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Cognitive representations of the future: Survey results

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Abstract

This paper reports the results of a web-based survey concerning how people think about the future. Five hundred and seventy-two people from 24 countries completed the survey. The results indicate that when the respondents hear the word 'future', they think about a point in time 15 years into the future, on average, with a median response of 10 years. Respondents think less about the future than the present. On the other hand, they tend to worry more about the future than the present. Respondents' ability to imagine the future goes 'dark' around 15–20 years into the future. Most of the respondents are optimistic about the near term, but become more pessimistic about the longer term. Respondents believe that humankind is not acting very responsibly with respect to a whole host of environmental and social issues but is acting responsibly with respect to technology. Almost half of the respondents would not wish to have been born in the future. Most of the other respondents would have preferred to have been born 50–500 years into the future. Approximately 45% of the sample believes that humankind will become extinct. The data suggest that Christians are more optimistic and less worried about the future and do not believe that we will become extinct. Males worry less but also think more about the future. There is a strong correlation between thinking about the future, clearly imagining the future, and being optimistic about the future. It is concluded that individuals have diverse and rich conceptions about the future but that they think less about the future than futurists might hope. Individuals' considerations of the future are highly influenced by their identities and worldviews. Future research should focus on better unraveling these relationships and on understanding their implications for futures-oriented policy making.

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1. Introduction

The paper presents the results of an international, web-based survey that explored individuals' conceptions and cognitive representations about the future. It is extraordinarily important for futurists to understand how people think about the future. This is because if futurists and non-futurists have different conceptions about the future, then at the very least, communication between the two groups will be strained if not severely degraded. Additionally, if conceptions are very different, then non-futurists may have difficulty understanding the relevance and results of futurists' work. Lastly, if non-futurists have naive and/or undeveloped concepts about the future, then futurists should work to better educate non-futurists about the future.

This research builds upon experiences in the closely related field of risk analysis. The focus of this field is the estimation of risks that plague people and the environment. The field arose due to the need to estimate risks associated with nuclear power but has since expanded to include almost every conceivable risk faced in everyday life, from contracting cancer due to inhalation of air toxics to dying in automobile accidents. In this field, people are generally sorted into two categories: experts and non-experts. Experts have the responsibility for assessing risks and communicating the results of their work to the non-experts. Over the years, research has revealed that experts and non-experts differ on their views about what threatens the health and safety of humans [1]. This research has also revealed that non-experts often do not understand and/or misinterpret the results of risk analyses communicated to them by the experts [2]. Psychologists have also found that non-experts do not process risk information in ways stipulated by the experts' models [3]. In part because of these problems, non-experts often mistrust the experts and experts often view non-experts as impediments rather than partners in the policy-making process. In response to these and other research results, the risk analysis community has undertaken the challenges of better educating the public about risks and improving how risk information is communicated. To accomplish these two goals and also to help build trust between experts and non-experts, numerous public participation processes have been established to open dialog between these groups on important public policy issues [4].

It should be noted that all discussions about risk are essentially discussions about the future. In this way, how people think about the future has a strong influence on how they think about risk. If experts use one time frame and lay people use another, then there is a potential mismatch between the two perspectives. Of, if experts make more fine-grained temporal distinctions than lay people, there is also the potential for misunderstandings and communication difficulties. Understanding how people think about the future should contribute to better risk analyses and communication. This research should benefit futurists in an analogous fashion.

It has been our experience that futurists often complain that non-futurists do not care about the future and frequently do not take their work seriously. It may be that there is nothing futurists can do about this state of affairs because people's views about the future are intractable. However, it could also be that non-futurists have rich conceptions about the future that futurists do not yet understand or appreciate. It could be that these conceptions are different from those of futurists and even erroneous in nature. It is our belief that if futurists can do a better job of understanding non-futurists' conceptions about the future, then futurists could do a better job of crafting their communications about their concerns about the future and educating people.

The research reported below should be considered exploratory in nature. The research is designed to provide initial insights into individuals' cognitive conceptions about the future. We hope that this research will encourage additional research that will support theory development and the testing of formally stated hypotheses. We can imagine subsequent research into individuals' conceptions about the future being much more focused on untangling influences of culture upon such conceptions than was possible in this research.

The next section presents the specific questions addressed by our research and lists our preliminary expectations. This section also describes the web survey and how it was administered. The third section presents the results. The paper concludes with observations for futurists and recommendations for future research.

2. Approach

2.1. Research questions

This research was designed to answer these types of questions:

- How many years into the future do people think about when they hear the word 'future'?
- To what extent do people think and worry about the future?
- How far into the future do people find it difficult to clearly imagine possible futures?
- Are people optimistic or pessimistic about the future?
- How actively do people believe humankind should plan for the future?
- How responsibly is humankind addressing the major issues that will impact the future?
- Given these views, would people choose to live in the future or rather be content with living in present times?
- Also, given these views, do people believe that humans will become extinct, and if so, when in the future and what would be the cause of our extinction?

Given the exploratory nature of this study, it is more accurate to say that we had certain expectations about the results rather than a more formal set of hypotheses to be tested. Among our expectations were these:

- The word 'future' would be interpreted by non-futurists to be much closer to the present than might be assumed by futurists.
- We expected that people would think more about futures closer to the present than farther away.
- We expected people to worry more about futures closer to the present than farther way.
- We expected people's ability to imagine the future would go 'dark' at some threshold (i.e., some number of years into the future).
- We expected people to be either optimists or pessimists about the future by nature.
- We expected that people would support planning for futures closer to the present than farther away.
- We expected that people would believe that, in general, humankind is not responsibly addressing the major issues that will impact the future.

- We had no a priori expectations about what fraction of our sample would want to live in the future or not and what fraction of people would believe that humans will become extinct.

The survey included several demographic questions, including questions about the respondent's sex, age, religious affiliation (if any), race, income, education, employment, and place of residence. Several previous surveys concerning the future have focused on the images that youth have about the future. Generally, it has been found that youth are more optimistic about their individual futures and more pessimistic about the future of the globe [5–9]. We expected the same outcome. It should be noted that our survey also included people of all ages. We expected older individuals to think and worry less about the future than younger people.

Our expectations with respect to gender were fairly limited. We expected to find that women worry more about the future than men [10]. As such, we expected women to be less optimistic about the future than men.

Religion was approached simply in the survey. Respondents were only asked to indicate their religious affiliations. We did not inquire about how deeply they may hold their beliefs or how actively they practice their religion. Nevertheless, we expected those who believe that a supra-natural being is determining their fate would think and worry less about the future than people who do not hold this belief. Thus, one expected result would be that Christians would think and worry less about the future than non-religious respondents.

2.2. Method

As mentioned above, data were collected for this research via a web-based survey. A web-based survey was chosen for reasons of cost and convenience. Additionally, using the web offered us the opportunity to include people from all over the world through the implementation of a network survey. Essentially, the authors of this paper sent the web address of the survey to their primary e-mail correspondents and to various list serves. Those receiving the requests to complete the survey were then asked to pass the request along to others, with one exception. If the primary respondent was a futurist, they were asked to not complete the survey. There were no restrictions placed on who could answer this survey. This methodology was successful at generating a fairly large number of respondents in a fairly short period of time: 572 people completed the survey from January to April 2004. Additionally, it is apparent that numerous secondary and tertiary contacts completed the survey.

The network sample using a web-based approach, while cost and time efficient, does have drawbacks. First, the survey was limited to those with e-mail and web access. Second, because the sample was not random in the classical sense, we cannot say that X% of the population of the United States, for example, views the word 'future' in some particular way. We can only say what percentage of our sample held such views. However, we believe it is important to reveal to futurists what these views might be in the first place.

Lastly, the sample is biased based upon the composition of our primary contacts. The composition of our primary contacts, in combination with the demographics of the typical Internet user, lead to a sample dominated by US citizens and people with higher than

average incomes and educations, although our sample is somewhat typical of web-users [11,12]. We hope that future research will be more inclusive.

3. Results

3.1. Survey respondents

Five hundred and seventy-two individuals completed the survey. Table 1 presents the distribution of respondents by region of the world. As expected, most respondents live in the United States. However, approximately 20% of the respondents live outside the United States and represent 24 different countries.

Table 2 presents the demographic characteristics of the respondents. Since a classic random sampling methodology was not used in this study and because the study was limited to Internet users, it was anticipated that the sample would be diverse in some aspects and not diverse in other aspects. The sample is fairly evenly split between males and females. The ages of the respondents range from 13 to 83. Individuals aged 30–50 are somewhat over-represented in this sample, but the sample does contain substantial numbers of younger and older individuals. Other aspects of the sample are not very representative of the population in the United States or the world. The preponderance of the respondents is Caucasian, very highly educated, and have middle class or higher household incomes. Most of the respondents are married and over half have children, although few have grandchildren. The respondents are somewhat diverse with respect to religious beliefs, although most of respondents consider themselves Christian (which includes Roman Catholics, Protestants, Anglicans, among other Christian denominations) or secular/non-religious (which also includes agnostics and atheists). The Asian Traditional category contains Hindus, Muslims, Buddhists, Taoists, and Shintos. The Pagan/New Age category contains these two categories plus Heathen and Asatru. Most of the results summarized below are assessed over the demographic variables showing the most diversity in this sample: gender, age, and religious beliefs.

As noted above, we expected that individuals' interpretations of the word 'future' could be described as being closer to the present than not. We did not have any expectations about how close to the present the interpretations might be. Table 3 indicates that on average, the respondents interpreted the word future to mean a point approximately

Table 1
Where survey respondents live

Country/area	Number	Percentage
United States	427	74.7
Other North America	6	1.0
South America	5	0.9
Western Europe	51	8.9
Eastern Europe	23	4.0
Australia and New Zealand	13	2.3
Asia	9	1.6
Missing	38	6.6
Total	572	100.0

Table 2
Demographics (% of respondents)

Sex:	Male	Female					
	45.7	54.3					
Age:	<30	30–50	>50				
	29	46.2	24.9				
Race/ethnicity:	Caucasian	Black	Asian	Hispanic	Indian	Arab	Multiple
	87.3	1.5	3.7	3.4	1.1	0.2	2.8
Domestic status:	Single	Married	Co-habitating	Divorced	Widowed	Other	
	26.9	55.8	8.1	6.9	1.9	0.4	
Number of children:	0	1	2	3	4+		
	48.3	15.4	19.6	10.0	5.8		
Number of grandchildren:	0	1	2	3	4+		
	85.5	3.0	3.5	2.1	4.7		
Household income:	Very poor	Poor	Middle class	Upper middle class	Upper class		
	0.9	6.0	58.6	31.5	3.0		
Employment status:	Work full-time	Work part-time	Unemployed	Student	Retired	Other	
	58.8	8.1	4.9	19.2	6.0	0.5	
Education:	Less than high school	High school	Associate or vocational degree	Some college	College degree	Some post degree	Post college degree
	1.2	3.3	3.5	15.7	21.5	10.2	44.5
Religion:	Christian	Judaism	Asian traditional	Pagan or new age	Secular or non-religious	Other	
	54.7	2.8	4.0	7.6	27.2	3.7	

Table 3
"When you hear someone use the word future, approximately how many years into the future does this mean to you?"

	Mean	Median	Std.
All respondents	14.79	10.0	21.3
Males**	16.8	10.0	26.2
Females	13.0	10.0	14.4
<30 years	14.2	10.0	24.3
30–50 years	15.7	10.0	22.1
>50 years	14.0	10.0	15.8
Christian	13.00	10.0	15.9
Judaism	21.8	10.0	26.4
Asian traditional	22.0	10.0	43.6
Pagan and new age	17.1	10.0	35.4
Secular and non-religious	15.8	10.0	20.2
Other	16.5	10.0	21.3

**Means are significantly different at the $p \leqslant 0.05$ level.

15 years into the future, with a median of only 10 years into the future. The answers ranged from 0 to 200 years. One respondent answered 1 million years. This data point was dropped from the analysis because of its extreme skewing effect on the mean. We were somewhat surprised about how close the mean and the median are to the present, especially given the high educational attainment of the sample. Futurists might hope that people would interpret the word in longer-term context, say 50–100 years, if not more. It appears that people interpret the word primarily with respect to their own affairs and lives and not with respect to larger public policy concerns.

There is a statistically significant difference in how the word 'future' is interpreted between males and females ($p \leqslant 0.05$). Females interpret the word as being much closer to the present than males and show much less variation in their interpretation of the word. There are also differences among those of different ages and those of different religious beliefs, but an ANOVA indicated that the differences were not statistically significant. Younger and older individuals also interpret the word as being closer to the present than those of middle age, although younger individuals exhibit quite a bit of variation in their interpretation whereas older individuals are more in agreement. Lastly, Christians stand out as assigning the shortest period of time to the word.

We expected people to think more frequently about futures closer to the present than farther away. The results of Table 4 support our expectations. Overall, the respondents think very to somewhat frequently about the future 1 day from now, and somewhat frequently about the future 1 week, 1 month, and 1 year from now. Thinking about the future degrades till respondents indicate they do not frequently think about the future 20 years from now. The means of the answers are significantly different from each other over the seven time periods ($p \leqslant 0.001$ level using Mauchly's Test of Sphericity for repeated measures). These results are consistent with the results in Table 3, in that one-half of the sample does not interpret the word 'future' to be more than 10 years into the future.

Table 4
"How frequently do you think about what your life will be like…?"

	Overall mean	One day from now	One week from now	One month from now	One year from now	Ten years from now	Twenty years from now	More than 20 years from now
Overall mean***	2.24	1.80	1.94	2.06	2.02	2.32	2.63	2.88
Males	2.22	1.80	1.93	2.02	1.97	2.32	2.61	2.86
Females	2025	1.81	1.95	2.08	2.06	2.32	2.65	2.88
<30 years old***	2.10	1.50	1.64	1.84	1.78	2.34	2.72	2.87
30–50 years old	2.21	1.84	1.96	2.04	1.99	2.29	2.55	2.81
>50 years old	2.44	2.09	2.29	2.36	2.34	2.35	2.67	3.01
Christian	2.26	1.81	1.96	2.09	2.07	2.36	2.65	2.86
Judaism	2.32	1.94	2.00	2.19	2.00	2.31	2.69	3.13
Asian traditional	2.30	2.32	2.18	2.13	2.05	2.22	2.36	2.74
Pagan and new age	2.21	1.91	1.93	1.95	1.93	2.28	2.58	2.91
Secular and non-religious	2.19	1.69	1.89	2.03	1.94	2.28	2.65	2.91
Other	2.14	1.70	1.90	1.85	1.85	2.25	2.61	2.85

1 = very frequently; 2 = somewhat frequently; 3 = not very frequently; 4 = never.
***Statistically significantly different at the $p \leqslant 0.001$ level.

A repeated measures test of between-subject effects indicated statistically significant differences among age groups ($p \leqslant 0.001$). Younger individuals think much more about tomorrow and older individuals think about tomorrow much less, as expected. (Please note that the smaller numbers in Table 4 indicate more thought about the future.) Also as expected, older individuals think much less about their lives 20 years into the future. No statistically significant differences were found across sex and religion, although the data suggest that respondents in the secular and non-religious category also think more about tomorrow than their counterparts. Jews in the sample tend to think less about the longer term than others.

We expected people to worry more about futures closer to the present than farther away. The results in Table 5 are contrary to our expectations. Overall, the respondents are less worried about tomorrow and 1 week from now than they are about 20 or more years into the future. These results suggest that people have some control over their lives in the near term and therefore are less worried about the near term. As the time horizon stretches into the future, there is more uncertainty and therefore more worry. On the other hand, overall, the sample is not very worried about the future, as the results even for more than 20 years into the future are close to the answer 'not very worried.'

Females appear to be more worried about the future than males, especially with respect to the longer term, although this result is not statistically significant. Younger individuals

Table 5
"How worried are you about what your life will be like….?"

	Overall mean	One day from now	One week from now	One month from now	One year from now	Ten years from now	Twenty years from now	More than twenty years from now
Overall mean***	2.96	3.28	3.23	3.12	2.79	2.73	2.77	2.80
Males	3.02	3.33	3.27	3.15	2.84	2.75	2.88	2.90
Females	2.91	3.25	3.21	3.09	2.75	2.71	2.67	2.70
<30 years old*	2.90	3.12	3.03	2.88	2.58	2.83	2.91	2.94
30–50 years old	2.93	3.26	3.22	3.09	2.78	2.72	2.73	2.72
>50 years old	3.08	3.50	3.49	3.44	3.06	2.63	2.68	2.75
Christian*	3.04	3.37	3.32	3.23	2.87	2.82	2.83	2.86
Judaism	2.72	3.00	3.00	2.94	2.44	2.38	2.56	2.67
Asian traditional	2.83	3.05	3.05	2.91	2.70	2.57	2.78	2.77
Pagan and new age	2.95	3.23	3.21	3.02	2.81	2.67	2.79	2.95
Secular and non-religious	2.86	3.25	3.16	3.03	2.68	2.63	2.66	2.65
Other	2.80	2.90	2.90	2.80	2.75	2.70	2.75	2.80

1 = very worried; 2 = somewhat worried; 3 = not very worried; 4 = not worried at all.
***Statistically significantly different at the $p \leqslant 0.001$ level.
*Statistically significantly different at the $p \leqslant 0.05$ level.

are more worried about the short term and less worried about the longer term ($p \leqslant 0.05$ level). For most of the provided time frames, Christians are less worried about the future than others, especially in the shorter term ($p \leqslant 0.05$ level), as expected.

We expected that individuals' ability to imagine the future would go 'dark' at some threshold into the future but we did not develop any expectations about what that threshold might be. The results of Table 6 do indeed suggest that individuals' ability to imagine the future decreases as the time frame increases ($p \leqslant 0.001$). There is a steady and significant degradation from up to 1 year into the future (very clearly to somewhat clearly) to 2–5 years (somewhat clearly) to 20–50 years (not very clearly) to over 1000 years (not at all clear). The results suggest that the future goes dark for most respondents around 20 years into the future. It is interesting that the overall pattern does not differ much among the different demographic categories, although the patterns are significantly different by sex and religion ($p \leqslant 0.05$).

We expected people to be optimists or pessimists. The results in Table 7 suggest that overall the respondents are optimists, especially in the near term. However, they become less optimistic with respect to longer-term futures ($p \leqslant 0.001$). Females are more optimistic about the near term than males but less optimistic about the longer-term futures. Older

Table 6
"How clearly can you imagine the future for the following time frames?"

	Overall mean	Up to 1 year	1–2 years	2–5 years	5–10 years	10–20 years	20–50 years	50–100 years	100–200 years	200–1000 years	Over 1000 years
Overall mean***	2.82	1.53	1.73	2.09	2.41	2.75	3.13	3.47	3.67	3.76	3.78
Males*	2.78	1.54	1.71	2.06	2.36	2.72	3.06	3.40	3.60	3.73	3.74
Females	2.86	1.52	1.75	2.11	2.45	2.78	3.19	3.52	3.73	3.79	3.82
<30 years old	2.82	1.50	1.74	2.10	2.46	2.73	3.05	3.45	3.67	3.75	3.76
30–50 years old	2.81	1.55	1.73	2.05	2.34	2.70	3.10	3.44	3.65	3.77	3.80
>50 years old	2.84	1.55	1.73	2.14	2.48	2.87	3.27	3.54	3.69	3.75	3.77
Christian*	2.84	1.56	1.76	2.09	2.41	2.76	3.18	3.54	3.71	3.78	3.80
Judaism	2.78	1.44	1.62	1.94	2.31	2.81	3.00	3.38	3.69	3.75	3.88
Asian traditional	2.78	1.55	1.61	2.23	2.52	2.78	3.00	3.41	3.59	3.64	3.68
Pagan and new age	2.70	1.58	1.67	1.93	2.35	2.60	2.88	3.19	3.44	3.69	3.72
Secular and non-religious	2.86	1.51	1.75	2.16	2.45	2.80	3.16	3.49	3.71	3.80	3.81
Other	2.52	1.40	1.50	1.70	2.15	2.50	2.80	2.90	3.30	3.50	3.50

1 = very clearly; 2 = somewhat clearly; 3 = not very clearly; 4 = not at all clear.
***Statistically significantly different at the $p \leqslant 0.001$ level.
*Statistically significantly different at the $p \leqslant 0.05$ level.

Table 7
"How optimistic are you about the future for each time frame?"

	Overall mean	Up to 1 year	1–2 years	2–5 years	5–10 years	10–20 years	20–50 years	50–100 years	100–200 years	200–1000 years	Over 1000 years
Overall mean***	2.56	2.05	2.04	2.11	2.25	2.44	2.75	2.97	3.05	3.06	3.05
Males	2.56	2.21	2.18	2.21	2.28	2.43	2.70	2.90	2.94	2.91	2.92
Females	2.57	1.90	1.91	2.00	2.21	2.45	2.79	3.03	3.14	3.19	3.17
<30 years old	2.49	2.07	1.96	1.94	2.03	2.20	2.57	2.96	3.08	3.07	3.09
30–50 years old	2.56	2.01	2.04	2.13	2.31	2.46	2.75	2.91	3.00	3.04	3.04
>50 years old	2.65	2.08	2.13	2.22	2.37	2.68	2.98	3.11	3.10	3.08	3.05
Christian*	2.50	1.90	1.93	2.03	2.19	2.38	2.69	2.93	3.00	2.99	2.99
Judaism	2.57	2.33	2.33	2.13	2.07	2.47	2.60	2.87	2.93	2.93	2.93
Asian traditional	2.54	2.14	2.17	2.27	2.45	2.65	2.59	2.68	2.73	2.86	2.95
Pagan and new age	2.49	2.21	1.98	1.98	2.12	2.33	2.72	2.86	2.93	2.93	2.90
Secular and non-religious	2.75	2.26	2.25	2.26	2.38	2.59	2.96	3.14	3.23	3.26	3.26
Other	2.50	2.10	2.00	2.10	2.20	2.40	2.55	2.80	2.95	3.05	2.90

1 = very optimistic; 2 = somewhat optimistic; 3 = neither optimistic nor pessimistic 4 = somewhat pessimistic; 5 = very pessimistic.
***Statistically significantly different at the $p \leqslant 0.001$ level.
*Statistically significantly different at the $p \leqslant 0.05$ level.

Table 8
"How actively should humanity plan for the future for each time frame?"

	Overall mean	Up to 1 year	1–2 years	2–5 years	5–10 years	10–20 years	20–50 years	50–100 years	100–200 years	200–1000 years	Over 1000 years
Overall mean***	1.74	1.38	1.35	1.31	1.32	1.39	1.55	1.85	2.18	2.51	2.69
Males***	1.84	1.45	1.41	1.33	1.34	1.42	1.60	1.94	2.34	2.72	2.92
Females	1.66	1.31	1.29	1.29	1.30	1.35	1.50	1.76	2.05	2.34	2.48
<30 years old*	1.69	1.35	1.32	1.31	1.27	1.33	1.52	1.74	2.05	2.43	2.59
30–50 years old	1.71	1.38	1.35	1.30	1.31	1.34	1.49	1.81	2.13	2.46	2.63
>50 years old	1.84	1.39	1.36	1.32	1.36	1.50	1.66	2.01	2.39	2.67	2.88
Christian*	1.78	1.36	1.34	1.32	1.34	1.41	1.58	1.90	2.26	2.61	2.80
Judaism	1.70	1.19	1.25	1.13	1.31	1.38	1.56	1.81	2.25	2.50	2.69
Asian traditional	1.55	1.43	1.29	1.18	1.23	1.24	1.33	1.71	1.71	2.00	2.14
Pagan and new age	1.66	1.26	1.26	1.29	1.29	1.41	1.57	1.74	2.00	2.33	2.46
Secular and non-religious	1.76	1.45	1.41	1.36	1.34	1.37	1.54	1.83	2.18	2.48	2.66
Other	1.54	1.35	1.30	1.10	1.11	1.26	1.30	1.55	1.85	2.20	2.42

1 = very actively; 2 = somewhat actively; 3 = not very actively; 4 = not at all actively.
***Statistically significantly different at the $p \leqslant 0.001$ level.
*Statistically significantly different at the $p \leqslant 0.05$ level.

Table 9
Repeated measures tests for statistically significant differences in means—significance levels (p-values)

Question/ demographic category	Thinking about the future	Worrying about the future	Imagining the future	Optimism–pessimism about the future	Planning for the future
All responses[a]	0.000	0.000	0.000	0.000	0.000
Sex[b]	0.474	0.101	0.057	0.862	0.000
Age[b]	0.000	0.022	0.353	0.248	0.038
Religion[b]	0.834	0.016	0.022	0.040	0.042

[a]Mauchly's Test of Sphericity.
[b]Tests of between-subject effects.

individuals are less optimistic about mid-term futures than others. Youth are generally optimistic about the future, which supports our expectations. Christians are more optimistic about the near term than others. Those in the secular and non-religious category are generally less optimistic and are the least optimistic about the longer-term futures. Only the difference in means among the religious categories was statistically significant ($p \leqslant 0.05$).

Overall, as indicated in Table 8, the respondents' support for planning decreases as the time frame increases, as expected ($p \leqslant 0.001$). However, the pattern has a bit of nuance. Support for planning 1–2 years into the future is less than for planning 2–5 years into the future. The logic here may be that the near term is already under control or mostly determined, so more attention is needed a few years into the future. Support for planning is actually very strong up to 100 years into the future (at least somewhat actively) and is higher for even the over 1000 year category than we had expected.

There are statistically significant differences among the means by gender, age, and religion. Females, who tend to worry a bit more about the future, support planning a bit more than the males ($p \leqslant .001$). Younger respondents support planning more than the older respondents ($p \leqslant .05$). The patterns among religions differ in interesting manners ($p \leqslant .05$). Christians and secularists support less planning in the near term. Asian traditionals generally favor more planning in every time period.

Table 9 summarizes the significance levels of the repeated measures tests for the five variables just presented: thinking about the future, worrying about the future, imagining the future, optimism/pessimism about the future, and planning for the future. As the table indicates, there is a complex relationship among the five aspects of considering the future and the three demographic variables, sex, age, and religion. At times, differences are most pronounced by sex (i.e., planning for the future) or by age (i.e., thinking about the future) or by religion (e.g., optimism/pessimism about the future).

Table 10 presents Pearson correlations among the mean answers for the five ways of considering the future presented in Tables 4–8. Individuals who think more about the future are able to better imagine the future, but also tend to worry more about the future and, logically, are more active supporters of planning. As could be expected, worrying and optimism are negatively correlated. The ability to imagine and optimism are positively correlated. This is a key finding for futurists, as it supports futurists' use of visioning and scenario techniques to help people better understand and prepare for their futures. It can

Table 10
Pearson correlations among conceptions of the future

	Thinking	Worrying	Imagining	Optimism	Planning
Thinking	1.0	0.314**	0.292**	−0.040	0.273**
Worrying		1.0	−0.011	−0.321**	0.150**
Imagining			1.0	0.200**	0.197**
Optimism				1.0	0.019
Planning					1.0

*Statistically significantly different at the $p \leqslant 0.05$ level.
**Statistically significantly different at the $p \leqslant 0.01$ level.

Table 11
"How responsibly is humankind addressing the future regarding…?" (%)

	Very responsibly	Somewhat responsibly	Not very responsibly	Not at all responsibly
Global warming	9.5	28.0	42.1	20.4
Energy	10.0	24.9	40.6	24.6
Water quality	13.0	34.8	38.8	13.4
Water quantity	9.8	27.9	44.0	18.2
Biodiversity	8.9	30.0	42.7	18.4
Education	11.4	45.1	32.1	11.4
Quality of life	12.6	42.5	35.2	9.7
Peace and security	14.9	32.2	32.6	20.3
Spirituality	8.7	35.3	38.2	17.8
Economics	10.9	42.2	33.9	13.0
Politics	10.1	30.3	40.8	18.8
New technologies	24.1	50.1	19.9	5.9

be argued that better understanding leads to better planning, which, in turn, leads to more optimism about the future. By in large, the correlations among the variables are consistent across time scales. Separate correlations were run for a short-term variable (1–2 years into the future), mid-term variable (10–20 years into the future) and a longer-term variable (20–50 years into the future). The magnitudes of the correlation coefficients and significance levels were exactly the same as those shown in Table 10, with two exceptions. In the short term, thinking about the future and planning about the future are not correlated but optimism and planning are positively and significantly correlated.

It was expected that most respondents would indicate that humankind is not dealing with the major issues of the day very responsibly. The results, reported below in Table 11, generally support our expectations. For eight of the 12 issues, over 50% of the respondents indicated that humankind is addressing those issues not very responsibly or not at all responsibly. Three other issues are close to 50%. The most negative issues are related to the environment and energy policy. Given the generally optimistic outlook of the respondents, these results might seem to be a bit contradictory.

Table 12
"Please indicate how much you agree…" (%)

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
I have complete control over my future	10.5	45.9	25.7	17.9
There are many paths open for my future	47.7	40.6	10.1	1.6
I am an optimist about my future	40.5	48.5	9.4	1.6
Change happens too fast for me to have control	4.4	18.8	51.7	25.1
My future will be radically different from today	14.7	34.8	41.0	9.4
Humankind has complete control over its future	8.0	30.0	32.4	29.6
There are many paths open to humankind	45.9	40.1	10.5	3.5
I am an optimist about humankind's future	16.8	46.2	27.6	9.4
Change happens too fast for humankind to control	5.9	33.2	45.9	15.0
Humankind's future will be radically different	31.1	42.5	23.0	3.4

Maybe the respondents' optimism is rooted in their views about technology. Almost 75% of the sample indicated that humankind is very responsibly or somewhat responsibly addressing new technologies, which, presumably, would include new information, biological, and nano-technologies, among many others. Given that many people blame technology for today's problems, this result is somewhat counter-intuitive. On the other hand, it may indicate the source of the respondents' optimism, that new technologies, such as renewable energy, will be more environmentally friendly, more decentralized, and more beneficial than not to humankind.

Table 12 poses additional questions pertaining to control over the future. Many authors have described today's world as driven by change, change which may be so extreme and unpredictable as to drive society into and then through a singularity [13]. The respondents tend to disagree with this assessment. Most believe they have control over their future and that they have many paths open to them in the future. They believe that they have control over change, even though many believe that their futures will be radically different from today's.

Interestingly, the respondents tend to believe they have more control over their future than humankind has over its future. This is somewhat counter-intuitive from a systems viewpoint, as the behavior of systems is more predictable than the behavior of any specific element in a complex system. It could be that respondents were thinking of two different futures, a more limited one with respect to themselves, and a much longer one with respect to humankind.

Given respondents' views about the issues and about their own futures, we thought it would be interesting to explore whether any respondents would wish to have been born in the future rather than in the present time. Overall, almost one-half of the respondents said no, they would not wish to have been born in the future (Table 13). They are satisfied with life in the present time and/or believe that the world will be worse in the future. On the other hand, half of the respondents indicated that they would have preferred to have been born farther into the future, mostly about 50–1000 years into the future. Maybe these respondents expect advances in technology to lead to longer life spans, improved environmental quality, and significant advances in our knowledge about the cosmos. Males are more inclined than females to wish to live in the future; Christians and Jews are

Table 13
"If you could have been born in the future, how far into the future would you like to have been born?" (%)

	0 years	10 years	50 years	100 years	500 years	1000 years	5000 years	10000 years	100000 years	1000000 years	>1000000 years
Overall mean***	49.3	5.1	9.1	12.6	10.8	5.1	1.7	0.9	1.0	0.3	2.3
Males***	39.2	5.5	11.8	14.9	12.2	7.1	2.7	1.6	1.6	0.8	2.7
Females	59.3	5.0	7.3	10.6	10.3	3.6	1.0	0.3	0.7	0.0	2.0
<30 years old	54.3	3.7	8.0	8.0	11.1	5.6	2.5	1.2	0.6	1.2	3.7
30–50 years old	47.9	4.6	10.4	13.5	12.4	4.6	1.9	1.2	1.5	0.0	1.9
>50 years old	50.7	8.2	9.0	16.4	7.5	6.0	0.0	0.0	0.7	0.0	1.5
Christian***	57.9	5.9	9.5	11.2	6.9	3.9	2.0	0.3	0.7	0.3	1.3
Judaism	60.0	6.7	6.7	13.3	6.7	0.0	6.7	0.0	0.0	0.0	0.0
Asian traditional	34.8	8.7	4.3	13.0	30.4	0.0	0.0	4.3	0.0	0.0	4.3
Pagan and new age	39.5	0.0	9.3	11.6	27.9	4.7	4.7	2.3	0.0	0.0	0.0
Secular and non-religious	40.0	4.5	9.7	15.5	12.3	9.0	0.6	1.3	1.9	0.0	5.2
Other	42.9	4.8	9.5	19.0	9.5	4.8	0.0	0.0	4.8	4.8	0.0

***Statistically significantly different at the $p \leqslant 0.001$ level.

Table 14
"Do you believe that humankind will become extinct?" (%)

	Yes	No
Overall***	45.1	54.9
Males	46.1	53.9
Females	44.3	55.7
<30 years old***	62.3	37.7
30–50 years old	42.6	57.4
>50 years old	31.2	68.8
Christian***	37.7	62.3
Judaism	25.0	75.0
Asian traditional	60.9	39.1
Pagan and new age	51.2	48.8
Secular and non-religious	59.7	40.3
Other	33.3	66.7

not very inclined to live in the future. Maybe their views of the afterlife make the time period in which one lives irrelevant. The differences in means by gender and religion are statistically significant at the $p \leqslant 0.001$ level but are not statistically different by age.

Lastly, we asked respondents questions about the possible extinction of humankind. We were surprised at how many of the respondents believe that humankind will go extinct, just over 45% (see Table 14). Futurists need to wonder whether these people will support futures work if in the long-run all of humanity's efforts and achievements will be for nought. Younger individuals are much more inclined to believe in extinction, whereas the more experienced humans believe we will muddle through. There is a huge discrepancy between Christians and Jews and everyone else. The former do not believe extinction will occur whereas the latter mostly do. Is it simply a matter of faith? The differences in means by age and religion are statistically significant at the $p \leqslant 0.001$ level but are not statistically different by gender.

For those who believe humans will go extinct, they were also asked when (Table 15) and for what reason (Table 16). It appears that the next 500–1000 years are key, as these are popular time frames for this answer. People believe that humans will go extinct because that is what happens to most species (7%), environmental degradation (6.8%) and war/politics/greed (5.6%) were frequently cited.

4. Conclusions

The results of this survey provide several interesting insights into individuals' conceptions of the future. In general, we found that individuals have very rich and extremely diverse conceptions and approaches to considering the future. More specifically, the respondents appear to be interpreting the word 'future' within the context of their own lives. Half of the respondents place 'the future' as 10 or fewer years into the future. Additionally, images of the future grow dark approximately 15–20 years into the future, and people infrequently thinking about the future in this or longer time frames. The respondents tend to worry more about the future than the present, possibly because the

Table 15
"About what time will humankind become extinct?" (%)

	Unsure when	10 years	50 years	100 years	500 years	1000 years	5000 years	10000 years	100000 years	1000000 years	>1000000 years
Overall	35.3	0.0	0.8	2.3	11.3	15.0	9.0	6.0	7.9	5.3	7.1
Males	35.2	0.0	0.8	0.8	10.4	11.2	8.0	2.4	12.0	8.8	10.4
Females	34.8	0.0	0.7	3.6	12.3	18.1	10.1	9.4	4.3	2.2	4.3
<30 years old	41.0	0.0	1.0	1.9	12.4	13.3	6.7	7.6	3.8	3.8	8.6
30–50 years old	31.9	0.0	0.0	2.7	11.5	15.9	11.5	6.2	9.7	6.2	4.4
>50 years old	31.9	0.0	2.1	2.1	8.5	14.9	8.5	2.1	12.8	6.4	10.6
Christian	39.5	0.0	0.8	1.6	9.7	14.5	8.9	7.3	8.9	4.0	4.8
Judaism	33.3	0.0	0.0	0.0	0.0	33.3	0.0	0.0	0.0	0.0	33.3
Asian traditional	21.4	0.0	0.0	7.1	0.0	21.4	14.3	7.1	21.4	0.0	7.1
Pagan and new age	45.5	0.0	0.0	0.0	13.6	9.1	13.6	4.5	4.5	9.1	0.0
Secular and non-religious	31.6	0.0	1.1	2.1	14.7	15.8	8.4	4.2	5.3	7.4	9.5
Other	0.0	0.0	0.0	14.3	14.3	14.3	0.0	14.3	14.3	0.0	28.6

Table 16
"Why do you think that humankind will become extinct?" (%)

Religious reasons	3.8
Environmental degradation	6.8
All species eventually become extinct	7.0
Evolution	3.0
Other species will gain control	0.7
Depletion of earth's resources	5.1
Overpopulation	1.4
Global-scale natural disaster	2.8
Climate change	2.3
Epidemic illness or disease	0.5
War/politics/greed	5.6
Human self-destruction	4.2
No idea	0.3
No answer	56.5

longer term is 'dark' to them. On the other hand, this group of respondents is fairly optimistic about the future overall, although their optimism decreases as the time horizon grows. This group supports planning for the future even for time periods 100 or more years into the future. Respondents who think more about the future are better able to imagine the future and appear to be more optimistic about the future. These results suggest that visioning and scenario writing, tools to help people think and imagine the future, may be able to help people become more positive about the future and lead people to be more proactive about the future (i.e., by supporting planning for time periods much more distant than planners and policy analysts typically address).

The results suggest that individuals' psychological representations of the future are highly complex and context dependent. The results indicate that representations differ by sex, age, and religion. The implications of the latter finding are very interesting. The data indicate that Christians, as opposed to secularists, think and worry less about the future, are more optimistic about the future, and are much less likely to believe that humans will become extinct in the future. Is faith a positive influence with respect to the future because it engenders optimism or is it a negative influence if it constrains people from more seriously considering the future? Do different considerations of the future impact, in turn, support for or lack of support for long-term environmental initiatives or even war against other nations? These are very important questions for futurists to explore in more depth.

We conclude that futurists cannot assume that everyone has similar notions about the future. Futurists may have to shape their messages depending upon the demographic characteristics of those they wish to communicate with. The survey was not designed to identify logical flaws in how people think about the future or suggest how the respondents may think about the future differently than futurists. However, it is interesting that the respondents believe they have more control over their destinies than humankind does when in fact the behavior of even chaotic systems is more predictable at a large scale than is any of the parts or agents that compose the systems.

The fact that almost one-half of the sample believes that humankind will become extinct within 500–1000 years should be a cause of concern for futurists. This is because if one does not believe that humankind has a future, then one might be less inclined to support the efforts to protect the future for future generations and the efforts of futurists. A belief in extinction also calls into question the meaning of our lives and contributions. Are all of our achievements doomed to die along with our species? If so, what ought we be doing now? Future surveys should explore in more depth individuals beliefs in this area. For example, how many people believe that humankind ought to die out for the benefit of other species on earth?

Future surveys should be more international. This survey, for example, could have been posted in several different languages. Also, a more concerted effort should be made to improve the diversity of respondents with respect to race/ethnicity and income.

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