

THINKING ABOUT THE FUTURE: A PSYCHOLOGICAL ANALYSIS

BRUCE E. TONN

University of Tennessee, Knoxville, TN, USA

FRED CONRAD

University of Michigan, Ann Arbor, MI, USA

In this paper, the relationships between three endogenous variables – thinking about, worrying about, and imagining the future – and the relationships between these variables and a rich set of exogenous variables were explored. Data were collected via a web-based survey using a sample of convenience; 572 individuals from 24 different countries completed the survey. The results suggest that respondents think about the near-term future frequently and about the long-term future not at all frequently. Additionally, individuals who are better able to imagine the future think about the future more than those who cannot imagine the future well. Those who worry more about the future tend to think more about the future than those who do not. Older individuals think about the future less than younger individuals even though age is not correlated with worrying about or imagining the future. Christians think more about the future than others although they also tend to worry less about the future. Secularists are less able to imagine the future. Individuals who are worried about major issues like global warming tend to think more about the future. The results suggest that training individuals to better imagine potential futures could give them more confidence to think more and worry less about their futures.

Keywords: thinking, worrying, imagining, future, sample of convenience, potential futures, long-term, short-term.

Bruce E. Tonn, PhD, Professor, Department of Political Science, University of Tennessee, Knoxville, TN, USA; and Fred Conrad, Research Associate Professor, Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor, MI, USA.

Appreciation is due to reviewers including: Cristina Atance, PhD, School of Psychology, University of Ottawa, 550 Cumberland, Ottawa, Ontario, K1N 6N5, Canada, Email: atance@uottawa.ca; William S. Bainbridge, PhD, The National Science Foundation, 4201 Wilson Boulevard, Arlington, VA 22230, USA, Email: wbainbri@nsf.gov; Donald G. MacGregor, PhD, MacGregor-Bates Inc., 1010 Villard Ave, Cottage Grove, OR 97424, USA, Email: donaldm@epud.net

The authors also wish to thank two anonymous reviewers for their helpful comments on a draft of this paper.

Please address correspondence and reprint requests to: Bruce E. Tonn, Department of Political Science, University of Tennessee, McClung Tower, Room 1018, Knoxville, Tennessee, USA. Phone: 001-865-974-7041; Fax: 001-865-974-7037; Email: btonn@utk.edu

The relationships between three endogenous variables, thinking, worrying and imagining about the future are explored in this study. The relationships that a range of exogenous variables may have with these variables have also been examined. Studying the psychology of thinking about the future is vitally important because individuals need to effectively think about the future to help them make predictions about the future (Nussbaum, Liberman, & Trope, 2006) and ensure their personal and collective prosperity. As a group, humans need to effectively think about the future to ensure our survival into the distant future. The better we understand this area of psychology, the better we may be able to train individuals to overcome cognitive barriers, anxieties, biases and heuristics that may constrain their ability to effectively think about the future.

There is a rich literature on the psychology of time (e.g., how quickly people think and/or react or how well they estimate the passage of time; Roetzheim, 2000; Strathman & Joireman, 2005). The literature about how people think about time and the future is much more limited. Indeed, Zimbardo and Boyd (1999) state that how people perceive time is a pervasive and powerful, yet largely unrecognized, influence on much of human behavior.

How much should people think about the future? This is a difficult question to answer because the need to think about the future is determined, in part, by individual circumstances. For example, a college student may think frequently about the future several weeks and months ahead and again about the future in several years, which would be after graduation. A middle-aged person may be comfortably set in her career so she may think relatively more about her retirement and financial issues a decade or more into the future. The question is further complicated by the needs of people to think about a range of futures (e.g., their own, their children's, their community's).

It can be hypothesized that less well off people may need to think more about the future than do those more well off. Many people who live in more turbulent and changing societies may need to think more about the future than do those in more traditional societies. Culture may also directly impact how people think about the future. For example, Agarwal and Tripathi (1984) state that socialization has a greater effect on future orientation than does physical-economic deprivation.

Research generally supports the contention that younger people think more about the future than older people (Gidley, 1998; Hicks, 1996; Ono, 2003; Rubin, 1998). Lang and Carstensen (2002) found that older people perceived their future time as more limited than younger people, and Fingerman and Perlmutter (1995) found that younger participants addressed more distant futures than older participants. Brandtstadter, Wentura, and Schmitz (1997) found that as people age, their time perspectives become less concrete, open and controllable.

Thinking about the future may be related to gender and education. For example, Seth (1986) found that women have a greater present-orientation, while men have a greater future-orientation. In this same vein, Sunberg, Poole, and Tyler (1983) found that Indian boys were more future-oriented than were Indian girls. Conway, Wood, Dugas, and Pushkar (2003) found that women worry more about the future than do men. To complicate matters, Bouffard, Bastin, and Lapierre (1996) found that women's future time perspectives change with age and social roles and are rich and complex. Indeed, Nurmi (1982) has stated that the concept of time perspective is ambiguous. Lastly, it could be hypothesized that more educated people think more about the future than do less educated people but Bouffard (1982) found that the concept of futurity is equally strong in uneducated and educated Africans.

Do beliefs impact how much people think about the future? Religious beliefs, for example, may paint a clear picture of the future, helping people better imagine and, thus, think about their future. People who believe that the future will be good may think more about the future than pessimists because it is a more enjoyable activity. Previous research has suggested that youth are generally more optimistic about the future (Gidley, 1998; Hicks, 1996; Ono, 2003; Rubin, 1998). People who believe they have more control over their lives may have more incentive to think about the future than those who believe they have no control over their futures.

The survey results reported below support several of these previous findings, especially with respect to age and gender. However, in this research we explore the influence on thinking about the future of a much wider range of beliefs and attitudes and potentially influential demographic variables, such as marriage status, religion, and citizenship.

This research is unique in that it also explores two additional psychological constructs associated with thinking about the future: imagining and worrying about the future. Indeed, Zaleski (2005) states that future orientation is driven, in part, by anxiety and worry. It can be argued that the ability to imagine the future is strongly correlated with thinking about the future. It can also be hypothesized that the more that people worry about the future, the more they will think about the future. Conversely, people who cannot imagine the future well may be more prone to worry but find themselves unable to think well about the future. Importantly, the ability to imagine the future and the propensity to worry about the future could also be influenced by the same personal beliefs, attitudes, and demographic situations addressed above. Thus, a task undertaken in this research is to comprehensively assess the relationships between these three endogenous variables and a rich set of exogenous variables.

The next section presents the research design. The third section presents descriptive statistics and the results from a simultaneous equation regression model.

RESEARCH DESIGN

SURVEY

Survey data were collected for this research via a web-based survey. This approach was chosen for reasons of cost and convenience. Additionally, using the web created the opportunity to include people from all over the world through the implementation of a network sample of convenience. To initiate the solicitation of survey respondents, the authors sent the web address of the survey to their primary email correspondents and to various list servers. Those receiving the requests to complete the survey were then asked to pass the request along to others. 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 short period of time: 572 people completed the survey from January to April 2004. Additionally, it is apparent that numerous secondary and tertiary contacts unknown to the authors completed the survey.

This approach, while cost and time efficient, does have drawbacks. First, the survey was limited to those with email and web access. Second, because the sample was not random in the classical sense, it cannot be said, for example, that X% of the population of the United States views the word 'future' in some particular way. It can only be said what percentage of the sample held such views.

Thirdly, 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, led to a sample dominated by U.S. citizens and people with higher than average incomes and educations (see Table 1), although it can be argued that the sample is typical of web-users (Georgia Tech, 2004; Tonn & Hemrick, 2004). On the other hand, Table 1 indicates that the sample is diverse with respect to sex, age, religion, domestic status, and households with children. A substantial number of students and others who do not work full-time also completed the survey.

Mediating these issues with the sample is the fact that this study is mainly concerned with exploring the relationships between variables, not with estimating how frequently people think about the future or the prevalence of future-oriented beliefs and attitudes in a defined population. A more representative sample could bring additional variables into the analysis, such as race and ethnicity, but would be unlikely to alter the statistical findings that describe the relationships between the variables that are well represented in the sample.

TABLE 1
DEMOGRAPHICS

Sex (%)	Male 45.7	Female 54.3					
Age (%)	Mean 40.0	Median 37.0	Std. 14.1	Min 13	Max 83		
Race/Ethnicity (%)	Caucasian 87.3	Black 1.5	Asian 3.7	Hispanic 3.4	Indian 1.1	Arab 0.2	Multiple 2.8
Country (%)	U.S. 75	Western Europe 9.0	Eastern Europe 4.0	Other 12.0			
Domestic Status (%)	Single 26.9	Married 55.8	Co-Habiting 8.1	Divorced 6.9	Widowed 1.9	Other 0.4	
Number of Children (%)	0 48.3	1 15.4	2 19.6	3 10.0	4+ 5.8		
Number of Grandchildren (%)	0 85.5	1 3.0	2 3.5	3 2.1	4+ 4.7		
Household Income (%)	Very Poor 0.9	Poor 6.0	Middle Class 58.6	Upper Middle Class 31.5	Upper Class 3.0	Class	
Employment Status (%)	Work Full-time 58.8	Work Part-time 8.1	Unemployed 4.9	Student 19.2	Retired 6.0	Other 0.5	
Education (%)	Less than High School 1.2	High School 3.3	Associate or Vocational Degree 3.5	Some College 15.7	College Degree 21.5	Some Post Degree 10.2	Post College Degree 44.5
Religion (%)	Christian 54.7	Judaism 2.8	Asian Traditional 4.0	Pagan or New Age 7.6	Secular or Non-Religious 27.2	Other 3.7	

STATISTICAL MODELING

This research encompasses three endogenous variables, thinking, worrying and imagining about the future and a comprehensive set of exogenous variables. To statistically explore the relationships between the endogenous and exogenous variables, regression analysis is typically employed. To implement this approach, the endogenous variables needed to be operationalized and the regression equations needed to be specified and estimated.

Operationalizing the endogenous variables was not straightforward. To take one variable for example, the survey asked respondents how frequently they thought about the future over seven different time periods. To create one endogenous variable, the mean of the answers provided for all seven time periods was used. It can be argued that this solution was better than choosing an answer for only one time period or weighting the individual means by the number of days in each time period. The former approach is too limited and the latter approach was discarded because thinking frequently about the future ten years from now should not necessarily count more than thinking frequently about the future one month from now. A similar approach was used to operationalize the other two endogenous variables.

Specifying and estimating the regression models was also complicated. One might be tempted to estimate three independent regression models, one for each of the three endogenous variables mentioned above. This approach is satisfactory only if none of the endogenous variables are specified in the other equations. However, in this case, a primary research goal was to do just that, specify the endogenous variables in the other equations in order to learn more about their relationships to each other. It is important to include the worrying and imagining about the future variables in the thinking about the future regression equation, testing the thinking and imagining about the future variables in the worrying about the future regression equation, and specifying the thinking and worrying about the future variables in the imagining about the future regression equation, along with different combinations of exogenous variables.

When one has a set of interrelated regression equations to estimate, ordinary least squares does not yield an efficient estimation of the beta coefficients. This is because this statistical method does not take into account the possibility that the error terms in the regression equations may be correlated with each other. In these situations, it is recommended that the equations be estimated simultaneously (Theil 1978). In this case, three stage least squares (3SLS), as implemented in the Statistical Analysis System (SAS), were used to simultaneously estimate the equations. It is recognized that this statistical method is not frequently used within psychology, but it is often used in economics. Also, it is limited in some ways. For example, it does not allow the step-wise inclusion of independent variables because all the coefficients for all the variables in all the equations are estimated simultaneously. Thus, the incremental contribution of independent variables to explaining variance cannot be assessed.

The approach used to specify each of the three regression models was driven by initial hypotheses and assessment of interim results. Variables were included in each model that represented the other endogenous variables, demographics of the respondents, and the respondents' situations and their attitudes and beliefs about the future. Highly statistically nonsignificant variables were dropped from

the models and the models were re-estimated. Often, other variables were added and tested. The final model results, which are reported in Tables 3, 4 and 5, retain all highly statistically significant variables and several other variables that improved the models' ability to explain the variance in the data.

RESULTS

DESCRIPTIVE STATISTICS

As noted above, Table 1 contains descriptive statistics for the demographic variables that describe the respondents to the survey. The first three rows of Table 2 contain descriptive statistics for the three endogenous variables, thinking, worrying, and imagining about the future. The means reported for the thinking and worrying about the future variables are taken over seven time periods, from 'one day from now' to 'more than twenty years from now.' The overall means suggest that the respondents think about the future somewhat frequently and are not overly worried about the future. Answers for the range of time periods show that the respondents think much more about time frames closer to 'now' than for time frames further into the future. The respondents are decidedly not worried about the near-term but worry more about the mid- to long-term.

The means reported for the imagining the future endogenous variable and the support for planning exogenous variable, which is the fourth one in Table 2, are taken over ten time periods, from 'up to one year' to 'over 1000 years.' Overall, the respondents report not being able to clearly imagine the future. Answers for the range of time periods show that respondents can clearly imagine the future up to two to five years into the future. The future begins to become much less clearly imaginable around ten to twenty-years into the future. For all three endogenous variables, changes over time are very systematic and monotonic. The thinking variable is significantly correlated with the worrying variable ($r = 0.314$, sign. < 0.01) and the imagining variable ($r = 0.292$, sign. < 0.01), but the imagining and the worrying variables are not significantly correlated.

Table 2 also contains descriptive statistics for all the other exogenous variables found in the three models. To begin, the respondents actively support planning for the future overall and for most time frames out to over 100 years into the future. The following five variables listed in this table pertain to respondents' views about their own future. Most believe that their futures will not be radically different, change is not happening too fast for them to control, and there are many paths open to them for their future. Most believe that they do not have complete control over their futures. Overall, the respondents are optimistic about their futures.

TABLE 2
ENDOGENOUS AND OTHER EXOGENOUS VARIABLES

Variable Description	Mean	Median	Std.
How frequently do you think about what your life will be like... from now?*(1 = very frequently, 4 = not at all frequently)	2.24	2.14	.549
How worried are you about what your life will be like.... from now?*(1 = very worried, 4 = not at all worried)	2.96	3.00	.627
How clearly can you imagine the future for the following time frames?**(1 = very clearly, 4 = not at all clearly)	2.82	2.89	.467
How actively should humanity plan for the future for each time frame?**(1 = very actively, 4 = not at all actively)	1.75	1.70	.573
My future will be radically different from today (1 = strongly agree, 4 = strongly disagree)	2.45	3.00	.856
Change is happening too fast for me to control (1 = strongly agree, 4 = strongly disagree)	2.98	3.00	.785
I am an optimist concerning my future (1 = strongly agree, 4 = strongly disagree)	1.72	2.00	.697
I have complete control over my future (1 = strongly agree, 4 = strongly disagree)	2.51	2.0	.905
There are many paths open to me for my future (1 = strongly agree, 4 = strongly disagree)	1.66	2.00	.724
Change is happening too fast for humanity to control (1 = strongly agree, 4 = strongly disagree)	2.70	3.00	.793
Humankind's future will be radically different from today (1 = strongly agree, 4 = strongly disagree)	1.99	2.00	.823
Humankind dealing with global warming (1 = very responsibly, 4 = not at all responsibly)	2.73	3.00	.891
Humankind dealing responsibly with energy (1 = very responsibly, 4 = not at all responsibly)	2.80	3.00	.924
Humankind dealing with peace and security (1 = very responsibly, 4 = not at all responsibly)	2.58	3.00	.974
Humankind dealing with social concerns *** (6 = very responsibly, 24 = not at all responsibly)	15.2	15.0	4.19
Humankind dealing with Quality of Life (1 = very responsibly, 4 = not at all responsibly)	2.42	2.00	.831
Humankind dealing with new technologies (1 = very responsibly, 4 = not at all responsibly)	2.08	2.00	.820
When you hear someone use the word future, approximately how many years into the future does this mean to you? (years)	14.79	10.0	21.3
Do you believe that humankind will become extinct? (1 = yes, 2 = no)	1.55	2.00	.498

* These variables are averages taken over 7 time periods, from 'one day from now' to 'more than twenty years from now.'

** These variables are averages taken over 10 time periods, from 'up to one year' to 'over 1000 years.'

*** This variable is constructed from six social concerns: education, quality of life, peace and security, spirituality, economics, and politics.

The next two variables pertain to humanity's future. Respondents believe that change is happening too fast for humanity to control and that humankind's future will be radically different. It is interesting to note that individuals perceive they have more control over their own futures than humanity might. These perceptions are supported by the results for the next few variables. Humanity is judged not to be dealing very responsibly with major issues such as global warming, energy, and peace and security or quality of life. However, the respondents generally agree that humanity is dealing responsibly with new technology.

The last two variables pertain to the future. The first one captures how many years into the future individuals think when they hear the word 'future.' The mean is almost fifteen years and the median is only ten. The second variable captures how many respondents think that humans will become extinct, which is about forty-five percent. Although we did not have strong a priori expectations about the results for these variables, we were surprised that the former was as low as it was and that the latter was as high as it was. Additional descriptive statistics developed from this survey can be found in Tonn, Conrad, and Hemrick (2006).

THREE STAGE LEAST SQUARES MODEL RESULTS

Tables 3, 4 and 5 contain the 3SLS regression results for the models with the thinking about the future, worrying about the future, and imagining the future endogenous variables, respectively. All three models are statistically significant at the .0001 level. The adjusted R^2 's range from a high of 0.26 for the worrying about the future model to a low of 0.16 for the imagining the future model. Each model has at least one highly significant endogenous variable and several significant and nearly significant exogenous variables. Let's focus on the relationships between the endogenous variables first.

Referring to Table 3, both worrying and imagining the future are positively related to thinking about the future. In other words, the more one worries about the future, the more one thinks about the future and the better one is able to imagine the future, the more one thinks about the future (although this last relationship is not generally accepted to be statistically significant). Conversely, the more one thinks about the future, the more one worries about the future (Table 4). Additionally, the more one worries about the future, the less able is one to think clearly about the future, although more thinking about the future aids in imagining the future (Table 5).

The next several paragraphs address themes that can be identified across the three models. One theme is that religion may help individuals deal with the future. Religion can offer a 'story' about one's future and that story may help individuals imagine the future better and worry less about the future. Less worry, then, can translate into more thinking about the future. Indeed, Christians tend

to think more about the future than others (Table 3) and may worry less about the future (this variable has the expected sign but is not statistically significant; see Table 4). Respondents who describe themselves as secular imagine the future much less clearly than those who report some type of religion (Table 5).

TABLE 3
REGRESSION MODEL: THINKING ABOUT THE FUTURE

Variable	Parameter Estimate	Significance Level
Intercept	-0.85	0.16
Worrying About Future (1 = <i>very worried</i> , 4 = <i>not at all worried</i>)	0.50	0.001
Imagining the Future (1 = <i>very clearly</i> , 4 = <i>not at all clearly</i>)	0.20	0.183
Actively Planning the Future (1 = <i>very actively</i> , 4 = <i>not at all actively</i>)	0.18	.0001
Age (yrs)	0.006	0.001
Gender (1 = <i>male</i> , 2 = <i>female</i>)	0.15	0.0008
Single (1 = <i>yes</i> , 0 = <i>no</i>)	0.14	0.012
Upper income (1 = <i>yes</i> , 0 = <i>no</i>)	0.09	0.05
Christian (1 = <i>yes</i> , 0 = <i>no</i>)	-0.08	0.07
I am an optimist concerning my future (1 = <i>strongly agree</i> , 4 = <i>strongly disagree</i>)	0.16	0.01
My future will be radically different from today (1 = <i>strongly agree</i> , 4 = <i>strongly disagree</i>)	0.04	0.11
Change is happening too fast for me to control (1 = <i>strongly agree</i> , 4 = <i>strongly disagree</i>)	-0.07	0.04
Humankind dealing with Quality of Life (1 = <i>very responsibly</i> , 4 = <i>not at all responsibly</i>)	-0.04	0.19
Humankind dealing with new technologies (1 = <i>very responsibly</i> , 4 = <i>not at all responsibly</i>)	0.05	0.1
Humankind dealing with peace and security (1 = <i>very responsibly</i> , 4 = <i>not at all responsibly</i>)	-0.04	0.12
Will humans become extinct? (1 = <i>yes</i> , 2 = <i>no</i>)	0.11	0.01

(1 = *very frequently*, 4 = *not at all frequently*) [$R^2 = 0.26$; Adj $R^2 = 0.23$;
Significance Level < .0001]

Another theme is control over one's life. Respondents who believe that change is happening too fast for them to control worry about the future more than others (Table 4) but think less about the future (Table 3) and are less able to clearly imagine the future (Table 5). It appears that for these individuals, change is overwhelming and it prompts worry. Maybe change is overwhelming because they are not good at imagining the future or maybe too much worry blocks their ability to imagine and constrains their thinking about the future.

Along another line of reasoning, optimists think more about the future than pessimists (Table 3) and, as expected, worry less (Table 4). Optimists also tend to imagine the future better than pessimists (Table 5). One can argue that being

able to imagine the future clearly results in at least some positive images and paths into the future, which, in turn, reduces worry. This could occur because it is probably more pleasurable thinking about brighter futures than darker futures.

TABLE 4
REGRESSION MODEL: WORRYING ABOUT THE FUTURE

Variable	Parameter Estimate	Significance Level
Intercept	2.84	0.0001
Thinking About the Future (1 = <i>very frequently</i> , 4 = <i>not at all frequently</i>)	0.35	0.001
Gender (1 = <i>male</i> , 2 = <i>female</i>)	-0.1	0.04
Single (1 = <i>yes</i> , 0 = <i>no</i>)	-0.11	0.03
Retired (1 = <i>yes</i> , 0 = <i>no</i>)	0.2	0.06
Christian (1 = <i>yes</i> , 0 = <i>no</i>)	0.05	0.27
Upper income (1 = <i>yes</i> , 0 = <i>no</i>)	-0.06	0.26
Change is happening too fast for me to control (1 = <i>strongly agree</i> , 4 = <i>strongly disagree</i>)	0.08	0.01
I am an optimist concerning my future (1 = <i>strongly agree</i> , 4 = <i>strongly disagree</i>)	-0.28	.0001
How optimistic are you about the future (1 = <i>very optimistic</i> , 5 = <i>very pessimistic</i>)	-0.12	0.0006
Humankind dealing with Quality of Life (1 = <i>very responsibly</i> , 4 = <i>not at all responsibly</i>)	-0.04	0.25
Humankind dealing responsibly with energy (1 = <i>very responsibly</i> , 4 = <i>not at all responsibly</i>)	0.05	0.13

(1 = *very worried*, 4 = *not at all worried*) [$R^2 = 0.28$; Adj $R^2 = 0.26$; Significance Level < .0001]

The results of the 'context' variables are about as expected. Older respondents think less frequently about the future than do younger respondents (Table 3), and worry less about the future (see the 'Retired' variable in Table 4). This first finding is consistent with previous research findings (e.g., Ono 2003; Gidley 1998; Hicks 1996; Rubin 1998) No age variable was significant in the imagining the future model. Males tend to think more frequently about the future (Table 3) and worry less about the future (Table 4) than do females. These findings are similar to those reported by Seth (1986), Sunberg et al. (1983) and Conway et al. (2003). Like the age variable, gender does not appear to influence imagining the future. Single respondents think less about the future, worry more about the future, and less clearly imagine the future. One could speculate that uncertainties surrounding their marital status dominate their views of the future. Lastly, upper income respondents think less about the future but worry more about the future.

TABLE 5
REGRESSION MODEL: IMAGINING THE FUTURE

Variable	Parameter Estimate	Significance Level
Intercept	2.42	0.0001
Thinking About the Future (1 = <i>very frequently</i> , 4 = <i>not at all frequently</i>)	0.45	0.0002
Worrying About Future (1 = <i>very worried</i> , 4 = <i>not at all worried</i>)	-0.22	0.04
Actively planning the Future (1 = <i>very actively</i> , 4 = <i>not at all actively</i>)	0.04	0.35
US citizen (1 = <i>yes</i> , 0 = <i>no</i>)	-0.09	0.08
Single (1 = <i>yes</i> , 0 = <i>no</i>)	0.07	0.16
Secular (1 = <i>yes</i> , 0 = <i>no</i>)	0.15	0.003
When you hear the word future, how many years into the future do you think? (yrs)	-0.001	0.11
Change is happening too fast for me to control (1 = <i>strongly agree</i> , 4 = <i>strongly disagree</i>)	-0.07	0.04
There are many paths open to me for my future (1 = <i>strongly agree</i> , 4 = <i>strongly disagree</i>)	-0.06	0.08
I have complete control over my future (1 = <i>strongly agree</i> , 4 = <i>strongly disagree</i>)	0.03	0.21
Humankind dealing responsibly with energy (1 = <i>very responsibly</i> , 4 = <i>not at all responsibly</i>)	0.08	0.03
Humankind dealing with social concerns (1 = <i>very responsibly</i> , 4 = <i>not at all responsibly</i>)	0.01	0.01
Humankind dealing with global warming (1 = <i>very responsibly</i> , 4 = <i>not at all responsibly</i>)	-0.09	0.006
Humankind's future will be radically different from today (1 = <i>strongly agree</i> , 4 = <i>strongly disagree</i>)	-0.06	0.01
Change is happening too fast for humanity to control (1 = <i>strongly agree</i> , 4 = <i>strongly disagree</i>)	0.06	0.02
How optimistic are you about the future (1 = <i>very optimistic</i> , 5 = <i>very pessimistic</i>)	0.04	0.21
Will humans become extinct? (1 = <i>yes</i> , 2 = <i>no</i>)	-0.08	0.07

(1 = *very clearly*, 4 = *not at all clearly*) [$R^2 = 0.19$; Adj $R^2 = 0.16$; Significance Level < .0001]

Respondents who believe that humankind is not dealing well with major issues generally think more about the future (Table 3), and are less able to imagine the future clearly. Respondents who believe that humans will become extinct think more frequently about the future than other respondents and, somewhat paradoxically, are less able to imagine the future clearly.

CONCLUSIONS

This exploratory research revealed that cognition about the future is complex. The simultaneous equation model results suggest that that the three endogenous

variables, thinking, worrying, and imagining about the future, interrelate in complicated ways. Worrying may prompt more thinking about the future but if one cannot well imagine the future, worry may actually act to constrain thinking about the future. It appears that the key to helping people better think about the future is being able to help them better imagine the future. Future research needs to explore adding other constructs to this nascent model, such as the outputs of thinking about the future (e.g., personal plans).

It appears that one's nature, context, and beliefs have sophisticated and rich impacts on thinking, worrying, and imagining about the future. For example, results presented above suggest that women worry more about the future but think less about the future. Is this a genetic and/or cultural trait? This research could not provide an answer. Certainly, one's context, as described by one's age, for example, impacts thinking about the future. Beliefs, however, appear to have the most impact. Not feeling in control of one's life may act to constrain thinking about the future, a rather ironic outcome. Religious beliefs appear to strongly impact thinking about the future as do attitudes about the potential benefits of thinking about the future. If people believe the future is hopeless, then they may fulfill their pessimism by not thinking about the future and enduring more hardships than most.

Can people be trained to think more effectively about the future? We cannot make a definitive statement on this question. This is because effective thinking about the future was not measured (and would be a challenging future research topic in its own right). However, imagining about the future appears to have positive impacts on thinking about the future. It can be argued that better imagining the future can also reduce worries about the future, which may also unblock people's ability to think more about the future. Having people write scenarios or participate in other mental exercises could significantly improve people's ability to imagine the future. Improved abilities to deal with the future could help people better cope with day-to-day struggles as well as help people better plan their futures, businesses and society.

It was hard to disentangle personal futures from those of humanity. Thus, future research could focus on specific topics of future inquiry, such as one's health and finances or the state of one's company and country. Future research should also endeavor to better understand how people experience the future and where, when, and how effectively they think about the future. Ties to research in risk perception and decision making under uncertainty should be explored.

REFERENCES

- Agarwal, A., & Tripathi, K. (1984). Influence on prolonged deprivation, age, and culture on the development of future orientation. *European Journal of Social Psychology*, **14** (4), 451-453.

- Bouffard, L. (1982). Future time perspective in Africans. *Ethnopsychologie*, **37**, 15-31.
- Bouffard, L., Bastin, E., & Lapierre, S. (1996). Future time perspective according to women's age and social role during adulthood. *Sex Roles*, **34**, 253-285.
- Brandstadter, J., Wentura, D., & Schmitz, U. (1997). Age-related changes in future time perspectives: Cross-sectional and longitudinal findings. *Zeitschrift für Psychologie*, **205**, 377-395.
- Conway, M., Wood, W., Dugas, M., & Pushkar, D. (2003). Are women perceived as engaging in more maladaptive worry than men? A status interpretation. *Sex Roles*, **49** (1/2), 1-10.
- Fingerman, K., & Perlmutter, M. (1995). Future time perspective and life events across adulthood. *Journal of General Psychology*, **122**, 95-111.
- Georgia Tech. University (2004). GVVU's www user surveys. Retrieved October 4, 2004 from http://www.gvu.gatech.edu/user_surveys
- Gidley, J. (1998). Prospective youth visions through imaginative education. *Futures*, **30** (5), 395-408.
- Hicks, D. (1996). A lesson for the future: Young people's hopes and fears for tomorrow. *Futures*, **28** (1), 1-13.
- Lang, F., & Carstensen, L. (2002). Time counts: Future time perspective, goals, and social relationships. *Psychology and Aging*, **17** (1), 125-139.
- Nurmi, J. (1982). Time perspective and future orientation in psychological research. *Psychologia*, **17**, 305-311.
- Nussbaum, S., Liberman, N., & Trope, Y. (2006). Predicting the near and distant future. *Journal of Experimental Psychology – General*, **135** (2), 152-161.
- Ono, R. (2003). Learning from young people's image of the future: A case study in Taiwan and the US. *Futures*, **35**, 737-758.
- Roeckelein, J. (2000). *The concept of time in psychology*. Westport, CT: Greenwood Press.
- Rubin, A. (1998). *The images of the future of young Finnish people* (Sarja/Series D-2: 1998). Turku, Finland: The Turku School of Economics and Business Administration.
- Seth, U. (1986). Future time orientation of boys and girls of different educational facilities. *Indian Journal of Current Psychological Research*, **1**, 107-111.
- Strathman, A., & Joireman, J. (2005). *Understanding behavior in the context of time*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Sunberg, N., Poole, M., & Tyler, J. (1983). Adolescents' expectations of future events: A cross-cultural study of Australians, Americans, and Indians. *International Journal of Psychology*, **18** (5), 415-427.
- Theil, H. (1978). *An introduction to econometrics*. Englewood Cliffs, NJ: Prentice Hall.
- Tonn, B., & Hemrick, A. (2004). Impacts of the use of e-mail and the internet on personal trip-making behavior. *Social Science Computer Review*, **22** (2), 1-11.
- Tonn, B., Conrad, F., & Hemrick, A. (2006). Cognitive representations of the future: Survey Results. *Futures*, **38**, 810-829.
- Zaleski, Z. (2005). Future orientation and anxiety. In A. Strathman, and J. Joireman (Eds.) *Understanding behavior in the context of time* (pp. 125-141). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Zimbardo, P., & Boyd, J. (1999). Putting time in perspective: A valid, reliable individual-difference metric. *Journal of Personality and Social Psychology*, **77**, 1271-1288.