Gesture Use Contributes to Autobiographical Remembering

Selma Berfin Tanis (selmaberfin@sabanciuniv.edu)
Department of Psychology, Sabancı University, Istanbul, Turkey

Yağmur Damla Şentürk (yagmursenturk@sabanciuniv.edu)
Department of Psychology, Sabancı University, Istanbul, Turkey

İbrahim Akkan (iakkan21@ku.edu.tr)
Department of Psychology, Koç University, Istanbul, Turkey

Tilbe Göksun (tgoksun@ku.edu.tr)
Department of Psychology, Koç University, Istanbul, Turkey

Cagla Aydin (cagla.aydin@sabanciuniv.edu)
Department of Psychology, Sabancı University, Istanbul, Turkey

Abstract

Gestures support communication and mental processes. However, the contribution of co-speech gestures to autobiographical retrieval has recently started to receive attention. This study examines whether gestures facilitate autobiographical constructions by activating existing episodic details and integrating new ones, through a within-participant manipulation of gesture use (spontaneous and encouraged) and event type (past and future). Our main findings showed that representational gestures accounted for an increase in episodic details within autobiographical memory constructions. Although participants gestured more when they were encouraged, and past events elicited more details than future events, the association between gestures and increased episodic details did not differ across conditions. These findings suggest that representational gestures are particularly instrumental in autobiographical memory processes, as they contribute to the activation and retrieval of episodic details in mental simulations.

Keywords: Co-speech gestures; Representational gestures; Autobiographical memory; Future simulation; Episodic specificity

Introduction

Gestures serve not only social-communicative purposes but also contribute to mental representations and processing (Kita et al., 2017). Recently, there has been a surge of interest in examining whether gestures support autobiographical memory as well (Akkan et al., 2024; Aydin et al., 2023; Güneş-Acar et al., 2024). Two factors motivate this expectation: First, autobiographical remembering almost never occurs in a social vacuum. Some argue that its primary function is communicative (Mahr & Csibra, 2017), while others highlight the role of social interactions in shaping and constructing autobiographical memories (Nelson & Fivush, 2020). Second, autobiographical memories often incorporate multimodal elements, such as sensory-motor and perceptual episodic details (Conway, 2001). Given these inherently social and multimodal characteristics, gestures may play an integrative role in the retrieval of autobiographical memories. Therefore, in the present study, we systematically investigated the potential connection between gesture use and autobiographical remembering, both when recalling past events and imagining future scenarios.

Autobiographical memories involve complex episodic representations with accompanying phenomenological and sensory-perceptual experiences. Episodic information in autobiographical memories includes elements such as spatiotemporal context (e.g., location and position of the surroundings, time and duration), the chain of actions, mental states, and observations. These representations also entail semantic components involving long-term experiences and facts defining self or resulting in world-related knowledge (Levine et al., 2002). Because previously, memory retrieval has been shown to benefit from sensory-motor activations during encoding (Dijsktra & Zwaan, 2014), and it also seems to encompass modalities such as body positions or movements (Casasanto & Dijkstra, 2010; Dijkstra et al., 2007), it is plausible that hand gestures accompanying speech could support autobiographical memory by facilitating the integration and retrieval of sensory-motor details.

Gesture and speech form a semantically and temporally connected multimodal language system (McNeill, 1992). Although there are differences among theoretical perspectives, gestures can be broadly categorized as representational and non-representational (e.g., Arslan & Göksun, 2021; Feyereisen & Havard, 1999; Kita et al., 2017). Representational gestures mainly include *iconic* (i.e., referring to concrete objects and actions), *metaphoric* (i.e., referring to abstract entities and emotions), and *abstract deictic* gestures (i.e., pointing at abstract entities vs. concrete objects–*concrete deictic*). Non-representational gestures mainly encompass beat gestures, which are small rhythmic hand movements without a clear semantic content. Representational gestures, particularly, could assume roles

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that can be meaningfully considered in the context of autobiographical memory by representing sensory-spatial-motoric information. These gestures not only facilitate the exploration and organization of mental content but may also contribute to shaping the final form of autobiographical representations during retrieval. According to the gesture-for-conceptualization framework (Kita et al., 2017), gestures have the potential to trigger and integrate new sensory-motor representations, thereby influencing the structure and specificity of recalled events.

The gesture-for-conceptualization hypothesis focuses on the self-oriented functions of gestures (Kita et al., 2017). This hypothesis asserts that gesturing can aid the process of exploring, activating, manipulating, and packaging spatial, sensory, and motoric representations. As a result, when people gesture, they may conceptualize spatial, sensory, and motoric information. Similarly, gesturing may help organize and retrieve rich information, as in the process of autobiographical memory retrieval.

Building on these insights, Aydin et al. (2023) investigated the relationship between gesture production and the richness of autobiographical memory representations. Their findings demonstrated that representational gestures were positively associated with episodic details in past event narratives, while non-representational gestures correlated with non-episodic details. Representational gestures were also related to individuals' subjective ratings of the phenomenological features of their narratives. In future event narratives, however, both gesture types contributed predominantly to non-episodic details. These results suggest that gestures may differentially support the construction and retrieval of past and future events, a notion consistent with the gesture-for-conceptualization hypothesis (Kita et al., 2017). These findings that representational gestures were associated with episodic components were supported by further studies (Akkan et al., 2024; Güneş-Acar et al., 2024).

Although these are promising results, the correlational nature of the previous studies limits our ability to infer causal relations between gesture use and memory detail retrieval. Therefore, it is unclear whether gestures actively shape memory construction or merely reflect underlying cognitive processes. As the first step in addressing this gap, we adopted an experimental approach to investigate whether encouraging gesture use during autobiographical memory retrieval would affect episodic richness.

The Present Study

This study investigated whether the elevated use of gestures would contribute to autobiographical event construction. In particular, we examined the role of representational gestures in the episodic specificity of autobiographical memories and whether gesturing and gesture types would explain the change in the rate of memory details in past and future autobiographical event narratives. Based on previous research (the gesture-for-conceptualization framework; Kita et al., 2017), we proposed that representational gesture use would activate and enrich the episodic content of autobiographical recollections, which would, in turn, facilitate the recall and articulation of autobiographical memories. Also, we proposed that as the semantic content in the autobiographical memory narratives increases, non-representational (i.e., beat) gestures would also increase (Aydin et al., 2023) to facilitate speech (e.g., Lucero et al., 2014).

Following the recent findings on the association between representational gestures and episodic details, as well as non-representational gestures and non-episodic details in past event narratives (Aydin et al., 2023), we sought to determine the direction of these relationships. Therefore, we manipulated the gesture use by employing a within-design in which the first condition allowed participants to spontaneously gesture and the second one encouraged them to gesture during autobiographical event narration–an effective procedure widely used to elevate the gesturing rate (e.g., Cravatto et al., 2019; Hyusein & Göksun, 2023). Through the activation of spatiotemporal representations in memory recollections during representational gesture use, we expected to observe an increase in the episodic specificity of the past autobiographical event narratives when gesture use is encouraged. Furthermore, because remembering the past and thinking of the future rely on shared constructive processes (Hassabis & Maguire, 2009; Schacter & Addis, 2007), our main predictions on the contributing role of gestures to the details hold the same for past and future events. However, considering the difficulty in constructing a never-experienced event without an existing spatiotemporal content at encoding, as opposed to a past recollection, we also expected to observe an increase in the rate of non-representational gestures and semantic details in future autobiographical event narratives when gesture use is encouraged.

Method

Participants

We conducted an a priori power analysis in G*Power Version 3.1.9.7. (Faul et al., 2007), which indicated that a sample size of 28 was required to detect an effect size F = .281 (see Aydin et al., 2023) with 80% power (alpha = .05). Thirty-six students were recruited through XX University's participant pool in return for course credit. Two participants were excluded from the analyses due to experimenter error (i.e., missing instructions and recording error). The final sample consisted of 34 people (M_{age} = 23.30, SD_{age} = 1.63; 64.71% female). Informed consent was obtained with the protocol number (FASS-2022-13).

Materials and Procedure

Participants were asked to provide written consent and then complete demographic forms prior to the experimental session in the laboratory. They also filled out imagery questionnaires (adapted from Clark & Maguire, 2020; VVIQ; Marks, 1973); however, for the purposes of the

present study, we do not report those findings. We employed a within-subjects design with all participants completing the two gesture conditions: (i) gesture spontaneous and (ii) gesture encouraged, respectively. Experimental sessions took place in the laboratory with at least a one-week interval between the gesture conditions. Participants were seated on an armless chair across from the experimenter in each session, allowing for free use of gestures.

In the first session (i.e., gesture-spontaneous condition), Participants started by verbally narrating a warm-up event to the experimenter, followed by one narration from each of three event types: (i) past and (ii) future autobiographical events and (iii) a non-autobiographical event in response to a cue word (e.g., *family* and *school* for autobiographical events; *sandwich* for the non-autobiographical event). At no place in the procedure was a mention of gesture use. They were instructed to recall past and simulate future autobiographical events that must be specific in time and place, occur within a 24-hour timeframe, and happened/will happen at least a month earlier/later. The instruction for the non-autobiographical event was to narrate the typical event order of preparing the favorite food of a certain type to a stranger who knew nothing about that food. Participants always started with the non-autobiographical event, then the order of the autobiographical event conditions and cue words were counterbalanced for all participants. In the second session (i.e., gesture-encouraged condition), roughly a week later, participants followed the same experimental flow with the same event order and similar cue words, except during each event narration, they were instructed to use their hand gestures when applicable. Akin to previous studies (e.g., Avcı et al., 2022; Hyusein & Göksun, 2023), this methodological choice ensured that the manipulation of gesture encouragement did not affect the narratives during the gesture-spontaneous condition at a later session. Experimental sessions were video recorded for gesture coding and narrative transcription before the analysis.

Event Detail Coding Autobiographical event narratives were transcribed from the video recordings and coded (Taguette Software; Rampin & Rampin, 2021) for their event details using the Autobiographical Interview (AI; Levine et al., 2002; adapted to Turkish by Otenen et al., 2021) coding scheme by two independent coders. Coders first identified the main event in the narrative, then classified the details specific to the main event as internal, and details not specific to the main event as external. *Internal details* were unique episodic information such as place, time, emotion/thought, perceptual details, people, and actions in the main event; whereas *external details* were semantic information about the world and the self, episodic details that were not about the main event in the narrative, repetition of the details, and metacognitive comments. We further classified semantic information under the external detail categories according to Renoult et al. (2020), but for the present purposes, we are not reporting those data. Each piece of information was scored as 1, and the total internal and external detail scores were computed by the sum of all related details under each detail category. Thus, internal details served as an index of *episodic* elements in the narratives, while all external details represented the *non-episodic* elements.

The inter-rater reliability scores for event coding were computed over 15% of the autobiographical event narratives. Intraclass-correlation coefficients (ICC; two-way random effect model for absolute agreement, McGraw & Wong, 1996) indicated good agreement (ICC = .89, $p < .001$) for external details, and excellent agreement (ICC = .94, $p < .001$) for internal and (ICC = .90, $p < .001$) total details (Koo & Li, 2016).

Gesture Coding EUDICO Linguistic Annotator software package (ELAN; Lausberg & Sloetjes, 2009) was used to code hand gestures. They were coded under 5 main categories: *iconic*, *metaphoric*, *deictic* (*concrete deictic*, *abstract deictic*), *beat* gestures, and *others* (i.e., gestures that do not conform to the categories established in this study, such as palm-up gestures and interactive gestures) (McNeill, 1992). Based on the current framework (e.g., Kita, 2000), iconic, metaphoric, and abstract deictic gestures were summed as the composite *representational gesture* score (McNeill et al., 1994), and the beat gestures were treated as *non-representational gestures* for the following analyses. Concrete deictic gestures were excluded from the analyses following previous studies (e.g., Arslan et al., 2023) as they did not hold a representational meaning (e.g., self-pointing) and were low in number. Two independent coders coded 20% of the data and reached excellent reliability for both total gesture (ICC = .99, $p < .001$) and representational gesture (ICC = .90, $p < .001$), and moderate (ICC = .63, $p = .035$) reliability for non-representational gestures (Koo & Li, 2016).

Results

Due to the multilevel structure of the data, where all event narrative trials were nested within individuals, we employed hierarchical linear modeling (Huta, 2014) using Jamovi (The jamovi project, 2024). This statistical choice allowed for flexible control of within- and between-subject variability (Brown, 2021). Our within-participants Level 1 predictor included gesture manipulation (spontaneous vs. encouraged) and event type (past vs. future) conditions, and Level 2 predictors included between-participant measures of gesture type (representational and non-representational). An initial intercept-only model suggested that between-participant variability was explaining 33.7% of the data variance in internal detail count ($p < .001$); thus, participants were entered as a cluster variable, and the intercept was allowed to vary across participants in all subsequent models. Although computing the ratio of gestures to verbal utterances is the norm in the literature (e.g., Kendon, 1994), taking the rate of event details is not a common practice across memory studies (e.g., Levine et al., 2002). To resolve the mismatch between the computation of these two variables while controlling the variability of

Table 1: Means and standard deviations.

	Past-Spontaneous		Past-Encouraged		Future-Spontaneous		Future-Encouraged	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Total gestures	26.9	33.7	41.6	21.3	18.8	18.7	33.1	14.3
Representational gestures	15.4	23.4	25.5	14.5	10.2	10.6	19.5	11.4
Non-representational gestures	11.1	12.7	15.6	10.9	8.35	9.14	13.0	7.92
Total details	41.9	18.5	47.5	21.6	35.1	15.7	34.9	10.5
Internal details	30.3	13.6	35.4	20.9	25.5	17	21.9	13.8
External details	11.6	11.4	12.1	9.39	9.65	8.35	12.9	8.73
Utterances	168	107	194	84.8	146	64.2	156	57.4

Note. Representational gestures refer to iconic, metaphoric, and abstract deictic gestures; non-representational ones refer to beat gestures.

utterance production across participants, (i) the verbal utterance rate was entered in all the analysis models as a predictor, where the event detail counts were the outcome variable, and (ii) was allowed as a random slope across participants (between-participant variability explained 63.5%, $p < .001$ of the data variance in internal detail count when utterance rate was entered in the null model as a slope). This way, we eliminated the need to proportion each variable count–especially the event details–to utterance production. To validate our results, we also ran the analyses by taking the ratio of each variable to verbal utterance rate, in which all our findings remained the same. Thus, we chose to proceed with our first approach. All between-subjects measures were grand mean-centered. To address the main research question of whether gestures facilitate the retrieval of episodic details in autobiographical event constructions, we compiled separate models to avoid multicollinearity where each of our study measures (i.e., gesture types) predicted internal and external detail counts.

We first tested whether gesture use differed across event and gesture conditions, where the gesture rate was computed by dividing the total gesture count by the verbal utterance count. A two-way mixed model analysis for repeated measures indicated that the gesture condition had an effect on total gesture use ($F[1, 99] = 66.40$, $p < .001$), where encouragement manipulation led participants to gesture more ($M = 37.40$, $SD = 18.52$) compared to gesture spontaneous ($M = 22.84$, $SD = 27.37$) condition ($t[99] = -8.15$, $p < .001$). The event type ($F[1, 99] = 0.36$, $p < .55$), or its interaction with the gesture condition ($F[1, 99] = 1.51$, $p = .22$) were not significant. Similar results were viable for both gesture types when we assessed the distributions across conditions. Gesture condition influenced the rate of two gesture types ($F[1, 99] = 55.63$, $p < .001$ for representational gestures; $F[1, 99] = 15.40$, $p < .001$ for non-representational gestures), where gesture encouragement yielded higher rates of gesturing ($M = 22.49$, $SD = 13.30$ for representational gestures; $M = 14.29$, $SD = 9.52$ for non-representational gestures) than gesture spontaneous ($M = 12.79$, $SD = 18.22$ for representational gestures; $M = 9.75$, $SD = 11.05$ for non-representational gestures) condition ($t[99] = -7.46$, $p < .001$ for representational gestures; $t[99] = -3.92$, $p < .001$ for non-representational gestures). However, again, both the event type ($F[1, 99] = 0.66$, $p < .42$ for representational gestures; $F[1, 99] = 0.01$, $p < .92$ for non-representational gestures) and interaction between conditions ($F[1, 99] = 0.29$, $p < .59$ for representational gestures; $F[1, 99] = 1.55$, $p < .22$ for non-representational gestures) did not hold a significant effect on the rate of gesture types.

Next, we examined whether the total number of event details differed across conditions. We observed that the total number of details was different across event types ($F[1, 96.1] = 12.35$, $p < .001$), where past events ($M = 44.7$, $SD = 20.2$) involved more details compared to the future events ($M = 35$, $SD = 13.2$; see Table 1 for the distribution of mean scores across sub-conditions), ($t[98.7] = -3.46$, $p < .001$). Yet, the gesture condition ($F[1, 95.8] = 1.77$, $p = .19$) and the interaction between conditions ($F[1, 95.2] = 0$, $p = .98$) did not reveal an effect on the total detail count.

We also looked into the distribution of internal details across conditions and then tested whether two gesture types predicted internal details in autobiographical event constructions. We found that the internal detail count was different across event types ($F[1, 98.8] = 16.26$, $p < .001$) but not across gesture conditions ($F[1, 98.6] = 2.62$, $p = .109$). Internal details were produced more in past events ($M = 32.8$, $SD = 17.7$) than in future events ($M = 23.7$, $SD = 15.5$, $t[99.2] = -3.96$, $p < .001$). Confirming our predictions, we observed that the representational gestures predicted the internal detail count regardless of the experimental conditions ($\beta = 0.28$, $t[110] = 3.19$, $p = .002$, 95% CI [0.11, 0.45]), whereas non-representational gestures did not ($\beta = -0.21$, $t[116.6] = -1.69$, $p = .093$, 95% CI [-0.46, 0.03]). To further investigate whether gesture encouragement had an effect on representational gestures' estimation of internal detail count, we examined the interaction effect between representational gestures and gesture condition. However, the estimation of the interaction effect was not significant ($\beta = 0.17$, $t[100.7] = 1.47$, $p = .145$, 95% CI [-0.06, 0.40]). On the contrary, the interaction between gesture condition and non-representational gestures predicting internal details was significant ($\beta = -0.35$, $t[100.5] = -2.27$, $p = .025$, 95% CI [-0.64, -0.05]). The simple effect of the gesture condition with the gesture-spontaneous condition being the reference

level was significant at one standard deviation above the mean level of non-representational gesture rate (β = -5.41, t[98.5] = -2.49, p = .014, 95% CI [-9.73, -1.10]), and not significant at the mean (β = -1.78, t[96.5] = -1.28, p = .202, 95% CI [-4.54, 0.97]) and at one standard deviation below the mean level (β = 1.85, t[98.8] = 0.90, p = .371, 95% CI [-2.23, 5.93]). The simple effect of non-representational gesture rate was significant at the gesture-encouraged condition (β = -0.43, t[115] = -2.70, p = .008, 95% CI [-0.74, -0.11]), but not at the gesture-spontaneous condition (β = -0.08, t[110] = -0.58, p = .562, 95% CI [-0.36, 0.20]). These results suggest that non-representational gestures failed to estimate internal detail count in the gesture-spontaneous condition, whereas they negatively predicted internal details in the gesture-encouraged condition when the rate is high.

After examining the distribution of the external detail count across conditions, we repeated the same analyses with external detail count as the outcome variable and representational and non-representational gesture counts as separate model predictors. The results similarly showed that the external detail count was different across event types (F[1, 103.8] = 4.53, p = .036), where external details were reported slightly more in past events (M = 11.9, SD = 10.4) than in future events (M = 11.3, SD = 8.64, t[99.5] = 2.09, p = .039); and was not different across gesture conditions (F[1, 103.5] = 0.70, p = .405). Finally, both representational (β = -0.07, t[118.9] = -1.23, p = .223, 95% CI [-0.18, 0.04]) and non-representational gestures (β = 0.08, t[126.2] = 1.03, p = .305, 95% CI [-0.07, 0.23]) did not account for the external details. Similarly, the interaction effect between gesture condition and representational gestures (β = -0.14 t[105.6] = -1.89, p = .062, 95% CI [-0.29, 0.01]) nor non-representational gestures (β = 0.13, t[109.3] = 1.30, p = .197, 95% CI [-0.07, 0.32]) were not significant.

Discussion

In the present study, we investigated whether encouraging gesture use would result in increased episodic content when recalling autobiographical events. Considering the multimodal nature of the autobiographical representations and gestures' ability to schematize information (Kita et al., 2017) during retrieval, autobiographical memories may be open to reconstruction through the integration and reassessment of sensory-motor representations facilitated by gesturing. We asked participants to recall one past autobiographical event and generate one future autobiographical event under two conditions: without any instructions (gesture-spontaneous) and with instructions to use their hands while speaking (gesture-encouraged). Our results showed that representational gesture use was positively associated with episodic details regardless of the condition. Non-representational gestures, however, were negatively associated with episodic details in the gesture-encouraged condition.

This result replicated the previous findings on the relationship between representational gestures and episodic details (e.g., Aydin et al., 2023). Yet, our prediction about the nature of this relationship, where representational gestures could go beyond a mere association with episodic detailedness and account for the episodicity of autobiographical event narratives, remains an open question. Here, gesturing might have activated the existing spatio-motoric information within autobiographical recollections (Kita et al., 2017) and helped retrieve episodic details during narration. As remembering is not an exact replay of the past but a reconstructive process (Lifanov-Carr et al., 2024; Schacter & Addis, 2007), details that were captured in gesture format could further trigger additional details in the narratives (Aydin et al., 2023). Gestures might have also eased the cognitive load of the simultaneous recall and narration processes (e.g., Cook et al., 2010; 2011) by maintaining the already active information or organizing retrieved information into manageable chunks. As a result, gesture use could increase the number of episodic details accessed and transferred to the interlocutor during autobiographical recall.

In the current event narratives, gesture encouragement yielded an increased rate of gesturing for all gesture types (both representational and non-representational), as we expected. Yet, the difference between the encouraged and spontaneous gesture conditions did not influence the retrieval of episodic details. This might be due to the context-dependent functions of gestures. Encouraging people to gesture is usually associated with gestures' assistance to individuals in exploring more information or ideas (e.g., Hyusein & Göksun, 2024). Thus, gesture encouragement may be effective in on-line problem-solving contexts rather than recollecting details of autobiographical events. Another non-mutual explanation comes from studies on memory processes for non-autobiographical narratives, where gesture encouragement improves recall, especially when it is also encouraged during the encoding (Bharadwaj et al., 2022; Stevanoni & Salmon, 2005; Sweller et al., 2024). That is, more cognitive resources can be allocated to effective encoding by representing visuospatial information with gestures, which in turn improves recall (Cook et al., 2010; Hostetter & Alibali, 2008, 2019; Sweller et al., 2024).

Since non-representational gestures contribute to fluency and support the retrieval processes (e.g., Lucero et al., 2014; Vilà-Giménez & Prieto, 2020), we expected them to facilitate the recall of semantic details, and to some extent, episodic details while striving to keep track of a specific memory event, especially in future simulations. Interestingly, our findings revealed a different pattern: When non-representational gestures were employed more frequently as a result of encouragement, they did not contribute to the retrieval of episodic details but rather inhibited their construction, irrespective of the event type. This outcome aligns with previous studies suggesting gestures can be inefficient or even harmful in certain instances where they are unnecessary for the speaker (e.g., Pyers et al., 2021; Thakore et al., 2024). For instance, Bharadwaj et al. (2022) found that beat gestures negatively

impacted the recall of fictional stories, especially among participants with high verbal abilities. While we were unable to pinpoint specific explanatory mechanisms with our current design, these findings together support our claim that representational gestures play a more critical role in organizing episodic details in mental simulations. However, this should be a cautious interpretation as the association between non-representational gestures and episodic details could reflect a more general cognitive demand arising from the experimental instructions. In the gesture-encouraged condition, since participants emphasized gesture use when relevant, they might have employed non-representational (i.e., beat) gestures extensively, not necessarily when needed in the natural flow of the narrative but rather to meet the experimental demands. Thereby, an externally triggered motivation to use gestures might have interfered with the retrieval of episodic details in the autobiographical event constructions.

Here, we were unable to replicate the association between non-representational gestures and semantic details in past events from Aydin and colleagues (2023). Also, our findings did not reveal the role of non-representational gestures in future events either. This was unexpected, as our predictions were grounded in the previous findings (Aydin et al., 2023). Observing such a disparity might have simply stemmed from the employed analytical approach, where we controlled the rate of verbal utterance production, unlike previous studies using raw scores of their variables (Aydin et al., 2023). However, considering the role of non-representational gestures in resolving fluency and facilitating retrieval, non-representational gestures might not be used to assist cognitive processes in our sample; instead, they might have been used for communicative purposes to emphasize information (Dimitrova et al., 2016). Thus, further investigation is needed to determine whether beat gestures primarily support memory construction or enhance communication. Because participants in this study recounted events to an experimenter, their descriptions likely reflect not only autobiographical remembering but also linguistic and social-narrative factors, including storytelling motivations. Future research should therefore employ paradigms that more directly engage the cognitive processes of retrieval, in order to better isolate the role of gesture in remembering itself, rather than in the broader act of narrating past or imagined experiences.

Also, we should consider these in the light of narrative characteristics. We obtained detail counts that were already high for the narratives. Therefore, to disentangle the contribution of non-representational gestures, other experimental manipulations where gesture use was inhibited can be employed in future studies. Notably, future events in our sample did not contain more semantic components than past events–in fact, the opposite held true–contrary to what might be expected based on previous studies (e.g., D'Argembeau & Van der Linden, 2004; De Brigard et al., 2017). One potential reason for this position is that participants were not time-constrained in their event generation and thereby prepared better for specific event constructions containing more episodic details. Therefore, it would still be compelling to further test how non-representational gestures facilitate future thinking under conditions of greater demands posed either by the tasks or neurocognitive difficulties of the participants.

Nevertheless, building on previous findings that revealed the relationship between gesture use and episodicity of autobiographical memories, we targeted an initial approach to investigate the impact of gesture use. To this end, we manipulated the gesture use (i.e., encouraged) without harming the natural communicative setting of the narratives. Importantly, we found that representational gestures play a key role in predicting episodic details in autobiographical event narratives, although this effect was not more pronounced when gesturing was encouraged. This finding might decrease the argument of gestures' causal role in shaping cognitive processes, which requires replication and further investigation. Future studies should investigate the temporal dynamics between gesture and recall to clarify whether gestures trigger sensorimotor details in memory (Kita et al., 2017) by preceding them (e.g., Ianì et al., 2017) or reflect information already activated during retrieval (e.g., Ianì et al., 2018).

Furthermore, while depending on a within-design can obtain more reliable results in some occasions, it can be vulnerable to practice effects for the investigated task (see Charness et al., 2012 for an extensive discussion), such that our participants might have developed retrieval strategies for the second session, especially for future simulations. Accordingly, while we aimed to make sure that the gesture encouragement was restricted only to the targeted condition, implementing a fixed order for the experimental conditions in a within-design might have interfered with the narrative length and quality only for a certain condition, hinging on ordering effects. Therefore, employing a between-subjects design can be useful in examining the other side of this trade-off and successfully controlling any practice effects. Moreover, to have a better understanding of gestures' causal role in shaping cognition, future studies should consider restricting gesture use besides encouraging them, along with taking into account individual differences in working memory and visual imagery–as these factors are closely related to autobiographical memory (e.g., Aydin, 2018; Unsworth et al., 2012) and gesture production (Özer & Göksun, 2020). Likewise, while examining the association with gestures, differentiating the semantic components (Renoult et al., 2020) and specific episodic elements in event narratives would be beneficial to pinpoint unique contributions to autobiographical remembering. Overall, these approaches would strengthen claims about the potential causal link between gesture use and the retrieval of details from autobiographical events.

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