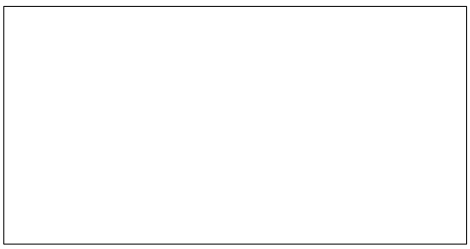

# Personal and Collective Memories and Future Thoughts: A Laboratory Study of Episodic and Non-Episodic Detail

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**Abstract**

Self-based mental time travel – the ability to remember past events and imagine future events on a personal timeline - is well-characterized in cognitive science. A similar, but less-understood, ability is that of collective memory and collective future thinking, termed collective mental time travel (CMTT). To our knowledge, this is the first study to investigate the episodic richness of collective memory and future thoughts using an in-person laboratory paradigm. In two studies (UK and Turkey), we examined the effect of Event Type (collective, personal; between-groups) and Temporal Orientation (past, future; within-groups) on quantities of episodic and non-episodic details. Results show that personal events contained more episodic detail compared to collective events, and past events were associated with more episodic detail than future events. The distinction between personal and collective events was more pronounced in the UK than in Turkish sample, hinting at an influence of cross-cultural context on the episodicity of collective memories and future thoughts. Additionally, we observed a relationship between the episodicity of the past and the future exclusively in the UK population and for personal events, partially supporting the constructive episodic simulation hypothesis. These findings initiate a deeper understanding of the underlying cognitive processes that enable humans to engage in collective mental time travel.

**Keywords**: Collective Memory; Collective Future Thinking; Autobiographical Memory; Episodic Detail; Non-Episodic Detail

## Introduction

Humans can mentally travel through time, a concept extensively studied in episodic memory research as (*self-based) mental time travel* (Atance & O'Neill, 2001; Tulving, 2005). These studies have provided valuable insights into the cognitive and neuroanatomical processes involved in recalling the personal past and envisioning the personal future, especially concerning its episodic nature (Addis et al., 2008; Conway et al., 2016; Kvavilashvili & Rummel, 2020; Schacter & Addis, 2007; Szpunar, 2010). More recently, research has expanded to focus on the recollection and imagination of events experienced by groups, termed *collective mental time travel* (Merck et al., 2016; Topçu & Hirst, 2022; Szpunar & Szpunar, 2016; Yamashiro et al., 2023). Unlike autobiographical memory, the cognitive processes underlying collective mental time travel have received less attention, especially regarding their episodic characteristics (Topçu & Hirst, 2022). Yet, this emerging area provides a unique perspective for exploring the connections between the past and the future at individual and collective levels, and the relative involvement of episodic and semantic memory systems.

### Self-Based Mental Time Travel

Autobiographical memories are mental reconstructions built on both episodic and semantic information (Conway et al., 2016; Conway et al., 2019; Levine et al., 2002; D'Argembeau, 2020). According to Levine et al. (2002), memories comprise two types of information: episodic (internal details) referring to specific aspects of the recalled event, such as information about time, space, emotions, and thoughts, and non-episodic (external details) referring to general, repetitive or metacognitive information, and semantic knowledge, such as personal facts devoid of context. Episodic details are essential in creating a sense of re-experiencing the events and their associated phenomenology. The associated coding method (Levine et al., 2002) henceforth termed the *Internal-External coding method*, has been used extensively in the mental time travel literature. For instance, studies showed that when more episodic details are retrieved, participants assessed their memories as more vivid (D'Argembeau & Van der Linden, 2012; D'Argembeau & Van der Linden, 2006; Klein, 2012). In contrast, semantic information is important for conceptualizing specific events within broader social and cultural systems (Irish & Piguet, 2013).

Extensive cognitive and neuroanatomical studies have identified links between remembering the personal past and imagining the personal future (for a review, see Schacter et al., 2017). One prominent theoretical approach, the constructive episodic simulation hypothesis, suggests that the construction of future events (episodic future thinking) draws upon a database of information from past lived experiences (episodic memories) (Schacter & Addis, 2007; Szpunar & Szpunar, 2016). Consequently, imagining a personal future event involves tapping into both general knowledge and specific details from previous experiences (Atance & O'Neill, 2001; D'Argembeau, 2020; Hassabis & Maguire, 2007; Schacter & Addis, 2007; Szpunar, 2010).

Studies examining populations with episodic memory deficits, such as older adults, helped to support this theoretical framework. For instance, research showed that older adults recall fewer episodic details and more semantic information for personal memories and future thoughts than younger adults (Addis et al., 2008; Addis et al., 2010; Devitt et al., 2017; Lapp & Spaniol, 2017; Terrett et al., 2016). Further evidence from studies on semantic dementia (Irish et al., 2012; Irish et al., 2018) reveal the complementary role of semantic systems in scaffolding episodic recollection, suggesting a more interactive relationship between semantic and episodic contributions to mental time travel. These studies converge on the fact that the episodic memory system– which involves a core network including medial (hippocampus, parahippocampus) and lateral temporal lobe structures, areas of the prefrontal cortex (ventromedial and dorsomedial), and posterior cingulate (including retrosplenial cortex) (Benoit & Schacter, 2015) – is important, often critical, for remembering the past and imagining the future. Without this system, individuals lose their ability to mentally re- and pre-experience events on a personal timeline.

Links between both the past and future in self-based mental time travel have been well-established, but differences have also been found. Findings indicate that personal future thoughts are less episodic than personal memories. In other words, when people imagine personal future events, they include fewer episodic details than when recalling personal memories – this is the case when using the *Internal-External coding method*, or when examined using rating scales of phenomenological experience (Addis et al., 2008; Conway et al., 2016; D'Argembeau & Van der Linden, 2004). Therefore, it is not surprising that when participants introspect about their experiences of mental time travel, they consistently rate memories as more vivid than future thoughts (D'Argembeau & Van der Linden, 2012; D'Argembeau & Van der Linden, 2006; Klein, 2012).

**Collective Mental Time Travel**

Recently, the exploration of collective mental time travel, which involves both people's recollection of their group's past (collective memories) and imagination of their group's future (collective future thinking), has gained considerable interest (de Saint-Laurent, 2018; Szpunar & Szpunar, 2016; Topçu & Hirst, 2022; Öner & Gülgöz, 2020). Collective memories - memories shared among group members that bear on group identity (Hirst & Manier, 2008) – have been studied across multiple dimensions. Research has examined age-related differences in recalling public events (Cheriet et al., 2021; Zaromb et al., 2014), cross-country differences (Mert et al., 2023; Öner et al., 2023), the influence of collective identity on the frequency of collective memories (Merck et al., 2016), their similarities (Cheriet, Topçu, et al., 2023), as well as their emotional valence (see Liu & Szpunar, 2023 for a review).

Collective future thinking, defined as "the act of imagining an event that has yet to transpire on behalf of, or by, a group" (Szpunar & Szpunar, 2016, p.378), has received comparatively less attention, especially concerning the cognitive mechanism involved. Szpunar & Szpunar (2016) also highlight that

collective future thought is simultaneously dependent on the past and acts as a catalyst for reconstructing the past (p.376). Therefore, as the counterpart of self-based mental time travel, collective mental time travel also focuses on similarities between the past and future. To date, research has primarily focused on two aspects: the content (the themes imagined) and the phenomenology (including vividness, agency, and emotional valence) (e.g., Öner et al., 2023; Öner & Gülgöz, 2020; Shrikanth et al., 2018; Topçu & Hirst, 2020), neglecting the examination of the episodic detail.

Regarding content, studies have identified similarities between the topics reported in the collective past and future (Topçu & Hirst, 2020; Öner et al., 2023). For instance, Öner et al. (2023) found that following the onset of the pandemic, participants imagined themes related to the economy, lockdowns, and a potential second wave of COVID-19 infections in the future. These results suggest that when individuals consider future events during ongoing collective experiences, they draw upon real-life experiences to imagine what might happen. Theoretically, this also supports a constructive perspective of future thinking at the collective level, where imagined futures are shaped by past and ongoing experiences.

In terms of phenomenology, studies have examined the emotional biases and vividness of collective memories versus collective future thoughts. Collective memories are generally recalled with a negative emotional bias (Liu & Szpunar, 2023). However, results seem inconsistent about the collective future, with studies generally showing a negativity bias (see Liu & Szpunar, 2023 for a review), yet some studies have found no bias or a positive bias and explain these discrepancies through either methodological or cultural differences and influence of perceived agency (Deng et al., 2022; Mert et al., 2023; Topçu & Hirst, 2020). Additionally, differences in vividness have also been found, with collective future thoughts less vivid than collective memories (Topçu & Hirst, 2020). Studies have shown that vividness is associated with the quantity of episodic details (D'Argembeau & Van der Linden, 2012; Klein, 2012); therefore, it is plausible that collective future thoughts contain fewer episodic details than collective memories. Nevertheless, without detailed coding of episodic and non-episodic detail, it has been difficult to verify this claim.

Given the lack of data, our understanding of the episodic nature of collective mental time travel compared to self-based mental time travel remains limited. Autobiographical memory studies have shown that patients with hippocampal damage had difficulty imagining personal future events but could imagine general scenarios such as future worldwide environmental issues (see Szpunar & Szpunar, 2016 for a review). These results hint at the idea that self-based and collective mental time travel might rely on different cognitive mechanisms (see Szpunar & Szpunar, 2016 for a review), stressing the importance of examining self-based and collective mental time travel in tandem (see Cheriet, 2024 for a similar discussion; Hazan et al., 2024) – i.e., examining the effect of temporality and type (self/collective) within the same study.

In the context of collective mental time travel, researchers have examined the episodicity of lived collective memories within a Belgian population (Cheriet, 2024). Their findings indicated that

self-relevance of a collective event influenced the episodicity of these memories. Participants recalled their memories of the 2020 pandemic and a political event from the same time (e.g., the 2020 American Presidential elections or the Black Lives Matter movement). Memories related to the pandemic contained more internal and external details and were more episodic than political memories (Cheriet, 2024). These findings suggest that collective events assessed as more self-related are recalled with more episodicity. Participants also imagined a future pandemic and political event (the EU dissolution) in 2031. Similarly, participants used more internal details (but not external details) and greater episodicity for the future pandemic than for future political events. This study did not separately examine personal and collective memories or future thoughts, making it difficult to isolate the differences between the types of events (personal vs. collective) and the temporal dimensions (past vs. future).

Complementing this work, Topçu and Hirst (2020) examined the specificity of past and future collective events. Their study examined specificity related to a general spatiotemporal framework, where events, including time and place information in a 24-hour window, were considered the most specific. Results showed that the collective future was less specific than the collective past. Additionally, participants were more likely to imagine specific and rich collective events when they could remember specific and rich collective memories (Topçu & Hirst, 2020). While both studies give a glimpse of the episodicity of collective mental time travel, precision is still lacking. Cheriet (2024) did not differentiate between personal and collective memories and future thoughts, while Topçu and Hirst's broader definition of episodicity limits interpretations around amount of (episodic) detail. Moreover, no research has yet compared episodicity across self-based and collective mental time travel, leaving a significant gap in cognitive psychology research.

The present study is one of the first investigations into the episodic nature of collective memories and future thoughts, which will code individual information units as either internal (episodic) or external (non-episodic). Compared to previous studies (see above), this study represents a substantial increase in the resolution of data available regarding the involvement of episodic details in collective mental time travel. This is, in part, due to implementing an in-person laboratory study, in which participants can produce longer narratives involving themselves / their social group. In line with this, using the autobiographical interview and Internal-External coding method can provide a deeper understanding of the cognitive processes underlying collective mental time travel episodicity by focusing on internal (episodic) details and external (which includes semantic and general knowledge, metacognitive information, repetitions, general knowledge) details rather than a more general spatiotemporal context (Cole et al., 2013; Levine et al., 2002; Topçu & Hirst, 2020).

Finally, the lack of research on collective mental time travel results in limited comparisons with self-based mental time travel in cognitive studies. Previous research has mainly focused on differences and similarities in the emotional bias between self-based and collective mental time travel (see Liu & Szpunar, 2023). For instance, individuals tend to envision a more favorable personal future compared to a collective one (Shrikanth et al., 2018; Shrikanth & Szpunar, 2021). However, further studies are

necessary to explore the differences between the past and future, *as well as between individual and collective levels*, in a crossed-factorial design, regarding the episodicity of these mental representations.

**The present study**

Examining the episodicity (the degree of episodic versus other details) of mental representations allows a more in-depth investigation of the cognitive processes underlying self-based mental time travel (Cole et al., 2013). The term episodicity refers to the richness of internal (episodic) details, following Levine et al. (2002). This differs from the specificity in autobiographical memory research, which defines events by their temporal and spatial uniqueness within a 24-hour window.

In psychology, there remains a need for deeper comprehension regarding the episodicity of collective mental time travel. Therefore, this study aims to assess how episodicity is influenced by whether the event is personal or collective (self-based vs. collective), its temporal orientation (past or future) by examining the quantity of internal details (episodic details), external details (non-episodic details including semantic information), and the episodicity of these representations (i.e., a measure of the relative proportion of episodic versus non-episodic detail). After an initial study of UK students (Experiment One), we aimed to replicate these results in a second study with a Turkish student sample (Experiment Two).

Building on existing research, we had two main hypotheses. First, we hypothesized that memories would contain more internal details and would be more episodic than future thoughts for both the individual and collective levels (Cole et al., 2012; 2013; Öner et al., 2023; Topçu & Hirst, 2020). Additionally, we hypothesized that personal events would contain more internal details and more episodicity than collective events recalled and imagined. This hypothesis was built on the self-reference effect, as participants were not always actors for the collective events contrary to personal events; the personal events are more likely to be associated with the self and, therefore, more easily encoded and recalled episodically (Cole et al., 2012; Öner et al., 2023; Topçu & Hirst, 2020). While we had a priori hypotheses for internal and episodicity scores, the analyses on the external scores are exploratory.

Furthermore, we had two hypotheses regarding the influence of collective identity and emotions on event detail. (1) Since national identity influences collective memories and future thoughts (Deng et al., 2022; Mert et al., 2023; Topçu & Hirst, 2020), we hypothesized that the strength of participants' national identity would correlate positively with event episodicity at the collective level. (2) Second, building on the emotion enhancement effect revealing that emotions can strongly influence memory encoding, we expected emotions felt during an event to influence the memory episodicity (Faul et al., 2024; Kensinger & Schacter, 2008).

## Methods

This research used the same design, procedure, material, and data coding for Experiments 1 and 2. As such, the methods outlined below describe the protocol used across both experiments, except for the participant section which is presented separately for each experiment. The study and the hypotheses were not preregistered.

### Data Availability Statement

De-identified data can be found here: https://osf.io/zb24x/

### Design

The research adopted a mixed factorial design. Participants were randomly assigned to either the self-based mental time travel task (personal events) or collective mental time travel task (collective events), allowing for between-group comparisons. Building on previous studies (e.g., Addis et al., 2008), each participant engaged in both recalling past events and imagining future events (within-subjects), enabling within-participant comparisons of temporal orientation. Task order (past or future first) was randomized to control for order effects. This factorial design allowed a comprehensive analysis of how event type (self-based vs. collective) and temporal orientation (past vs. future) interact in mental time travel.

### Participants

A priori analysis using the G*Power 3.1 (Faul et al., 2007) based on an ANOVA with repeated measures within (temporal orientation: past and future) and between (event type conditions: self-based vs collective) design, for a large effect size f = .40 (Addis et al., 2008), with alpha = .05, and a power = 0.80 recommended a minimum of 16 participants in total for each experiment.

*Experiment One: United Kingdom (UK) Participants' Characteristics*

Sixteen undergraduate students from York St. John University were recruited. Participants received credits for their degrees in exchange for participating in the study. The York St. John University Research Ethics Committee granted ethical approval. No exclusionary criteria were applied.

Twelve females, three males, and one person who preferred to self-describe participated in the study. Participants were aged between 18 and 30 ($M$ = 21.1; $SD$ = 3.58). Nine participants were randomly assigned to the collective condition and seven to the self-based condition. There was no significant age difference between the two groups ($p$ = .11).

The study took place in the York St. John Psychology laboratories. Participants attended an interview with a master level researcher and all data and task instructions were presented using the survey platform Qualtrics. The experiment lasted approximately 30 minutes, with the memory task taking around 8 minutes.

*Experiment Two: Turkish Participants Characteristics*

Seventeen undergraduate students from *Kadir Has University* participated in the study. No exclusionary criteria were set, and ethical approval was obtained from the Research Ethics Committee of Kadir Has University Psychology Faculty. Ultimately, 22 participants took part in the study, with five participants excluded either due to incomplete data (N = 3) or failure to follow the instructions (N = 2). The final sample consisted of 12 females and five males, aged between 19 and 26 years old ($M$ = 22.88; $SD$ = 1.83). Ten participants were included in the collective condition and 7 in the personal condition. No significant age difference was found between participants in the two conditions ($t$ = 1.13, $p$ = .28).

*UK and Turkish Participants comparisons*

Compared to participants from Experiment 1, Turkish participants identify significantly more with their country than UK participants, $t$ = 3.99, $p$ <.001. No significant differences were found regarding age ($p$ = .08), nor well-being ($p$ = .95).

**Table 1.** *Mean scores (with standard deviation) of age, well-being scores and identification to their country of participants from Experiments One and Two.*

| | N | Age | Well-being | National Identity |
|---|---|---|---|---|
| **UK** | 16 | 21.13 (3.58) | 2.4 (0.85) | 62.31 (14.76) |
| **Turkey** | 17 | 22.88 (1.83) | 2.38 (1.08) | 86.65 (19.75) |

**Procedure & Material**

Participants provided demographic information, including age and gender, and completed the event task using Qualtrics. Participants were instructed to recall four specific memories from approximately one year ago and imagine four events that could occur in one year. The written instructions emphasized detailing each narrative with as much information as possible. These events were either personal (self-based condition) or collective (collective condition), depending on the randomly assigned event type condition. In the self-based condition, participants were asked to recall/imagine events that happened/will happen related to themselves personally. Participants in the collective condition were instructed to recall/imagine events that happened/will happen to their country as a whole.

If necessary, the researcher could prompt the participant by asking for more details about each event. The event descriptions were narrated orally and the researcher audio-recorded the responses. The temporal orientation conditions (past and future) were balanced across the sample.

After recalling or imagining each event, the audio recording was paused, allowing participants to evaluate their *perceived agency*[1], using a scale that gauged agency concerning the self, others, and circumstances beyond anyone's control (retrieved from Topçu & Hirst, 2020).

The *emotions* were also evaluated using two questions: the first assessed how participants felt during the interview while recalling or imagining the event, and the second assessed how they felt or would feel when the event occurred or would occur. Participants provided answers on a scale ranging from -3 (Very negative) to 0 (No Emotion) and +3 (Very positive).

Following the memory task, participants completed the WHO well-being scale to assess their *mental well-being* (WHO-5, 1998) and the *national identity* scale, including 27 items on a scale ranging from 1 (strongly disagree) to 5 (strongly agree) (adapted from Čorkalo & Kamenov, 2003), with a Cronbach alpha of .95 suggesting high reliability (Grozdanovska, 2016).

Finally, a debriefing was provided to explain the study's objectives.

**Data coding: Internal-External Coding Method**

All narratives were coded following transcriptions using the *Internal-External coding method* Levine et al., 2002). This method distinguishes between specific details (internal) and non-specific details (external). Internal details correspond to episodic details related specifically to the events recalled/imagined. It includes details about the event, such as time, place, perceptual details, emotions, and thoughts. Conversely, external details are considered as information not specific to the event, such as metacognitive information, repetitions, or more semantic and general knowledge. The quantity of internal details is summed for each event. Then, this number is divided by the number of events to compute a mean score of internal details. The same is done for external details. Based on these two mean scores, we computed an *episodicity ratio* (Mean of internal details/ (Mean of internal details + Mean of external details), which provides information on the episodicity of these memories and future thoughts (the extent to which the narratives are episodic) (Cheriet, 2024).

[1] An informatic issue on the Qualtrics survey prevented us from using these data.

## Results

### Statistical information

For both experiments, three mixed ANOVAs were conducted with a 2 between (event type conditions[2]: self-based vs. collective) x 2 within (temporal orientation: past and future) groups design across three separated dependent variables: internal details, external details, and episodicity ratio. While we had a priori hypotheses for internal and episodicity scores, the analyses on the external scores are exploratory. Mean scores and standard deviations can be found in Table 2 for the UK population and in Table 3 for the Turkish sample. The analyses were computed using Jamovi version 2.2 (The Jamovi Project, 2021). Plots were computed using the matplotlib package in Python (Hunter, 2007).

### Experiment One Results

*Details and Episodicity Analyses*

**Internal details**. The analyses revealed a significant main effect of event type, $F(1,14) = 9.72$, $p = .008$, $\eta^2 = .32$, with a higher level of internal details for personal events compared to collective events. Additionally, there was a significant main effect of the temporal orientation, $F(1,14) = 32.1$, $p < .001$, $\eta^2 = .11$, indicating more internal details for the past compared to the future (see Table 1). The interaction effect between the temporal orientation and event type was also significant, $F(1,14) = 14.6$, $p = .002$, $\eta^2 = .05$. Post hoc t-tests showed that there were more internal details for the personal past than the collective future ($t = 4.61$, $p_{holm} = .002$, $d = 2.35$).

**External details**. The results showed a significant effect of event type, $F(1,14) = 5.22$, $p = .04$, $\eta^2 = .23$, demonstrating a greater use of external details for collective events than personal ones. The analysis did not reveal a significant effect of temporal orientation, $F(1,14) = 1.84$, $p = .20$, and the interaction effect between group and temporal orientation was not significant, $F(1,14) = 2.24$, $p = .16$.

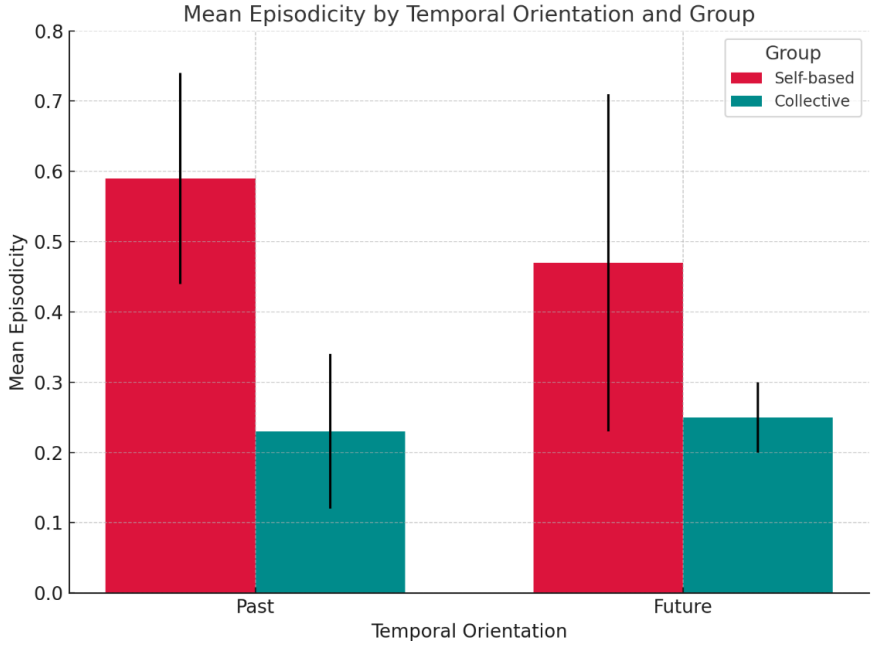
**Episodicity**. A significant main effect of the event type was found, $F(1,14) = 20.4$, $p < .001$, $\eta^2 = .50$, revealing greater episodicity for personal than collective events. No significant effect of temporal orientation was found ($F(1,14) = 2.39$, $p = .15$), or interaction effect between group and time ($F(1,14) = 3.58$, $p = .08$) were observed (see Figure 1).

[2] The event type corresponds to the event type conditions. Personal events are the type of events recalled and imagined in the self-based mental time travel condition (events related to the self only). Collective events are the type of events recalled and imagined in the collective mental time travel condition (events related to their country as a whole).

**Table 2.** *Mean scores (with standard deviation), minimum and maximum for each type of detail, and episodicity by event type and temporal orientation.*

| Event Type Conditions | Temporal Orientation | Internal Details | External Details | Episodicity |
|---|---|---|---|---|
| **Collective** | Past | 4.67 (3.08)<br>[1.25, 11] | 16.30 (10.1)<br>[8, 37.5] | 0.23 (0.11)<br>[0.12, 0.34] |
| | Future | 3.83 (1.85)<br>[2.75, 8.5] | 12.6 (5.61)<br>[5.75, 22.3] | 0.25 (0.05)<br>[0.18, 0.33] |
| **Self-Based** | Past | 10.80 (3.69)<br>[5.75, 16.8] | 7.39 (2.41)<br>[5, 11] | 0.59 (0.15)<br>[0.34, 0.70] |
| | Future | 6.50 (3.07)<br>[3.25, 11.3] | 7.57 (5.61)<br>[3, 13.3] | 0.47 (0.24)<br>[0.21, 0.75] |

**Figure 1.** *Representation of the episodicity mean scores (standard deviation) by event type and temporal orientation in the UK population*




*Additional analyses*

Due to the violation of normality for most of the variables, Spearman correlations were computed on the additional variables of interest, including episodicity, emotions, and national identity. Primary analyses were computed on the mean episodicity scores of participants without distinguishing between self-based and collective conditions. To examine potential differences in personal and collective events, additional analyses were conducted at the event level without aggregating by participants. This approach analyzed episodicity scores for each past event ($N = 4$) and future event ($N = 4$) per participant ($N = 16$).

**Episodicity**. Initial analyses on mean episodicity scores revealed a significant positive correlation between past and future episodicity, $r_s = .62$, $p = .01$. Follow-up event-level analyses showed a significant positive correlation between memories episodicity and future thoughts episodicity for

personal events ($r_s$ = .53, $p$ = .004), but just fail to reach statistical significance for collective events ($r_s$ = .32, $p$ = .05).

**National Identity**. Primary correlations computed between memories episodicity and national identity did not yield significant results ($r_s$ = .42, $p$ =.11, $BF_{10}$ = 1.01). However, a significant positive correlation was found between national identity scores and future thoughts episodicity ($r_s$ = .73, $p$ = .001, $BF_{10}$[3] = 5.09). Additional event-level analyses run specifically on collective events revealed that national identity did not correlate with memories episodicity ($r_s$ = -0.05, $p$ = .73) nor future thoughts episodicity ($r_s$ = .04, $p$ = .84).

**Emotions**. For the past, both emotions felt while remembering ($r_s$ = .48, $p$ = .06) and emotions at the time of the event ($r_s$ = .40, $p$ = .13) did not significantly correlate with memory episodicity. Similarly, no significant correlations were observed between memory episodicity and emotions while remembering (collective: $r_s$ = .22, $p$ = .20; personal: $r_s$ = .24, $p$ = .22), nor emotions at the time of the event (collective: $r_s$ = .22, $p$ = .21, personal: $r_s$ = .22, $p$ = .25) at the event level.

For the future, emotions when imagining ($r_s$ = .48, $p$ = .06) and emotions during the event ($r_s$ = .46, $p$ =.07) did not correlate significantly with future thought episodicity. Similarly, no significant correlations were observed between future episodicity and emotions while imagining (collective: $r_s$ = .23, $p$ = .17, personal: $r_s$ = .18, $p$ = .36), nor emotions during the event (collective: $r_s$ = .14, $p$ = .42, personal: $r_s$ = .09, $p$ = .66) at the event level.

[3] Bayes factors were reported alongside frequentist analyses to quantify the strength of evidence for null versus alternative hypotheses, offering greater interpretative nuance for small-sample correlational analyses.

**Experiment Two Results**

*Details and Episodicity Analyses*

**Internal details**. Results revealed a significant main effect of event type, $F(1,15) = 5.21$, $p = .04$, $\eta^2 = .12$, showing more internal details for personal events than collective events. Results also showed a significant main effect of the temporal orientation, $F(1,15) = 4.78$, $p = .045$, $\eta^2 = .09$, with more internal details for memories than imagined events (see Table 2). The interaction effect between the event type and the temporal orientation was significant, $F(1,15) = 9.39$, $p = .01$, $\eta^2 = .17$, and explained by more internal details for the personal past than the collective future ($t = 3.07$, $p_{holm} = .03$, $d = 1.57$).

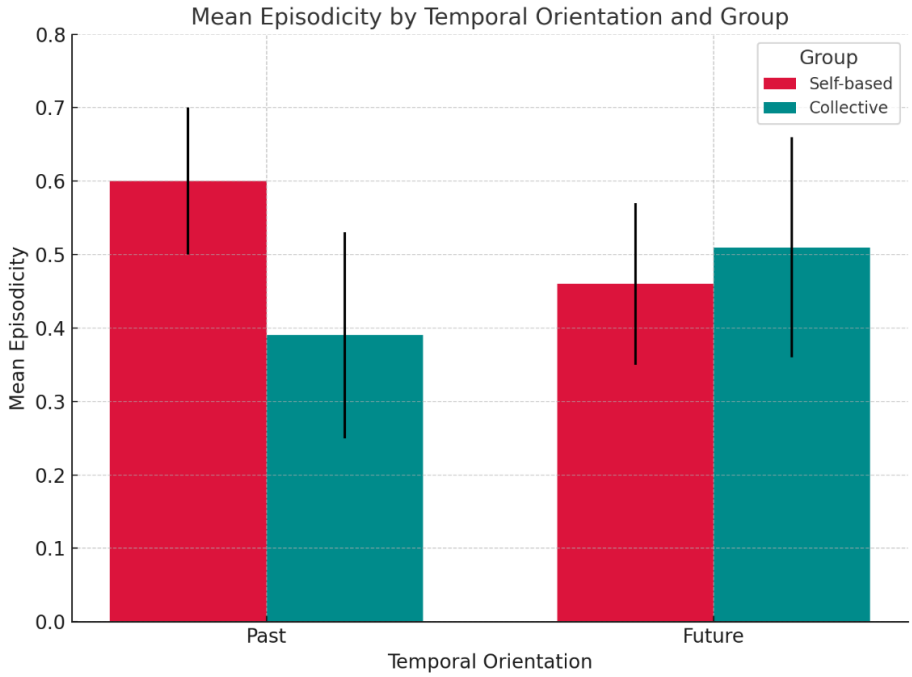
**External details**. Analyses did not reveal a significant main effect of event type ($F(1,15) = 0.26$, $p = .62$, $\eta^2 = .01$), nor the temporal orientation ($F(1,15) = 4.56$, $p = .05$, $\eta^2 = .08$). The interaction effect between event type and temporal orientation was not significant ($F(1,15) = 0.21$, $p = .65$, $\eta^2 = .004$).

**Episodicity**. There were no significant main effects of event type, $F(1,15) = 2.45$, $p = .14$, $\eta^2 = .07$, or temporal orientation, $F(1,15) = 0.07$, $p = .80$, $\eta^2 = .002$, However, the interaction effect between event type and the temporal orientation was significant, $F(1,15) = 8.67$, $p = .01$, $\eta^2 = .19$. Post hoc t-test revealed that personal memories were more specific than collective memories, $t = -3.14$, $p_{holm} = .03$, $d = 1.53$ (see Figure 2).

**Table 3.** *Mean scores (standard deviation), minimum and maximum for each type of detail and episodicity by event type and temporal orientation.*

| Event Type Conditions | Temporal Orientation | Internal Details | External Details | Episodicity |
|---|---|---|---|---|
| **Collective** | Past | 7.25 (3.26)<br>[2.75, 13.8] | 11.40 (5.10)<br>[5.25, 22.3] | 0.39 (0.14)<br>[0.19, 0.67] |
| | Future | 8.90 (5.03)<br>[3.75, 20.3] | 8.65 (5.46)<br>[3.75, 20.5] | 0. 51 (0.15)<br>[0.17, 0.77] |
| **Self-Based** | Past | 17.80 (9.62)<br>[6.50, 37.3] | 13.40 (9.0)<br>[2.25, 24.5] | 0.60 (0.1)<br>[0.39, 0.74] |
| | Future | 7.89 (3.91)<br>[2.5, 13.3] | 9.18 (4.60)<br>[3.75, 17.5] | 0.46 (0.11)<br>[0.29, 0.63] |

**Figure 2.** *Representation of the episodicity mean scores (standard deviation) by event type and temporal orientation in the Turkish population*




*Additional analyses*

Primary analyses were computed on the mean scores by participants without distinguishing between self-based and collective conditions. To examine personal and collective events' potential differences, additional analyses were conducted on individual event scores without aggregating by the participant (event-level analyses). This approach analyzed episodicity scores for each past ($N = 4$) and future ($N = 4$) event of each participant ($N = 17$).

**Episodicity**. Pearson correlations were computed between the memory episodicity and future thought episodicity. No significant correlation was observed between memory episodicity and future thoughts episodicity: $r$ = -0.06, $p$ = .83. Similarly, no significant correlation was observed between memory episodicity and future thought episodicity for collective events ($r$ = .07, $p$ =.67), and personal events ($r$ = .22, $p$ =.27).

**National Identity.** Results showed that national identity did not correlate significantly with memory episodicity ($r$ = -.3, $p$ = .22, $BF_{10}$ = 0.60) nor future thought episodicity ($r$ = -0.01, $p$ = .97, $BF_{10}$ = 0.3). Similarly, analyses of collective events also showed no significant correlation between nationality identity and memory episodicity ($r$ = .22, $p$ =.17) and future thought episodicity ($r$ = -0.001, $p$ = .99).

**Emotions**. For the past, both emotions felt while remembering ($r$ = .06, $p$ = .81) and emotions at the time of the event ($r$ = .08, $p$ = .77) did not significantly correlate with memory episodicity. Similarly, no significant correlations were observed between memory episodicity and emotions while

remembering (collective: $r = .12$, $p = .47$; personal: $r = .09$, $p = .65$), nor emotions at the time of the event (collective: $r = .10$, $p = .54$, personal: $r = .06$, $p = .77$) at the event level.

For the future, emotions when imagining ($r = -.45$, $p = .07$) and emotions during the event ($r = -.037$, $p = .15$) did not correlate significantly with future thought episodicity. Similarly, no significant correlations were observed between future episodicity and emotions while imagining (collective: $r = .08$, $p = .64$, personal: $r = .30$, $p = .13$), nor emotions during the event (collective: $r = .05$, $p = .75$, personal: $r = .29$, $p = .13$) at the event level.

## General Discussion

This study explored the episodic characteristics underlying mental time travel, focusing on how episodic (internal) details, non-episodic (external) details, and episodicity differ across personal and collective events, as well as between the past and the future. To examine generalizability, we conducted two studies with participants from the UK and Turkey, respectively. Across both studies, our findings demonstrated that personal events contained more *episodic (internal) details* than collective events, and memories were richer in episodic (internal) details than future thoughts. When examining *episodicity* (the degree of episodic detail in mental representations), personal events were more specific than collective for both past and future temporal orientations among UK participants and only for past events in Turkish participants. Additionally, a correlation between memory and future thought episodicity was found solely in the UK sample. The following sections further discuss these episodic characteristics, focusing on event type (personal vs. collective), temporal orientation (past vs. future) and cross-country differences.

### Self-based vs. Collective Mental Time Travel: episodic details and episodicity

Across both experiments, our findings showed that personal events, whether recalled or imagined, contain more episodic (internal) details than collective events. In other words, regardless of the temporal orientation, personal events included more contextual information, such as details about space, time, emotions, and thoughts than collective events. In line with prior findings on autobiographical memory, we also found in both studies that memories contained more episodic (internal) details than future thoughts (Addis et al., 2008; Cole et al., 2013; Conway et al., 2019). Specifically, here, personal memories contained more episodic details (internal) than collective future thoughts.

These results – showing more episodic details for personal events and for the past- align with the self-reference effect (Klein, 2012; Sui & Humphreys, 2015) and constructive episodic simulation hypothesis (Atance & O'Neill, 2001; D'Argembeau, 2020; Schacter & Addis, 2007; Szpunar & Szpunar, 2016). The self-reference effect suggests that memories are more easily accessible when linked to the self (one's identity) (Klein, 2012; Sui & Humphreys, 2015). Participants were directly involved as actors in personal events, engaging their identity and personal experiences more deeply than with collective events, which likely facilitated a deeper encoding and detailed recollection. Thus, personal memories offer a larger stock of contextual information compared to collective memories. The constructive episodic simulation hypothesis posits that imagining future events relies on past experiences (including details and more general knowledge) (Schacter & Addis, 2007; Szpunar & Szpunar, 2016). Building on both concepts, it is logical that personal memories include more episodic details than collective future thoughts as there were less collective episodic details (internal) to rely on to imagine future collective events.

A noteworthy finding in the UK sample was the correlation between the *episodicity* of memories and future thoughts, supporting constructive episodic simulation hypothesis at the personal level only, and only for the UK sample. This result is inconsistent with the findings of Topçu and Hirst's (2020), who observed a correlation between the episodicity of collective memories and collective future thought episodicity. These differences may be explained by methodological differences: Topçu and Hirst (2020) used a broader definition, considering events highly specific if they included time and place details, and happened within a 24-hours period. In our study, we explored the cognitive construction of collective future thoughts in greater depth by assessing not only episodic (internal) details (as in Topçu & Hirst, 2020), but also non-episodic (external) details and the episodicity, using the Internal External coding method (Levine et al., 2002). The differences between these two studies highlight the need for additional studies that assess both internal/external details and other coding structures across personal and collective events, to assess the consistency across measures. In addition, as the relationship between episodicity in past and future thinking was observable only for the UK participants, this difference could potentially be explained by cross-country differences.

**Cross-country differences**

Interestingly, *episodicity* differences between personal and collective events were observed only in the UK sample. UK participants' personal events – whether recalled or imagined- exhibited a higher degree of episodicity than collective events. In the Turkish sample, personal events also contained more *episodic details (internal)* than collective memories, but only personal memories (not future thoughts) were significantly more *episodic* than collective ones. These cross-country differences may be due to UK participants including more external details for collective events than personal ones, thereby reducing episodicity scores and increasing the difference between collective and personal. The absence of this result in the Turkish sample suggests that country-wise differences may influence how individuals prioritize external details. However, additional analyses showed no significant correlation between the degree of national identification and *external details* for collective memories in either country ($p$ = .13 for the UK and $p$ = .60 for Turkey), suggesting that these differences go beyond national identification.

Moreover, the lack of episodicity differences between personal and collective future events in the Turkish sample, contrary to the UK participants, could indicate a blurring of personal and collective experiences boundaries influenced either by cultural norms (Wang, 2021; Wang & Mert, 2025). For instance, Wang (2021) showed how Western populations tend to construct more self-focused and elaborated autobiographical memories, whereas collectivist contexts highlight relational and contextually embedded narratives. Similarly, Mert et al. (2023) demonstrated cross-cultural differences in collective future thinking with differences in emotional valence and perceived control across Turkish, Chinese, and American adults. This blurring could also be triggered by societal context (Hazan et al., 2024; Yamashiro et al., 2022; Zerr et al., 2023), such as the political context in Turkey at the time of the study. In June-July 2023, Turkey experienced significant uncertainty following the May presidential and

parliamentary elections. In addition to the growing economic downturn, the outcome deepened societal polarization, with opposition supporters expressing concerns about the future of democracy and civil liberties. It is possible the uncertain context might have shaped the outlook for Turkey's collective future. This result is consistent with the phenomenon of identity fusion (Reese & Whitehouse, 2021; Zerr et al., 2023), which has been examined for groundbreaking events such as the COVID-19 pandemic, where individuals' personal and collective future thoughts align with a shared negative bias, as opposed to the typical positive bias for personal future thoughts (Liu & Szpunar, 2023; Yamashiro et al., 2022; Zerr et al., 2023). It is also consistent with emerging research indicating that during periods of uncertainty, such as the political climate in Hong Kong, individuals' personal future thoughts and collective future thoughts tend to be associated (Hazan et al., 2024). Our study expands this hypothesis, suggesting that uncertain times can be associated with a more integrative experience of personal and collective domains. This experience may also impact the episodic characteristics of future representations, reducing episodicity of future thoughts and weakening the episodic link between the past and the future. These are timely questions that could be addressed in further work on self-based and collective mental time travel.

Building on the notion of uncertainty, the remembering-imagining system emphasizes how the temporal proximity of imagined events influences the episodicity of these representations; the closer, the more specific (Conway et al., 2016). Drawing upon this system, it is plausible that Turkish participants found it challenging to imagine a nearer future (in one year) than the UK population due to ongoing political and economic uncertainty within the country (Park & Folkman, 1997) – in times of uncertainty, imagining the future is more difficult (Lalla & Sheldon, 2021). Similarly, studies on the COVID-19 pandemic have demonstrated that the worldwide context of uncertainty makes it more challenging to imagine future events *but not retrieve memories* (Lalla & Sheldon, 2021). This variability underscores how cultural frameworks around identity and future outlooks can affect the episodic details and episodicity of collective future thoughts.

**Limitations and Future Directions**

While this study provides new insights, some limitations warrant discussion. First, cross-country differences (such as the sociopolitical context) between the UK and Turkey must be considered. We noted differences in episodic characteristics of personal and collective events, especially in UK participants who demonstrated a differentiation between personal and collective events. Future research should address this by conducting similar studies across more diverse cultural contexts. Moreover, this study did not examine the role of external details in depth, encouraging future studies to assess their importance in future thoughts. External details, particularly semantic ones, might serve as a form of cultural scaffolding supporting narrative construction. Schematic narrative templates are schemas that people use to build a narrative (Bartlett, 1932). These templates are culturally dependent (Bartlett, 1932; Scherman et al., 2017; Wertsch, 2008). Consequently, it could be that the use of external details

(specifically semantic) varies across cultures, possibly reflecting differences in the narrative construction employed in memory and imagination. In addition, political orientation and voting behavior were not assessed in this study. However, given the timing of data collection shortly after May 2023 elections, it is possible that election-related emotions influenced collective future imagination (Fraser et al., 2023). Moreover, while we used a one-year temporal horizon to parallel self-based MTT paradigms, longer horizons (such as an electoral cycle) may better capture the extended nature of collective foresight. Future studies should test whether collective episodicity varies with temporal distance. Finally, as the notion of blurred lines between the personal and collective could be dependent on the societal context, we suggest that future studies examine the extent to which participants feel themselves involved in past and future collective events (see Cheriet, 2024 and Zerr et al., 2023 for a similar discussion). To some extent, data on perceived agency could have brought some answers, but we believe that the inclusion of the self in the collectivity goes beyond agency as it could also be influenced, for instance, by the personal view of the collective future, the personal willingness to shape that collective future, and the personal degree of involvement in that collective future.

In conclusion, to our knowledge, this study is the first to delve into the episodic nature of collective memories and future thoughts, using an in-person laboratory paradigm. This contrasts with previous findings that have predominantly relied on online survey methods (e.g., Mert et al., 2023; Öner et al., 2023). Our findings revealed that personal events contain more episodic details compared to collective events, and past events encompass more episodic details than future events. The distinction between personal and collective events was more pronounced in the UK population compared to Turkish citizens, suggesting an influence of cross-cultural context on the episodicity of collective memories and future thoughts. Additionally, we observed a link between the episodicity of the past and the future exclusively in the UK population and for personal events, partially supporting constructive episodic simulation hypothesis. These findings contribute to a clearer understanding of the memory systems involved in personal and collective mental time travel.

## Declarations

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**Competing interests**

The authors declare no competing interest.

**Ethical approval**

Both studies were performed in line with the 1994 Helsinki Declaration. The Faculty of Psychology of Kadir University and York St John University approved the study.

**Consent to participate**

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

**Consent for publication**

The authors affirm that consent was obtained from all participants to publish the anonymized data online and the results in a scientific paper.

**Availability of data and materials**

We share all the measures that were collected, as well as the computation to determine our sample size. Anonymized information and resources are available at https://osf.io/zb24x/. The study was not preregistered.

**Code Availability**

Not applicable

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