Journal of Psychopathology and Behavioral Assessment (2022) 44:376–395
https://doi.org/10.1007/s10862-021-09910-2

Why We Imagine Our Future: Introducing the Functions of Future Thinking Scale (FoFTS)

D. J. Hallford[1] · A. D'Argembeau[2]

Accepted: 19 June 2021 / Published online: 19 July 2021

Abstract

Imagining future events is a crucial cognitive process in adaptation, but impairments have been identified in a range of mental disorders. Taking a functional approach to future thinking, this paper reports on the development and deployment of a scale to assess the frequency of self-reported functions of future thinking: The Functions of Future Thinking Scale (FoFTS). In Study 1 ($N = 565$) items were developed and subjected to exploratory factor analysis. Ten factors were extracted representing distinct purposes of future thinking: Boredom Reduction, Death Preparation, Identity Contrasting, Negative Emotion Regulation, Social Bonding, Goal Setting, Planning, Problem-Solving, Decision-Making, and Positive Emotion Regulation. Construct, convergent and divergent validity were established. The FoFTS predicted unique variance in transdiagnostic variables even after accounting for frequency, attitudes, and clarity of future thought. In Study 2 ($N = 467$), confirmatory factor analysis showed the 10-factor FoFTS model was an excellent fit to the data. In Study 3 ($N = 106$) it was shown that participants with probable major depression, relative to non-depressed participants, reported a significantly different profile of future thinking for different purposes. In conclusion, the FoFTS can be used to examine future thinking from a functional perspective and may help enrich models of psychopathology.

Keywords Future thinking · Autobiographical memory · Episodic future thinking · Factor analysis · Scale development · Major depression

Future thinking refers to the mental simulation of future events or circumstances that one might be personally involved in (Atance & O'Neill, 2001), and is used frequently in daily life (Barsics et al., 2016; D'Argembeau et al., 2011). Future thinking is thought to be reliant on, but distinct from, mentally simulating events from memory (Suddendorf, 2010; Schacter et al., 2007). Indeed, anticipating future experiences involves the recall and recombination of information stored in the form of semantic memory (abstracted knowledge, ideas, and concepts) and episodic memory (autobiographical events with contextual details) in order simulate possible circumstances.

Research has indicated that future thinking is impaired or abnormal in a range of mental disorders, such as depression, schizophrenia-spectrum disorders, and bipolar disorders (Hallford, 2019; Hallford et al., 2018). There is substantial variation between individuals on various dimensions of future thinking, and a range of measures have been used to capture these differences. These have focused on variables such as the frequency or clarity of thoughts of one's future self (McElwee & Haugh, 2010), preferences and attitudes towards future-oriented thinking (Webster, 2011; Zimbardo & Boyd, 1999), the ability to imagine specific, spatiotemporally located future events (Hallford et al., 2019; Levine et al., 2002), and consideration of the future consequences of actions (Strathman, Gliecher, Boninger, & Edwards, 1994). Other studies have assessed particular phenomenological characteristics of future thinking, such as the amount of detail (e.g., Beaty et al., 2019; Blackwell et al., 2013; Cole et al., 2013), the use of verbal or mental imagery (e.g., Beaty et al., 2019; Blackwell et al., 2013), and perspective (e.g., first person or observer perspectives; D'Argembeau & Van der Linden, 2004; Vasquez & Buehler, 2007). Such research has helped clarify the role of future thinking in attitudes (Zimbardo & Boyd, 1999), behaviour (Zimbardo et al., 1997), and mental well-being (Raffard et al., 2013; Rush & Grouzet, 2012; Webster & Ma, 2013; Zimbardo & Boyd, 1999).

✉ D. J. Hallford
david.hallford@deakin.edu.au

[1] School of Psychology, Deakin University, 221 Burwood Hwy, Burwood, Melbourne, Victoria 3125, Australia

[2] Psychology and Neuroscience of Cognition Research Unit, Department of Psychology, University of Liège, Liège, Belgium

One understudied approach to future thinking is from a functional perspective. That is, examining the explicit purposes of why individuals engage in future thinking. If one assumes that the capacity to mentally generate future scenarios has evolved due to it giving humans some adaptive advantage, then it follows that it serves particular functions (Suddendorf, 2010). Much research to date has examined future thinking by studying its effects on specific decision-making tasks or behavioural outcomes (see Schacter et al., 2017 for a recent review). Research on these effects has tended to stipulate reasons for participants to engage in future thinking by nature of the research question (e.g., to think of a positive future event to gauge attitudes, consider specific outcomes of a decision, or solve a problem). This approach isolates the use of future thinking for a prescribed purpose. We propose that another fruitful approach would be to assess a range of reasons why, in daily life, individuals use future thinking, and how often they do so. Such a measure could help predict the association between future thinking and other traits, emotional states, and behavioural outcomes as distinct from the general tendency to think about the future (i.e., time perspective) and the specific content of thoughts (e.g., imagining feared outcomes during a particular event). An example in depression will illustrate this distinction. Depressive symptoms are associated with less *frequent* thoughts of specific positive future events (Hallford, 2019), and less *detail and use of mental imagery* which predicts lower anticipation of pleasure (Hallford et al., 2020). A lack of anticipation or experience of pleasure is a key criterion of depression and a maintaining factor (American Psychiatric Association, 2000). Here we can see that these two levels of analysis implicate future thinking in a model of depressive psychopathology. Incorporating a functional approach would enrich this by also considering whether depressive symptoms are associated with less propensity to imagine future events *as a means* to, for example, promote positive feelings (up-regulating positive emotion function), decide whether or not to engage in a behavior (decision-making function), or establish what one's goals would be by doing so (goal-setting function). This functional level of analysis therefore considers the reasons for which future thinking is being used and represents a separate target for specific interventions. Indeed, much of cognitive-behavioural therapy involves bringing awareness to the purposes of different thoughts, feelings, and behaviours, and promoting their use in adaptive ways. For example, people are taught to imagine the consequences of avoiding or enacting certain behaviours (decision-making function), to habituate to adverse emotional reactions (down-regulating negative emotions function), and to plan out specific actions (planning function).

Some researchers have adopted this level of analysis through explicitly asking individuals the purpose of future thinking, and providing a limited set of options (Barsics et al., 2016; D'Argembeau et al., 2011). In other studies people are asked to imagine a series of future events and to evaluate their perceived functions using rating scales (Duffy & Cole, 2020; Özbek et al., 2018; Rasmussen & Berntsen, 2013). To date, however, no standardized tool has been evaluated to assess individual variation in why people engage in future thinking. This approach has already been enormously beneficial in advancing understanding of autobiographical memory (e.g., Bluck et al., 2005; Webster, 1993), but is under-utilized in future thinking. Further, to our knowledge this functional approach to studying future thinking has not been used in the context of psychopathology. There would be a range of possible benefits to having such a standardized tool for future thinking: 1) it would allow researchers to more easily compare findings on the purposes/motivation for imagining future events and the frequency of this, 2) it would increase knowledge of the function and frequency of future thinking and correlates that can be integrated into models of normal and abnormal psychology, 3) it would facilitate study of how individual differences affect function and frequency of future thinking, and 4) changes in the frequency of future thinking can be assessed across different contexts, and as an outcome of targeted intervention, for example, in populations such as depression that exhibit deficits in future thinking (Hallford, 2019; Hallford et al., 2018), anticipation of pleasure (Hallford & Sharma, 2019) and impairments in reward valuation and hopelessness (Pulcu et al., 2014).

The aim of this study was to develop and psychometrically validate a self-report tool to measure the frequency of future thinking for various functions, henceforth referred as the Functions of Future Thinking Scale (FoFTS). Firstly, a pool of items referring to specific uses for future thinking was developed, and then subjected to factor analysis. Secondly, the relative frequency of functions was examined, and convergent and divergent validity was assessed by comparing the FoFTS with existing measures of future thinking and other variables with transdiagnostic relevance in mental health disorders. Importantly, the incremental validity of the FoFTS was assessed by examining whether it would predict variance in these transdiagnostic variables above other dimensions of future thinking including frequency, attitudes towards future thinking, and clarity of future thought. Thirdly, the FoFTS items were subjected to confirmatory factor analysis in a separate sample to further assess the model fit. Fourthly, the FoFTS was deployed in a sample of individuals with probable depression to assess whether this psychopathology affected the purposes of future thinking.

Study 1 – Development and Validation

Methods

Participants and Procedure

Following approval from the university human research ethics committee, a sample of 725 participants were recruited to participate in the study from social media platforms, including

Facebook, Instagram, and forums such as Reddit. The only inclusion criterion was to be 18 years of age or older. Participation was voluntary, and no incentives were offered. After removing participants that did not complete all of the FoFTS items ($n = 153$), as well as participants that answered all items on all the scales with either the lowest or highest scores ($n = 8$), the sample used for analysis consisted of 564 people, allowing for an adequately stable factor solution (MacCallum et al., 1999). Participants completed the items in this survey as part of a larger survey which took an average of 28.4 ($SD = 39.8$) minutes to complete. This large standard deviation was due to significant variation in completion time for qualitative questions that were not relevant to this study.

The mean age of the sample was 34.2 years ($SD = 12.8$, 52.2% women). The majority of the participants identified as Caucasian (77.6%), with the remaining identifying as Asian (6.8%), African (6.0%), Latino or Hispanic (3.6%), Arab or Middle Eastern (0.2%), and other (5.9%). With respect to highest educational achievement, 23.8% of the sample had postgraduate qualifications, 46.5% had bachelor degrees, 14% had completed a diploma or certificate, 15.5% had completed high school, and 0.2% had finished primary school. The majority of the sample reported being in paid work (85.3%), and 36.5% were currently studying. The majority were in a romantic relationship, with 33.2% married and living together, 2.3% married but not living together, 14.7% living together but not married, and 12.4% neither married nor living together. The remainder were single (37.4%).

Materials

Functions of Future Thinking Scale (FoFTS) The test items were developed based on a range of functions of future thinking identified through previous research, review articles on future thinking, and studies of functions of autobiographical memory (e.g., Atance & O'Neill, 2001; Barsics et al., 2016; Bluck et al., 2005; Schacter et al., 2017; Szpunar et al., 2014; Webster, 1993). A pool of items was generated. An iterative process was then undertaken with possible functions and items discussed by authors. This resulted in a final pool of 80 items, with eight items used to assess each of 10 different proposed functions: solving future problems, goal setting, planning out sequences of actions, thinking of outcomes of decisions, upregulating positive emotion, socially bonding/increasing closeness with others, downregulating negative emotion in relation to upcoming experiences, reducing boredom and entertaining oneself, thinking about the type of person one might want to be, and anticipating and adjusting to the idea of death. This list of functions was not presumed to be exhaustive. Rather it consisted of 10 functions that were represented in current literature on future thinking and had some relevance to psychopathology. Prior to completing the items, instructions were provided to participants advising them that they would read a series of statements about how and why they think about their own future. They were asked to respond to each item to indicate how frequently they thought about their personal future for the purposes that were indicated (see Appendix 1 for full instructions). They were told that this thinking could relate to things that they could experience very soon, or very far into the future. To assess the frequency of future thinking for each item a 5-point self-report scale was used: 1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Very Often. The items were blocked according to the proposed function they referred to, and the order of presentation of these blocks was randomized to mitigate order effects.

It was thought that responses to the FoFTS items would likely share variance that reflected a general tendency to think about the future, and therefore this was also measured. This could then be controlled for in analyses to estimate how each function might uniquely vary with one another, and how specific functions might have incremental validity in prediction in addition to overall frequency of future thinking. Items to assess how frequently individuals thought about their future generally, at different time distances, were taken from Hallford (2019). The instructions for these items were "These questions are about how far into your future you tend to think", which was followed by a series of stems, "How frequently do you tend to think about your future for things that will happen…", with the branches of "later that day, tomorrow, over the next week, over the next year, in over a year, and in over ten years". The same 5-point scale was used as above. As indicated through factor analysis in their previous use, the items relating to the 'short-term future' ('later that day', 'tomorrow', 'over the next week') were averaged together and items relating to the 'long-term future' ('over the next year', 'in over a year', and 'in over ten years') were averaged together to form two subscales which showed acceptable internal reliability (both McDonald's $\omega = .82$). They correlated only weakly ($r = .16$, $p < .001$), indicating they were largely distinct processes.

Measures to Assess Construct Validity

To assess convergent and divergent validity, two measures of future thinking and a measure of functions of autobiographical memory were used. Four variables with transdiagnostic relevance to mental health disorders were also used, described below. To reduce the burden on participants, the measures used in the study were distributed across several different survey forms (all containing the FoFTS items) and presentation of these forms was randomized across participants. Consequently, a subset of 182 participants completed the validity measures, except for the Positive and Negative Affect Scale (MacKinnon et al., 1999) which was completed by 153 participants.

Zimbardo Time Perspective Scale (ZTPS; Zimbardo & Boyd, 1999) Three-item versions of the future negative and future positive subscales from the self-report ZTPS were used to assess how negative or positively-valenced people judged their future thinking as being (Košťál et al., 2016). A five-point response scale was used: 1 = Very Untrue, 2 = Untrue, 3 = Neutral, 4 = True, and 5 = Very True. The internal reliability of the subscales was acceptable: future negative McDonald's ω = .83, future positive McDonald's ω = .68.

Future Selves Questionnaire (FSQ; McElwee & Haugh, 2009) The clarity subscale of the FSQ was used to assess the clarity with which people have thoughts about themselves in the future (e.g., 'When I picture my future, I see clear and vivid images'). This subscale was initially validated with five items, however, in this sample the reverse-scored item correlated poorly with the other items in this sample (average $r = .11$) and was therefore removed. A 6-point response scale was used ranging from 1 = Not True at all for me to 6 = Completely True for Me. The internal reliability of the scale was good, McDonald's ω = .85.

Thinking about Life Experiences Scale (TALE; Bluck et al., 2005) The TALE is a self-report 15 item measure of how frequently people use their autobiographical memory for specific functions. Five items are used to assess each of three functions: self, directive-behavioural, and social bonding. A five-point response scale was used: 1 = Almost Never, 2 = Seldom, 3 = Occasionally, 4 = Often, and 5 = Very Frequently. The internal reliability of the subscales was good: self-function McDonald's ω = .88, directive-behavioural MacDonald's ω = .86, and social bonding McDonald's ω = .87.

Psychological Variables with Transdiagnostic Relevance

Life Orientation Test (LOT-R; Carver & Scheier, 1985) The LOT-R was used to assess optimism, as defined by the tendency to hold positive generalized outcome expectancies. Optimism influences mental and physical well-being in a transdiagnostic manner, promoting adaptive behaviours and cognitive responses to stressors (e.g., Conversano et al., 2010; Gallagher et al., 2020). This short-form uses three positively-worded items, and is psychometrically consistent with the full scale (Hallford et al., 2013; Lai & Cummins, 2013). Participants responded using five-point response scale: 1 = I Disagree a Lot, 2 = I Disagree a Little, 3 = I neither Agree nor Disagree, 4 = I Agree a Little, and 5 = I Agree a Lot. The internal reliability of the scale was good (McDonald's ω = .85).

New General Self-Efficacy Scale (NGSE; Chen et al., 2001) NGSE was used to assess self-efficacy, which has relevance for a range of emotional disorders and is considered a modifiable factor in mental health and interventions (Barlow et al., 2017). This eight-item self-report scale was used to assess generalized perceptions of competency in achieving tasks or goals. Participants responded using a five-point response scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Disagree nor Agree, 4 = Agree, and 5 = Strongly Agree. The internal reliability of the scale was good (McDonald's ω = .93).

Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990) The PSWQ assesses future-oriented, negativistic repetitive thinking, which is a transdiagnostic construct and is found to be increased in a range of disorders (Drost et al., 2014; McEvoy et al., 2013). A three-item short form of the PSWQ was used to assess the tendency to worry. It has demonstrated good psychometric qualities compared to the standard form (Kertz et al., 2014). Participants responded using a five-point response scale with anchors of 1 = Not at All Typical of Me at All, and 5 = Very Typical of Me. The internal reliability of the scale was good (McDonald's ω = .90).

Positive and Negative Affect Scale (PANAS; MacKinnon et al., 1999) The self-report, five-item positive affect subscale from the PANAS was used to assess positive affect, for which alterations are observed in many disorders (Carl et al., 2013). Participants responded to five positive adjectives to indicate how extent they felt that way using a five-point response scale: 1 = Very Slightly or Not at All, 2 = A Little, 3 = Moderately, 4 = Quite a Bit, and 5 = Extremely. The internal reliability of the scale was good (McDonald's ω = .88).

Data Analytic Approach

Parallel analysis (Horn, 1965) was conducted on the FoFTS items to determine the number of factors to extract using the R package version 3.6.1. Parallel analysis involves the creation of a random dataset using Monte Carlo simulation with the same number of observations and variables as the original dataset under consideration. Eigenvalues from this random dataset are then compared to eigenvalues extracted from the actual dataset to assess the number of factors that are likely to occur by chance, and those that could be retained. Given the data were ordinal in nature, the ordinary least squares estimator technique was used to extract factors (Gaskin & Happell, 2014), with an oblique rotation using the oblimin function. The fit indices used were the Tucker-Lewis Index (TLI) of Factor Reliability, the root mean square error of approximation (RMSEA), and the root mean square residual. These fit indices were assessed relative to guidelines provided by Hu and Bentler (1999): TLI ≥ .95, RMSEA ≤ .06, and RMSR ≤. 08. The remaining statistics were performed in SPSS Version 25. Descriptive statistics were generated, and the internal reliability amongst the items was assessed using McDonald's ω. Pearson correlations were used to assess zero-

order correlations, and partial correlations were used to assess the associations between the FoFTS subscales and other measures while controlling for the effect of short-term and long-term general future thinking subscales. This would establish whether the FoFTS shared variance with other variables distinct from the frequency of future thinking, and therefore would provide evidence for its incremental validity. Given the number of correlations and inflated risk of Type 1 error, the alpha level was set at .001 for these analyses. A repeated measures ANCOVA was conducted to compare the mean scores of the FoFTS subscales, while controlling for short-term and long-term general future thinking. Bonferroni corrections were used to control for Type 1 errors in pairwise contrasts. A further test of incremental validity was attempted by using hierarchical multiple regressions to see if the FoFTS would predict unique variance in optimism, self-efficacy, and worry after accounting for variance predicted by attitudes towards the future (using the ZTPS) or clarity of future thought (using the FSQ). The PANAS could not be included in these analyses as it was in a different form of the survey to the ZTPS and FSQ.

Results

Exploratory Factor Analysis of the FoFTS Items

The FoFTS items data were suitable for factor analysis, as indicated the Kaiser-Meyer-Olkin measure of sampling adequacy (.956), significant results of Bartlett's Test of Sphericity ($p < .001$), all diagonal elements on the anti-image correlation matrix being > .9, and off-diagonals 0.01–0.25. All communalities were above 0.52, with the exception of one item which was 0.42.

Parallel analysis indicated 10 factors could be extracted from the item pool (see Fig. 1). A ten-factor model was specified, and compared with nine and eleven factor models. The ten-factor model explained 61% of the variance in responses, and each of the eight items loading onto their hypothesized latent variables in a theory-congruent way. Item loadings were all above .50, and typically above .60, with no cross-loadings above .20. The sum of square loadings ranged from 6.1 to 3.8. The fit indices showed the model was an acceptable fit to the data: TLI = .89, RMSEA = .046, RMSR = 0.02.

The nine-factor model explained 59% of the variance, with the only difference being that the items assessing planning and decision-making loaded onto one factor, albeit, some with loadings < .40. The sum of square loadings ranged from 6.1 to 4.1. The fit indices showed the model was a slightly poorer fit: TLI = .87, RMSEA = .050, RMSR = 0.03.

The 11-factor model explained 62% of the variance in responses, again with items loading in a similar manner. The 11th factor was accounted for largely by one item cross-loading at .22 from the decision-making factor, and another from the goal setting factor at .43. The sum of square loadings ranged from 3.9 to 1.6, with the 11th factor having a loading of only 0.8. The fit indices were: TLI = .90, RMSEA = .050, RMSR = 0.04.

Taking the statistical tests into account, the 10-factor model was the best fit to the data and was consistent with the hypothesized latent variables that the items were designed to assess. The 11-factor model had a seemingly redundant factor, and therefore was not a plausible structure. The nine-factor model

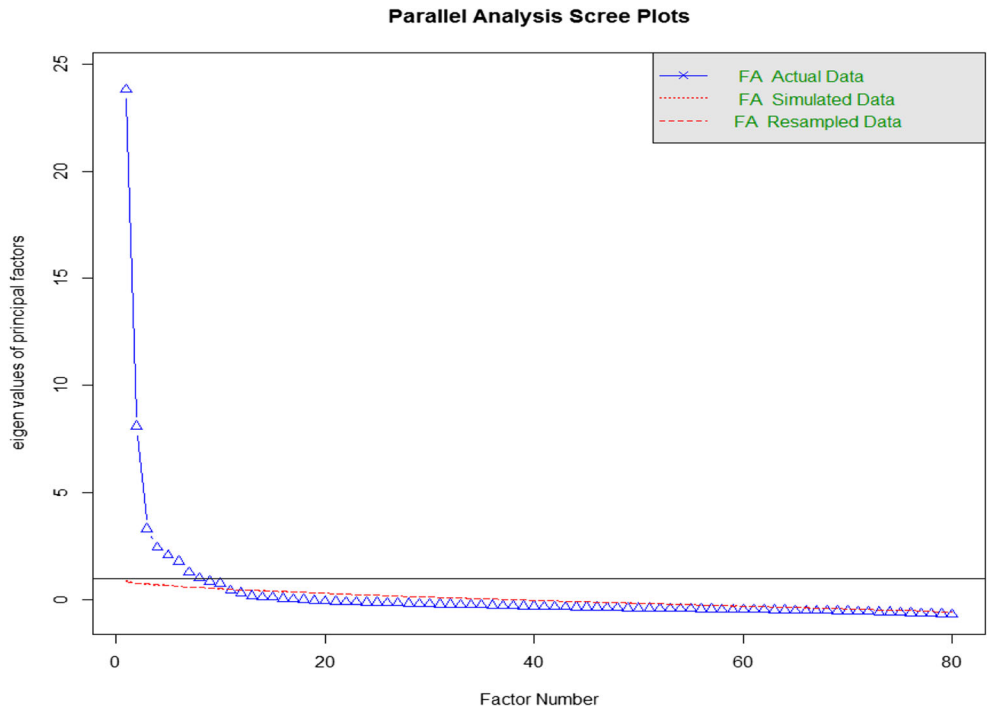

Fig. 1 Scree plot results of the parallel analysis on the initial pool of 80 items

offered a more parsimonious factor structure relative to the 10-factor model. However, planning and decision-making are theoretically distinct constructs. Further, the subscales correlated at $r = 0.55$ in the 10-factor model, indicating the majority of their variance was not shared.

An attempt was then made to trim the number of items down to three per factor, so as to make the scale more feasible for use. To do this, the three items with strongest factor loadings and weakest cross-loadings from each factor in the 10-factor model were subjected to another parallel analysis in the same dataset. The results using this 30-item pool indicated a nine or 10 factor model (see Fig. 2). These models were extracted, along with an eight-factor model for comparison. The nine-factor model explained 63% of variance in responses, with assessing planning and goal setting items loading onto one factor (sum of square loadings ranging from 2.5 to 1.8). The fit indices were: TLI = .93, RMSEA = .052, RMSR = 0.03. The eight-factor model explained 61% of the variance, with planning, goal setting, and decision-making items loading onto one factor (sum of square loadings ranging from 3.6 to 1.2). This model was a poorer fit compared to the nine-factor model: TLI = .90, RMSEA = .041, RMSR = 0.06. Lastly, the ten-factor model showed the items loading onto the hypothesized latent variables, explaining 65% of the variance (sum of square loadings ranging from 3.0 to 2.0), and fit indices showing a superior fit relative to the eight and nine-factor models: TLI = .96, RMSEA = .041, RMSR = 0.02. On all of the models, item factors loadings were generally strong and cross-loadings were low. In particular, the ten-factor model showed a clean factor structure, with all loadings ≥ .55 and few cross-loadings ≥ .10. The statistical evidence indicated the ten-factor model was the best fit to the data, and was again theory-congruent in terms of items loading onto conceptually different factors. Given that, the 10-factor model was retained.

Table 1 shows the statistics for the 30-item, ten-factor model of the FoFTS. The Death Preparation subscale had a slight negative skew, and the goal setting, planning, and problem-solving, and decision-making scales all had slight positive skews, although within acceptable limits to be considered normally distributed. The internal reliability of the subscales ranged from good (problem-solving; McDonald's ω's = .78) to excellent (boredom reduction; McDonald's ω's = .91).

FoFTS Subscale Analyses

A repeated measures ANCOVA, controlling for frequency of short and long-term general future thinking showed a significant omnibus test, $F(6.2, 3497.8) = 12.7$, $p < .001$. Figure 3 depicts the mean scores of the subscales. Follow-up pairwise comparisons indicated that future thinking was most frequently reported as being used for planning, setting goals, and decision-making, and these did not differ in frequency from one another. Next in frequency was future thinking for problem-solving and identity contrasting (both significantly different from other subscales, with no significant difference between them). Positive emotion regulation was the next most frequent, followed by negative emotion regulation and social bonding, then boredom reduction, and death preparation. The effect sizes for significant differences between the scale mean scores varied from large ($d = 1.27$; planning > death preparation) to small ($d = 0.16$; decision-making > identity contrast).

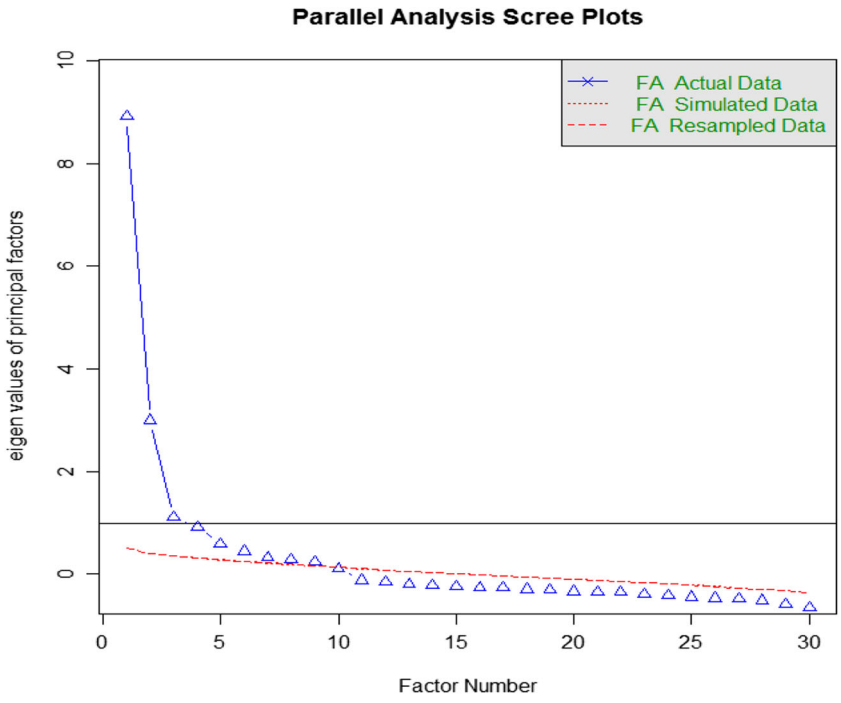

Fig. 2 Scree plot results of the parallel analysis on the refined pool of 30 items

Table 1 Study 1 Descriptive Statistics, and Factor Loadings for the FoFTS Subscales ($N = 564$)

Item	Boredom reduction	Death preparation	Identity contrast	Negative emotion regulation	Social bonding	Goal Setting	Planning	Problem-solving	Decision-making	Positive emotion regulation
McDonald's ω	.91	.90	.86	.84	.82	.82	.82	.78	.81	.81
Mean (*SD*)	2.79 (1.14)	2.47 (1.17)	3.56 (0.94)	2.97 (1.02)	3.08 (0.97)	3.71 (0.85)	3.74 (0.82)	3.52 (0.82)	3.70 (0.79)	3.40 (0.79)
Skew (Skew statistic/*SE*)	−0.31	−3.59	−0.45	−1.13	−2.29	−5.15	−3.84	−3.33	−3.93	−2.10
Kurtosis (Kurtosis statistic/*SE*)	5.03	4.87	1.01	2.77	2.32	0.77	0.97	0.90	1.03	2.39
Sum of squares loading	2.48	2.35	2.13	1.99	1.90	1.90	1.82	1.69	1.72	1.55
1. Just to keep my mind active, when I have nothing else to do	**.84**									
2. To pass time when I'm bored	**.92**									
3. To reduce boredom	**.80**									
4. When I want to think about my death		**.90**								
5. When I want to imagine the events leading up to my dying		**.85**								
6. To prepare myself for my death		**.83**								
7. To imagine I'll become the type of person I'd like to be			**.82**							
8. When I want to imagine myself developing in a positive way as a person			**.74**							.13
9. To imagine my personal identity improving over time			**.75**							
10. So I can get used to the idea of experiencing something bad				**.73**						
11. To steel myself before a negative experience				**.75**						
12. To come to an acceptance of how an upcoming event might cause me distress				**.80**						
13. When I want to maintain a friendship by discussing our personal futures together					**.78**					
14. To describe my future to others to make conversation interesting	.12				**.67**					
15. To bond with others	.12				**.70**					
16. To help me understand my personal goals						**.71**				
17. To establish what I'm trying to accomplish in my life						**.64**				
18. When I want to define what my ambitions in my life are						**.73**				
19. To plan out my actions in advance			.12				**.67**	.10		
20. To clarify a plan of action							**.59**			.14
21. To decide on a sequence in which to do things							**.73**			
22. To imagine myself solving problems that arise								**.79**		.11
23. To think about how I'll overcome problems that are upcoming								**.69**		.10
24. When I want to think about future problems that might occur, and how they will be solved				.11				**.56**		
25. To anticipate the best outcome from a range of decisions									**.62**	.16
26. When I want to think about what a personal decision will lead to						.13			**.69**	
27. When I want to anticipate what will happen depending on decisions							.11		**.67**	.11
28. To feel more positive emotions			.11							**.65**
29. To feel good about positive things that might happen to me							.11		.15	**.58**
30. When I want to improve my mood					.18					**.58**

Factor items in bold. Cross-loadings above .10 also displayed

Using zero-order correlations, the FoFTS subscales showed generally moderate bivariate correlations with one another (see Table 2), and only the death preparation subscale did not correlate with some of the directive-type functions (goal setting, planning, and decision-making). The weakest correlation was between the death preparation and goal setting subscales ($r = 0.06$), and the highest was between goal setting and planning ($r = .58$). As expected, all FoFTS subscales correlated significantly with short and long-term general future thinking. When controlling for short and long-term general future thinking, the correlations between the FoFTS subscales were generally in the same direction, but were attenuated, and more of them were not statistically significant, particularly in the case of the boredom reduction, negative emotion regulation, and death preparation subscales. In the sample as a whole, a paired-sample *t*-test showed that participants reported more frequent short-term future thinking ($M = 4.22$, $SD = 1.18$) relative to long-term future thinking ($M = 3.66$, $SD = 1.28$), $t(564) = 8.17$, $p < .001$, $d = 0.44$.

FoFTS and Demographics

Age correlated negatively with a number of the subscales, although most correlations were weak. Only the boredom function remained statistically significant after controlling for short and long-term general future thinking, indicating that a higher age was associated with less frequency of thinking about the future to reduce boredom. Education correlated with more frequent long-term general future thinking, but did not correlate with short-term or any specific function.

For gender, independent samples *t*-tests indicated women thought more frequently about their short-term future ($M = 4.34$, $SD = 1.19$) relative to men ($M = 4.07$, $SD = 1.16$), $t(559) = 2.66$, $p = .008$, $d = 0.29$, but there was no difference for long-term future (women: $M = 3.59$ [$SD = 1.32$]; men $M = 3.74$ [$SD = 1.24$], $t[559] = 1.33$, $p = .183$, $d = 0.11$). To assess differences on the FoFTS subscales, between-groups ANCOVAs controlling for short and long-term general future thinking were used. Men were found to report more frequent use of future thinking for reducing boredom (men: $M = 2.96$ [$SD = 1.13$]; women $M = 2.63$ [$SD = 1.12$], $F[1, 557] = 12.7$, $p < .001$, partial eta square = 0.02), preparing for death (men: $M = 2.83$ [$SD = 1.23$]; women $M = 2.15$ [$SD = 1.02$],], $F[1, 557] = 56.4$, $p < .001$, partial eta square = 0.09), and for negative emotion regulation (men: $M = 3.09$ [$SD = 1.06$]; women $M = 2.86$ [$SD = 0.98$],], $F[1, 557] = 10.0$, $p < .001$, partial eta square = 0.01), albeit all effects were small.

Construct Validity Analyses

Partial correlations between the FoFTS subscales and validity scales (controlling for short- and long-term general future thinking) are shown in Table 3. The FoFTS subscales that were related to negatively-valenced content (reducing boredom, preparing for death, and down-regulating negative emotion) correlated with the ZTPS future negative subscale, the FoFTS subscales related to constructive or positive content (goal setting, planning, decision-making, and up-regulating positive emotion) correlated with the ZTPS positive future subscale. More frequent future thinking for boredom reduction, death preparation, and negative emotion regulation were associated with less clarity of thinking about one's future. The FoFTS subscales concerned with boredom reduction, identity contrasting, and social bonding correlated with TALE self-function and social bonding scales, while more task-oriented FoFTS subscales (goal setting, problems-solving, decision-making, and imagining one-self changing with identify contrast) correlated with the TALE directive function. No FoFTS subscales correlated significantly with optimism at the $p < .001$ level. The FoFTS subscales pertaining to directive functions of goal setting, planning, decision-making, and up-regulating positive emotion were all positively correlated with higher self-efficacy. FoFTS subscales of down-regulation of negative emotion and problem-solving were positively correlated with higher worry as assessed using the PSWQ. Lastly, the FoFTS subscales of social bonding, goal setting, and up-regulation of positive emotion correlated with positive affect.

Two-step hierarchal multiple regressions were then conducted to test the incremental validity of the FoFTS scales in relation to attitudes towards future thinking and the clarity of future thought. The key findings are summarized here, with full results provided in Supplementary Table 1. The incremental validity over attitudes to future thinking using the negative and positive ZTPS scales was assessed first. With regard to optimism as the dependent variable, the first step of the regression showed that the ZTPS scales predicted 10.8% of variance in optimism ($F = 12.1[2, 183]$, $p < .001$, ZTPS future negative $\beta = -.15$, $p = .029$; ZTPS future positive $\beta = .29$, $p < .001$). The second step of the regression with the FoFTS predicted 9.6% additional variance (total 20.4%; F change = 3.2 [10, 173], $p = .001$). The ZTPS future positive scale was an independent predictor ($\beta = .20$, $p = .001$) as were several functions of future thinking: identity contrasting ($\beta = .22$, $p = .007$), negative emotion regulation ($\beta = -.26$, $p = .004$), and planning ($\beta = .20$, $p = .029$). For self-efficacy, similar results were found, with the ZTPS scales initially predicting 29.1% of variance ($F = 38.9[2, 183]$, $p < .001$, ZTPS future negative $\beta = -.27$, $p < .001$; ZTPS future positive $\beta = .45$, $p < .001$) and the FoFTS predicting 4.2% additional unique variance (total 33.3%; F change = 2.4 [10, 173], $p = .024$). While both ZTPS scales remained independent predictors (ZTPS future negative $\beta = -.26$, $p < .001$; ZTPS future positive $\beta = .29$, $p < .001$), no FoFTS subscales were found to uniquely predict variance although decision-making ($\beta = .13$, $p = .087$) and positive emotion regulation ($\beta = .14$, $p = .077$) showed non-

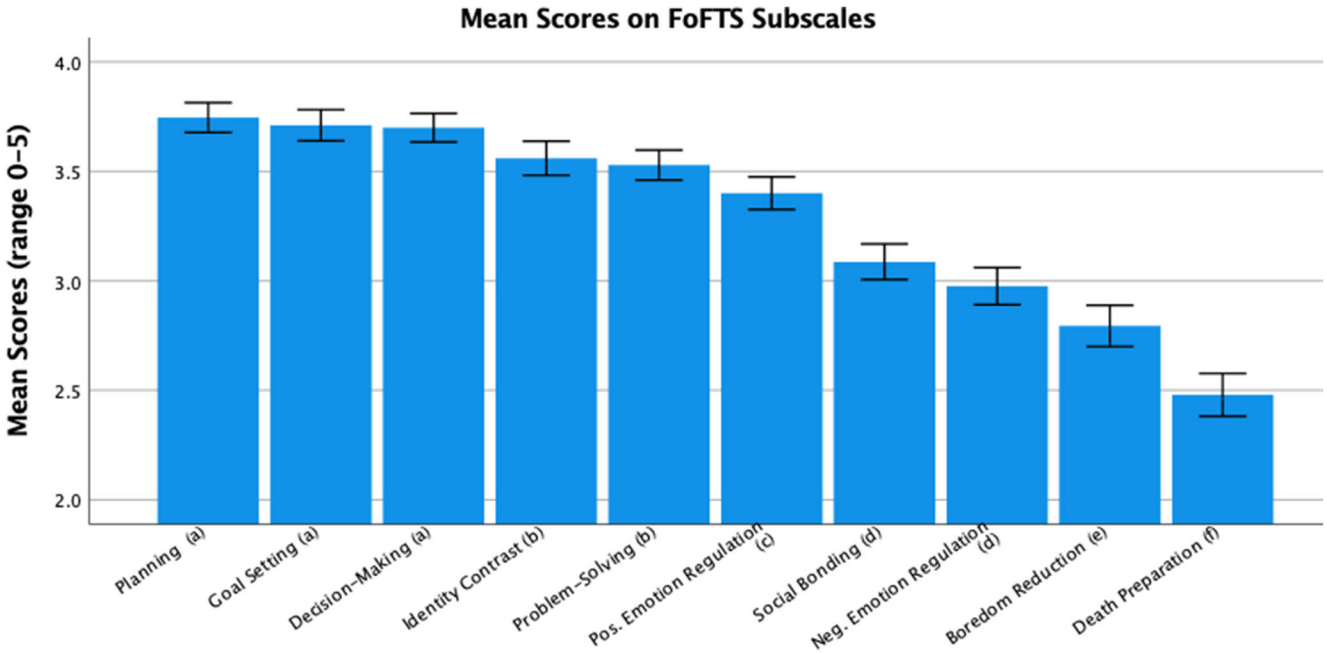

Fig. 3 Mean scores on the FoFTS subscales. Scales with different letters have means that are significantly from one another, following Bonferroni corrections (all at least $p < .05$)

trivial, non-significant beta weights. For worry, only the ZTPS future negative scale uniquely predicted variance (17.7%; $F =$ 20.8 [2, 183], $p < .001$, ZTPS future negative $\beta = .43$, $p < .001$). The FoFTS predicted 12.4% additional unique variance (total 30.1%; F change = 4.2 [10, 173], $p < .001$). The ZTPS future negative remained an independent predictor (ZTPS future negative $\beta = .29$, $p < .001$), and there were two FoFTS subscales that predicted unique variance: setting goals (g ($\beta = .18$, $p = .033$) and problem-solving ($\beta = .17$, $p = .041$), while negative emotion regulation had a non-trivial, but non-significant beta weight($\beta = .15$, $p = .069$).

Incremental validity of the FoFTS scales over clarity in thinking about one's future was then tested. With regard to optimism, clarity of future self predicted 5.1% of variance in optimism ($F =$ 10.9[1, 183], $p = .001$, $\beta = .23$, $p = .001$). The second step of the regression with the FoFTS predicted 16.6% additional variance (total 21.7%; F change = 4.8 [10, 173], $p < .001$). Clarity of future self remained an independent predictor ($\beta = .21$, $p = .006$) and several functions of future thinking were unique predictors: identity contrasting ($\beta = .25$, $p = .003$), negative emotion regulation ($\beta = -.20$, $p = .001$), planning ($\beta = .22$, $p = .015$), and problem-solving ($\beta = -.19$, $p = .028$). For self-efficacy, similar results were found with clarity of thinking of one's future self predicting 5.3% of variance ($F = 11.2$[1, 183], $p = .001$, $\beta = .24$, $p = .001$). The second step of the regression with the FoFTS predicted 21.2% additional variance (total 26.5%; F change = 6.2 [10, 173], $p < .001$). Clarity of future self was marginally non-significant as an independent predictor ($\beta = .14$, $p = .057$) and several functions of future thinking were unique predictors: boredom reduction ($\beta = -.19$, $p = .018$), negative emotion regulation ($\beta = -.19$, $p = .021$), decision-making ($\beta = .20$, $p = .012$), and positive emotion regulation ($\beta = .21$, $p = .010$). The planning function also had a non-trivial, but non-significant beta weight ($\beta = .15$, $p = .077$). Lastly, for worry, clarity of future self predicted 18.7% of variance ($F = 43.2$[1, 183], $p < .001$, $\beta = -.47$, $p < .001$). The second step of the regression with the FoFTS scales predicted 14.7% additional variance (total 33.4%; F change = 5.0 [10, 173], $p < .001$). Clarity of future self remained an independent predictor ($\beta = -.34$, $p < .001$) and two functions of future thinking were unique predictors: negative emotion regulation ($\beta = .17$, $p = .032$) and problem-solving ($\beta = .21$, $p = .011$). The settings goals function also had a non-trivial, but non-significant beta weight ($\beta = .14$, $p = .095$) as did positive emotion regulation ($\beta = -.13$, $p = .082$).

Discussion

The results provided support for a 10-factor model of the FoFTS that had good psychometric properties and correlated in theoretically-consistent ways with the validity measures. Importantly, the scales showed incremental validity by predicting additional variance in transdiagnostic variables when accounting for overall frequency of thinking about one's future, attitudes towards one's future, and the clarity of thinking about one's future. The next step taken was to confirm the 10-factor FoFTS model in a separate sample.

Table 2 Inter-correlations between FoFTS Subscales (Zero-Order Correlations on the Bottom Left Diagonal, and Partial Correlations Controlling for Short and Long-term General Future Thinking in the Top Right Diagonal)

	Age	Education	Short-Term Future	Long-Term Future	Boredom	Death Preparation	Identity Contrast	Negative Emotion Regulation	Social Bonding	Goal Setting	Planning	Problem-solving	Decision-making	Positive Emotion Regulation
Age	–		–	–	**−.23**	.00	−.17	−.17	−.13	−.11	−.01	−.08	−.07	−.02
Education		–	–	–	.07	.07	−.03	.01	.10	.08	.07	.10	.02	.06
Short-term future	−.08	.03	–	–	–	–	–	–	–	–	–	–	–	–
Long-term future	**−.18**	**.14**	**.16**	–	–	–	–	–	–	–	–	–	–	–
Boredom	**−.27**	.10	**−.14**	**.33**	–	**.35**	**.16**	**.39**	**.45**	.13	.13	**.29**	.10	**.27**
Death Prep	−.08	.11	**.15**	**.37**	**.43**	–	.03	**.43**	**.24**	−.12	−.06	.10	−.03	.06
Identity contrast	**−.23**	.03	**.22**	**.37**	**.26**	**.17**	–	**.18**	**.24**	**.44**	**.27**	**.30**	**.33**	**.45**
Negative emotion regulation	**−.22**	.05	**.27**	**.33**	**.46**	**.51**	**.31**	–	**.27**	.05	.05	**.29**	.08	.13
Social bonding	**−.19**	.13	**.27**	**.30**	**.48**	**.33**	**.34**	**.37**	–	**.25**	**.17**	**.24**	**.21**	**.43**
Goal setting	**−.17**	.13	**.30**	**.34**	**.25**	.06	**.53**	**.22**	**.36**	–	**.51**	**.31**	**.45**	**.40**
Planning	−.08	.09	**.31**	**.29**	**.25**	.08	**.37**	**.20**	**.29**	**.58**	–	**.35**	**.49**	**.33**
Problem-solving	**−.14**	.13	**.34**	**.31**	**.37**	**.22**	**.41**	**.41**	**.35**	**.44**	**.45**	–	**.33**	**.24**
Decision-making	−.13	.05	**.31**	**.28**	**.21**	.11	**.42**	**.22**	**.31**	**.54**	**.58**	**.44**	–	**.26**
Positive emotion regulation	−.10	.11	**.23**	**.38**	**.38**	**.22**	**.54**	**.28**	**.49**	**.50**	**.42**	**.38**	**.38**	–

All bolded correlations are $p < .001$, which was the designated cutoff to control for false positives

Table 3 Partial Correlations between FoFTS Subscales and Validity Scales Controlling for Short and Long-term General Future Thinking

	ZTPS future negative	ZTPS future positive	Future self clarity	TALE self-continuity	Tale directive-behavioural	Tale social bonding	Optimism	Self-efficacy	PSWQ	PANAS Positive
Boredom	**.28**	−.03	**−.29**	**.36**	.16	**.24**	.07	−.10	.16	.16
Death Prep	**.39**	.04	**−.33**	**.31**	.18	.22	−.04	−.08	.22	.20
Identity contrast	.03	.22	.01	**.30**	**.37**	**.35**	.21	.20	.11	.12
Negative emotion regulation	**.37**	−.12	**−.29**	**.27**	.20	.18	−.22	−.17	**.33**	.06
Social bonding	.09	.16	−.08	**.37**	.22	**.42**	.22	.12	.13	**.39**
Goals	−.12	**.34**	.10	.01	**.26**	.12	.09	**.25**	.13	**.29**
Planning	−.18	**.37**	.18	−.04	.23	.08	.21	**.30**	.03	.18
Problem-solving	−.01	.22	.02	.08	**.34**	.17	.00	.17	**.24**	.17
Decision-making	−.10	**.29**	.08	.02	**.31**	.11	.10	**.30**	.07	.20
Positive emotion regulation	.01	**.27**	.00	.00	.15	.23	.23	**.25**	−.05	**.28**

All bolded correlations are $p < .001$, which was the designated cutoff to control for false positives. TALE = Thinking About Life Experiences Scale, ZTPS = Zimbardo Time Perspective Scale, PSWQ = Penn State Worry Questionnaire

Study 2 – Confirmatory Factor Analysis

Participants and Procedure

The sample comprised 467 participants living in the U.S., recruited from Amazon's Mechanical Turk (MTurk) crowdsourcing website. Interested participants were taken to a website with the plain language statement and prompted to complete the FoFTS items first as part of a larger survey. Informed consent was implied by completion of the questionnaire. Participants were compensated with a nominal sum of US$1.

To improve the integrity of the data in the MTurk context, an instructional manipulation check was used (Oppenheimer et al., 2009). The first survey item required them to provide the correct response to a question relating to a favorite sporting activity, which was embedded in a paragraph of text instructions. They could not advance until this question was answered correctly. This approach has been shown to reduce careless responding, whereby where participants fail the item, repeat it, and then answer correctly, their responses to subsequent items have been shown to be similar to those that pass it the first time (Oppenheimer et al., 2009). The survey was attempted a total of 603 times, with 530 participants with correct attempts at the instructional manipulation check. A further 21 cases were removed due to incomplete data, and 40 duplicate responses were removed, leaving a final sample of 467 that was used for the CFA. This would statistically-power the CFA to find the predicted associations, taking into account the number of latent factors, factor loadings and inter-correlations of the items in Study 1 (Wolf et al., 2013).

The mean age of the sample was 34.8 years ($SD = 10.3$, 62.1% women). The majority identified as Caucasian (67.5%), with the remaining identifying as African (14.2%), Latino or Hispanic (8.8%), Asian (6.9%), Arab or Middle Eastern (0.9%), and other (1.9%). Half had bachelor degrees (49.2%), with the remaining having highest education achievement of postgraduate qualifications (18.1%), a diploma or certificate (13.8%), high school (18.7%), and primary school (0.2%). Most were in paid work (90.7%), and 15.5% were studying. The majority were in a romantic relationship, with 31.8% married and living together, 2.8% married but not living together, 16.5% living together but not married, and 8.2% neither married nor living together. The remainder were single (41%).

Materials

The 30-item FoFTS validated in Study 1 and short and long-term general future thinking scales were administered. Again, the items were blocked into their factors and blocks were presented randomly.

Data Analytic Approach

To assess the factor structure, confirmatory factor analysis (CFA) was conducted using the Lavaan package (Rosseel, 2012) in R version 3.5.1. A weighted least square means with variance adjusted robust estimator (WLSMV) was used to estimate the model. This provides less biased and more accurate estimations of factor loadings in ordinal data, which is not assumed to be normally distributed, compared to maximum likelihood estimation. A range of indices were used to assess model fit: The chi-square value (CMIN) and corresponding p value (set at $p < .05$), the relative chi-square statistic (CMIN/DF) using a conservative guide of <2.0 for indicating good fit (Tabachnick & Fidell, 2007), the root mean square error of approximation (RMSEA), the standardized root mean

square residual (SRMR), and the comparative fit index (CFI). The RMSEA, SRMR, and CFI were assessed using guidelines for good fit from Hu and Bentler (1999): RMSEA≤.06, SRMR≤.09, and CFI ≥ .95. No error terms were correlated. The remaining data analyses replicated Study 1.

Results

CFA Analyses

The results indicated the 10-factor model had a good fit to the data WLSMV statistic = 587.7 (df = 360, p < .001), CMIN/DF = 1.63, CFI = 0.99, RMSEA = .037 (90%CI .031–.042), SRMR = .032. All items loaded significantly and strongly onto their latent variables (all > .78, p < .001; see Table 4 for descriptive statistics and factor loadings, and Table 5 for standardized covariances between subscales). In general, the subscales correlated positively and significantly with one another, consistent with Study 1. Item-total correlations were strong across subscales.

FoFTS Subscale Analyses

The repeated measures analysis were replicated from Study 1, and again showed a significant omnibus test, F(5.4, 2517.5) = 14.3, p < .001. Follow-up comparisons indicated the results were fairly consistent with Study 1, with future thinking most frequently reported for planning, followed by goal setting, decision-making and identity contrasting, with the latter three not significantly differing. Problem-solving frequency did not differ from identity contrasting, but was lower than goal setting and decision-making. Positive emotion regulation was the next most frequent, followed by negative emotion regulation and social bonding, then boredom reduction, and death preparation. The effect sizes for differences between scale scores again varied from large (d = 1.52; planning > death preparation) to small (d = 0.16; planning > goal setting). Again participants reported more frequent short-term future thinking (M = 4.14, SD = 1.12) relative to long-term future thinking (M = 3.39, SD = 1.28), t(467) = 10.8, p < .001, d = 0.62.

Correlation analyses on the subscales indicated that the FoFTS subscales were associated with one another in a manner consistent with Study 1, with only minor differences in magnitudes (see Supplementary Table 2 for all correlation analyses). Again, all of the FoFTS subscales correlated significantly with the short and long-term general future thinking scales, with the exception of short-term future thinking not correlating with death preparation. When controlling for short and long-term general future thinking, the correlations between the FoFTS subscales were again consistent with those from Study 1. That is, attenuated, but generally in the same direction.

FoFTS and Demographics

Again, age was associated with lower scores on a number of FoFTS subscales. Controlling for general future thinking did not alter this finding. This indicated that older age was associated with less frequent use of future thinking to reduce boredom, social bonding, and goal setting. Education correlated with more frequent short and long-term general future thinking, and with functions of death preparation, down-regulating negative emotion and social bonding.

No gender differences were found on short-term (women: M = 4.18 [SD = 1.15]; men: M = 4.11 [SD = 1.11], t[465] = 0.73, p = .462, d = 0.06) or long-term general future thinking (women: M = 3.41 [SD = 1.27]; men: M = 3.38 [SD = 1.30], t[465] = 0.22, p = .826, d = 0.02). Between-groups ANCOVAs controlling for short and long-term general future indicated no differences for gender on the FoFTS subscales, all F's < 3.72, all p's > .05, all partial eta squares < .009.

Study 3 – Examining the Effect of Depression on Functions of Future Thinking

In a third study, the effect of probable major depression on the frequency of future thinking and its various functions was assessed. Several specific hypotheses were made. It was predicted that probable major depression would be related to a higher overall frequency of future thinking, based on previous findings in dysphoria (Hallford et al., 2019). It was also predicted that depression would be associated with more future thinking for boredom reduction, given that diagnosed depression and dysphoria are related to high levels of task-unrelated mind-wandering (Hoffmann et al., 2016; Smallwood et al., 2007). Given that suicidal ideation, hopelessness, pessimistic thinking are hallmarks of clinical depression, it was also predicted there would be a higher frequency of death preparation and negative emotion regulation functions. As in Study 1, incremental validity was tested by assessing whether differences in the FoFTS scales could be found while controlling for the general frequency of future thinking.

Participants

To identify participants, a mass screening (N = 500) was conducted using advertising on social media (e.g. Facebook, Instagram). To determine probable major depression, a cutoff of 11 points or higher on the Patient Health Questionnaire – 9 item version (PHQ-9; Kroenke et al., 2010) was used. The PHQ-9 has good psychometric properties in correcting classifying cases of depression detected by clinical interview (specificity of .89 and sensitivity of .89; Manea et al., 2011). The computerized version retains these excellent psychometric properties (Erbe et al., 2016). We also used the criterion

that participants report either a 2 (very difficult) or 3 (extremely difficult) on the functional impact item on the PHQ-9 that asks how difficult symptoms have made it for them to work, take care of things at home, or get along with others. For the non-depressed comparison group, the criteria of less than five points on the PHQ-9 (normal range,) and a 0 (not at all) or 1 (somewhat difficult) on the functional impact question were used. A total of 51 probable depression and 55 non-depressed cases were identified. The mean age of the sample was 36.1 years ($SD = 11.3$, 38% women). Almost half had bachelor degrees (48.1%), with the remaining having highest education achievement of postgraduate qualifications (16%), a diploma or certificate (14.2%), high school (21.7%).

Materials

The participants completed demographic questions, the 30-item FoFTs, the general future thinking questions and the PHQ-9. The PHQ-9 consists of nine self-report items relating to the Diagnostic and Statistical Manual for Mental Disorders 4th edition text revision criteria for a Major Depressive Episode (American Psychiatric Association, 2000). Each item is rated for frequency of the symptom in the last two weeks from 0 (not at all) to 3 (nearly every day). The internal reliability was excellent in this sample (Cronbach's $\alpha = .93$).

Procedure

The study received ethics approval from the University Human Ethics Committee prior to commencing recruitment and was completed online. Advertisements were posted online with a link to the online. After reading a plain language statement, they completed the survey. Informed consent was given by submission of the responses. The survey questions took an estimated 10–15 min to complete. No incentives were provided for participation.

Data Analysis

SPSS 25.0 was used for analyses. Independent *t*-tests and a chi-square test were conducted to assess group differences on demographic variables and general future thinking. Where significant differences were found, the variables were entered as covariates in a MANCOVA to assess for group differences on FoFTs subscales.

Results

The probable depression group was younger than the non-depressed group ($t[104] = 2.4$, $p = .018$, $d = .47$, $M = 33.4$, $SD = 11.0$ vs. $M = 38.6$, $SD = 11.1$), and reported higher frequency of short-term general future thinking ($t[104] = 2.3$, $p = .020$, $d = .45$, $M = 3.9$, $SD = 1.1$ vs. $M = 4.4$, $SD = 1.1$) and long-term general future thinking ($t[104] = 3.9$, $p < .001$, $d = .76$, $M = 3.1$, $SD = 1.2$ vs. $M = 4.1$, $SD = 1.3$). No differences were found for education ($t[104] = 0.6$, $p = .510$) or gender (χ^2 [1] = 2.2, $p = .132$).

The MANCOVA, controlling for age and general future thinking, showed a significant effect for group, $F(10, 92) = 5.1$, $p < .001$, partial eta square = 0.36. Table 6 shows descriptive statistics and univariate analyses. As indicated, those in the probable depression group reported higher frequency of future thinking for boredom reduction, death preparation and down regulating negative emotion, and lower frequency for planning and decision-making functions.

General Discussion

This study aimed to develop and validate the first standardized measure of self-reported functions of thinking about one's future: The Functions of Future Thinking Scale (FoFTS). In Study 1, exploratory factor analysis indicated that a 10-factor model for the FoFTS items was a good fit to the data and could be reduced to three items while still retaining a good model fit and internal consistency for the subscales. In Study 2 the 10-factor model was an excellent fit to the data, with items loading strongly onto their respective factors. This resulted in the 30-item FoFTS that assesses: planning, goal setting, decision-making, thinking about the type of person one wants to become, solving problems, upregulating positive emotion, social bonding, downregulating negative emotion about negative future experiences, reducing boredom/passing time, and thinking about and adjusting to death. The correlations with validity measures showed support for construct validity. Functions relating to negative content or distraction were associated with more negative future thinking, while directive-type functions were associated with positive future thinking. Moderate-sized correlations were found between the FoFTS and autobiographical memory functions, supporting previous research of the overlap between past and future thinking (Schacter et al., 2007). The FoFTS also showed incremental validity over the frequency of future thinking, attitudes towards one's future, and the clarity of future thinking. This indicates that this functional approach can provide a unique way of predicting transdiagnostic variables and depressive symptoms relative to some other dimensions of future thinking.

Along with the main FoFTS subscales, the current study provides a measure of the frequency of future thinking in general. Short-term general future thinking was more frequent than long-term, supportive of the idea that people tend to focus more on future circumstances that are nearer in time and that need to be attended to relative to distant future possibilities (see also D'Argembeau et al., 2011; Spreng & Levine, 2006). Interestingly, short and long-term future thinking were only weakly correlated. The tendency to think about the short-term future, and not the long-term future, may express as

Table 4 Statistics for the FoFTS Items in the 10-Factor Confirmatory Factor Analysis Model

Item	Mean (*SD*)	Item-total correlation (within subscale)	Unstandardized Factor Loadings (Std. Error)	Standardized Factor Loadings
1. Boredom reduction	2.94 (1.1)	.89	1	0.88
2. Boredom reduction	2.91 (1.2)	.92	1.02 (0.02)	0.91
3. Boredom reduction	2.85 (1.1)	.92	1.03 (0.01)	0.91
4. Death preparation	2.36 (1.2)	.92	1	0.90
5. Death preparation	2.29 (1.3)	.93	1.02 (0.01)	0.92
6. Death preparation	2.31 (1.3)	.94	1.06 (0.01)	0.96
7. Identity	3.64 (1.0)	.86	1	0.81
8. Identity	3.72 (1.0)	.88	1.07 (0.02)	0.87
9. Identity	3.63 (1.0)	.89	1.06 (0.03)	0.86
10. Negative emotion regulation	2.91 (1.1)	.88	1	0.85
11. Negative emotion regulation	2.81 (1.2)	.90	1.04 (0.02)	0.89
12. negative emotion regulation	3.01 (1.1)	.90	1.04 (0.02)	0.89
13. Social bonding	2.90 (1.1)	.89	1	0.87
14. Social bonding	3.01 (1.2)	.90	1.03 (0.02)	0.90
15. Social bonding	3.04 (1.1)	.91	1.01 (0.02)	0.88
16. Goals	3.64 (0.98)	.87	1	0.83
17. Goals	3.81 (0.95)	.89	1.06 (0.03)	0.88
18. Goals	3.75 (0.95)	.88	1.07 (0.03)	0.89
19. Planning	3.81 (0.87)	.82	1	0.78
20. Planning	3.85 (0.90)	.85	1.03 (0.04)	0.81
21. Planning	3.92 (0.90)	.85	1.03 (0.04)	0.81
22. Problem-solving	3.54 (0.92)	.87	1	0.85
23. Problem-solving	3.58 (0.97)	.88	1.01 (0.02)	0.86
24. Problem-solving	3.65 (0.95)	.87	0.97 (0.02)	0.83
25. Decision-making	3.66 (0.85)	.82	1	0.78
26. Decision-making	3.80 (0.93)	.84	1.00 (0.04)	0.79
27. Decision-making	3.79 (0.88)	.85	1.03 (0.04)	0.81
28. Position emotion regulation	3.36 (1.0)	.90	1	0.91
29. Position emotion regulation	3.43 (1.0)	.90	0.97 (0.02)	0.88
30. Position emotion regulation	3.28 (1.1)	.89	0.92 (0.02)	0.84

All item-total correlations and factor loadings significant at the $p < .001$ level. To estimate the model, the factor loading for the first

impulsivity whereby the immediate consequences of actions are focused on to the neglect of future consequences. Short-term future thoughts might also function as reminders of actions that need to be done in the next few days (Anderson & McDaniel, 2019; Conway et al., 2016). These scales appear useful to partial out the general tendency to think about the future when using the FoFTS, or used in their own right.

The most frequent use of future thinking was for directive-type functions of setting goals, making decisions, planning out actions, solving problems, and imagining the type of person one wants to become (identity contrasting). These functions share the common feature of being task or goal-oriented, and in the service of giving rise to related, purposeful action. This is perhaps unsurprising given that a primary role of imagining the future is to address current concerns (Barsics et al., 2016; Cole & Berntsen, 2016), and that even mind-wandering has been found to frequently involve autobiographical planning (Baird et al., 2011; Duffy & Cole, 2020). These findings are also consistent with a previous diary study where the participants nominated 'planning actions' and 'intention-formation' as the most frequent reasons for thinking about the future (Barsics et al., 2016).

Consistent with Barsics et al. (2016) findings, participants endorsed using future thinking for regulating emotions less frequently than directive-type functions. The FoFTS assesses up-regulation of current positive emotion and down-regulation of negative emotion associated with future events with separate subscales which did not correlate (after controlling for general future thinking). The positive emotion subscale correlated with positive affect and higher self-efficacy, whereas the negative emotion subscale did not, and the negative emotion subscale correlated with high worry, whereas the positive emotion subscale did not. This indicates that they assess different processes in regulation rather than just being an inverse of one another. The participants reported using future thinking to up-regulate positive emotions more often than to down regulate negative emotions about future events. This might be reflective of the general positivity bias in the valence of episodic thinking, both past and future (e.g., Marsh et al., 2019; Salgado & Berntsen, 2019). Interestingly, upregulating positive emotion had only a weak, and non-significant correlation with optimism after post-hoc correction

Table 5 Standardized Covariances Between the FoFTS Subscales from the CFA

	Boredom	Death preparation	Identity contrast	Negative emotion regulation	Social bonding	Goal Setting	Planning	Problem-solving	Decision-making	Positive emotion regulation
Boredom	–									
Death Prep	.49	–								
Identity contrast	.38	.16**	–							
Negative emotion regulation	.56	.72	.29	–						
Social bonding	.60	.46	.51	.47	–					
Goal setting	.31	.15**	.76	.21	.46	–				
Planning	.22	.06$^{n.s.}$	.58	.15**	.36	.68	–			
Problem-solving	.44	.26	.60	.45	.47	.61	.63	–		
Decision-making	.30	.15**	.68	.27	.39	.74	.76	.68	–	
Positive emotion regulation	.57	.29	.63	.32	.64	.58	.41	.52	.44	–

All correlations are significant at the $p < .001$ level, except for ** = $p < .01$, n.s. = $p > .05$

($p = .002$). Even without this correction, this indicates that the purposeful act of thinking about future events to upregulate current mood was only weakly associated with the general disposition for positive outcome expectancies, perhaps reflecting a distinction between purposeful behaviour versus a general tendency or attitude. Interactions between these variables might be of interest in future research examining change in positive attitude.

As expected, the subscales correlated with each other across both studies, with the exception of death preparation which was less consistent. The subscale correlations were reduced when general future thinking was accounted for, particularly in the case of functions of death preparation, boredom reduction, and negative emotion regulation which were not significantly associated with some directive functions. Future thinking for problem-solving was positively associated with down-regulating negative emotion related to upcoming events, and to reduce boredom and pass time. This is possibly indicative of attempts to feel less negatively about problems, or to avoid thinking about them. Although the correlations between the subscales, and particularly the directive subscales, were high in some cases, they were not indicative of co-linearity, and they were associated with measures of convergent and divergent validity in different ways.

There was some evidence that older age was related to less future thinking overall, and in terms of boredom reduction. This indicated that older people report less frequently future thinking in order to keep their mind active or pass time. This may be due to older adults being later in the lifespan, having less time ahead of them in life, and therefore being oriented towards present or past experiences in order to fulfil social and emotional-directed goals (Carstensen et al., 1999). The current study had a limited range of age, however, with few older adults, and further research is needed to assess whether these effects are stronger or more consistent with samples that include an older demographic. The findings were mixed for education, but taken together they indicate that higher education is related to more long-term future thinking, but not strongly or consistently related to future thinking otherwise. Differences in frequency between men and women were inconsistent, with Study 1 indicating men reported more frequent boredom reduction, down-regulating negative emotion related to events and death preparation, but these were not replicated in Study 2. Given this, further research examining gender differences is warranted.

The findings from Study 3 support previous findings that depressive symptoms are associated with more frequent future thinking overall (Hallford, 2019), albeit this tends to be more abstracted and general (Hallford et al., 2018). The finding of higher frequency of boredom reduction indicates that individuals with probable major depression think more frequently about the future as a means of entertainment and staving off boredom. This is somewhat consistent with previous studies

showing higher task-unrelated mind-wandering in depression (Hoffmann et al., 2016; Smallwood et al., 2007). More future thinking for boredom reduction may be a product of having fewer stimulating activities and reduced behavioural activation in depression, or may be a distraction from other negative internal or external experiences. Increased future thinking for death preparation is consistent with suicidal ideation as a symptom of depression. Increased imagining of negative future events is consistent with pessimistic and hopeless thinking styles in depression, but highlights an increased effort to try and regulate emotions related to these negative future experiences. The findings of reduced frequency of planning and decision-making were particularly novel. For planning, this suggests that those with probable depression are less likely to imagine the steps that are needed to enact plans and behaviours. This is consistent with findings in depression on problem-solving tasks which require the generation of steps that would be taken to solve challenges (e.g., Marx et al., 1992). For decision-making, it indicates that those with probable depression less often consider the outcomes or consequences when there are several options of behavior. This is consistent with prior research indicating that depression is associated with impulsivity, and potentially as a factor in suicide attempts (Corruble, Damy, & Guelfi, 1999; Granö et al., 2007; Ozten & Erol, 2019). In general, less frequently imagining the consequences of choices is likely to be maladaptive, as individuals may not anticipate negative consequences, or at least may make decisions based on factors other than how consistent a choice is with their goals. Reduced future thinking for planning and decision-making might be related to reduced specificity in depression (Hallford et al., 2018), whereby difficulties in imagining spatiotemporally-located circumstances inhibit the capacity to plan or anticipate outcomes effectively. Future research might investigate this further. Potentially, reduced future thinking regarding choices may be one factor in anhedonia, avoidance and psychosocial withdrawal in depression.

Limitations and Future Directions

The self-report nature of the FoFTS means it is largely retrospective. This might impact its validity given that the recall and frequency estimation of future thoughts may not be accurate. However, the rough concordance between this study and previous diary-based research (Barsics et al., 2016) indicates that responses to the FoFTS might map roughly onto the frequency of real-time purposes of engaging in future thinking. Much of future thinking is involuntary though (Berntsen & Jacobsen, 2008), and at times its functions may be either unclear, or we might not be consciously aware of them. Therefore, the FoFTS might be accurately conceptualized as capturing the meta-cognitive awareness of future thinking. Future research might use the FoFTS in ecological momentary assessment designs as a standardized taxonomy of functions that are comparable across studies.

It would be interesting to study whether particular uses of future thinking are associated with phenomenal characteristics, such as detail, imagery, or observer perspective. The interaction between particular purposes and particular characteristics of future thinking might have important implications for adaptation. For example, individuals who used future thinking for planning more frequently and reported higher levels of detail/vividness and mental imagery might be more effective in mapping out behaviours to reach goals. More frequent goal setting, in conjunction with higher levels of positive anticipated emotion, might lead to a higher likelihood of behavioural intention or enactment of goal-directed behavior (see Hallford, Farrell, & Lynch, 2020 for increasing positive anticipated emotion through simulation). In contrast, thinking of future events in abstracted forms that induce feelings of positive emotion might be beneficial in certain social bonding situations to create good will and generalized positive expectancies. For example, imagining an upcoming trip with a friend as exciting and adventurous.

Table 6 Study 3 Estimated Marginal Means (Std. Errors), and Results of Univariate Tests Controlling for Age and Short-Term and Long-Term General Future Thinking

Variable	Non-depressed	Probable depression	ANCOVA results
Boredom	2.7 (0.12)	3.1 (0.13)	F=5.1, p=.026, η_p^2 = .04
Death Prep	1.7 (0.15)	3.0 (0.16)	F=29.8, p<.001, η_p^2 = .22
Identity contrast	3.7 (0.10)	3.6 (0.11)	F=0.4, p=.485, η_p^2 = .00
Negative Emotion Regulation	2.4 (0.13)	3.5 (0.14)	F=27.2, p<.001, η_p^2 = .21
Social Bonding	3.0 (0.13)	3.1 (0.14)	F=0.3, p=.850, η_p^2 = .00
Goal Setting	3.8 (0.10)	3.6 (0.10)	F=2.2, p=.136, η_p^2 = .02
Planning	4.1 (0.10)	3.6 (0.10)	F=11.1, p=.001, η_p^2 = .09
Problem-solving	3.5 (0.09)	3.6 (0.10)	F= 0.9, p=.328, η_p^2 = .00
Decision-making	4.0 (0.09)	3.7 (0.09)	F= 5.1, p=.026, η_p^2 = .04
Positive Emotion Regulation	3.3 (0.13)	3.3 (0.13)	F= 0.4, p=.825, η_p^2 = .00

The FoFTS might be deployed in other clinical populations to further understanding of how future thinking is a factor in the maintenance of psychopathology or health behaviors. Given that many intervention programs aim to change how people engage in prospective thought, whether implicitly or explicitly (see Roepke & Seligman, 2016 for a review in the context of depression), the FoFTS might be used as an outcome measure to assess change over time. Examining whether particular uses of future thinking might be characteristic of particular personality traits might also be of interest. For example, those who are high on conscientiousness might be more likely to use future thinking for goal setting, planning, and decision-making, whereas those high on dependent traits might less frequently engage in such thinking. A future direction would be to collect longitudinal data for the FoFTS to clarify whether tendencies in future thinking are more or less stable traits or context or time-variable. This might also indicate how they are conceptualized as points of intervention.

There may also be ways to further parse the functions of future thinking assessed in the FoFTS in order to answer more specific questions. For example, Schacter et al. (2017) propose spatial navigation as a function of future thinking, which may be thought of as a specific planning function of coordinating the movement of the body through space. As noted, the functions that are assessed here are not considered to be an exhaustive list.

In conclusion, the FoFTS is a simple, psychometrically-sound, self-report tool. It assesses the frequency of thinking about the future for different purposes, and is related to a range of important psychological states and processes. The FoFTS is a useful tool for future research taking a functional approach to future thinking.

Appendix 1

The following statements refer to why you think about your own future. When answering these questions, please try to answer them in relation to **events or situations that might personally happen to you in your future**. They might relate to things you will experience very soon, or very far into the future.

Please answer using this 5-point scale:

1 = Never, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Very Often.

**Why you think about your personal future…*

1. Just to keep my mind active, when I have nothing else to do.
2. To pass time when I'm bored.
3. To reduce boredom.
4. When I want to think about my death.
5. When I want to imagine the events leading up to my dying.
6. To prepare myself for my death.
7. To imagine I'll become the type of person I'd like to be.
8. When I want to imagine myself developing in a positive way as a person.
9. To imagine my personal identity improving over time.
10. So I can get used to the idea of experiencing something bad.
11. To steel myself before a negative experience.
12. To come to an acceptance of how an upcoming event might cause me distress.
13. When I want to maintain a friendship by discussing our personal futures together.
14. To describe my future to others to make conversation interesting.
15. To bond with others.
16. To help me understand my personal goals.
17. To establish what I'm trying to accomplish in my life.
18. When I want to define what my ambitions in my life are.
19. To plan out my actions in advance.
20. To clarify a plan of action.
21. To decide on a sequence in which to do things.
22. To imagine myself solving problems that arise.
23. To think about how I'll overcome problems that are upcoming.
24. When I want to think about future problems that might occur, and how they will be solved.
25. To anticipate the best outcome from a range of decisions.
26. When I want to think about what a personal decision will lead to.
27. When I want to anticipate what will happen depending on decisions.
28. To feel more positive emotions.
29. To feel good about positive things that might happen to me.
30. When I want to improve my mood.

**this instruction can be used each time participants need to move to a new page of a survey, or otherwise intermittently.*

Item subscales have three items each, and are summed to produce a subscale score. Subscales are presented above in this order: Boredom Reduction, Death preparation, Identity contrast, Negative emotion regulation, Social bonding, Goal Setting, Planning, Problem-solving, Decision-making, Positive emotion regulation.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10862-021-09910-2.

Declarations

Ethics Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee of Deakin University (Australia) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest D. J. Hallford and A. D'Argembeau declare that they have no conflict of interest.

Experiment Participants The work described has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR*. American Psychiatric Association.

Anderson, F. T., & McDaniel, M. A. (2019). Hey buddy, why don't we take it outside: An experience sampling study of prospective memory. *Memory & Cognition, 47*, 47–62. https://doi.org/10.3758/s13421-018-0849-x.

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

Baird, B., Smallwood, J., & Schooler, J. W. (2011). Back to the future: Autobiographical planning and the functionality of mind-wandering. *Consciousness and Cognition, 20*(4), 1604–1611. https://doi.org/10.1016/j.concog.2011.08.007.

Barlow, D. H., Farchione, T. J., Sauer-Zavala, S., Latin, H. M., Ellard, K. K., Bullis, J. R., et al. (2017). *Unified protocol for transdiagnostic treatment of emotional disorders: Therapist guide*. Oxford University Press.

Barsics, C., Van der Linden, M., & D'Argembeau, A. (2016). Frequency, characteristics, and perceived functions of emotional future thinking in daily life. *The Quarterly Journal of Experimental Psychology, 69*(2), 217–233. https://doi.org/10.1080/17470218.2015.1051560.

Beaty, R. E., Seli, P., & Schacter, D. L. (2019). Thinking about the past and future in daily life: An experience sampling study of individual differences in mental time travel. *Psychological Research, 83*(4), 805–816. https://doi.org/10.1007/s00426-018-1075-7.

Berntsen, D., & Jacobsen, A. S. (2008). Involuntary (spontaneous) mental time travel into the past and future. *Consciousness and Cognition, 17*(4), 1093–1104. https://doi.org/10.1016/j.concog.2008.03.001.

Blackwell, S. E., Rius-Ottenheim, N., Schulte-van Maaren, Y. W., Carlier, I. V., Middelkoop, V. D., Zitman, F. G., et al. (2013). Optimism and mental imagery: A possible cognitive marker to promote well-being? *Psychiatry Research, 206*(1), 56–61. https://doi.org/10.1016/j.psychres.2012.09.047.

Bluck, S., Alea, N., Habermas, T., & Rubin, D. C. (2005). A tale of three functions: The self–reported uses of autobiographical memory. *Social Cognition, 23*(1), 91–117. https://doi.org/10.1521/soco.23.1.91.59198.

Carl, J. R., Soskin, D. P., Kerns, C., & Barlow, D. H. (2013). Positive emotion regulation in emotional disorders: A theoretical review. *Clinical Psychology Review, 33*(3), 343–360. https://doi.org/10.1016/j.cpr.2013.01.003.

Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist, 54*(3), 165–181. https://doi.org/10.1037//0003-066x.54.3.165.

Chen, G., Gully, S. M., & Eden, D. (2001). Validation of a new general self-efficacy scale. *Organizational Research Methods, 4*, 62–83. https://doi.org/10.1177/109442810141004.

Cole, S. N., & Berntsen, D. (2016). Do future thoughts reflect personal goals? Current concerns and mental time travel into the past and future. *The Quarterly Journal of Experimental Psychology, 69*(2), 273–284. https://doi.org/10.1080/17470218.2015.1044542.

Cole, S. N., Morrison, C. M., & Conway, M. A. (2013). Episodic future thinking: Linking neuropsychological performance with episodic detail in young and old adults. *The Quarterly Journal of Experimental Psychology, 66*(9), 1687–1170. https://doi.org/10.1080/17470218.2012.758157.

Conversano, C., Rotondo, A., Lensi, E., Della Vista, O., Arpone, F., & Reda, M. A. (2010). Optimism and its impact on mental and physical well-being. *Clinical Practice and Epidemiology in Mental Health: CP & EMH, 6*, 25–29. https://doi.org/10.2174/1745017901006010025.

Conway, M. A., Loveday, C., & Cole, S. N. (2016). The remembering–imagining system. *Memory Studies, 9*, 256–265. https://doi.org/10.1177/1750698016645231.

Corruble, E., Damy, C., & Guelfi, J. D. (1999). Impulsivity: a relevant dimension in depression regarding suicide attempts? *Journal of affective disorders, 53*(3), 211–215. https://doi.org/10.1016/S0165-0327(98)00130-X.

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

D'Argembeau, A., Renaud, O., & Van Der Linden, M. (2011). Frequency, characteristics and functions of future-oriented thoughts in daily life. *Applied Cognitive Psychology, 25*(1), 96–103. https://doi.org/10.1002/acp.1647.

Drost, J., Van der Does, W., van Hemert, A. M., Penninx, B. W., & Spinhoven, P. (2014). Repetitive negative thinking as a transdiagnostic factor in depression and anxiety: A conceptual replication. *Behaviour Research and Therapy, 63*, 177–183. https://doi.org/10.1016/j.brat.2014.06.004.

Duffy, J., & Cole, S. N. (2020). Functions of spontaneous and voluntary future thinking: Evidence from subjective ratings. *Psychological Research, 85*, 1–19. https://doi.org/10.1007/s00426-020-01338-9.

Erbe, D., Eichert, H. C., Rietz, C., & Ebert, D. (2016). Interformat reliability of the patient health questionnaire: Validation of the computerized version of the PHQ-9. *Internet Interventions, 5*, 1–4. https://doi.org/10.1016/j.invent.2016.06.006.

Gallagher, M. W., Long, L. J., Richardson, A., D'Souza, J., Boswell, J. F., Farchione, T. J., & Barlow, D. H. (2020). Examining hope as a transdiagnostic mechanism of change across anxiety disorders and CBT treatment protocols. *Behavior Therapy, 51*(1), 190–202. https://doi.org/10.1016/j.beth.2019.06.001.

Gaskin, C. J., & Happell, B. (2014). On exploratory factor analysis: A review of recent evidence, an assessment of current practice, and recommendations for future use. *International Journal of Nursing Studies, 51*(3), 511–521. https://doi.org/10.1016/j.ijnurstu.2013.10.005.

Granö, N., Keltikangas-Järvinen, L. I. I. S. A., Kouvonen, A., Virtanen, M., Elovainio, M., Vahtera, J., & Kivimaeki, M. (2007). Impulsivity as a predictor of newly diagnosed depression. *Scandinavian Journal of Psychology, 48*(2), 173–179. https://doi.org/10.1111/j.1467-9450.2007.00566.x.

Hallford, D. J. (2019). The phenomenological characteristics of autobiographical future thinking in dysphoric and non-dysphoric

individuals. *Psychiatry Research, 273*, 481–486. https://doi.org/10.1016/j.psychres.2018.12.100.

Hallford, D. J., & Sharma, M. K. (2019). Anticipatory pleasure for future experiences in schizophrenia-Spectrum disorders and major depression: A systematic review and meta-analysis. *British Journal of Clinical Psychology., 58*, 357–383. https://doi.org/10.1111/bjc.12218.

Hallford, D. J., Mellor, D., & Cummins, R. A. (2013). Adaptive autobiographical memory in younger and older adults: The indirect association of integrative and instrumental reminiscence with depressive symptoms. *Memory, 21*(4), 444–457. https://doi.org/10.1080/09658211.2012.736523.

Hallford, D. J., Austin, D. W., Takano, K., & Raes, F. (2018). Psychopathology and episodic future thinking: A systematic review and meta-analysis of specificity and episodic detail. *Behaviour Research and Therapy, 102*, 42–51. https://doi.org/10.1016/j.brat.2018.01.003.

Hallford, D. J., Takano, K., Raes, F., & Austin, D. W. (2019). Psychometric evaluation of an episodic future thinking variant of the autobiographical memory test–episodic future thinking-test (EFT-T). *European Journal of Psychological Assessment., 36*, 658–669. https://doi.org/10.1027/1015-5759/a000536.

Hallford, D. J., Barry, T. J., Austin, D. W., Raes, F., Takano, K., & Klein, B. (2020). Impairments in episodic future thinking for positive events and anticipatory pleasure in major depression. *Journal of Affective Disorders, 260*, 536–543. https://doi.org/10.1016/j.jad.2019.09.039.

Hallford, D. J., Farrell, H., & Lynch, E. (2020). Increasing anticipated and anticipatory pleasure through episodic thinking. *Emotion*. https://doi.org/10.1037/emo0000765.

Hoffmann, F., Banzhaf, C., Kanske, P., Bermpohl, F., & Singer, T. (2016). Where the depressed mind wanders: Self-generated thought patterns as assessed through experience sampling as a state marker of depression. *Journal of Affective Disorders, 198*, 127–134. https://doi.org/10.1016/j.jad.2016.03.005.

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika, 30*(2), 179–185. https://doi.org/10.1007/BF02289447.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118.

Kertz, S. J., Lee, J., & Björgvinsson, T. (2014). Psychometric properties of abbreviated and ultra-brief versions of the Penn State Worry Questionnaire. *Psychological Assessment, 26*(4), 1146–1154. https://doi.org/10.1037/a0037251.

Košťál, J., Klicperová-Baker, M., Lukavská, K., & Lukavský, J. (2016). Short version of the Zimbardo Time Perspective Inventory (ZTPI–short) with and without the future-negative scale, verified on nationally representative samples. *Time & Society, 25*(2), 169–192. https://doi.org/10.1177/0961463X15577254.

Kroenke, K., Spitzer, R. L., Williams, J. B., & Löwe, B. (2010). The patient health questionnaire somatic, anxiety, and depressive symptom scales: a systematic review. *General hospital psychiatry, 32*(4), 345–359. https://doi.org/10.1016/j.genhosppsych.2010.03.006.

Lai, L. C. H., & Cummins, R. A. (2013). The contribution of job and partner satisfaction to the homeostatic defense of subject wellbeing. Social Indicators Research, 111(1), 203–217. doi:https://doi.org/10.1007/s11205-011-9991-6.

Levine, B., Svoboda, E., Hay, J. F., Winocur, G., & Moscovitch, M. (2002). Aging and autobiographical memory: Dissociating episodic from semantic retrieval. *Psychology and Aging, 17*(4), 677–689. https://doi.org/10.1037/0882-7974.17.4.677.

MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample size in factor analysis. *Psychological Methods, 4*(1), 84–99. https://doi.org/10.1037/1082-989X.4.1.84.

Mackinnon, A., Jorm, A. F., Christensen, H., Korten, A. E., Jacomb, P. A., & Rodgers, B. (1999). A short form of the Positive and Negative Affect Schedule: Evaluation of factorial validity and invariance across demographic variables in a community sample. *Personality and Individual differences, 27*(3), 405–416. https://doi.org/10.1016/S0191-8869(98)00251-7.

Manea, L., Gilbody, S., & McMillan, D. (2011). Optimal cut-off score for diagnosing depression with the Patient Health Questionnaire (PHQ-9): A meta-analysis. *Canadian Medical Association Journal, 184*, 191–196. https://doi.org/10.1503/cmaj.110829.

Marsh, L., Edginton, T., Conway, M. A., & Loveday, C. (2019). Positivity bias in past and future episodic thinking: Relationship with anxiety, depression, and retrieval-induced forgetting. *Quarterly Journal of Experimental Psychology, 72*(3), 508–522. https://doi.org/10.1177/1747021818758620.

Marx, E. M., Williams, J. M., & Claridge, G. C. (1992). Depression and social problem solving. *Journal of Abnormal Psychology, 101*(1), 78–86. https://doi.org/10.1037/0021-843X.101.1.78.

McElwee, R. O. B., & Haugh, J. A. (2010). Thinking clearly versus frequently about the future self: Exploring this distinction and its relation to possible selves. *Self and Identity, 9*(3), 298–321. https://doi.org/10.1080/15298860903054290.

McEvoy, P. M., Watson, H., Watkins, E. R., & Nathan, P. (2013). The relationship between worry, rumination, and comorbidity: Evidence for repetitive negative thinking as a transdiagnostic construct. *Journal of Affective Disorders, 151*(1), 313–320. https://doi.org/10.1016/j.jad.2013.06.014.

Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State worry questionnaire. *Behaviour Research and Therapy, 28*, 487–495. https://doi.org/10.1016/0005-7967(90)90135-6.

Oppenheimer, D. M., Meyvis, T., & Davidenko, N. (2009). Instructional manipulation checks: Detecting satisficing to increase statistical power. *Journal of Experimental Social Psychology, 45*(4), 867–872. https://doi.org/10.1016/j.jesp.2009.03.009.

Özbek, M., Bohn, A., & Berntsen, D. (2018). Why do I think and talk about it? Perceived functions and phenomenology of episodic counterfactual thinking compared with remembering and future thinking. *Quarterly Journal of Experimental Psychology, 71*, 2101–2114. https://doi.org/10.1177/1747021817738731.

Ozten, M., & Erol, A. (2019). Impulsivity differences between bipolar and unipolar depression. *Indian Journal of Psychiatry, 61*(2), 156–160. https://doi.org/10.4103/psychiatry.IndianJPsychiatry_166_18.

Pulcu, E., Trotter, P. D., Thomas, E. J., McFarquhar, M., Juhasz, G., Sahakian, B. J., Deakin, J. F. W., Zahn, R., Anderson, I. M., & Elliott, R. (2014). Temporal discounting in major depressive disorder. *Psychological Medicine, 44*(9), 1825–1834.

Raffard, S., Esposito, F., Boulenger, J. P., & Van der Linden, M. (2013). Impaired ability to imagine future pleasant events is associated with apathy in schizophrenia. *Psychiatry Research, 209*(3), 393–400. https://doi.org/10.1016/j.psychres.2013.04.016.

Rasmussen, A. S., & Berntsen, D. (2013). The reality of the past versus the ideality of the future: Emotional valence and functional differences between past and future mental time travel. *Memory & Cognition, 41*, 187–200. https://doi.org/10.3758/s13421-012-0260-y.

Roepke, A. M., & Seligman, M. E. (2016). Depression and prospection. *British Journal of Clinical Psychology, 55*(1), 23–48. https://doi.org/10.1111/bjc.12087.

Rosseel, Y. (2012). *Lavaan: An R package for structural equation modeling and more. Version 0.5–12 (BETA)*. Ghent University.

Rush, J., & Grouzet, F. M. (2012). It is about time: Daily relationships between temporal perspective and well-being. *The Journal of Positive Psychology, 7*(5), 427–442. https://doi.org/10.1080/17439760.2012.713504.

Salgado, S., & Berntsen, D. (2019). My future is brighter than yours: The positivity bias in episodic future thinking and future self-images. *Psychological Research, 84*, 1–17. https://doi.org/10.1007/s00426-019-01189-z.

Schacter, D. L., Addis, D. R., & Buckner, R. L. (2007). Remembering the past to imagine the future: The prospective brain. *Nature Reviews Neuroscience, 8*(9), 657–661. https://doi.org/10.1038/nrn2213.

Schacter, D. L., Benoit, R. G., & Szpunar, K. K. (2017). Episodic future thinking: Mechanisms and functions. *Current Opinion in Behavioral Sciences, 17*, 41–50. https://doi.org/10.1016/j.cobeha.2017.06.002.

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping, and health: Assessment and implications of generalized outcome expectancies. *Health Psychology, 4,* 219–247. https://doi.org/10.1037/0278-6133.4.3.219.

Smallwood, J., O'Connor, R. C., Sudbery, M. V., & Obonsawin, M. (2007). Mind-wandering and dysphoria. *Cognition and Emotion, 21*(4), 816–842. https://doi.org/10.1080/02699930600911531.

Spreng, R. N., & Levine, B. (2006). The temporal distribution of past and future autobiographical events across the lifespan. *Memory & Cognition, 34*(8), 1644–1651. https://doi.org/10.3758/BF03195927.

Strathman, A., Gleicher, F., Boninger, D. S., & Edwards, C. S. (1994). The consideration of future consequences: weighing immediate and distant outcomes of behavior. *Journal of personality and social psychology, 66*(4), 742–752. https://doi.org/10.1037/0022-3514.66.4.742.

Suddendorf, T. (2010). Episodic memory versus episodic foresight: Similarities and differences. *Wiley Interdisciplinary Reviews: Cognitive Science, 1*(1), 99–107. https://doi.org/10.1002/wcs.23.

Szpunar, K. K., Spreng, R. N., & Schacter, D. L. (2014). A taxonomy of prospection: Introducing an organizational framework for future-oriented cognition. *Proceedings of the National Academy of Sciences, 111*(52), 18414–18421. https://doi.org/10.1073/pnas.1417144111.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Pearson/Allyn & Bacon.

Vasquez, N. A., & Buehler, R. (2007). Seeing future success: Does imagery perspective influence achievement motivation? *Personality and Social Psychology Bulletin, 33*(10), 1392–1405. https://doi.org/10.1177/0146167207304541.

Webster, J. D. (1993). Construction and validation of the reminiscence functions scale. *Journal of Gerontology, 48*(5), 256–262. https://doi.org/10.1093/geronj/48.5.P256.

Webster, J. D. (2011). A new measure of time perspective: Initial psychometric findings for the balanced time perspective scale (BTPS). *Canadian Journal of Behavioural Science/Revue canadienne des sciences du comportement, 43*, 111–118. https://doi.org/10.1037/a002280.

Webster, J. D., & Ma, X. (2013). A balanced time perspective in adulthood: Well-being and developmental effects. *Canadian Journal on Aging/La Revue Canadienne du Vieillissement, 32*(4), 433–442. https://doi.org/10.1017/S0714980813000500.

Wolf, E. J., Harrington, K. M., Clark, S. L., & Miller, M. W. (2013). Sample size requirements for structural equation models: An evaluation of power, bias, and solution propriety. *Educational and Psychological Measurement, 73*(6), 913–934. https://doi.org/10.1177/0013164413495237.

Zimbardo, P. G., & Boyd, J. N. (1999). Putting time in perspective: A valid, reliable individual-differences metric. *Journal of Personality and Social Psychology, 77*, 1271–1288. https://doi.org/10.1007/978-3-319-07368-2_2.

Zimbardo, P. G., Keough, K. A., & Boyd, J. N. (1997). Present time perspective as a predictor of risky driving. *Personality and Individual Differences, 23*, 1007–1023. https://doi.org/10.1016/S0191-8869(97)00113-X.