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Creative Mental Time Travelling: The Influence of Divergent Thinking on the Construction of Autobiographical Past and Future

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ABSTRACT

Memory recall is characterized by a reconstructive process characterized by flexible recombination of episodic and semantic materials and provides the basis for mental time travel in the past and in the future. The present research aimed to investigate whether divergent thinking (DT) can have an influence on this process. Eighty-five participants (60 females, $M_{age} = 36.05$, $SD_{age} = 13.46$) were involved in a randomized protocol of one DT and four narrative tasks. Results showed that DT is a positive significant predictor of several narrative measures: number of words, internal details, total coherence, episodic richness and meaning making of the narratives. No effect of DT emerged on the phenomenological measures. This study highlights that creative abilities can impact mental time travel processes by influencing narrative—but not phenomenological—aspects of the autobiographical recall and simulation of past and future events. Limitations and practical implications of our findings have been discussed.

1 | Introduction

Autobiographical memory (AM) is a complex and multidimensional construct consisting of the capacity to encode, store and recall information related to one's past and personal experiences (Sotgiu 2021). It is also described as a complex system of episodes linked together by temporal, causal and thematic connections (Habermas 2011) that create coherence and meaning between personal experiences (Gülgöz and Sahin-Acar 2020).

Numerous scholars agree that mnestic recall processes do not consist of a passive and faithful re-enactment of the past but rather represent an active reconstructive phenomenon (see Schacter 2012, 2022; Schacter et al. 2024; Suddendorf et al. 2009). Schacter and Addis (2007a, 2007b), for example, demonstrated that memory is subject to various types of errors and distortions during reconstruction, which reflect the functioning of adaptive cognitive processes, which in turn would contribute to the efficient and flexible functioning of memory systems (Schacter and Addis 2007c; Schacter et al. 2024). With specific regard to autobiographical memory, Conway and colleagues (Conway and Pleydell-Pearce 2000; Conway et al. 2004; Conway 2005) hypothesised that individuals tend to reconstruct their personal memories with the aim of making them consistent with their current goals, self-images and self-beliefs.

In recent years, much evidence has proven that the episodic memory system is not only involved in mental reconstruction of personal past, but also, together with the semantic memory system (Eustache et al. 2016), in the cognitive process of travelling into a personal future, suggesting a general concept of "mental time travel" (MTT, Suddendorf and Corballis 2007, Suddendorf et al. 2009). According to these findings, both past and future thinking rely on information stored in episodic and semantic

memory systems and on similar cognitive processes (e.g., self-referential processing, imagery and flexible recombination of stored details, see Eustache et al. 2016), as well as on overlapping brain networks (Addis et al. 2009; Beaty et al. 2014, 2018; Benedek et al. 2014; Schacter and Addis 2007a, 2007b). In line with this evidence, Schacter and Addis (2007a) have proposed the "constructive episodic simulation hypothesis", which states that remembering the past and imagining the future rely on the same underlying mechanism (and neural networks) which flexibly recombines traces of past experiences to build both past and future events. AM is therefore considered a reconstructive phenomenon that varies between individuals (Berntsen et al. 2019) and that can be influenced by a range of cognitive factors (Palombo et al. 2018; Rubin et al. 2019) such as visual imagery (D'Argembeau and Van der Linden 2006), attentional cognitive control (Byrnes and Was 2025; Wierzba et al. 2018) and executive functioning (Battista et al. 2020; D'Argembeau and Van der Linden 2004).

Considering this, it is conceivable that complex cognitive processes such as divergent thinking (DT), which requires exactly the ability to flexibly associate and recombine information retrieved from memory systems to produce original ideas (Benedek and Fink 2019; Guilford 1956; Mastria et al. 2018; Runco and Acar 2012) could potentially have an impact on how people construct the narrative of their past and future events. However, it is difficult to find empirical studies that have systematically investigated the relationship between AM and DT abilities, and, in particular, the predictive role of creative abilities on AM processes.

1.1 | The Influence of Memory Processes on DT

Within the literature that has explored the relationship between the two constructs, most of the studies have sought to explore how memory processes influence or affect creative thinking: a recent line of research by Madore et al. (2015, 2016, 2017), van Genugten et al. (2021) and Thakral, Devitt, et al. (2021); Thakral et al. (2023) is worth highlighting. Overall, these studies have shown a relationship between episodic memory and performance in various creative tasks, including DT tasks (Madore et al. 2015, 2016, 2017; Thakral, Devitt, et al. 2021; Thakral et al. 2023), consequences tasks (Thakral, Devitt, et al. 2021) and creative writing tasks (van Genugten et al. 2021), highlighting how episodic memory plays a key role in DT performance and thus in creative cognition processes. Another study offering interesting insights into the relationship between AM and DT has been conducted by Daviddi et al. (2022), who investigated both these processes in 14 individuals showing Highly Superior Autobiographical memory (HSAM)—that is, a rare condition characterized by the ability to recall past experiences with very high accuracy—as well as in 24 control participants matched for age, gender, and education. Notably, this research found that individuals with HSAM did not show enhanced DT compared to their control counterparts. This might suggest that AM accuracy does not necessarily lead to a higher creative performance.

However, a considerable number of these studies focused on episodic or semantic memory (see also Sheldon et al. 2011; Beaty and Schacter 2018; Benedek and Fink 2019; Benedek et al. 2023) and not on the memory systems specifically responsible for the recall of autobiographical memories. Moreover, many of them observed an involvement of mnestic processes in creative performance (see also Gerver et al. 2023 for a review) with results that do not appear to be consistent across experimental paradigms and age cohorts (Ahmed et al. 2023).

1.2 | The Role of DT on Memory Reconstruction and Future Projections

Unfortunately, only a few studies have investigated the inverse influence of DT on AM and episodic future thinking. Importantly, these studies were conducted within the theoretical framework of constructive episodic simulation hypothesis put forward by Schacter and Addis (2007a, 2007b). With this regard, Addis et al. (2016) argued that accessing and retrieving specific details from episodic memory is a necessary but not sufficient condition for creating simulations of autobiographical events. In their own words, in order to achieve this goal, "one has to organise disparate elements of information into a coherent form (Addis and Schacter 2012), which may require recruitment of creative thought processes (Khatena 1978), such as divergent thinking" (Addis, Pan, et al. 2016: 90). In the same paper, the authors empirically tested this theoretical hypothesis by investigating the influence of DT on the ability to construct detailed imagined future and imagined past events as opposed to recalling past events. Their study employed specific procedures for the recall and imagination of these events using a recombination task investigating the influence of DT abilities only on the number of internal (episodic) and external (semantic) details produced in participants' narratives. The data from this study showed null results regarding the influence of DT on the number of details recalled from past memories, and instead revealed a role of DT on the number of episodic details produced for narratives about imagined future episodes. Recently, using the same experimental procedure, Thakral, Yang, et al. (2021) confirmed these results and showed that the influence of DT on the number of episodic details was significant in both the recast and imagined future episodic thinking condition, but especially for those ideas that were classified as 'new' (as opposed to old ones, i.e., retrieved from memory). Finally, a recent work of Ramey and Zabelina (2024) on the relationship between DT and memory systems (which used a specific memory task with congruent–incongruent schemas) concluded that DT is related to both controlled and spontaneous memory processes, suggesting that DT is related to the ability to flexibly combine semantic knowledge with episodic memory.

When considering the empirical literature discussed above, it is worth highlighting that most of the typical criteria used to assess autobiographical memories still need a specific exploration in order to understand whether the narrative and phenomenological expression (over the past and the future) of autobiographical narratives are affected by creative abilities. Even if past research already provided first evidence on the relationship between DT and autobiographical memories, it is conceivable that the results emerging from past studies may have been influenced by methodological choices: on the one hand, by the type of experimental task (i.e., recombination paradigm) and, on the other hand, by the variables which were

taken into account for the analysis of autobiographical narratives. Past research has indeed considered the recall of memories through autobiographical narratives which were limited to events focused on the combination of the three elements included in the experimental recombination procedure (object, place, person, see Addis et al. 2010 for a detailed description of the procedure): though, this procedure may have diminished the possible influence of DT in the recall phase.

Furthermore, past research did not consider the emotional valence of the events narrated by the subjects (e.g., positive or negative memories/future events). According to several studies, indeed, the emotional valence of narratives plays a fundamental role on the access, vividness and characteristics of autobiographical memories (e.g., Berntsen et al. 2011; Berntsen and Rubin 2002; Bohanek et al. 2005; Rasmussen and Berntsen 2009; Sotgiu 2016; Sotgiu and Galati 2007; Sheldon and Donahue 2017; Sheldon et al. 2020; Schulkind and Woldorf 2005; Wardell et al. 2021; Walker et al. 1997, 2003; Walker and Skowronski 2009), which therefore could hypothetically, be severely influenced by individual differences related to the way these episodes are interpreted and thus narrated.

Moreover, it should also be emphasized that possessing higher DT abilities could have an influence that goes beyond the number of episodic and/or non-episodic details recalled by individuals in their narratives (the only variables that were previously explored; Addis, Pan, et al. 2016): DT could instead influence narrative characteristics such as the length of the narratives, narrative coherence, or even the phenomenological, hence subjective, characteristics of the past and future events, such as vividness, coherence, accessibility, etc., as well as the meaning-making processes (i.e., the creation of meaning from one's past experiences). These processes represent a central aspect of autobiographical memory (Vanderveren et al. 2020) and are influenced by reconstructive processes of one's experiences and could thus also be influenced by cognitive/affective abilities (Singer 2004) such as creative cognition. Recent results seem indeed to point in this direction: Thakral, Devitt, et al. (2021) showed that quantitative indices of DT (i.e., fluency, flexibility, appropriateness and elaboration) predicted the number of false recollections committed by participants, thus having an influence on accuracy and on how people reconstruct their memories. We are therefore proposing that the exploration of the role of DT on AM should take into account a wider array of elements characterizing autobiographical narratives, considering both the narrative and the phenomenological complexity of the mental time travel over the past and the future.

1.3 | Aims and Hypotheses

The present study extends previous empirical research conducted within the theoretical framework of constructive episodic simulation hypothesis (Addis, Pan, et al. 2016; Thakral, Yang, et al. 2021; Ramey and Zabelina 2024) providing an in-depth analysis of the influence of DT abilities on both AM and episodic future thinking. Differently from previous studies carried out in this field, we decided to focus on three aspects characterizing autobiographical past and future events: the emotional valence of the events, and the narrative and phenomenological dimensions of both autobiographical memories and episodic future thoughts. Specifically, the present research aimed to study (i) whether DT exerts an influence on the autobiographical narratives of past vs. future events with different emotional valence; and (ii) if DT has an influence on both narrative (length, number of episodic and semantic details, meaning making, etc.) and phenomenological (vividness, coherence, accessibility, etc.) measures of the past and future events narrated.

We specifically hypothesize that DT may have an influence on both the recall (i.e., reconstruction) and construction of future autobiographical events. Since higher DT abilities imply the ability to be fluent, flexible and original (Guilford 1967; Runco and Acar 2012; Runco and Jaeger 2012), we hypothesised that subjects with higher ability to produce creative ideas may recall memories and construct future events differently, in particular producing substantially longer, more detailed, and more elaborate autobiographical narratives. This hypothesis has been tested on four different narratives, and the impact of DT has been explored on measures extracted from several methods (i.e., autobiographical interview, narrative coherence, meaning making). In order to control for the possible interference effect of emotions, the event's valence was specifically controlled to recall and construct both positive and negative events.

2 | Materials and Methods

2.1 | Design and Procedure

Before starting data collection, we run an a priori power analysis using G*Power (version 3.1.9.3) to compute the required sample size for our study. We used as parameters for our linear multiple regression model, an α error probability of 0.05, an effect size of 0.15 (precautionary) and asked for a Power ($1-\beta$ err prob.) of 0.80. The total sample size to meet these requirements was estimated to be equal to 85.

The present study has been approved by the institutional ethical committees of the University of Bergamo (anonymized for peer review) (Minute N. 07/2022 Ethical Committee meeting of November 16, 2022) and was conducted following the Declaration of Helsinki. All participants were volunteers, were not paid for their participation, and they were informed that the questionnaire was anonymous and that their answers would be used for research purposes only.

Data collection took place from November 2022 to January 2024 and 155 participants were enrolled. Before the start of the experimental session, each participant must read and approve the informed consent to the research and then complete an online questionnaire, programmed on Qualtrics software, lasting approximately 70 min. Participants were placed in a quiet place, in front of the computer, with the presence of one of the researchers who was at their disposal if any problems and/or doubts arose during the completion of the questionnaires. More in detail, participants filled out a socio-demographic questionnaire and performed the tasks in the three blocks: A (AUT, Alternative

Uses Task), B (written narratives of four events: recall or episodic future events of positive or negative valence) and MEQ-SF (Memory Experiences Questionnaires (MEQ)-Short Form), and C (Cognitive Style Indicator, CoSI and Short Scale of Creative Self, SCSS). Blocks (A, B, C) and the specific measures inside each block were randomized between participants. A debriefing phase was planned at the end of the experiment. For the purpose of this study only blocks A and B will be described in the measures section.

2.2 | Participants

Out of 155 recruited participants, 72 participants were excluded from the final sample for at least one of the following reasons: (a) pilot subjects ($N=2$), (b) questionnaire was largely incomplete or without sociodemographic information (i.e., less than 80% of the questionnaire had been completed ($N=25$)); (c) participants did not provide 100% of the event narratives ($N=45$). Since we reached a sample size of 83 participants, we enrolled 2 other participants during June 2025 to reach $N=85$, as required by the sample size estimation. The final sample is therefore composed of 85 adult participants (60 females, 25 males; mean age = 36.05, SD = 13.46, range: 20–62; mean education = 15.41, SD = 3.45, range: 8–21).

2.3 | Measures

Block A.

2.3.1 | Alternate Uses Task

Alternate Uses Task (AUT, Guilford 1967) is a measure for the evaluation of the creative ideation ability through DT, which is considered a reliable indicator of creative potential (Runco and Acar 2012). During the task, participants were requested to think about and list all alternative, original and creative uses they could imagine in relation to three commonly used objects (i.e., brick, plastic bottle and cardboard box) for 5 min each. The order of presentation of the items has been randomized between subjects. Scoring has been carried out by two independent raters who were trained in the scoring of AUT. Creativity was specifically scored through the snapshot method because of its proven good reliability (see Saretzki, Andrae, et al. 2024; Saretzki, Forthmann, and Benedek 2024). In particular, two raters (G.F. & B.M.) evaluated the creativity of the entire set of answers of each participant using a scale ranging from 1 (not creative at all) to 5 (very creative). The interrater reliability (two-way random, interrater absolute agreement, average measures) between the two raters was good ICC = 0.88, 95% CI [0.81, 0.92].

Block B.

2.3.2 | Autobiographical Narrative Task

Each participant was asked to provide four written autobiographical narratives: two concerned past episodes (either positive or negative) and two concerned imagined future events (either positive or negative). All the instructions for eliciting narratives were taken and adapted from previous studies investigating both AM (Berntsen and Bohn 2010; Grysman et al. 2013; Nigro and Neisser 1983; Sotgiu et al. 2025; Waters and Fivush 2015; Waters et al. 2014) and episodic future thinking (Berntsen and Bohn 2010; Grysman et al. 2013).

Concerning past episodes, participants were told: "We ask you to recall an episode in your life, which occurred in the last 12 months, in which you experienced very intense positive/negative emotions. In choosing the episode, keep in mind that it must relate to a personal experience that happened on a specific day and therefore lasted 24 hours at most. Now, describe in your own words the event you thought of. We ask you to try to report as many details related to the event as possible: e.g., when and where it happened, with whom you were in that situation, what emotions and feelings you felt, what you thought about, etc."

The same instructions were adapted for the construction of future (positive or negative) autobiographical episodes; participants were told: "We ask you to try to imagine an episode that will happen in your future life, in the next 12 months, in which you will experience very intense positive/negative emotions. In choosing the episode, keep in mind that it must relate to a personal experience that will happen on a specific day and therefore cannot last more than 24 hours. Now describe in your own words the event you thought of. We ask you to make an effort to report as many details related to the event as possible: e.g. when and where it will happen, who will be with you in that situation, what emotions and feelings you will experience, what you will be thinking about, etc."

2.3.2.1 | Narrative Coding. Examples of narratives are provided in Appendix A. For each memory account, narrative length was calculated using a word count tool (*numword*).

Two Authors independently coded 30% of the narratives (according to Syed and Nelson 2015) for all quantitative measures, according to the coding schemes described below. Inter-rater reliability statistics were computed for each variable and disagreements between the two coders were resolved through discussion with a trained research assistant. Then, one of the coders continued the coding work independently for all the remaining narratives.

2.3.2.1.1 | Narrative Measures of Autobiographical Memory. Autobiographical Interview (Levine et al. 2002): According to Levine et al. (2002), each memory or future episode was segmented into informational bits or details. Then, raters coded for:

Internal details: refer to episodic details contained in a central event generated by the participants, which were specific to time and place and were considered to reflect episodic reexperiencing. Internal details were separated into five mutually exclusive categories: (a) event (i.e., happenings or the unfolding of the story), (b) place, (c) time, (d) perceptual, and (e) emotion/thought. The interrater reliability (two-way random, interrater absolute agreement, average measures) between the two raters was excellent, ICC = from 0.97 to 0.99 (see Appendix S1 for more details).

External details refer to semantic and off-topic details contained in the event narrative (including factual statements, commentary on the task itself, and so on). The interrater reliability (two-way random, interrater absolute agreement, average measures) between the two raters was good, ICC = from 0.73 to 0.80 (see Appendix S1 for more details).

Episodic richness: was scored on a linear system of three points: 3—was assigned to a rich, highly specific, evocative and/or vivid description that seems to emerge from a feeling of reliving; 2—was assigned to a detailed description; 2—was assigned to a description limited to general and non-specific information, but still episodic in nature, while 0 points were assigned if there was no mention of information related to the specified category or an answer based on semantic rather than episodic memory. The interrater reliability (two-way random, interrater absolute agreement, average measures) between the two raters was excellent, ICC = from 0.93 to 0.98 (see Appendix S1 for more details).

Temporal Integration: assess a person's ability to integrate the recalled episodic event into a broader time scale by providing additional contextual temporal information or relating it to other life periods. Three points were assigned if details on a broader time scale together with a complete and in-depth description of the same; 2 points were assigned if some details on a broader time span were provided, but a full description was lacking; 1 point if some details on a broader time span appeared to be given, but are doubtful; 0 points were assigned if no details on a broader time frame than the main event were considered. The interrater reliability (two-way random, interrater absolute agreement, average measures) between the two raters was good to excellent, ICC = from 0.86 to 0.96 (see Appendix S1 for more details).

Narrative Coherence: This variable has been coded using the scheme developed by Reese et al. (2011), who identified three theoretically distinct dimensions of narrative coherence: theme, context, and chronology. (i) Theme indicates the extent to which a narrative focuses on a specific topic, encompassing causal connections between the various parts of the tale and personal evaluations on the part of the narrator. (ii) Context is defined as the extent to which a narrative includes specific details concerning the space and time of the reported event. (iii) Chronology regards the temporal ordering of facts and actions reported in the narrative. For each narrative, coders rated these dimensions on a 4-point scale ranging from 0 to 3. Narratives obtained a score of 0 if participants did not report any details of the dimension of coherence under assessment, and a score of 3 if all details defining that particular dimension were provided. The interrater reliability (two-way random, interrater absolute agreement) between the two raters was excellent for theme, ICC = from 0.91 to 0.96, and context, ICC = from 0.91 to 0.99, and good/excellent for chronology, ICC = from 0.88 to 0.97 (see Appendix S1 for more details).

These scores were then summed to create an overall coherence score (*coherence_tot*) that could range from 0 to 9 (see e.g., Waters and Fivush 2015).

Meaning Making: Meaning making was scored according to the system of McLean and Pratt (2006). A linear system (0–3) is adopted, with increasing scores reflecting greater complexity of autobiographical reasoning. A score of 0 was assigned to narratives that report no meaning. A score of 1 was assigned to narratives reporting a lesson, defined as meanings that were often behavioural and did not extend the meaning beyond the originally recalled event. A score of 2 was assigned to narratives with a vague meaning. These narratives contained slightly more sophisticated meanings than the lessons but were not as explicit as the insights. Finally, a score of 3 was assigned to narratives with insights, defined as meanings that go beyond the specific event and extend to explicit transformations in understanding oneself, the world or relationships. Specific examples were shown to the coders to a better understanding of the differences between the four categories of meaning making.

The interrater reliability (two-way random, interrater absolute agreement) between the two raters was acceptable to excellent, ICC = from 0.69 to 0.92 (see Appendix S1 for more details).

2.3.2.1.2 | Phenomenological Measures of Autobiographical Memory. For each narrative event, was also administered the Memory Experiences Questionnaire—Short Form (MEQ-SF; Luchetti and Sutin 2016). This is a 31-item self-report questionnaire, which has already been translated into Italian language (Luchetti 2015) and assesses the phenomenological characteristics of autobiographical memories through a 5-step Likert scale. Specifically, the characteristics assessed were: (1) vividness (MEQ_VIV), (2) coherence (MEQ_COE), (3) accessibility (MEQ_ACC), (4) sensory details (MEQ_DS), (5) emotional intensity (MEQ_IE), (6) visual perspective (MEQ_VP), (7) temporal perspective (MEQ_TP), (8) distancing (MEQ_D). Valence items have not been administered as they were defined a priori in the research design. Moreover, sharing items have also not been administered as they were not of interest for the present research. As in previous research (e.g., Addis, Pan, et al. 2016; Brown et al. 2013; Grysman et al. 2013), the same instruments were adapted [version—Episodic Future Thinking—EFT] to detect phenomenological features of imagined future events as well (median alpha = 0.72).

2.4 | Data Analysis

All analyses were conducted using version 29.0.2.0 of SPSS (International Business Machines Corporation 2023). A check for normality assumption revealed a non-normal distribution for some of the narratives variables (skewness and kurtosis values $\leq |1|$ and $\leq |3|$, respectively; Kim 2013).

Means, SD, and non-parametric correlation analyses were then calculated.

Then, generalized linear mixed regression modeling (GLMMs) were chosen in order to handle non-normally distributed and non-continuous dependent variables. For each GLMM reported in the current study, we set DT creativity scoring, condition, valence and creativity × condition as fixed independent variables and Subjects as random effect with normal probability distribution and Identity link function. The models employed robust estimation to handle violations of model assumptions and the

possible effect of outliers (Wu 2009). Dependent variables were narrative and phenomenological measures.

3 | Results

3.1 | Preliminary Analyses

Descriptive statistics and correlations between DT creativity and narrative and phenomenological measures are reported in Table 1.

GLLMs were then run with a random intercept (to control for individual differences) and four fixed effects, with three main effects (DT creativity scores, condition, valence) and one interaction (DT × condition).

3.2 | Creativity on Autobiographical Narrative Measures

GLMM results on narrative measures as dependent variables can be observed in Table 2.

DT creativity scores main effect resulted to be a significant predictor of several narrative measures, such as the length of the narrative (number of words), $F(1, 335) = 20.32$, $p < 0.001$, the total coherence of the narrative, $F(1, 334) = 9.94$, $p = 0.002$, the number of internal details, $F(1, 334) = 12.08$, $p < 0.001$, episodic richness of the story, $F(1, 334) = 970$, $p = 0.004$, and the meaning that subjects were able to give to the narrative, $F(1, 334) = 8.56$, $p = 0.002$. Instead, condition showed no significant impact on narrative measures ($F < 1.98$), whereas valence showed only a significant effect on the coherence index, $F(1, 334) = 9.46$, $p = 0.002$. No interaction between DT and condition was also found, $F < 2.12$.

3.3 | Creativity on Autobiographical Phenomenological Measures

Results with phenomenological measures as the dependent variables can instead be observed in Table 3.

Overall, DT creativity score was not a significant predictor for any of the phenomenological variables, $F < 3.09$. Instead, condition and valence were the only significant predictors for these types of variables. In particular, a significant condition effect indicates that participants reported higher perceived vividness, $F(1, 335) = 19.79$, $p < 0.001$, coherence, $F(1, 332) = 15.38$, $p < 0.001$, sensory details, $F(1, 333) = 16.36$, $p < 0.001$, and time perspective $F(1, 335) = 39.88$, $p < 0.001$, for the recalled condition in comparison with the future condition. A significant valence effect indicates instead that participants report higher vividness, $F(1, 335) = 10.50$, $p = 0.001$, coherence, $F(1, 332) = 24.18$, $p < 0.001$, accessibility, $F(1, 330) = 23.24$, $p < 0.001$, sensory details, $F(1, 333) = 10.87$, $p = 0.001$, time perspective, $F(1, 335) = 15.66$, $p < 0.001$, and distancing $F(1, 334) = 7.94$, $p = 0.005$, for positive rather than negative narratives. These findings seem independent from the interaction between DT abilities and the condition, which did not emerge as significant in any phenomenological index, $F < 3.66$.

4 | Discussion

The present research aimed to assess whether and how DT, intended as the ability to produce creative contents, exerts an influence on the narrative and phenomenological characteristics of personal memories and episodic future thoughts with different emotional valence.

4.1 | Narrative Measures

In line with our initial hypothesis, we found a significant main effect of DT on several narrative measures. In particular, a higher ability to produce creative ideas predicted a higher number of words and episodic details in the narrative episodes produced by participants as well as higher scores of internal coherence, episodic richness and meaning making, regardless of the condition (past vs. future) and valence (positive vs. negative). No interaction between DT abilities and the time condition emerged from our results. These findings indicate that creative abilities do have a significant impact on narratives; moreover, partially in contrast with past research (Addis, Pan, et al. 2016), this effect seems to be true both for how we reconstruct our autobiographical past and for how we construct our future projections.

It is worth highlighting that having higher DT abilities implies higher abilities to dynamically employ cognitive processes such as goal-directed memory (Beaty et al. 2019) to access and use different types of memory materials (i.e., episodic and semantic, Benedek et al. 2023) and to flexibly (Palmiero et al. 2022; Zabelina et al. 2019) associate these materials (see e.g., Benedek et al. 2012; Campidelli et al. 2026; Kenett 2018; Benedek et al. 2023) into episodic simulations (Benedek et al. 2020) in original and creative ways. These higher abilities in the flexible and differential use of memory materials directed toward the generation of creative ideas appear to come into play both when creative people think at their personal past and when they think at their personal future. This effect, in particular, emerged when participants were relatively free on the content of their narratives (in comparison with what emerged with an episodic simulation paradigm). The narrations of creative participants appear longer, richer in episodic details, more highly coherent as concern theme, context and chronology of the narrated events as well as more elaborated, so much that their narratives contain higher meaning, which implies that these participants have probably integrated their narrative in a broad frame of their personal history.

Our results partially contrast also with the findings from Daviddi et al.'s (2022) study, which did not find a significant association between AM and DT. However, we note that the comparison between this study and the present one should be conducted with great caution for at least three reasons. First, while Daviddi et al. compared a small group of individuals exhibiting a rare syndrome (i.e., HSMA) with control participants, we examined only adult participants from the general population. Second, while Daviddi et al. were mainly interested in

TABLE 1 | Descriptive measures of narratives and phenomenological measurements and correlations with DT creativity scores.

	Recall—positive				DT	Recall—negative				DT
Measure	***M***	**SD**	**Skew**	**Kurt**	**Rho**	***M***	**SD**	**Skew**	**Kurt**	**Rho**
Narrative measures										
1. wn	132.12	97.39	1.46	2.42	0.30**	151.14	91.28	0.70	−0.25	0.43**
2. coher	1.65	0.74	−0.18	−0.76	0.33**	1.71	0.76	−0.42	−0.52	0.25*
3. mm	0.67	0.82	1.21	1.05	0.09	0.88	1.01	0.89	−0.33	0.23*
4. inter	18.80	16.36	3.57	20.36	0.31**	19.76	12.22	1.29	2.72	0.33**
5. ext	5.53	6.15	1.87	4.08	0.06	5.99	6.96	1.56	1.93	0.06
6. eprich	1.41	0.90	0.37	−0.62	0.27*	1.61	0.94	0.15	−0.98	0.34**
7. tempint	0.96	0.91	0.56	−0.58	0.10	0.91	0.93	0.64	−0.65	−0.03
Phenomenological measures										
1. VIV	4.47	0.60	−0.99	0.19	−0.13	4.39	0.75	−1.26	1.28	−0.21
2. COH	4.33	0.83	−1.13	0.28	0.10	4.14	0.85	−0.85	−0.21	0.05
3. ACC	4.34	0.78	−1.01	0.01	0.16	4.05	0.85	−0.85	0.83	−0.10
4. SED	3.95	0.69	−0.42	0.23	0.02	3.78	0.75	−0.06	−0.05	−0.22*
5. EI	4.38	0.75	−0.93	−.06	−.13	4.27	0.80	−0.78	−0.53	−0.12
6. PV	4.01	1.10	−1.00	0.12	0.18	4.02	1.04	−0.99	0.44	−0.01
7. TP	4.48	0.66	−1.32	1.26	0.01	4.24	0.87	−0.87	−0.51	−0.16
8. D	1.91	1.12	1.22	0.65	−0.08	2.46	1.26	0.47	−0.87	−0.10
	EFT—positive				**DT**	**EFT—negative**				**DT**
Measure	***M***	**SD**	**Skew**	**Kurt**	**Rho**	***M***	**SD**	**Skew**	**Kurt**	**Rho**
Narrative measures										
1. wn	126.19	106.27	2.29	7.87	0.33**	119.46	81.26	1.59	4.08	0.34**
2. coher	1.47	0.79	0.01	−1.06	0.27*	1.11	0.68	0.32	−1.02	0.22*
3. mm	0.78	0.89	0.98	0.16	0.23*	0.73	0.77	0.84	0.28	0.18
4. inter	18.19	19.10	4.63	31.06	0.25*	13.57	10.10	1.75	3.68	0.26*
5. ext	5.26	6.65	3.46	19.44	0.02	6.14	7.68	2.97	12.12	0.10
6. eprich	1.48	0.98	0.05	−0.99	0.23*	1.07	0.93	0.50	−0.60	0.14
7. tempint	0.68	0.83	0.91	−0.21	−0.04	0.80	0.88	0.74	−0.47	−0.05
Phenomenological measures										
1. VIV	3.68	1.01	−0.65	0.07	0.01	3.02	1.10	0.20	−0.73	0.05
2. COH	3.55	0.82	−0.14	−0.51	0.12	2.93	0.88	0.59	0.23	−0.04
3. ACC	4.12	0.94	−0.91	−0.19	−0.10	3.28	1.28	−0.35	−1.06	0.13
4. SD	3.55	0.78	−0.42	0.23	0.01	3.29	0.80	0.22	−0.12	0.16
5. EI	4.29	0.70	−0.70	−0.12	−0.07	4.23	0.85	−1.11	0.26	−0.03
6. PV	3.60	1.17	−0.50	−0.65	0.02	3.25	1.21	−0.25	−0.87	0.14
7. TP	2.83	1.08	0.27	−0.84	0.07	2.41	0.93	0.52	−0.10	0.18
8. D	2.32	1.17	0.42	−1.00	−0.09	2.44	1.09	0.20	−0.93	−0.12

Note: $N = 85$, $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.
Abbreviations: ACC = accessibility; COH = coherence; coher = narrative coherence; D = distancing; DT = creativity score; EFT = episodic future thinking; EI = emotional intensity; eprich = episodic richness; ext. = semantic details; inter = episodic details; Kurt = kurtosis; *M* = mean; mm = meaning making; PV = point of view; Rho = Spearman's rho; SED = sensory details; SD = standard deviation; Skew = skewness; tempint = temporal integration; TP = temporal perspective; VIV = vividness; wn = words number.

TABLE 2 | Generalized linear mixed models with random intercept, narrative measures as the dependent variables and DT, condition (recall vs. episodic future thinking), valence (positive vs. negative), and interaction between DT and condition as predictors.

DV	Effects	Predictors	Estimate	*Z*/*t*	*p*	95% CI
1. Words numb	Random	Intercept	4074.68	5.06	**< 0.001*** **	95% CI [23.99, 95.13]
	Fixed	DT	28.66	3.79	**< 0.001*** **	95% CI [13.78, 43.53]
		Condition	−4.19	−0.28	0.78	95% CI [−33.41, 25.03]
		Valence	−8.29	−1.09	0.28	95% CI [−23.32, 6.74]
		DT × condition	10.50	1.46	0.15	95% CI [−3.70, 24.71]
2. Coherence	Random	Intercept	0.24	4.89	**< 0.001*** **	95% CI [0.48, 1.16]
	Fixed	DT	0.17	2.39	**0.017***	95% CI [0.03, 0.31]
		Condition	0.25	1.41	0.161	95% CI [−0.10, 0.59]
		Valence	0.14	3.08	**0.002****	95% CI [0.05, 0.24]
		DT × condition	0.06	0.93	0.353	95% CI [−0.07, 0.18]
3. Mm	Random	Intercept	0.15	3.20	**< 0.001*** **	95% CI [−0.02, 0.67]
	Fixed	DT	0.20	2.46	0.015*	95% CI [0.04, 0.35]
		Condition	0.13	0.56	0.58	95% CI [−0.32, 0.57]
		Valence	−0.07	−0.80	0.43	95% CI [−0.23, 0.10]
		DT × condition	−0.05	−0.47	0.64	95% CI [−0.23, 0.14]
4. Internal	Random	Intercept	65.23	4.50	**< 0.001*** **	95% CI [2.47, 13.12]
	Fixed	DT	2.82	2.38	**0.018***	95% CI [0.49, 5.16]
		Condition	1.36	0.50	0.62	95% CI [−4.04, 6.77]
		Valence	1.39	0.92	0.36	95% CI [−1.58, 4.36]
		DT × condition	1.47	1.12	0.26	95% CI [−1.11, 4.05]
5. External	Random	Intercept	16.30	4.34	**< 0.001*** **	95% CI [1.65, 6.62]
	Fixed	DT	0.81	1.47	0.14	95% CI [−0.28, 1.91]
		Condition	−0.28	−0.17	0.87	95% CI [−3.52, 2.97]
		Valence	−0.65	−1.13	0.26	95% CI [−1.80, 0.49]
		DT × condition	0.16	0.20	0.84	95% CI [−1.39, 1.71]
6. Episrich	Random	Intercept	0.37	4.72	**< 0.001*** **	95% CI [0.37, 1.25]
	Fixed	DT	0.19	2.03	**0.043***	95% CI [0.01, 0.37]
		Condition	0.01	0.01	0.99	95% CI [−0.41, 0.42]
		Valence	0.07	1.10	0.27	95% CI [−0.06, 0.20]
		DT × condition	0.11	1.34	0.18	95% CI [−0.05, 0.28]
7. Temporal integration	Random	Intercept	0.20	3.61	**< 0.001*** **	95% CI [0.51, 1.15]
	Fixed	DT	−0.03	−0.53	0.09	95% CI [−0.15, 0.09]
		Condition	−0.05	−0.24	0.36	95% CI [−0.47, 0.36]
		Valence	−0.04	−0.46	0.12	95% CI [−0.20, 0.12]
		DT × condition	0.11	1.16	0.30	95% CI [−0.08, 0.30]

Note: $*p < 0.05$, $**p < 0.01$, $***p < 0.001$. The data highlighted in bold were the ones that proved to be significant.
Abbreviations: CI = confidence intervals; Df = degrees of freedom; DT = divergent thinking; episodicrich = episodic richness; external = semantic details; internal = episodic details; mm = meaning making; tempint = temporal integration; wordsnumb = words number.

investigating the accuracy of their participants' personal memories, we employed a range of instruments assessing AM, including a questionnaire about memory phenomenology and a set of well-established coding systems aimed at measuring the most relevant narrative characteristics of AM (e.g., coherence, episodic richness, internal and external details). Third, contrary to

TABLE 3 | Generalized linear mixed models with random intercept, phenomenological measures as the dependent variables and DT, condition (recall vs. episodic future thinking), valence (positive vs. negative), and interaction between DT and condition as predictors.

DV	Effects	Predictors	Estimate	*Z*/*t*	*p*	CI
1. MEQ_VIV	Random	Intercept	0.10	2.53	**0.011***	95% CI [2.65, 3.69]
	Fixed	DT	0.04	0.37	0.71	95% CI [−0.16, 0.24]
		Condition	1.29	4.45	**< 0.001*****	95% CI [0.72, 1.86]
		Valence	0.23	3.24	**0.001****	95% CI [0.09, 0.37]
		DT × condition	−0.11	−0.95	0.34	95% CI [−0.33, 0.12]
2. MEQ_COH	Random	Intercept	0.14	2.91	**0.004****	95% CI [2.52, 3.34]
	Fixed	DT	0.05	0.64	0.52	95% CI [−0.11, 0.21]
		Condition	0.94	3.92	**< 0.001*****	95% CI [0.47, 1.41]
		Valence	0.41	4.92	**< 0.001*****	95% CI [0.25, 0.57]
		DT × condition	0.02	0.24	0.81	95% CI [−0.16, 0.20]
3. MEQ_ACC	Random	Intercept	0.13	2.48	**0.013***	95% CI [3.02, 3.98]
	Fixed	DT	0.02	0.201	0.84	95% CI [−0.15, 0.18]
		Condition	0.30	1.16	0.25	95% CI [−0.21, 0.82]
		Valence	0.46	4.82	**< 0.001*****	95% CI [0.27, 0.65]
		DT × condition	0.05	0.51	0.61	95% CI [−0.14, 0.24]
4. MEQ_SD	Random	Intercept	0.19	4.23	**< 0.001*****	95% CI [2.75, 3.50]
	Fixed	DT	0.08	1.16	0.25	95% CI [−0.06, 0.23]
		Condition	0.82	4.05	**< 0.001*****	95% CI [0.42, 1.22]
		Valence	0.20	3.30	**0.001****	95% CI [0.08, 0.32]
		DT × condition	−0.16	−1.91	0.06	95% CI [−0.33, 0.01]
5. MEQ_EI	Random	Intercept	0.25	4.76	**< 0.001*****	95% CI [3.97, 4.63]
	Fixed	DT	−0.04	−0.52	0.60	95% CI [−0.19, 0.11]
		Condition	1.13	0.74	0.46	95% CI [−0.21, 0.47]
		Valence	0.09	1.32	0.19	95% CI [−0.04, 0.21]
		DT × condition	−0.03	−0.34	0.73	95% CI [−0.18, 0.12]
6. MEQ_PV	Random	Intercept	0.35	3.68	**< 0.001*****	95% CI [2.66, 3.85]
	Fixed	DT	0.04	0.35	0.73	95% CI [−0.20, 0.29]
		Condition	0.49	1.57	0.12	95% CI [−0.12, 1.11]
		Valence	0.16	1.79	0.08	95% CI [−0.02, 0.33]
		DT × condition	0.03	0.23	0.82	95% CI [−0.25, 0.31]
7. MEQ_TP	Random	Intercept	0.03	0.77	0.44	95% CI [1.74, 2.65]
	Fixed	DT	0.11	1.32	0.19	95% CI [−0.06, 0.28]
		Condition	2.00	6.32	**< 0.001*****	95% CI [1.38, 2.62]
		Valence	0.31	3.96	**< 0.001*****	95% CI [0.16, 0.47]
		DT × condition	−0.11	−1.03	0.31	95% CI [−0.33, 0.10]
8. MEQ_D	Random	Intercept	0.31	3.28	**0.001****	95% CI [2.27, 3.37]
	Fixed	DT	−0.13	−1.20	0.23	95% CI [−0.33, 0.08]

(Continues)

TABLE 3 | (Continued)

DV	Effects	Predictors	Estimate	*Z*/*t*	*p*	CI
		Condition	−0.15	−0.43	0.67	95% CI [−0.83, 0.53]
		Valence	−0.32	−2.82	**0.005****	95% CI [−0.54, −0.10]
		DT × condition	−0.02	−0.13	0.90	95% CI [−0.28, 0.24]

Note: *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. The data highlighted in bold were the ones that proved to be significant.
Abbreviations: ACC = accessibility; CI = confidence intervals; COH = coherence; D = distancing; Df = degrees of freedom; DT = divergent thinking; EI = emotional intensity; PV = point of view; SD = sensory details; TP = temporal perspective; VIV = vividness.

Daviddi et al.'s study that was focused on the predictive role of AM on DT performance, the present study explored the inverse relationship, that is, the predictive role of DT over AM narratives and phenomenology.

By looking at our findings on the relationship between DT and narrative measures from a different perspective, they appear in accordance with previous literature highlighting how different cognitive processes such as visual imagery (D'Argembeau and Van der Linden 2006), executive functions (D'Argembeau and Van der Linden 2004), and, in the case suggested by the present findings, DT can impact both how we re-construct our past and how we built our future. This result demonstrates once again how these processes are similar, constructive in nature and closely related to creative skills. However, it is important to remember that these findings are part of a richer body of scientific literature which, based on evidence examining the inverse relationship between the two constructs (i.e., how episodic or autobiographical memory influence creative abilities), seems to suggest that the relationship between the two constructs is complex and most likely bidirectional (Addis, Pan, et al. 2016).

Noteworthy, our interpretations of the significant association between DT and some narrative characteristics of AM and future thinking are by no means definite. An alternative explanation of our findings points to our participants' verbal abilities, which could act as a mediating variable for the influence of DT on narrative length, quantity of internal details, episodic richness, and narrative coherence. Since we did not assess verbal abilities in our study, future research implementing measures of this variable (e.g., verbal fluencies, WAIS vocabulary, etc.) is strongly needed. Moreover, it is arguable that verbal abilities would correlate with measures of dispositional creativity such as those included in the Block C of our design (i.e., Cognitive Style Indicator, CoSI and Short Scale of Creative Self), which will be the focus of future analyses of our data.

4.2 | Phenomenological Measures

In contrast with the results on narrative indexes, where the ability to generate creative contents with DT emerged as a main predictor of the way participants produced autobiographical episodes, and contrary to our initial hypothesis, no effect of DT was found on phenomenological variables. This means that creative abilities affect the construction of autobiographical episodes both referred to the past and to the future, especially in terms of structure, coherence, and meaning making, but it seems that these abilities do not affect the qualitative and experiential indexes of this re/constructive process. Specifically, according to previous literature, phenomenological characteristics of memory are the elements that allow us to travel back in time and relive each experience that we consciously remember (Sutin and Robins 2007; Tulving 2002); we could therefore hypothesize that the cognitive processes guiding DT could emerge as significant mechanisms of the reconstructive processes described by narrative measures, whereas these could not impact the phenomenological measures that could rely more on self-perception and reliving experiences, which could potentially be based on emotional elements or on predispositional and contextual factors.

However, in line with past literature, a prominent impact of condition and valence has been found on phenomenological measures. In particular, the narrative condition (recall vs. future thinking) emerged as a significant predictor of several measures: past narratives are perceived as more experienced with their own eyes (in first person), as more vivid, more logically connected with specific time and place rather than fragmented (i.e., coherent), clearer concerning the time in which the experience in the memory took place (e.g., date), with more re-experienced sensory details and with higher intensity of the emotions experienced during the narration. These results are in line with several studies that showed how remembering past events were experienced as more vivid (Morton and MacLeod 2023; De Brigard et al. 2016), more detailed (Addis et al. 2009) and more emotionally intense (Addis et al. 2009; De Brigard et al. 2016) than imagined future events.

Concerning the effect that the valence had on phenomenological measures, results indicated that participants reported higher vividness, coherence, accessibility, sensory details, time perspective and distancing for positive in comparison to negative narratives. This finding is again consistent with previous literature that showed how, for both past and future, representations of positive events were associated with a greater feeling of re-experiencing (D'Argembeau and Van der Linden 2004), more specific (Byrne et al. 2001) and with a higher number of visual and sensory details (D'Argembeau et al. 2003, 2011).

4.3 | Limitations and Future Directions

The present study has some limitations that should be taken into account: first, the sample size is at the limit to achieve good statistical power. Moreover, the greater representation of the female compared to the male gender may have an impact on the generalizability of the results. Second, the correlational

nature of the study can provide an initial basis for discussion in showing the possible influences of DT on the construction of past and future narratives, but studies with experimental manipulations will play a crucial role in definitively demonstrating the directionality of this relationship. Third, it is possible that some confounding variables (such as participants' verbal abilities) may have influenced the obtained results. Further studies are therefore needed to confirm our results.

Finally, it is important to emphasize that the fact that individual differences in cognitive factors—such as DT—can have an impact not only on how we build future scenarios, but also on how we reconstruct (and "re-write") our personal past may have important practical implications.

For example, some authors have already put forward the idea that memory specificity and coherence—that appear higher for higher divergent thinkers—are both features of autobiographical memories that are related to aspects of well-being and effective functioning of the self (see e.g., Waters et al. 2013). In particular, having access to specific (episodic) personal memories and therefore having the possibility to construct coherent narratives about these experiences might lead individuals to a better emotional processing of these events and this represents a protective factor against depression and emotional avoidance (Raes et al. 2006; Vanderveren et al. 2017; Williams et al. 2007). This is crucial from an educational and interventional point of view because intervention that targets specifically DT along the lifespan might, in accordance with our results, have a positive side effect on autobiographical narrative abilities, in particular on the ability to form memories that are richer in episodic details and more emotionally coherent and integrated.

This, in turn, has two main implications: on the one hand, DT might help to process and "re-write" difficult memories (as occurs for example in some forms of narrative therapy, see e.g., Pennebaker 1997; Pennebaker 2007; Pennebaker and Smyth 2016); but, on the other hand, more creative individuals seem also more prone to false memories (Thakral, Devitt, et al. 2021). It is worth noticing, however, that these contrasting implications can also be integrated considering that memory flaws, sometimes, can be considered adaptive (Schacter et al. 2024).

Future studies can thus consider to: (i) try to support the results of the present study also with diverse, and especially experimental, designs to better comprehend the nature—most probably bidirectional—of the relationship between the two constructs; (ii) evaluate the role of DT training on autobiographical narratives and well-being and (iii) plan new studies to prove the possible role of DT in memory accuracy (e.g., false memories), that, for example, might be fundamental in the context of eyewitness research, where considering all the potential influencing factors on the subjects' narration is pivotal.

5 | Conclusion

The present research represents an expansion of previous literature on the constructive episodic simulation hypothesis, which has evidenced how the retrieval of autobiographical memories and the projection into the personal future share the same mechanisms and neural networks. Indeed, using a specific methodology that allows stimulating free recall and imagination of future events, DT emerged to influence not only how we build personal projections into the future but also the construction process of autobiographical memories. In particular, the most creative subjects produced narratives with more words, more internal (episodic) details and that are characterized by a higher coherence and a higher subjective meaning both in the recall and in the future thinking condition. Combining the results emerging from the present study with the results from past literature, we can assume that the relationship between AM and DT is far from being linear and straightforward, appearing, more likely, bidirectional. Further studies are needed to confirm our findings, accounting also for any potential confounding variables.

Author Contributions

R. Testa: data curation, writing – review and editing. **G. Fusi:** conceptualization, investigation, writing – original draft, methodology, validation, visualization, writing – review and editing, formal analysis, project administration, data curation. **I. Sotgiu:** conceptualization, methodology, supervision, resources, writing – review and editing. **A. Mavuli:** data curation, writing – review and editing. **S. Agnoli:** conceptualization, writing – review and editing, formal analysis, visualization, methodology. **M. L. Rusconi:** supervision, writing – review and editing, resources. **B. Mazzoleni:** data curation, writing – review and editing.

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Ethics Statement

The present study has been approved by the institutional ethical committees of the University of Bergamo (Minute N. 07/2022 Ethical Committee meeting of November 16, 2022) and was conducted following the Declaration of Helsinki.

Consent

Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are openly available in Creative Mental Time Travelling: The Influence Of Divergent at https://osf.io/k8az6/overview, reference number K8az6.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Appendix S1:** Supporting information.

Appendix A: Examples of Narratives in the Four Experimental Conditions

Positive Recall Condition

"*An episode in which I experienced very intense positive emotions occurred on Friday, June 30, 2023, precisely at lunchtime. It was two days before my birthday.*

That day I was at home with my parents, studying in my room while my father was preparing lunch. At one point, the doorbell rang. My mother said it was my aunt, but when I went downstairs, my boyfriend walked through the door, even though he was supposed to be at work at that moment. At first, I didn't understand what was happening. I was very confused. Then my parents gave me an envelope with a note saying that they had given us a weekend getaway to the Cinque Terre. I was bursting with happiness, I hugged everyone and asked when we would be leaving. They told me we would be leaving right after lunch, and at that moment I noticed that the table was set for four people, as Alessandro would also be staying to eat with us. So I ate, I don't remember exactly what we had, and hurriedly packed my suitcase to leave. I remember very well that I forgot many things because I was so excited that I didn't pay much attention to what I needed to take with me".

Negative Recall Condition

"The event it refers to dates back to June 6, 2023, the day my father had a heart attack. When it happened, I was in Bergamo and had just finished a student internship. I was alone in my room when I received a call from my mother telling me what had happened a few hours earlier. The first emotion I felt was fear because never before had I been so afraid of losing someone in my life, and never before had I wanted to be close to my family so much. As a student living away from home, the only way to get there would be to take an exam.

Despite this, however, I managed to be brave because, thanks to my dad who encouraged me, I was able to take my last exam and then go back to him and be close to him, together with my mom and sister".

Positive Episodic Future Thinking Condition

"It's a cold winter evening and I'm waiting outside my house for the guy I've arranged to meet for the evening. Fabio arrives right on time, as usual, and I'm right on time too, because I was so excited that I started getting ready hours in advance. All afternoon I couldn't do anything productive or concentrate on anything, because I was too busy imagining how the evening would go. Finally, the moment arrives, and I am beside myself with excitement. I am sweating profusely, and getting dressed just before leaving has been useless because my armpits are already stained. He arrives, and the closer he gets, the more my heart explodes in my chest. We greet each other with the usual pleasantries, and I notice his embarrassment, hidden by his feigned confidence, because he stammers a little. We decided to go for a beer somewhere not far from where I live. We walk there, and it's quite a long walk. We talk a lot, and I realize more and more how much I've missed talking to him. Because with him, you can talk about anything without being judged. You can have deep, intelligent conversations and be understood. I think he's the only person who really understands me. The only person whose soul is perfectly in tune with mine. But then I remember that he is a skilled flatterer and a great narcissist, and that he has this effect on all girls. We drink our beer while continuing to chat, and throughout the evening he tries to win me over with his tactics, while I pretend to be uninterested. We leave the bar, I walk a step ahead of him, we are about to reach the car. I turn suddenly towards him to talk to him and, without even giving me time to think, he kisses me on the mouth. He pulls away for a second, looks into my eyes for my approval and starts kissing me again, this time more passionately and holding me tight around the neck".

Negative Episodic Future Thinking Condition

"An episode that I have unfortunately been thinking about lately concerns my grandmother, particularly her health. She is 85 years old and has had a number of health problems for several years, one of which is Parkinson's disease. I see her getting worse day by day and for this reason I am afraid that she may die within the next 12 months.

I cannot say exactly when it will happen, but I know it will happen in her home, where she currently lives. Obviously, I will experience very negative emotions, such as sadness and despair, also because she is the last grandmother I have left. However, I don't think I would be surprised or overwhelmed, as it is something I would have expected, but I would still feel a lot of pain at her loss; I might also feel lonely because she is the glue that holds the whole family together. I will try to stay as close as possible to my mother, as will my father, and I know that my boyfriend will be there to comfort me. It will be a time when the whole family will come together and when I will see people and relatives I would rather not see, so I would also feel a certain amount of annoyance and nervousness.

Finally, I think I would feel worse at first, as I did when my grandfather died, but then life would go on as before".