



## The immediacy of recollection: The use of the historical present in narratives of autobiographical episodes by patients with unilateral temporal lobe epilepsy

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### ARTICLE INFO

#### Article history:

Received 30 August 2010

Received in revised form 26 January 2011

Accepted 28 January 2011

Available online 15 February 2011

#### Keywords:

Historical present

Autonoetic consciousness

Autobiographical memory

Medial temporal lobe

Recollection

### ABSTRACT

Objectively measuring the experiential phenomenon of “reliving” a personal memory without relying on the retrieval of specific contents such as richness/vividness of perceptual details is difficult. There are, however, some circumstances in which an indirect measure that does not require conscious retrieval or deliberate assessment of such information, would be quite useful (e.g., in very young children, in patients with poor fluency or inappropriate use of rating scales). Here, we examined the use of the historical present (HP), defined as a present tense that refers to a past action, in autobiographical narratives. The HP indexes a sense of reliving because the memory of the event is vividly re-experienced as occurring again in the current moment. We compared the use of the HP in narratives from neurologically intact controls and from patients with unilateral temporal lobe excisions or epilepsy (TLE). Results indicate that patients used fewer instances of the HP than healthy controls. Also, the use of the HP correlated positively with other measures of recollection, such as the total number of perceptual details contained in a narrative. We provide the first empirical evidence that a linguistic construct can be used to assess the conscious experience that accompanies recollection.

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### 1. Introduction

Language is a window into the mind (Pinker, 2007), but with few exceptions (Duff, Hengst, Tranel, & Cohen, 2007, 2009; MacKay, James, & Hadley, 2007; Pillemer, 1992; Pillemer, Desrochers, & Ebanks, 1998) no one has examined what linguistic constructions can reveal about the nature of episodic memory in adults (see Fivush & Nelson, 2006, on children). In this study we show that a linguistic construct, the *historical present* (HP), can provide insight into the experience of recollection, a hallmark of episodic memory (Tulving, 1985).

The HP is a literary and rhetorical device for both oral and written narratives, common to several different languages, including English (Palmer, 1965; Wolfson, 1979), Senegalese (Perrino, 2007), and Spanish (Silva-Corvalan, 1983). The HP tense appears as a present tense form, but clearly refers to a past event. In this example from one of the interviews (Eccleston & Bell, 2001) in the New

York Times' 9/11 oral history project, *The Sept. 11 Records*, Jody Bell, an emergency medical technician (EMT), describes the event from his perspective:

“We jumped out of the car. We turned around, and we *see* the building on fire. We *see* the smoke coming out of the building and automatically assumed that we were bombed again, that another bomb went off in the World Trade Center. . . . *I'm* not sure how much time passed after that. I lost track of time.” (italics and underline added)

Although all these actions took place in the past, Bell uses the HP tense *see*, rather than the past tense *saw*, to describe his witnessing of the fire. The present tense *am* in *I'm* in the penultimate sentence would not be categorized as a HP tense because Bell is speaking about his current state of uncertainty.

The traditional interpretation of the HP is that it indexes the narrator's reliving of the moment while describing the event (Fludernik, 1991; Pillemer, 1992; however, see Wolfson, 1979). Jespersen (1929) and Joos (1964) reason that the HP is used when the speaker recalls or imagines an event so vividly that he or she speaks as if it were unfolding before his or her eyes.

This description of the use of the HP has much in common with the concept of memory recollection, as it captures two of its defining features: autonoetic consciousness, the phenomenologi-

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**Table 1**  
Demographic and neuropsychological characteristics of control and TLE participants.

	Control (n = 21)	Dominant (n = 12)	Non-Dominant (n = 13)
Mean age in years (SD)	39.43 (8.57)	43.21 (7.28)	38.62 (8.41)
Gender: male/female	10/11	3/9	5/8
Years of education (SD)	16.04 (2.64)	15.29 (3.39)	14.92 (3.57)
Surgical status: Pre-surgery/Post-surgery	N/A	9/3	7/6
Handedness: right/left	N/A	9/3	11/2
Mean WASI Full Scale IQ (SD)	N/A	96.17 (11.55)	96.38 (12.74)
RAVLT: mean standardized total recall score (SD) <sup>a</sup>	N/A	-0.41 (0.77)	0.31 (0.80)
RVDLT: Mean standardized total recall score (SD) <sup>b</sup>	N/A	-2.12 (1.76)	-2.62 (1.49)

<sup>a</sup> Raw scores were converted into z scores based on norms from Selnes et al. (1991).

<sup>b</sup> Raw scores were converted into z scores based on norms from Strauss and Spreen (1991).

Note: IQ = Intellectual Quotient; L = left; N/A = not applicable; R = right; RAVLT = Rey Auditory-Verbal Learning Test; RVDLT = Rey Visual Design Learning Test; SD = standard deviation; TLE = temporal lobe epilepsy or excisions; WASI = Wechsler Abbreviated Scale of Intelligence (1999).

cal experience of reliving a personal event (Tulving, 1985; Wheeler, Stuss, & Tulving, 1997), and the retrieval of contextual details that constitute the memory (Moscovitch, Nadel, Winocur, Gilboa, & Rosenbaum, 2006). Both these features of recollection are prominent in narratives of autobiographical memory episodes (AM) (Rubin, Schrauf, & Greenberg, 2003; St-Laurent, Moscovitch, Levine, & McAndrews, 2009), and are associated with the HP. Indeed, the HP emphasizes the immediacy of recollection, so that the past lives in the present moment. Also, while the HP is not a direct quantifier of memory details per se, it is used in the context of rich storytelling and during the description of emotionally salient moments (Fludernik, 1991; Harvey, 1986; Pillemer et al., 1998), both of which have a great deal of contextual details. Based on the premise of a relationship between the HP and recollection, especially as an indicator of auto-noetic consciousness (Tulving, 1985), we attempted to gain insight into the conscious experience of AM recollection by comparing the use of HP in neurologically intact people with that in patients with medial temporal lobe (MTL) damage when relating autobiographical memories.

While a loss of contextual details is clearly found in autobiographical memory narratives of patients with MTL lesions or dysfunction (Noulhiane et al., 2007, 2008; St-Laurent et al., 2009; Viskontas, McAndrews, & Moscovitch, 2000), measures of the subjective experience of recollection, that is, of auto-noetic consciousness, have led to conflicting results. Patients' self-report ratings of the *subjective* vividness of AM recollection on Likert scales were indistinguishable from those of neurologically intact participants (Addis, 2006; Hassabis, Kumaran, Vann, & Maguire, 2007; St-Laurent, 2007), despite the impoverished details in their narratives. On the other hand, Piolino and colleagues (Noulhiane et al., 2007, 2008; Piolino et al., 2008) found that MTL patients describe fewer of their AMs as being re-experienced ("Remembered"), and recall fewer specific spatio-temporal details for these *Remembered* memories, indicating reduced recollection. However, one limitation of this method is its very reliance on the retrieval of contextual details in order to assess the phenomenon of re-experiencing. Documenting the insertion of the HP in AM narratives provides an indirect, but objective, measure of auto-noetic consciousness that is independent from conscious retrieval of event details and circumvents the problem of using subjective measures of auto-noetic consciousness which produce contradictory results in patient populations.

AM narratives were collected with an adapted version of Levine, Svoboda, Hay, Winocur, and Moscovitch's (2002) *Autobiographical Interview* (AI) because its scoring method distinguishes between internal and external details (see Section 2.2) which are linked to episodic and semantic memory, respectively. Verbs within internal and external details were categorized according to their tenses. The *Historical Present* tense was defined as a verb appearing in the present tense form while referring to a past event. All other present tense verbs were categorized as *Present*. Verbs were categorized as

*Past tense* if they appeared in one of the past tense forms or as *Other*, if they appeared in any other tense: future, conditional, or subjunctive.

The purpose of this study was to compare patients with unilateral temporal lobe epilepsy or excisions (TLE) with healthy participants to determine whether our patients' loss of AM details, as observed on objective measures of memory content, was accompanied by a loss of the subjective sense of AM re-experiencing that we believe is reflected by the use of the HP. If the HP serves the function of indexing the recollective experience of the narrator, and if patients with MTL damage have reduced auto-noetic consciousness, we would expect to observe the following:

- (1) Neurologically intact participants should be more likely to use the HP tense in their autobiographical narratives than patients with unilateral TLE;
- (2) The use of the present tense in its usual capacity as a present tense, rather than as a HP tense, should be equivalent in patients and in controls;
- (3) The use of the HP tense may or may not correlate with objective measures of memory content; while we do not exclude the possibility of a dissociation between auto-noetic consciousness and detailed retrieval, we expect these two features of recollection to be positively correlated for internal details;
- (4) The use of the present tense should not correlate with objective measures of memory content.

## 2. Methods

### 2.1. Participants

Participants were recruited and tested according to a protocol approved by Toronto's University Health Network (UHN) REB. Fourteen patients with left temporal lobe epilepsy or temporal lobe excision (LTLE; 10 pre-surgery, 3 male) and 11 patients with right temporal lobe epilepsy or excision (RTLE; 6 pre-surgery, 5 male) were recruited through the Epilepsy Program of Toronto Western Hospital. Of the 25 patients, 20 were right-handed (9 LTLE and 11 RTLE) and five left-handed (5 LTLE).

All but one patient were diagnosed with epilepsy from unilateral hippocampal origin. In one pre-surgical RTLE patient, an independent left temporal focus was also observed; his performance was indistinguishable from that of other TLE patients. Patients showed no brain damage that was unrelated to their epilepsy or surgery, except for three LTLE patients with a small lesion to their occipital cortex. Five of ten pre-surgery LTLE patients and three of six pre-surgery RTLE patients were diagnosed with medial temporal sclerosis by a radiologist. In pre-surgical patients, hippocampal atrophy was calculated by summing hippocampal width measured at four points along its long axis using ANALYZE AVW Software (Biomedical Imaging Resource, Mayo Foundation, Rochester, MN), and by dividing its sum by intracranial width. The differences between the right and left composite scores were 6.62% and -2.12% of intracranial width for patients with LTLE and RTLE, respectively. The temporal lobe excision removed the amygdala, 2–4 cm from the hippocampus and parahippocampal gyrus and 4–6 cm along the lateral convexity of the middle, inferior and fusiform gyri. All patients who had undergone surgery were seizure-free post-operatively, except for one RTLE patient whose ablated epileptogenic cyst had re-grown since surgery.

All patients were native or fluent speakers of English. Two LTLE (1 Post-Surgery, 1 Pre-Surgery) patients had language lateralized to the right hemisphere. Because our

measure of interest was based on language, these two patients and the RTLE patients were classified as non-language-dominant (Non-Dominant; language representation contralateral to the seizure focus), while patients with LTLE with left-lateralized language were classified as language-dominant (Dominant; language representation ipsilateral to the seizure focus), for statistical comparisons. A full-scale WASI IQ scale was administered and patients' scores fell within normal range (Dominant mean = 96.17, SD = 11.55; Non-Dominant mean = 96.38, SD = 12.74). Additional demographic information and standardized neuropsychological test scores from participants are presented in Table 1.

Healthy controls were recruited among staff members at the Toronto Western Hospital, and through on-line and newspaper advertisement. Exclusion criteria consisted of a history of neurological (e.g., tumor, epilepsy, concussion, cyst, meningitis, stroke, congenital disease) or psychiatric (e.g., depression, schizophrenia) disorder. Controls were matched to patients for age, gender and years of education. Three controls whose demographic information matched the original group of controls in St-Laurent et al. (2009) were added to the study for a total of 21 healthy participants.

## 2.2. Procedure

Participants were tested by MSL on an adapted version of Levine et al.'s (2002) Autobiographical Interview (see St-Laurent et al., 2009, for the full methodology). Each participant selected two personal events that had occurred between 1 and 10 years ago, and that had lasted from a few minutes to a few hours. For each event, the Free Recall and the General Probe conditions were administered consecutively. The Specific Probe was administered after all memories were assessed under the first two conditions. In the Free Recall condition, participants were instructed to describe their memory for the event in as much detail as possible, without interruption. For the General Probe, participants were invited to recollect more information in a non-specific manner (e.g., "Is there anything else you can tell me about this event?"), until they could not report any additional information. Finally, for the Specific Probe, participants answered the same series of questions about different aspects of the memory: time, place, people present, perceptual elements encoded through the senses, emotions, and thoughts. Those results were not parts of the current verb analysis because all questions were asked in the past tense, which discouraged the use of the HP. Narratives were audio-taped and transcribed into word documents by a naive person, and were made anonymous.

When scoring the AI (Levine et al., 2002), narrative elements are split into two major categories—internal and external details. Internal details refer to portions of the narrative that describe the main event of interest, whereas external details refer to events other than the one of interest, general semantic knowledge, metacognitive statements, or repetitions. Verbs were categorized as corresponding to internal or external memory elements before they were further categorized according to their tense.

Both internal and external verbs (corresponding to the internal and external details, respectively) were classified into one of four categories: *Past*, *Present*, *Historical Present (HP)*, and *Other*. Internal and external verbs were categorized as *Internal Past* and *External Past*, respectively, if they appeared in any form of a past tense (e.g., simple [baked], progressive [was baking], perfect [had baked], and perfect progressive past [had been baking]). Verbs found in the internal details in the present tense were categorized either as *Internal Present* or *Internal HP* depending upon the context in which they appeared. Verbs were categorized as *Internal HP* if the scorer felt confident that they reflected the narrator's reliving of the past. The following is an excerpt from a transcript from a participant:

"There was [internal past] a candle on the table... I don't know [external present] how she moved [internal past] it around but the napkin caught [internal past] fire. So now we *are having* [internal HP] this fire at the table... the waiter *comes* [internal HP] and kind of like *puts* [internal HP] the fire out..." (italics and coding within brackets added).

Note the change from past tense to HP tense in the sentence beginning with "So". Action verbs corresponding to either physical (e.g., say, sit, push, enter, walk) or mental (e.g., remember, think, hear, see) actions performed by the narrator or by others were considered HP (e.g., then I *remember* the ticket is in my bag; I *see* her come running). Verbs were categorized as *Internal Present* when they reflected information that was specific (internal) to the AM, but did not unambiguously depict the narrator's experience of reliving the moment (e.g., I talked to this girl. Her name is Alice.). To be conservative in our measure of recollection, stative verbs (e.g., be, seem, appear, feel) were considered HP if and only if they corresponded to a change in state in either the narrator, in others, or in the environment, reflecting the narrator's re-experience of the moment (e.g., suddenly I *feel* pain in my leg; dark clouds *appear* in the sky). Internal stative verbs that did not correspond to a change of state, such as verbs corresponding to the situation (e.g., it *is* my wedding day; my family *is* present; everyone *is* cheerful), the scenery or setting (e.g., it *looks* like a big barn), or to factual information that was specific to the context of the memory (e.g., We went to a new bar; it *is* on Yonge Street) were considered *Internal Present*. As can be appreciated from these examples, there were occasional difficulties in classifying internal present tense verbs. Our main interest was in developing a measure that could reflect recollection and the experience of re-living the event, and we therefore chose to be conservative in assigning the HP label by excluding ambiguous verbs.

Present verbs found in the external details (e.g., semantic knowledge unrelated to the main event, metacognitive statements, etc.) were categorized as *External Present* (e.g., I *am* not sure what I was thinking at the time). This category included present tense verbs that were descriptive of the narrator's current rather than past mental state (e.g., I *remember* I was sick). External HP verbs were HP verbs that referred to past events other than the main event discussed in the narrative; these verbs were considered *External*, in accordance with the AI's scoring guidelines (Levine et al., 2002).

Verbs were not tallied if they occurred within reported speech. For example, in the sentence "Jason just went to the store," my dad said," *went* would not be tallied in the verb count because it is a part of reported speech, but the verb *said* would be tallied. Counting the verbs was left to LP, who was blind to whether the narratives were given by patients or controls. For reliability check, a blinded research assistant counted verbs for 25% of the transcripts. Intraclass correlations (one-way random effects model; McGraw & Wong, 1996) for HP, Present, Past, and Other verb tenses were .99, .98, .99, and .99, respectively.

In order to correct for differences in narrative length across participants, we calculated ratios for *Internal Historical Present tense-to-Internal Past Tense* (IHPres-to-IPast), *Internal Present tense-to-Internal Past Tense* (IPres-to-IPast), and *External Present tense-to-External Past tense* (EPres-to-EPast). The IHPres-to-IPast tense ratio is an indication of the proportion of internal verbs in the HP tense; we assumed a high ratio reflected more vivid re-experiencing. The IPres-to-IPast ratio and the EPres-to-EPast tense were used as control measures for the usage of the present tense. For each participant, we averaged the number of verbs within each category from their two narratives. Final ratios were obtained by dividing the mean of the indicated present verb by the mean of the indicated past verb.

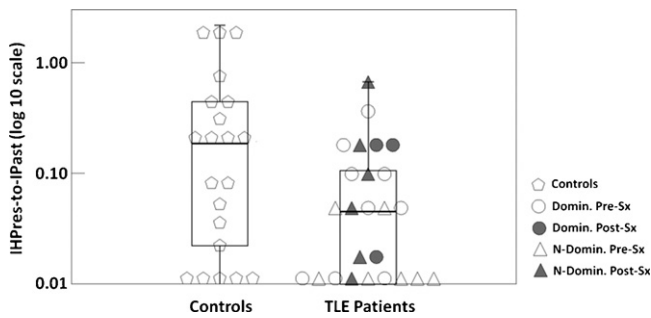
We used non-parametric tests to analyze the data because of the non-normal distribution of the ratios in our sample. The ratios were correlated with three different measures of AM performance that have been reported elsewhere (St-Laurent et al., 2009; St-Laurent, Moscovitch, Tau, & McAndrews, in press): internal details, clustered details, and perceptual details. We chose these measures because they were most sensitive to medial temporal damage in our previous work, and they are thought to reflect the vivid and detailed recollective experience of AM. Clustered details are a measure of temporal specificity; these are concrete, visualizable actions that correspond to the minute-by-minute unraveling of an event. They tend to be narrated in clusters that correspond to film-like sequences of actions. Perceptual details refer to visual details, and other memory details experienced through the senses (sounds, smells and tastes and physical sensations). The numbers of internal and clustered details correlated with the verb ratios were tallied for the Recall condition only, while perceptual details were tallied for both the Recall (Free Recall + General Probe) and the Specific Probe conditions, because most perceptual details were retrieved following probing (St-Laurent et al., 2009).

## 3. Results

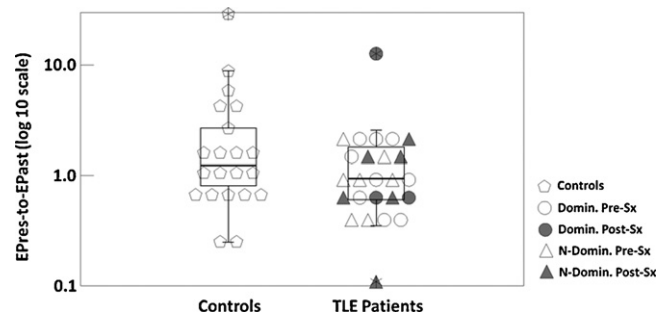
In our previous work on autobiographical recall using these same narratives, we found that neither laterality of seizure focus (left vs. right) nor surgical status (pre-operative vs. post-operative) had an impact on the magnitude of the recollection deficit (St-Laurent et al., 2009). Still, we tested whether these variables affected the linguistic forms that were the primary dependent variables here. We compared performance between the Dominant (12 LTLE patients) and the Non-Dominant (2 LTLE and 11 RTLE patients) patient groups, and found no statistically significant difference in the IHPres-to-IPast, IPres-to-IPast, and EPres-to-EPast ratios (Mann-Whitney  $U$ s = 56.50, 67.00, 65.50,  $p$ s = .25, .57, .50). In addition, we found that surgical status had no significant effect on patients' performance for the IHPres-to-IPast, IPres-to-IPast, and EPres-to-EPast ratios (Mann-Whitney  $U$ s = 42.00, 38.50, 70.00,  $p$ s = .10, .06, .93). Because we found no difference in performance as a function either of laterality of seizure, or of language dominance, we collapsed over these factors in the following analyses.

### 3.1. Internal details

We predicted that controls would have greater IHPres-to-IPast ratios than patients, indicating that they had more instances of the HP. Comparison between IHPres-to-IPast ratios confirmed this prediction (Mann-Whitney  $U$  = 173.50,  $p$  < 0.05; see Fig. 1). While we observed a significant difference between the groups, there was a considerable range of ratios obtained within each group. Also, 7 out of 25 patients (28%), and 4 out of 21 controls (19%), did not have a single instance of an HP verb; these proportions did not differ



**Fig. 1.** The distribution of IHPres-to-IPast ratios from controls and patients. *Note.* Ratios of 0 were plotted at .01 because 0 cannot be plotted on a log scale. Domin. = Dominant, N-Domin. = Non-Dominant, Pre- and Post-Sx = Pre- and Post-Surgery, respectively.

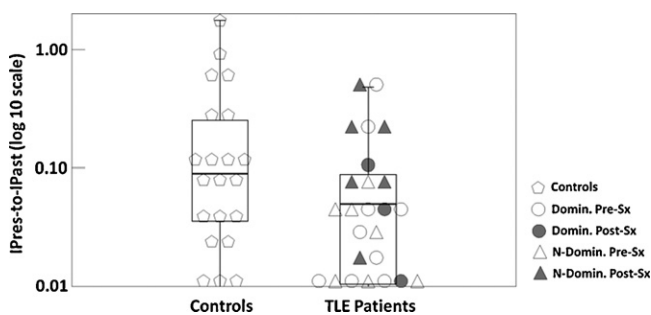


**Fig. 3.** The distribution of EPres-to-EPast ratios from controls and patients. *Note.* Ratios of 0 were plotted at .01 because 0 cannot be plotted on a log scale. Domin. = Dominant, N-Domin. = Non-Dominant, Pre- and Post-Sx = Pre- and Post-Surgery, respectively.

significantly between the two groups ( $\chi^2 = 0.50$ ,  $p = .48$ ). In other words, both controls and patients were equally likely to have at least one instance of the HP; however, controls who used the HP tense, did so more extensively than the patients.

We then used Spearman's rank correlations to determine whether the use of the historical present tense correlated with other measures of AM performance. We expected to find correlations between HP, which reflects autoegetic consciousness, and measures of AM performance that reflect detailed memory recollection. The Holm–Bonferroni correction (Holm, 1979) was applied to correct for multiple comparisons;  $p$  values smaller than .05 are reported post-correction. We found a significant correlation between IHPres-to-IPast ratio and the total number of internal details during Recall (Free Recall + General Probe) ( $r = .33$ , corrected  $p = .029$ ). We observed significant correlations between the IHPres-to-IPast ratio and the number of clustered details ( $r = .48$ , corrected  $p = .003$ ). The correlation between IHPres-to-IPast ratio and perceptual details was also significant ( $r = .35$ , corrected  $p = .04$ ). The IHPres-to-IPast ratio did not correlate significantly with the number of external details during Recall ( $r = .11$ , uncorrected  $p = .472$ ). Our results support our hypothesis that the use of the HP tense correlates with other measures of detailed AM recollection, as participants who reported the greatest numbers of internal, clustered, and perceptual details engaged in more HP in their narratives.

Present tense verbs were not as clear a measure of re-experiencing as HP. As such, we hypothesized that the use of present tense verbs would not differ between patients and controls and would not correlate with measures of AM performance. A non-parametric comparison between patients and controls revealed that there was a trend toward significance for the IPres-to-IPast ratio, (Mann–Whitney  $U = 187.00$ ,  $p = 0.10$ ) (see Fig. 2), suggesting that controls were likely to use the present tense more frequently



**Fig. 2.** The distribution of IPres-to-IPast ratios from controls and patients. *Note.* Ratios of 0 were plotted at .01 because 0 cannot be plotted on a log scale. Domin. = Dominant, N-Domin. = Non-Dominant, Pre- and Post-Sx = Pre- and Post-Surgery, respectively.

than patients. Of note, Spearman's rank correlations adjusted with the Holm–Bonferroni correction revealed that the IPres-to-IPast ratio was strongly correlated with the IHPres-to-IPast ratio, indicating a relationship between the two measures ( $r = .520$ , corrected  $p < .004$ ). However, the IPres-to-IPast ratio did not correlate significantly with the number of internal details ( $r = .13$ , uncorrected  $p = .39$ ), with the number of clustered details ( $r = .24$ , uncorrected  $p = .109$ ), or with perceptual details tallied for the Recall and the Specific Probe ( $r = .08$ , uncorrected  $p = .62$ ).

### 3.2. External details

There were no instances of the HP tense in the external details because no participant used the HP when describing episodes secondary to the main event. All external verbs in the present tense form were categorized as External Present. We hypothesized that patients and controls would not differ on their usage of present tense verbs, which was confirmed by non-parametric comparison between their EPres-to-EPast tense ratios (Mann–Whitney  $U$  test = 205.00,  $p = .21$ ) (see Fig. 3). Spearman's rank correlations adjusted with the Holm–Bonferroni correction were calculated between EPres-to-EPast tense ratio and the detail categories associated with recollection. There was no statistically significant correlation between the EPres-to-EPast tense ratio and either internal details ( $r = .19$ , uncorrected  $p = .21$ ), clustered details ( $r = .17$ , uncorrected  $p = .27$ ), or perceptual details ( $r = .14$ , uncorrected  $p = .38$ ). Overall, these results indicate that the relationship between the use of the present tense form and the different measures of AM recollection is particular to the HP tense, rather than reflecting a general relationship with the present tense.

### 3.3. Other verbs

Both controls ( $M = 2.10$ ,  $SD = 1.10$ ) and patients ( $M = 1.62$ ,  $SD = 1.84$ ) scarcely had Other verbs appearing in their narratives. Therefore we decided to collapse the Other verbs category across internal and external details. A non-parametric comparison found no significant difference in the frequency of Other verbs between controls and patients (Mann–Whitney  $U = 231.00$ ,  $p = .48$ ).

## 4. Discussion and conclusion

We assessed the use of the HP tense as a new objective measure of autoegetic consciousness. Our results showed that this measure is sensitive enough to reveal group differences between neurologically intact controls and patients with unilateral TLE. Also, we found that the use of the HP was specifically correlated with other measures of recollection: the tallied number of internal details, per-

ceptual details, and clustered details in the narrative. Internal and External Present tense verbs did not correlate with those measures nor did they reliably distinguish between patients and controls.

One potential concern is that perhaps the HP tense is simply associated with verbal output, regardless of the specificity of that output. We controlled for this problem by transforming our verb counts into ratios, so that our measure of the use of the HP was independent from the number of details recalled. We also correlated the use of the HP tense with the total number of external details, a measure of verbal output which is not indicative of recollection, and that correlation was not statistically significant.

Our results did reveal a significant positive correlation between the ratio of internal present verbs and the use of the HP. As explained in the methods section, Internal Present verbs were internal to the memory, but the scorer did not feel confident that they reflected the narrator's reliving of the moment. We introduced the Internal Present category in order for our tally of HP verbs to be a cleaner measure of recollection. We planned to use the Internal Present as a control measure for the general use of the present tense. However, the large correlation between the HP and the Internal Present verb ratios indicates shared variance between the two measures which could reflect a number of different factors. Given that Internal Present verbs mostly corresponded to general descriptions of the memory's context or physical environment, it is plausible that narrators describing sequences of actions in the HP tense may also revert to the present tense when describing the setting or when giving contextual information about the memory. Importantly, other measures of AM recollection correlated strongly with ratios of HP, but not with ratios of Internal Present verbs, validating HP as a purer measure of recollection. Still, the correlation between these two verb constructs makes the Internal Present an ambiguous control measure, and we recommend future studies to adopt the use of the External Present as a straightforward control measure for the general use of the present tense.

Measuring auto-noetic consciousness through the use of HP provides an advantage of dissociating it from the number of contextual details, thus allowing an independent assessment of the relationship between the two. Interestingly, our results confirm our hypothesis of a close relationship between the use of the HP tense and other measures of memory that quantify details from categories thought to reflect recollection. Our evidence is two-fold: firstly, we observe positive correlations between the use of the HP and measures of memory content. Importantly, these correlations are specific to HP and not to general measures of present tense use. The use of HP was most strongly correlated with clustered details, which are a measure of temporal specificity. These details correspond to moments in the narrative that relay detailed sequences of actions, relieved minute-by-minute. The positive correlation between HP ratio and clustered details is consistent with Fludernik's (1991, p. 374) note that HP tends to appear in the climax of a story, marking the "subjective involvement" felt by the narrators.

Secondly, we observe that the phenomenological sense of re-experiencing the past is deficient in a clinical population whose memory has been shown to lack episodic details. There were no significant differences in the use of the HP between pre-surgical and post-surgical patients, suggesting that the deficit is associated with MTL dysfunction, the common region affected in both groups. There also was no difference in the use of HP between Dominant and Non-Dominant TLE patients indicating that the reduction in HP use seen in our patients is a reflection of reduced recollection, which is sensitive to damage to both the left and the right MTL (Cohn, McAndrews, & Moscovitch, 2009), rather than a language deficit per se. Our results support those of Piolino's group (Piolino et al., 2008; Noulhiane et al., 2007, 2008) who have also shown deficits in auto-noetic consciousness in TLE patients, with the additional advantage

of introducing a method that is independent from the retrieval of details. Another advantage of our method is that it does not require self-ratings which frequently fail to show deficits in autobiographical memory in patients with MTL dysfunction (Addis, 2006; Hassabis et al., 2007; St-Laurent, 2007), perhaps because patients' meta-memory is distorted by their deficit or because Likert scales are vulnerable to anchoring differences in clinical populations.

In any case, our results indicate that detail retrieval and auto-noetic consciousness are both disrupted by damage to the MTL. It is likely that the retrieval of details, especially those that correspond to sequences of actions and to rich sensory details, facilitates the vivid re-living of the past. With the current study, we also demonstrate that a simple linguistic construct, the HP, is sensitive enough to reveal auto-noetic consciousness deficits in a clinical population, and we validate its use as a measure of recollection that reflects both the subjective re-living of an event and, indirectly, its detailed recollection.

The HP tense is commonly exploited by storytellers to make their stories richer and more vivid (Menn, O'Connor, Obler, & Holland, 1995). The HP tense most likely serves a dual purpose of indexing a narrator's recollective experience and evoking a vivid experiential component onto a listener by making the past immediate. It is doubtful, though possible, that our normal controls consciously exploited the HP tense for the purpose of evoking a vivid experience of the event for the listener, whereas our patients lacked the insight or motivation to do this. We believe that it is more likely that the HP was unconsciously employed when participants re-experienced that moment vividly.

The HP is not the only linguistic construction that is sensitive to memory loss. For example, Duff et al. (2007, 2009) reported that patients with memory loss caused by MTL damage have less imaginative use of language: fewer reports on past conversations (Duff et al., 2007) and fewer playful interactions and teasing (Duff et al., 2009). They proposed that these subtle deficits with interactional forms of communication occur because binding processes that are necessary for recollection are also needed for the formation of new associations between nodes to create novel expressions and imaginative events (Hassabis et al., 2007). MacKay et al. (2007), who hold similar views, noted that H.M. tended to rely on clichés and familiar interjections (e.g., Oh, boy!) to fill in the conversational gaps. These studies and ours indicate that examining linguistic usage may not only illuminate different aspects of episodic memory and contribute to memory theory, but also suggests how memory influences language.

In summary, we show that the phenomenological sense of re-experiencing the past is reflected in the use of the HP tense in autobiographical narratives. This linguistic construction underscores the sense of immediacy associated with recollective experience. Documenting its usage sheds light on nature of recollection in healthy people and individuals with damage to the medial temporal lobe by providing an objective measure of the subjective experience of recollection, which complements other measures of memory content currently in use.

## Acknowledgements

We thank Lisa Cauchi for transcribing the interviews, Michael Tau for scoring, Keith Scarola for his help with coding, Darlene Floden for recruitment, Donna Addis for sharing previous data, and all our participants. This project was supported by grants from the Canadian Institute for Health Research (CIHR) to MM and Gordon Winocur, and from Physicians Services Inc (PSI) to MPM. LP and MSt-L were supported by postdoctoral fellowships from the Rotman Research Institute and by a graduate scholarship from the National Science and Engineering Council of Canada (NSERC), respectively.

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