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ORIGINAL ARTICLE

# How young adults imagine their future? The role of temperamental traits

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**Abstract** Relatively few empirical studies have addressed the psychological dimensions involved in the imagination of the future. The present study aimed to verify the hypothetical link between the temperament traits of young adults and their attitudes towards the future. Through an online panel, 246 subjects aged 20 to 30 years (M = 26.07 ± 2.36), of whom 54.5% were female, answered a protocol consisting of an identity record, a specially designed tool called the Future Thinking Questionnaire, and the Temperament and Character Inventory developed by Cloninger. The data were analysed through linear regression, Student's t test, and the Kruskall-Wallis test. Results show that specific temperament traits, such as *Reward Dependence* and *Harm Avoidance*, significantly predict the perception of *Uncertainty*, the sense of *Helplessness*, the attitude of *Persistence*, and *Fantasy* regarding external solutions. Findings suggest that the view of the future is influenced by a temperamental and hence hereditary disposition.

**Keywords** Future thinking · Imagination · Temperament

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## Introduction

During the lifespan, especially in the transition from adolescence to adulthood, a person must address specific environmental requests, consisting of developmental tasks such as life structure-building and life structure changing [22]. This stage, spanning from 22 to 33 years, represents a delicate phase of transition and life development [4] in which the imagination of the future plays a key role, because it might determine a young person's feelings, thoughts, and behaviours [38]. Imagination, in fact, is an attempt towards environmental adjustment and a substitute for facing reality, being an extremely advanced form of autistic thinking. Its pragmatic function becomes more evident in the formulation of ambitions and ideals, when two conditions co-occur: dissatisfaction with the present and hope for the future [28].

When a person tries to imagine future events and the future self, both affective and cognitive processes are activated, and they are not always clearly distinguishable. Several psychological mechanisms, such as optimism and pessimism, the perception of uncertainty, and the locus of control, are hypothetically involved. Behaviour is unavoidably influenced by imaginary representations, and people behave, feel, and think on the basis of their beliefs [38].

The literature shows how affective phenomena, such as mood states, can affect the cognitive perception of the future and vice versa. For example, depressed subjects, in comparison with nondepressed subjects, show reduced positive future thinking and reduced anticipation of pleasant experiences, as though they have difficulty in accessing mental representation of such experiences [24]. By contrast, nondysphoric and mildly dysphoric subjects show higher positive pre-experiencing of the future, but also show related hyperarousal and avoidance [9]. Furthermore, the phenomenological observation of

the ability to retrieve past events and simulate future events suggest that dysphoric subjects saw future events as 'less vivid, coherent, sensorially detailed, bodily experienced, emotionally intense and important with respect to their life story and identity' [1].

In addition, cognitive processes, such as judgement, evaluation, expectations, and decision making, influence behavioural outcomes and the related mood states [36]. Cognitive processes are susceptible to several biases. For example, across the lifespan, people tend to consider future events as more positive than past events [14]. Contrarilly, the activation of the ruminative mechanism—in particular, a heightened ruminative disposition—leads to elevated emotional extrapolation from current events when formulating future expectancies, even in nonclinical samples. A ruminative disposition was found to be associated with an increased self-reported expectancy for negative subsequent events relative to positive subsequent events [40]. An experimental model of imaginative mental simulations, created by Sanna et al. [34], showed the virtues and vices of rumination, which is the tendency towards repeated involuntary recall of thoughts about the past, but which can also generate thoughts about future goals. When people imagine themselves in the future, it is hence plausible that they utilise imaginatively structured cognitive models that were developed on the basis of previous experiences, attribution beliefs, personality processes, and strategies for coping with life events [18].

Recent studies in the field of neuroscience demonstrate that imagining the future largely depends on the same neural machinery that is required for remembering the past, and this finding suggests the concept of a 'prospective brain', a specific cerebral function used to imagine, simulate, and predict possible future events from stored information [35]. The ability to imagine fictitious or future events and choice situations that require imagining potential outcomes involves regions of the brain associated with memory, such as the hippocampus [21, 42]. However, other anatomical correlates contribute to the prospective brain, such as the amygdala, which is more active when imagining positive future events relative to negative ones, suggesting a key role in mediating the optimism bias through the process of monitoring emotional salience [37].

Considering the great number of factors involved in the imagination of the future, it might be hypothesised that, because of the interaction of affective, cognitive, and environmental aspects, how a person pictures the future is determined by personality [16].

According the biopsychosocial model of personality developed by Cloninger, a person is born with a basic temperament, which is « independently heritable, manifest early in life, and involves pre-conceptual biases in perceptual memory and habit formation » [7]. Therefore, the person can be mainly characterised by (1) a hereditary tendency to respond actively to novel stimuli, with frequent exploratory activity or impulsive decision making (*Novelty Seeking*); (2) a heritable bias in the inhibition of behaviours, such as pessimistic worry, passive dependent behaviours, and rapid fatigability (*Harm Avoidance*); and (3) a heritable bias in the maintenance or continuation of ongoing behaviours, manifested as sentimentality and social attachment or dependence (*Reward Dependence*). Such traits influence social relationships and adaptation [25, 26, 33].

Although it can be hypothesised that the view of the future is influenced by some hereditary aspects, such as pessimism, fear of the unknown, and desire of social approval or perfectionism, as described in Cloninger's model, the relationship between the imagination of the future and the basic personality has been poorly explored, because the cognitive, affective, and social associated factors have been studied separately or only in clinical samples. From these premises, the objective of the present study was to determine whether temperament traits predict attitudes towards the future in a nonclinical sample of young adults.

## Method

### Procedure

Data were collected through an interactive online panel (Copyright © 2015, Toluna). Subjects were invited via e-mail to submit their responses through the site or the mobile app. Data collection lasted 6 months, from March 2015 to August 2015. Participation was voluntary and anonymity was guaranteed; after completion, the subjects could request a synthetic description of the results of the questionnaire Fig. 1.

### Instruments

For the evaluation, with the exception of the identity record, two instruments were used: the Future Thinking Questionnaire (F.T.Q.) and the Temperament and Character Inventory (T.C.I.).

An anagraphic sheet was utilised to collect information about gender, age, education, civil status, and working conditions. This section also contained an open question about the subject's professional projects for the future and a list (yes/no) of future desires, including (1) pursuing professional fulfilment; (2) getting married; (3) having children; (4) caring for the home; (5) devoting life to others; (6) doing something useful and important for humanity; and (7) other.

The F.T.Q. is a 25-item, specially designed tool consisting of five areas: (1) *Uncertainty about the Future* (e.g., 'the


**Fig. 1** Example of the online tool template

future is increasingly uncertain'); (2) *Avoidance of Problems*; (3) *Tendency towards Persistence*; (4) *Helplessness Attitude*; and (5) *Fantasy of Resolution*. The subject must indicate his or her level of agreement with the statements, from 0 (*completely disagree*) to 4 (*completely agree*). Finally, five scores are obtained and are subsequently transformed in percentages to represent the level of expression of the dimension considered.

The T.C.I., developed by Cloninger et al. [8: 19–28], is a 240-item, self-report questionnaire. The subject indicates whether statements are true (T) or false (F) according to his or her own life experience. The results include separate scores for the temperament dimensions (*Novelty Seeking*, *Harm Avoidance*, *Reward Dependence*), *Persistence* (excluded from the temperament dimensions through factor analysis), and character dimensions (*Self-directedness*, *Cooperativeness*, *Self-transcendence*). Each score is then transformed into a percentage and compared with a cutoff. Scores between 0% and 16.7% are very low, between 17% and 33% are low, between 34% and 66.7% are average, between 67% and 83.3% are high, and between 84% and 100% are very high. In the present study, the temperament dimensions were considered exclusively.

## Sample

The sample consisted of 246 valid cases (see Table 1) selected from an original sample of 260 cases; 14 cases were excluded because of omissions or protocol incompleteness. According to gender, the sample was balanced, with 115 (46.7%) males and 131 (53.3%) females, and was selected in the age range of 20 to 30 years ($M = 26.07 \pm 2.36$). Almost all subjects were from southern Italy, with 66.6% being from Sicily, 25.2% from Calabria, and the remaining 8.2% from the north and the centre of the country. Of the subjects, 45.5% had attained a high school diploma, 45.1% had a degree, and 9.3% had completed or were persuing graduate studies. The majority of the subjects were in a relationship (50.4%), with a high percentage being single (43.1%). Only a small percentage of the subjects reported being married or cohabiting (4.1% and 2.4% respectively).

## Results

### Validity and reliability

The first step in the analysis was to perform a reliability and validity test of the questionnaire specifically designed for this research—the F.T.Q.—to verify its psychometric properties. Data were analysed using the Statistical Package for Social Sciences (SPSS 17.0).

To verify the reliability of the scales, Cronbach's alpha test was performed, with the results indicating adequate levels of reliability for *Uncertainty* ($\alpha = .70$, if item 10 is deleted), *Persistence* ($\alpha = .79$), *Helplessness* ($\alpha = .77$), and *Fantasy* ($\alpha = .77$, if items 23 and 25 are deleted). Regarding *Avoidance*, Cronbach's $\alpha$ was .62 (sufficient) without any item deletion. Nevertheless, loading values lower than .30 were suppressed.

To explore the questionnaire's factor structure, an exploratory factor analysis (EFA) was performed. Principal component extraction, with an oblimin rotation with Keiser normalisation, was performed. Items 10, 23, and 25 were deleted, as suggested by the previous analysis. Because of the low scores of factor loading, and to enhance variance levels, items 1, 2, 5, 8 and 10 were deleted. The Keiser–Meyer–Olkin test value was .87, indicating good sample adequacy ($p < .001$).

Table 1 shows the results of the EFA, which revealed the presence of three latent factors. The first is composed of the items regarding *Uncertainty* and *Helplessness*; hence, it consists mostly of negative feelings and thoughts about the future (i.e., 'The future is uncertain and I can't do anything to modify it') or *Negative future thinking*. The second factor consists of the items measuring *Persistence* and

**Table 1** Factor structure of the Future Thinking Questionnaire

| Scale | Items | Factor 1 negative | Factor 2 positive | Factor 3 avoidant |
|---|---|---|---|---|
| Uncertainty | Item 4 | .779 | – | – |
| | Item 7 | .749 | – | – |
| | Item 13 | .604 | – | – |
| Helplessness | Item 6 | .794 | – | – |
| | Item 9 | .696 | – | – |
| | Item 12 | .746 | – | – |
| | Item 15 | .571 | – | – |
| Persistence | Item 18 | – | .675 | – |
| | Item 20 | – | .747 | – |
| | Item 22 | – | .704 | – |
| | Item 24 | – | .680 | – |
| Fantasy | Item 17 | – | .733 | – |
| | Item 19 | – | .772 | – |
| | Item 21 | – | .811 | – |
| Avoidance | Item 11 | – | – | .731 |
| | Item 14 | – | – | .692 |
| | Item 16 | – | – | .631 |
| | Item 24 | – | – | .680 |
| Eigenvalues | | 5,67 | 2,19 | 1,83 |
| Variance explained | | 33,36% | 12,93% | 10,08% |
| Cumulative | | 33,36% | 46,29% | 57,10% |

*Fantasies*, which represent a positive attitude towards the future (i.e., 'I believe in my abilities and that everything will be fine') or *Positive future thinking*. The third factor consists of the items regarding the attitude of *Avoidance* (i.e., 'I prefer not to think about the future'), describing *Avoidant*—neither negative nor positive—future thinking. These three factors explained 57.10% of the variance.

Table 1 Factor structure of the Future Thinking Questionnaire.

As regards the TCI, the temperament subscales obtained the following reliability scores: Novelty seeking ($\alpha = .77$); Harm Avoidance ($\alpha = .81$); Reward dependence ($\alpha = .83$); Persistence ($\alpha = .69$).

## Demographic characteristics

The variances of the samples may be assumed to be equal (H0) or unequal (H1). We assume that the variances for the two samples are unequal. Student's t test for independent samples and the Kruskall–Wallis test revealed some differences in the F.T.Q. subscales on the basis of the independent variables collected on the demographic data sheet.

Table 2 Differences in the Future Thinking Questionnaire subscales based on independent variables.

As can be observed, attitudes towards the future vary according to gender, age, education, employment status, and relationship status. Females, compared with males, show a higher level of *Uncertainty* about the future. The younger the subject is, the higher the *Persistence* attitude. Furthermore, educational level and employment status seem to play a role in future thinking: subjects with high school diplomas show higher levels of *Helplessness* compared with subjects who had degrees or had completed or were pursuing graduate studies, and subjects in a not (engaged) in education, employment, or training (NEET) condition exhibit a particularly high level of *Helplessness*. Finally, cohabitees, followed by those in a relationship, show higher levels of *Persistence* than those of married or single subjects.

## Regression analysis

To verify whether temperament traits predict attitudes towards the future among young adults, a regression analysis was performed. The four temperament traits were entered in blocks to identify the degree to which each trait contributes to the variance in the dimensions of the F.T.Q. Figure 2 shows the results of the analysis.

In particular, *Harm Avoidance* and *Reward Dependence* significantly predict *Uncertainty* scores [Regression M square = 99.55, F = 7.51 $p = .000$; HA St. Beta = .188, $t = 2.96$, $p = .003$; RD St. Beta = .205, $t = 3.23$, $p = .001$], *Helplessness* values [Regression M square = 135.58, F = 7.77 p = .000; HA St. Beta = .247, $t = 3.90$, p = .000; RD St. Beta = .153, $t = 2.42$, $p = .01$] and *Fantasy* regarding external solutions [Regression M square = 45.25, F = 4.02 $p = .004$; HA St. Beta = −.188, $t =$

**Table 2** Differences in the Future Thinking Questionnaire subscales based on independent variables

| Sample characteristics | | Frequency | Mean of rank | T-test and Chi-square | Sig. | FTQ scales |
|---|---|---|---|---|---|---|
| Gender | Male | 112 | 10.29 | t(244) = −2.45 | $p < .01$ | Uncertainty |
| | Female | 134 | **11.48** | | | |
| Age | 20–25 years | 115 | **14.97** | t(244) = 1.95 | $p < .05$ | Persistence |
| | 26–30 years | 131 | 14.11 | | | |
| Education | Diploma | 112 | **136.79** | $X^2(2) = 7.25$ | $p < .02$ | Helplessness |
| | Degree | 111 | 111.75 | | | |
| | Graduate studies | 23 | 115.50 | | | |
| Employment status | Students | 92 | 124.13 | $X^2(2) = 12.01$ | $p < .002$ | Helplessness |
| | NEET | 81 | **141.94** | | | |
| | Workers | 73 | 102.25 | | | |
| Relationship status | Single | 106 | 112.06 | $X^2(3) = 7.57$ | p < .05 | Persistence |
| | In a relationship | 124 | 134.58 | | | |
| | Married | 10 | 96.90 | | | |
| | Cohabitee | 6 | **141.08** | | | |

Bold statistically significant (higher) values

−2.89, p = .004; RD St. Beta = .208, $t = 3.19$, $p = .002$]. On the contrary, *Avoidance* obtained no significant regression values for temperament predictors. Finally, *Harm Avoidance* and TCI *Persistence* significantly predict FTQ *Persistence* [Regression M square = 74.14, F = 6.71 $p = .000$; HA St. Beta = −.249, $t = -3.89$, p = .000; P St. Beta = .175, $t = 2.81$, $p = .005$].

In other words, the most involved temperament traits are *Harm Avoidance* and *Reward Dependence*. The level of *Novelty Seeking* or *Persistence* seems to be independent from positive, negative, and avoidant attitudes towards the future. Conversely, *Harm Avoidance* influences both negative (*Uncertainty* and *Helplessness*) and positive (*Fantasy* and *Persistence*) attitudes. In addition, the *Reward Dependence* trait influences the level of *Uncertainty* and *Helplessness*, as well as *Fantasy* regarding external solutions, but not *Persistence.*

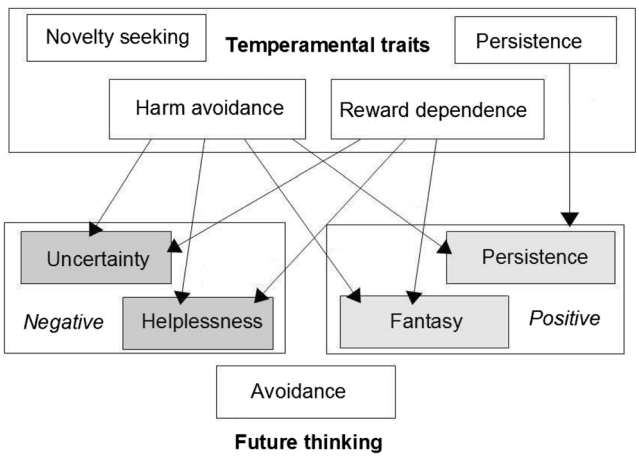


**Fig. 2** Graphical linear regression analysis between temperament and future-thinking dimensions

## Discussion and conclusions

The objective of the present study was to verify whether temperament traits predict attitudes towards the future in a non-clinical sample of young adults.

Although perceptions of the future might be expected to be influenced by the social atmosphere, such as the economic situation, unemployment rate, and cost of living, it is more plausible to consider them subjective phenomena. Wenglert and Rosen [41] compared the pessimism and optimism levels of students, using subjective values for negative and positive events regarding their personal lives and future world events. The authors found that personal projections and perceptions of the world in the future were weakly associated.

Our findings show that specific temperament traits, such as reward dependence and harm avoidance, significantly predict the perception of uncertainty about the future and the sense of helplessness, and negatively predict the persistence attitude and fantasy regarding external solutions, confirming the hypothesis of a subjective perception of the future based on the shades of temperamental disposition.

In particular, it was found that young subjects show three attitudes.

The first is *negative* future thinking (i.e., 'The future is uncertain and I can't do anything to modify it'), which is tied to specific temperament traits such as harm avoidance and reward dependence.

The psychobiological model of personality developed by Cloninger enables us to explore personality factors associated with depressive feelings. For example, in depressive patients, even after remission of depressive episodes, harm avoidance scores are still elevated in comparison with those of the

general population, despite being lower than those before treatment [32].

The relationship between the TCI harm avoidance scale score and depression is in fact established: depressed patients also exhibit higher harm avoidance compared with healthy controls according to the Hamilton scale [15].

A possible cognitive explanation is provided by Lavender and Watkins [20], who found that rumination, as a depressive characteristic, reduces the ability to imagine positive future events, whilst increasing the ability to imagine negative future events.

According to our results, temperment predicted a negative view of the future in a nonclinical sample. Thus, if temperment predicts levels of depression, temperament evaluation can represent an opportunity to identify depressive attitudes towards the future. These representations are not psychopathological, but can be considered subthreshold depressive symptoms that are present in the general population, as argued by Fergusson et al. [12].

The second attitude is characterised by *positive* future thinking (i.e., 'I believe in my abilities and that everything will be fine'). This attitude is negatively influenced by the harm avoidance trait. In other words, the lower the level of harm avoidance is, the more positive the perception of the future. Conversely, results regarding fantasy concerning external solutions suggest a locus of control based on coincidence or destiny, which is linked to the temperament trait of reward dependence. According to Oettingen and Mayer [30], two forms of thinking about the future can be distinguished: expectations and fantasies. Positive expectations are defined as judging a desired future as likely, and predict high effort and successful performance. The reverse is true for positive fantasies, which instead concern experiencing thoughts and mental images about a desired positive future do not involve behaviour.

A reward-dependent person attributes the chance of a resolution to external sources. This is consistent with the description of Cloninger [6], according to whom '"reward dependence" is a heritable tendency to respond intensely to reward and succorance and to learn to maintain rewarded behaviour'. Such people are very sensitive to the positive and negative feedback from the environment and social relations.

This interpretation is supported by evidence that the reward dependence temperament trait also predicts uncertainty and a sense of helplessness about the future. This could mean that the ability to act (self-efficacy) and environmental control are not considered attributable to the self. However, this notion remains a hypothesis, because the relationship between temperament and locus of control has not yet been studied sufficiently.

The third attitude is the a*voidance* of future thinking (i.e., 'I prefer not to think about future'). Although recent evidence has shown that avoidance—in both cognitive and behavioural processes—and depression are significantly correlated [29]. The avoidant attitude seems to be completely independent from temperament.

There are several possible explanations regarding this avoidant attitude. For example, it can be hypothesised as a loss of the intrinsic motivation, which mediate imagination capability [23] or it could be lead to the mechanism of repression. According to Erdelyi [10], repression is the intentional 'not-thinking' of a matter, in which case it is a mechanism of defence. It can also be used for a variety of other purposes, such as memory manipulation, as Ebbinghaus showed, in which case it remains the same mechanism but not a mechanism of defence. In the imagination of the future, this distinction probably exists, since a person can avoid imagining because of the negative quality of the images that come to the mind, or can repress the imagination to avoid memory overload and a sense of confusion.

A possible explanation of the individual differences in future thinking can be linked to personality type. Not all people show the same ability to imagine, as stated by Chang and Liang [5], who found different levels of imaginative capability in students. These differences can also depend on age, gender, and occupational and relational status.

It has been observed that females report higher levels of uncertainty compared with males, who, in turn, appear more avoidant and less worried. This result is consistent with the studies of Eschenbeck et al. [11], who found that boys tend to display more avoidant coping strategies while solving a problem or making a decision, whereas girls usually appear more worried, suggesting hypothetical links among problem solving, decision making, and future thinking.

Furthermore, future thinking seems to be influenced by educational level and employment status. Our results showed that subjects with a high school diploma reported higher levels of helplessness, compared with subjects who completed or were pursing graduate studies, and people in a NEET condition exhibited a particularly high level of helplessness.

The literature emphasises the importance of task persistence in young adolescence for successful educational and occupational attainment in middle adulthood [2] and explains how repeated learned helplessness experiences and dysfunctional decisional processes may lead to depression [13].

Furthermore, thinking about the future involves relational and emotional variables. It is interesting how subjects who cohabitate or are in a relationship show higher persistence than that of married or single subjects. The sharing of a life project, and the need for independence and affective support, may lead to a greater attitude of persistence towards the future, as a study on support and satisfaction in partners in a two-career relationship demonstrated [31].

In conclusion, our findings suggest that (1) there are three main views of the future; (2) the view is influenced by a temperamental and hence hereditary disposition; and (3) assessment of temperament has value in predicting young adults' future thinking. Of course, we do not mean inheritance as genetics, but in its psychological sense: the temperament

theories presume a biological basis to those behavioral tendencies thought to be temperamental in origin.

The present study contributes to the undestranding of several dimensions, i.e. « the exploration of possible (the full range of agency and imagination), probable (likely given historical structures) and preferred (where we seek to go) futures » theorized by Inayatullah [17], studied from young adults' point of view. According to Miller [27], « the paradox of futures is that we can't find ways to 'know' the future, but rather we need to find ways to live and act with not-knowing the future », for these reasons the author suggests the need for a Discipline of Anticipation (DOA) guided by the scientific method (hypothesis testing and external review) to reach a level of specialization in using the future to understand the present.

Nevertheless, the study has some limitations. The majority of the sample was from southern Italy; therefore, slight cultural or social background variance must be assumed.

Furthermore, it cannot be stated that the view of the future is modifiable and plastic rather than a trait, if the brain plasticity of young adults [19], environmental and individual experience factors [39], the role of memory [3], and the strong association with the personality structure are considered. These issues can be explored only with a wider sample and a longitudinal research design.



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**Compliance with ethical standards**

**Conflict of interest** The authors declare that there is no financial, general, and institutional conflict of interest regarding the publication of this article.

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