittedly, speculative) implications of time-traveling preferences. For instance, if future self-continuity indeed proved to be a determinant of time-travel preference, one could use hypothetical journeys to the future to increase future self-continuity. A boost in self-continuity could, in turn, foster saving behavior by attenuating the discount rate of future relative to immediate rewards (see Bartels & Urminsky, 2011, about the causal relationship between future self-continuity and temporal discounting; also Hershfield, 2011).

5 Conclusion

In light of the vast trove of stories that engage our ability to imagine time periods other than the present, it is surprising that so little is known about people's time-travel preferences and the factors underlying them. By means of hypothetical time-travel scenarios, we identified three factors that affect people's preferences regarding the direction of time travel. Of those, age is, perhaps, the most important one. Contrary to Aristotle's view, instead of being encapsulated in the past (Cameron, 1972) older adults preferred to get a glimpse of the future. That last result in particular deserves to be better understood and may provide us with interesting insights into the psychology of old age.

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Appendix A

Courageousness was assessed with the following question (original in German): "Wie mutig sind Sie? Stellen Sie sich eine Gruppe von 100 Leuten vor. Die mutigste dieser 100 Personen bekommt den Rang 1, die am wenigsten mutige Person bekommt den Rang 100. Welchen Rang würden Sie sich zuschreiben? Bitte schätzen Sie, wie mutig Sie sind, indem Sie sich einen Rang zwischen 1 und 100 geben."

Translation: "How courageous are you? Imagine a group of 100 people. The most courageous of them is ranked 1, the least courageous person is ranked 100. How would you rank yourself? Please give an estimate of your level of courageousness by ascribing yourself a rank between 1 and 100."

Appendix B

Table B1. Relations among independent variables: correlations (and p-values).

	Subjective courageousness[a]	Risk propensity[b]	Conservatism	Openness	Extraversion
Age	.17 (.004)	−.06 (.301)	.15 (.011)	.08 (.195)	−.14 (.017)
Subjective courageousness[a]		−.05 (.448)	−.03 (.571)	.03 (.640)	−.20 (.001)
Risk propensity[b]			−.18 (.003)	.10 (.111)	.00 (.977)
Conservatism				−.39 (<.001)	−.10 (.083)
Openness					.09 (.123)

Note. $N = 301$. [a] Lower values indicate higher subjective courageousness. [b] $N = 286$.

Appendix C

Table C1. Categories of time travel destination. Multinomial regression: parameter estimates for age.

				95% CI for Odds Ratio	
Age	*B (SE)*	*p*	Lower limit	Odds ratio[b] *Exp(B)*	Upper limit
Before one's birth[a]	−0.03 (0.01)	< .001	0.95	0.97	0.99
Personal past[a]	−0.06 (0.02)	.001	0.91	0.94	0.98
Personal future[a]	−0.06 (0.01)	< .001	0.93	0.95	0.97

Note. CI = confidence interval. Time travel destination was entered as the dependent variable with the beyond-one's-lifetime category as the reference category. $N = 297$. Model with age as independent variable, $\chi^2(3) = 32.58$, $p < .001$, $R^2_{Nagelkerke} = 0.11$.

[a] Compared to the beyond-one's-lifetime category.

[b] Odds ratios: see footnote 4. The odds ratios below one signify that the older a participant, the less likely she is to travel to a destination lying within any one of the categories before one's birth, personal past, or personal future, rather than to a destination lying in the future beyond her lifetime.