On the Same Wavelength: The Impact of Other-Generated Cues on the Reported Retrieval Processes and Qualities of Autobiographical Memories

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Abstract

In autobiographical memory cuing studies, self-generated retrieval cues lead to fast, effortless retrieval of rich memories. In everyday life, retrieval cues may often be provided by other people. We compared self-generated cues to other-generated cues, in terms of their impact on retrieval processes and memory qualities. In Experiment 1, participants were romantic couples. In Experiment 2, participants were pairs of strangers. Participants generated personalised cues (people, places) either for themselves or their experimental partner. Participants then retrieved autobiographical memories to personalised and generic cues. For couples, both self- and other-generated cues yielded higher rates of direct retrieval and richer memories than generic cues. For strangers, other-generated cues were less effective than self-generated cues and yielded less rich memories. Findings support the possibility that close family and friends have a particular ability to cue our memories, by providing us with autobiographically-relevant cue content that yields fast, effortless, and rich remembering experiences.

Keywords: autobiographical memory, direct retrieval, retrieval cues, relationships

General Audience Summary

Retrieving the memory of a specific event from our life can be cognitively demanding, and gets more challenging as we get older. However, research suggests that the cues or prompts that initiate retrieval are important in determining the processes involved in memory retrieval as well as how rich the recalled memories are. Particularly, research has shown that the processes of retrieval are made easier and the memories recalled are richer when people are provided with personalised cues, relevant to their life, that they have generated for themselves, such as names of familiar people and places. In the current research, we tested whether other people can be sources of effective memory cues for each other. In Experiment 1, we compared retrieval processes and memory qualities when people generated their own cues vs. received cues generated for them by their romantic partner. In Experiment 2, we compared retrieval processes and memory qualities when people generated their own cues vs. received cues generated for them by a stranger. Overall, we found that for intimate couples, other-generated cues were just as effective as self-generated cues, leading to high rates of direct retrieval as well as richer, more vivid recollections. In contrast, other-generated cues from strangers were less effective than self-generated cues. These findings support the idea that people who know us well and have shared our life story with us may have a special ability to cue our memories.

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Successful retrieval of events from autobiographical memory depends on the presence of effective retrieval cues (Tulving, 1974). Cues provide some information at retrieval that matches encoding, re-instating the encoding context to bring a specific memory to mind (Steffens et al., 2003). Such cues can make retrieval more likely: enriched retrieval environments enhance memory performance for older adults who otherwise show retrieval deficits (Robin et al., 2019). In everyday life, memory cues can come from a range of modalities and can be encountered in a variety of ways. The physical environment might remind us of a previous visit to the same place, hearing a song might remind us of another occasion on which we heard it, or our internal emotional state might cue us to think of other times we have felt the same way: that is, memory retrieval is cued by both external and internal cues (Mace, 2004).

Conversations with other people are likely to be a frequent source of external memory cues. We talk about our memories with other people – strangers, acquaintances, and our most intimate family and friends – for a range of meaning-making and relationship-building reasons (Alea & Bluck, 2003; Harris, Rasmussen, & Berntsen, 2014; Hyman & Faries, 1992). Everyday family conversations consist largely of recounting shared and unshared events, recent and distant (Bohanek, Fivush, Zaman, Lepore, Merchant, & Duke, 2009). Sometimes, but relatively rarely outside of the experimental research context, we recall an event from our life because someone else asks us to, via abstract cues such as "tell us a time you showed leadership" in a job interview, or "were you ever bullied at school?" when comforting our child. More often perhaps, our memories are cued incidentally, when we hear the people around us mention concrete cues relevant to our own experiences, such as familiar names, places, and activities (Brown, 2016). Despite the everyday frequency of conversational

memory sharing, little research on autobiographical memory has examined the ways in which *other people* can be sources of memory cues. In the current research, we compared autobiographical memory cues generated by familiar partners (Experiment 1) and unfamiliar partners (Experiment 2) to cues generated by participants for themselves, as well as generic experimenter-provided cues. We examined the impact of other-generated memory cues on reported retrieval processes and resulting memory phenomenology, drawing on prior research on the impact of self-generated cues and extending it to other-generated cues.

Self-Generated Cues

Previous research on memory cuing has noted the power of self-generated cues for enhancing retrieval (Wheeler & Gabbert, 2017). Mantyla (1986) found that participants could accurately recall many hundreds of stimuli when permitted to generate their own cues as reminders. It is perhaps not surprising that self-generated cues enhance later retrieval. There are two possible mechanisms for this benefit (see also Wheeler & Gabbert, 2017). First, benefits for later recall may arise from the process of generating cues itself. Tullis and Benjamin (2015) found that people who generated cues either for themselves or for another person benefited equally from receiving those cues at retrieval, such that the intended target did not influence cue effectiveness. Rather, it was the process of generating cues and receiving them at recall – rather than the content itself – that enhanced memory performance (Tullis & Benjamin, 2015). Alternatively, the mnemonic benefits of self-generated cues may also arise from the personalised, tailored cue content, that provides a better match with people's existing idiosyncratic systems for encoding, storing, and retrieving information than do generic, non-personalised cues (Hunt & Smith, 1996; Wheeler & Gabbert, 2017).

In addition to facilitating recall of laboratory word-list stimuli, self-generated, personally-relevant, idiosyncratic cues have been shown to impact the processes of autobiographical memory retrieval. Uzer et al. (2012) developed an autobiographical memory

cuing paradigm in which they compared how often participants reported direct, effortless retrieval versus generative, effortful, search-based retrieval in response to different kinds of cues (see also Uzer & Brown, 2017). Although most theories of autobiographical memory have emphasised generative retrieval as the norm, in recent years multiple studies using Uzer et al.'s (2012) direct retrieval paradigm have shown that direct retrieval is relatively common. Even in response to generic, concrete cues like "book", participants report that about half the time, these cues lead to direct retrieval of a specific memory without the need to search or generate additional information (e.g. Harris & Berntsen, 2019; Harris et al., 2015). Critically, when participants provided their own cues for the memory experiment – names of people and places that were familiar to them – rates of direct retrieval were very high, approximately 80% (Harris & Berntsen, 2019; Uzer & Brown, 2017). These effects of self-generated cues were similar regardless of whether cues were generated immediately prior to the experimental session, or several months prior, suggesting it was the cue content and not the act of generating cues that facilitated direct retrieval (Uzer & Brown, 2017). In addition to shifts in reported retrieval process, self-generated cues also shift the qualities of recalled memories, relative to generic cues. Self-generated cues lead to retrieval of specific memories that are more vivid, personally-significant, and frequently rehearsed than do generic cues (Harris & Berntsen, 2019). These findings show that self-generated, idiosyncratic cues are important for retrieval of autobiographical memories, influencing both the processes involved in bringing a memory to mind as well as the characteristics of recalled memories.

Other-Generated Cues

In the current research, we aimed to determine whether cues generated by another person can impact the processes and qualities of memory retrieval in similar ways to self-generated cues, and whether the nature of the relationship between the cue provider and the cue recipient impacts on cue effectiveness. That is, do other-generated cues influence the

processes and products of autobiographical memory retrieval in the same way as self-generated cues do? If the personally-relevant, distinctive cue content is responsible for the effectiveness of self-generated cues (Hunt & Smith, 1996), then it is plausible that cues containing personalised content could be provided by another person, if they were able to tailor the cue content sufficiently. On the other hand, if the effectiveness of self-generated cues identified in prior studies (Harris & Berntsen, 2019; Uzer & Brown, 2017) resulted from the generation process and the repetition of participant-generated material at retrieval (as in Tullis & Benjamin, 2015), then other-generated cues should be less effective than self-generated cues regardless of their source.

Limited previous research has examined the circumstances under which other people can be sources of effective memory cues. Tullis and Benjamin (2015) found that people can use their shared knowledge and their understanding of other's knowledge to tailor memory cues for others. In their study, participants had to generate cues as reminders for a list of sixty words, either for themselves or for an unknown fellow participant. They found that participants recalled more items when they received cues that were designed "for a fellow participant" than when they received cues that another participant had generated for themself. This suggests that people are sensitive to what others know and can design cues with other people in mind: cues designed for others were more generic and less idiosyncratic than cues participants designed for themselves. However, Tullis and Benjamin (2015) did not directly compare the effectiveness of self-generated and other-generated cues, and they only tested strangers.

Research from the collaborative recall domain suggests some possible circumstances under which other people may be more effective at cuing their retrieval partners' memories. Harris et al. (2013) found that groups of three individuals who jointly encoded a list of words by generating associations to them later remembered more when they collaborated than

groups who encoded separately. Shared encoding increased the extent to which individuals reported explicitly attempting to use shared cues to prompt each others' memory during collaborative recall. Thus, cues from another person are likely to be more effective when they come from someone with whom we shared encoding of experiences, because shared encoding leads to shared associations between to-be-remembered material and potential cues. These associations are less idiosyncratic to a single individual and are instead common to the group, when encoding is actively and meaningfully shared (Harris et al., 2013).

Typically, we share the experiences of our day-to-day life with people we are in relationships with; family, friends, colleagues, and partners. Thus, close partners who have shared the encoding of many experiences may be particularly well-placed to effectively cue each others' memories, via the provision of cues based on shared knowledge and the prompting of joint experiences that both parties remember in common. In a diary study where people recorded events that happened to themselves and their roommates over a 3-month period, Thompson (1983) reported that both recorders and roommates were similarly accurate in recalling the events when provided with the event labels noted by the recorder. This finding suggests that meaningful and relevant autobiographical memory cues can be provided by other people, and these cues have benefits for recall independently of the process of generating them. The potential benefits of shared cues are also consistent with findings that older adults remembered more when they recalled together with their long-term spouse than when they recalled separately, particularly for meaningful autobiographical content (Barnier et al., 2014, 2018; Harris et al., 2014; Harris et al., 2011; Harris et al., 2017). Older couples were able to use their shared knowledge to prompt each other to recall events and information that neither individual would have recalled alone (Barnier et al., 2018). Taken together, these findings support the idea that close relationships and shared experiences enable people to provide effective memory cues for each other. However, prior research has not examined

whether strangers show the same effects, and these studies did not isolate the effects of cues themselves from other aspects of the social environment that could lead to memory benefits. For instance, the social context of remembering with a partner may boost performance by reducing anxiety created by the testing situation for older adults (Feeney & Kirkpatrick, 1996). The communication processes of back-and-forth turn-taking, repetition, prompting, and acknowledging the other person also support memory performance (Harris et al., 2019). In the current research, we isolated *cue content*. Independently of the social context, can people generate effective autobiographical memory cues for each other, similar to the effects of self-generated cues?

The Current Research

We aimed to compare the impact of self-generated and other-generated cues on autobiographical memory retrieval processes and products, to test whether cues from another person are similar to self-generated cues, and to examine whether the relationship between partners and the extent to which they have shared experiences influences cue effectiveness. In order to control other aspects of the social context and the broader range of effective communication strategies that are adopted by intimate partners (Harris et al., 2019), we used the autobiographical memory cuing paradigm developed by Uzer et al. (2012). We aimed to replicate and extend Uzer & Brown's (2017) findings of high rates of effortless, direct retrieval in response to self-generated cues, as well as prior findings showing richer memory qualities in response to self-generated cues (Harris & Berntsen, 2019). Extending Uzer et al.'s procedure, we varied the source of the personalised cues between-subjects: for participants in the Self condition, personalised cues were self-generated as in Uzer & Brown (2017), and for participants in the Other condition, personalised cues were generated by their experimental partner. In Experiment 1, experimental partners were romantic partners; in Experiment 2, experimental partners were fellow undergraduate students who were strangers to each other.

Our primary question was whether self-generated and other-generated cues were similarly effective at yielding direct, rapid retrieval of phenomenologically rich autobiographical memories.

Experiment 1

Method

Participants. We recruited 54 participants for Experiment 1. These participants made up 27 male-female couples, in which one individual was a psychology undergraduate student from Macquarie University, Australia, and the other individual was their romantic partner. These participants were aged between 17 and 53 years (M_{age} = 22.65 years, SD = 6.56). Couples were recruited who had been in a relationship for a minimum of 1 year. Relationship length ranged from 1 and 19 years ($M_{relationship}$ = 4.06 years, SD = 4.79). Undergraduate students participated in this study in return for either course credit or payment of AUD $15, and their partners all received payment of AUD $15. We had two conditions, manipulated between-subjects. Half the participants generated cues for themselves ("Self condition") and half generated cues for their partner ("Other condition") as described below.

Materials. Participants elicited memories in response to 20 cues. Ten cues were the "generic" concrete noun cues used by Uzer et al. (2012; bag, ball, book, bread, car, chair, dog, river, pencil, radio). The other ten cues were "personalised" cues, elicited as per the procedure below. Cues were presented via the ePrime computer program. All analyses reported below were conducted using IBM SPSS Statistics version 26.

Procedure. Our procedure was based closely on that developed by Uzer and Brown (2017). Couples attended the laboratory together, but participants were tested individually throughout the experimental session.

Phase 1. Cue Generation. Participants were seated at desktop computers in separate booths where they could not see or interact with each other. After providing informed

consent, participants were given a sheet of paper with headings “names of people” and “names of places”. The experimenter asked them to generate personalised cues depending on Self/Other condition. For participants in the Self condition, the experimenter asked participants to list the name (first name and surname) of 5 people who had been a part of their life in the last 5 years, and 5 places which had been part of their life in the last 5 years. For participants in the Other condition, the experimenter asked participants to list the names of people and places that had been part of their partner’s life in the last 5 years. As per the method of Uzer et al. (2017), participants were asked not to list immediate family members, generic group labels (e.g. “friends”), their home, the university, or vague locations like a town name. Participants in both conditions were told that they/their partner would later be asked some additional questions about the people and places that were listed, but were not specifically told that they would need to recall autobiographical memories.

While participants completed a filler task, the experimenter created an individualised ePrime program for each participant that included both personalised and generic cues. The generic cues were the same for all participants as listed above. The personalised cues depended on condition: in the Self condition they were the people and places participants had listed for themselves; in the Other condition they were the people and places that the participant’s partner had listed for them. In this way, all participants were presented with 10 generic and 10 personalised cues, but the source of the personalised cues varied between participants assigned to the Self vs. Other condition.

Phase 2. Recall. The experimenter told participants that they would be presented with a series of cues on the computer, and for each one, they should report the first memory that came into their mind in response to this cue. Participants were encouraged to think of specific events, to sample widely from their life, and to try not to repeat events if possible. The experimenter told participants that they should press the spacebar as soon as they had the

event in mind. They would then be prompted to report on its characteristics and to type a brief description of the event into the computer. The experimenter verbally described to the participant the nature of the distinction they would be asked to make for the retrieval processes involved for each event: namely, whether it was recalled via direct or generative retrieval. Participants then commenced the experiment, first by reading written instructions regarding the ratings that closely matched the descriptions given verbally by the experimenter, and then by initiating the presentation of cue words when they were ready.

Each of the cue words was presented in a random order in the centre of the computer screen. Generic and personalised cues were randomly intermingled. When the cue appeared, at the bottom of the screen an instruction reminded participants to "Press the spacebar as soon as you have a memory in mind". If/when participants pressed the spacebar, they were prompted to make an initial, immediate report about the nature of their memory retrieval process. The verbal and written instructions had described the direct vs. generative retrieval distinction to participants as follows, based on Uzer et al.'s (2012) Experiment 3, which avoids defining direct and generative retrieval in terms of effort or time:

> "There are two ways that people can retrieve memories in response to cues: the first is when the cue directly triggers a memory and no additional information needs to be thought about; the second is when the cue does not directly trigger a memory so additional information from one's life is thought about in order to arrive at a specific memory."

For each retrieved memory, participants rated retrieval process. To avoid biasing responses in either direction, we used two versions of the question regarding retrieval mode when participants made their ratings, and we counterbalanced which version participants saw. Half the participants saw the statement "This memory was directly triggered by the cue word so I did not have to use information about my life to help me recall this memory", and the

response instruction “If the statement above is true for how you retrieved this memory, please press ‘Y’. If you thought about other information and considered its content before a memory could be brought to mind, please press ‘N’.” The other half of the participants saw the statement “This memory was not directly triggered by the cue word so I had to use information about my life to help me recall this memory” and the response instruction “If the statement above is true for how you retrieved this memory, please press ‘Y’. If you didn't think about other information, and the cue word directly triggered the memory, please press ‘N’.” In both counterbalancing conditions, responses were coded such that 1 = direct and 0 = generative retrieval.

After answering this initial question, participants then typed a brief description of the event into a free response box. Then, participants reported how old they were in years at the time of the event, and rated on 7-point Likert scales their confidence in the memory's accuracy (1 = *happened not at all as remembered*, 7 = *happened exactly as remembered*), the clarity of the memory (1 = *not at all clear*, 4 = *somewhat clear*, 7 = *extremely clear*), personal importance of the event (1 = *not at all important*, 4 = *somewhat important*, 7 = *extremely important*), how often they had recalled the event previously (1 = *not rehearsed at all*, 4 = *somewhat rehearsed*, 7 = *rehearsed a great deal*), positive emotionality (1 = *not at all positive*, 7 = *highly positive*), negative emotionality (1 = *not at all negative*, 7 = *highly negative*), field visuospatial perspective (1 = *not at all through my own eyes*, 7 = *very much through my own eyes*), and observer visuospatial perspective e (1 = *not at all as an outside observer*, 7 = *very much as an outside observer*).

If participants did not press the spacebar in response to an item, that item timed out after 90 seconds, and the computer automatically proceeded to the next item. The procedure was repeated until participants had completed all 20 items. This procedure took approximately 1 hour, although exact durations varied between participants.

Results

Manipulation Checks. Data files from two participants misaligned cue type and elicited memory due to a technical error, so we excluded them from analysis. The remaining 52 participants successfully recalled memories within the time limit to 97.21% of the memory cues, leading to 1009 elicited memories from 1040 presented cues. To examine whether there were differences in successful elicitation of memories, we applied a multilevel model with a binary logistic dependent variable (elicited = 1, not elicited = 0). This model included Self/Other Condition and Cue Type as predictors, as well as their interaction. The model included Participant and Counterbalancing condition as well as their intercepts as random variables, with individual retrieval trials nested under these grouping variables, to account for the multiple memories each participant contributed to the dataset. The multi-level analysis indicated no significant main or interaction effects, *t*s < 1.30, *p*s > .195. Overall, participants successfully recalled memories in response to most of the cues, with 1009 autobiographical memory retrieval trials used for analysis.

To examine whether there were differences in reporting retrieval processes depending on counterbalancing condition, we applied a multilevel model with a binary logistic dependent variable (direct retrieval = 1, generative retrieval = 0). This model included counterbalancing condition as the only predictor (1 = direct retrieval emphasised; 2 = generative retrieval emphasised). The model included Participant as a random variable as well as the intercept, with individual retrieval trials nested under this grouping variable, to account for the multiple memories each participant contributed to the dataset. The multi-level analysis indicated no significant effect of counterbalancing condition, β =0.19, *SE* = 0.28, *t* = 0.70, *p* = .481. That is, whether we asked participants to respond in terms of direct retrieval or generative retrieval did not appear to bias their overall responding rate in either direction,

such that there was no general bias to respond "yes" or "no". Overall, on average, participants reported direct retrieval on 58.89% of retrieval trials, across cues.

Cue Generation. We first examined the content of the personalised cues that participants generated for themselves and for their partner. Following inspection of the cues, we classified them into categories. Cues were coded by two independent raters, with an initial agreement of 89% and disagreements resolved via discussion. For the 5 "people" cues generated by participants in the Partner condition, we found that the majority were specific names of individuals (99.19%). Similarly, the 5 "people" cues generated in the Self condition were all names of specific individuals (100%). For the 5 "place" cues generated by participants in the Partner condition, we found that two-thirds were specific places (e.g. "Canterbury Ice Skating Rink"; 64.66%), one-quarter were Sydney landmarks or famous places (e.g. "Bondi"; 26.72%), and the remainder were generic places (e.g. "gym"; 5.17%), personalised to autobiography (e.g. "brother's house"; 2.59%), and university-based (e.g. university hospital"; 3.45%). For participants in the Self condition, the distribution of cues was similar. The majority were a specific place or address (e.g. "Jim's house", "The Rusty Rabbit Café"; 74.38%), followed by famous places or landmarks (20.66%), and the remainder were generic (2.48%), personalised to autobiography (2.48%) and none were university-based.

Retrieval Processes. Our first research question focused on retrieval processes in response to personalised vs. generic cues, for participants in the Self vs. Other conditions. To test rates of reported direct retrieval, we applied a multilevel model with a binary logistic dependent variable (direct retrieval = 1, generative retrieval = 0). This model included Self/Other Condition and Cue Type as predictors, as well as their interaction. The model included Participant and Counterbalancing condition as well as their intercepts as random variables, with individual retrieval trials nested under these grouping variables, to account for

the multiple memories each participant contributed to the dataset. The multi-level analysis indicated a significant main effect for Cue Type, β =1.22, *SE* = 0.30, *t* = 4.10, *p* < .001, but no main effect of Self/Other Condition, β =0.08, *SE* = 0.39, *t* = 0.20, *p* = .841, and no interaction between them, β = 0.32 *SE* = 0.39, *t* = 0.83, *p* = .410. Personalised cues (*M* = .75, CI = .68-.82) led to a higher proportion of direct retrieval trials than generic cues (*M* = .51, CI = .44-.58), regardless of whether the source of the cues was oneself or one's partner.

To test the relationship the impact of cues on retrieval speed, we applied a multilevel linear model to the time taken for participants to respond to each cue. This model included Self/Other Condition and Cue Type (Personalised vs. Generic) as well as their interaction as fixed factors, and it included Participant, Couple, Item Number, and Counterbalancing condition as well as their intercepts as random variables, with individual retrieval trials nested under these grouping variables, accounting for the multiple memories each participant contributed to the dataset. The multi-level analysis indicated a significant main effect for Cue Type, β =1.04, *SE* = 0.52, *t* = 1.99, *p* = .046, but no main effect of Self/Other Condition, β =1.60, *SE* = 0.95, *t* = 1.68, *p* = .098, and no interaction between them, β =0.32, *SE* = 0.72, *t* = 0.44, *p* = .658. Overall personalised cues resulted in faster retrieval (*M* = 4.33 seconds, CI = 3.38-5.28) than generic cues (*M* = 5.53, CI = 4.58-6.48) regardless of source, although there was large variability between participants.

Qualities of Retrieved Memories. Our second research questions focused on the qualities of recalled memories, and how memory phenomenology might vary depending on the nature and source of the cue. We applied a series of multilevel linear models to reported age, and ratings of clarity, rehearsal, significance, emotion, and visuospatial perspective. These models included included Self/Other Condition and Cue Type (Personalised vs. Generic) as well as their interaction as fixed factors, and included Participant, Couple, Item Number, and Counterbalancing condition as well as their intercepts as random variables, with

individual retrieval trials nested under these grouping variables, accounting for the multiple memories each participant contributed to the dataset. Across analyses, we were interested in the main effect of Cue Type, replicating prior research on the impact of personalised cues, and the interaction between Self/Other Condition and Cue Type, which would indicate a differential impact of self-generated vs. other-generated personalised cues. Table 2 presents descriptives for the Self/Other Condition × Cue Type interaction across quality variables. Where we report significant main effects below, reported means in text are estimated marginal means obtained from the multilevel analysis.

For reported age at the time of the event, the multi-level analysis indicated a significant main effect for Cue Type, β =1.85, SE = 0.75, t = 2.45, p = .014, but no main effect of Self/Other Condition, β =1.78, SE = 1.89, t = 0.95, p = .348, and no interaction between them, β =0.82, SE = 1.05, t = 0.78, p = .435. Personalised cues (M = 21.68, SE = 0.95) led to slightly more recent memories than generic cues (M = 20.24, SE = 0.94), regardless of whether the source of the cues was oneself or one's partner.

For rated memory clarity, the multi-level analysis indicated a significant main effect for Cue Type, β =0.61, SE = 0.12, t = 5.01, p < .001, but no main effect of Self/Other Condition, β =0.17, SE = 0.26, t = 0.67, p = .504, and no interaction between them, β = 0.29, SE = 0.17, t = 1.76, p = .079. Personalised cues (M = 5.30, SE = 0.13) led to retrieval of clearer memories than generic cues (M = 4.84, SE = 0.13), regardless of whether the source of the cues was oneself or one's partner.

For rated memory significance, the multi-level analysis indicated a significant main effect for Cue Type, β =1.08, SE = 0.15, t = 7.10, p < .001, but no main effect of Self/Other Condition, β =0.42, SE = 0.22, t = 1.91, p = .060, and no interaction between them, β = 0.28, SE = 0.21, t = 0.14, p = .892. Personalised cues (M = 4.63, SE = 0.11) led to retrieval of more

personally-significant memories than generic cues (M = 3.57, SE = 0.11), regardless of whether the source of the cues was oneself or one's partner.

For rated memory rehearsal, the multi-level analysis indicated a significant main effect for Cue Type, β =0.96, SE = 0.14, t = 6.92, p < .001, but no main effect of Self/Other Condition, β =0.03, SE = 0.28, t = 0.12, p = .904, and no interaction between them, β = 0.17, SE = 0.19, t = 0.86, p = .390. Personalised cues (M = 3.67, SE = 0.14) led to retrieval of more frequently rehearsed memories than generic cues (M = 2.79, SE = 0.14), regardless of whether the source of the cues was oneself or one's partner.

For rated positive emotion, the multi-level analysis indicated a significant main effect for Cue Type, β =0.74, SE = 0.16, t = 4.54, p < .001, but no main effect of Self/Other Condition, β =0.12, SE = 0.27, t = 0.44, p = .660, and no interaction between them, β = 0.28, SE = 0.23, t = 1.24, p = .215. Personalised cues (M = 5.05, SE = 0.14) led to retrieval of more emotionally positive memories than generic cues (M = 4.45, SE = 0.14), regardless of whether the source of the cues was oneself or one's partner. For rated negative emotion, there were no main or interaction effects, all ts < 0.82, all ps > .418.

For rated field visuospatial perspective, the multi-level analysis indicated a significant main effect for Cue Type, β =0.70, SE = 0.18, t = 3.84, p < .001, but no main effect of Self/Other Condition, β =0.23, SE = 0.29, t = 0.79, p = .433, and no interaction between them, β = 0.47, SE = 0.25, t = 1.86, p = .063. Personalised cues (M = 5.26, SE = 0.15) led to retrieval of memories with a stronger first-person perspective than generic cues (M = 4.79, SE = 0.15), regardless of whether the source of the cues was oneself or one's partner. For rated observer perspective, there were no main or interaction effects, all ts < 0.55, all ps > .589.

In sum, there was a common pattern across most of the memory retrieval and memory phenomenology measures, in which we identified a main effect of Cue Type, replicating previous findings suggesting that personalised cues lead to higher rates of direct retrieval,

faster retrieval, and richer memory qualities than generic cues. Importantly, there were no interactions between Cue Type and Self/Other condition, indicating that across measures, self-generated cues were similar to partner-generated cues.

Table 1. *Frequency of Direct Retrieval by Self/Other Condition and Cue Type in Experiment 1*

Self/Other Condition	Cue Type	Percentage Direct Retrieval
Self	Personalised	75.56%
	Generic	56.92%
Other	Personalised	71.49%
	Generic	47.30%

Table 2. *Qualities of Elicited Memories, By Self/Other Condition and Cue Type in Experiment 1*

Self/Other Condition	Cue Type	Latency (seconds)	Age at Event (years)	Clarity (1-7)	Significance (1-7)	Rehearsal (1-7)	Positive Emotion (1-7)	Negative Emotion (1-7)	Field Perspective	Observer Perspective
Self	Personalised	5.11	20.64	5.32	4.79	3.65	5.08	2.26	5.13	2.90
		(6.34)	(8.24)	(1.52)	(1.80)	(1.84)	(1.87)	(1.83)	(2.18)	(2.23)
	Generic	6.28	19.42	5.01	3.73	2.87	4.63	2.38	4.91	2.83
		(8.46)	(8.45)	(1.71)	(1.87)	(1.78)	(2.02)	(1.82)	(2.25)	(2.14)
Other	Personalised	3.51	22.74	5.20	4.37	3.69	4.98	2.40	5.39	2.91
		(4.76)	(16.30)	(1.44)	(1.74)	(1.75)	(1.83)	(1.79)	(2.04)	(2.15)
	Generic	4.57	20.70	4.59	3.28	2.72	4.22	2.50	4.68	2.98
		(5.33)	(5.22)	(1.68)	(1.83)	(1.68)	(2.13)	(1.86)	(2.29)	(2.21)

Note: values are means across elicited memories, and standard deviations in parentheses.

Experiment 2

In Experiment 1, we replicated previous findings about the impact of self-generated cues on retrieval processes and memory qualities (see Harris & Berntsen, 2019; Uzer & Brown, 2017). Importantly, we found that personalised cues generated by one's romantic partner were similarly effective, and that there were no statistical differences in retrieval processes nor in memory qualities in the Self vs. Other condition. These findings imply that other-generated cues are just as effective as self-generated cues, supporting the conclusion that it is the cue content itself and not the cue generation process that underlies the benefits of personalised cues. However, there were a range of differences in the nature of the personalised vs. generic cues beyond the source. In Experiment 2, we repeated the procedure of Experiment 1 with pairs of strangers instead of intimate couples. We aimed to determine whether cues consisting of people and places are always as effective as self-generated cues regardless of source, or whether other-generated cues are distinct from self-generated cues when partners have limited shared experiences to draw upon.

Method

Participants. We recruited 64 participants for Experiment 2. These participants made up 32 stranger dyads, in which both individuals were psychology undergraduate students from Macquarie University, Australia. These participants were aged between 18 and 29 years (M_{age} = 19.79 years, SD = 2.33). Undergraduate students participated in this study in return for course credit. We had two conditions, manipulated between-subjects. Half the participants generated cues for themselves and half generated cues for their partner as in Experiment 1.

Materials. Participants elicited memories in response to 20 cues. Ten cues were the "generic" concrete noun cues used by Uzer et al. (2012; bag, ball, book, bread, car, chair, dog, river, pencil, radio). The other ten cues were "personalised" cues, idiosyncratic to each participant, elicited as per the procedure below. Cues were presented via the ePrime computer

program. Analyses were conducted using IBM SPSS Statistics version 26.

Procedure. Our procedure was identical to Experiment 1. The only difference between experiments was the nature of the relationship between participants. Participants generated personalised cues. In the Self condition, they generated names of people and places that had been part of their own life in the last 5 years, exactly as in Experiment 1. In the Partner condition, they generated cues for their fellow participant partner who they had met at the outset of the experiment, with the following instructions:

"Before you start the experiment, we would like you to generate some information for your paired partner for today. Based on what you can tell about your partner, like what they look like, as well as the fact that they are also studying psychology this year at this university, and you both live in Sydney, we would like you to generate some information. Specifically, we want you to think of people and places that could have been part of your partner's life within the last 5 years." As in Experiment 1, participants in both conditions were told that they/their partner would later be asked some additional questions about the people and places that were listed, but were not specifically told that they would need to recall autobiographical memories.

In the Recall phase, all participants recalled and rated autobiographical memories in response to 20 cue words. Half of the cues were generic, experimenter provided, and the same for all participants. As in Experiment 1, half were personalised cues, the source of which depended on condition: in the Self condition, personalised cues were the people and places participants had listed for themselves; in the Partner condition, personalised cues were the cues that participants' stranger partner participant had generated for them. The presentation of cues and rating measures was as in Experiment 1.

Results

Manipulation Checks. The 64 participants successfully recalled memories within the time limit to 98.8% of the memory cues, leading to 1264 elicited memories from 1280 presented cues. To examine whether there were differences in successful elicitation of memories, we applied a multilevel model with a binary logistic dependent variable (elicited = 1, not elicited = 0). This model included Self/Other Condition and Cue Type as predictors, as well as their interaction. The model included Participant and Counterbalancing condition as well as their intercepts as random variables, with individual retrieval trials nested under these grouping variables, to account for the multiple memories each participant contributed to the dataset. The multi-level analysis indicated no significant main or interaction effects, *t*s < 1.07, *p*s > .287. Overall, participants successfully recalled memories in response to most of the cues, with 1264 autobiographical memory retrieval trials used for analysis.

To examine whether there were differences in reporting retrieval processes depending on counterbalancing condition, we applied a multilevel model with a binary logistic dependent variable (direct retrieval = 1, generative retrieval = 0). This model included counterbalancing condition as the only predictor (1 = direct retrieval emphasised; 2 = generative retrieval emphasised). The model included Participant as a random variable as well as the intercept, with individual retrieval trials nested under this grouping variable, to account for the multiple memories each participant contributed to the dataset. The multi-level analysis indicated a significant effect of counterbalancing condition, $\beta = 0.49$, $SE = 0.18$, $t = 2.78$, $p = .006$. Participants who received the rating that prioritized direct retrieval reported higher rates of direct retrieval ($M = .60$, CI = .53-.66), than those who received the rating that prioritized generative retrieval ($M = .47$, CI = .42-.53). That is, the way in which we asked participants to report the retrieval type did appear to influence their response rates unlike in Experiment 1. There were equal numbers of participants in each counterbalancing across the self and partner conditions; thus, this potential "yes" bias should not have influenced any

differences between conditions. However, as in Experiment 1, we accounted for counterbalancing condition as a random factor in all analyses below. We return to issues with self-reporting retrieval processes in the Discussion. Overall, on average, participants reported direct retrieval on 53.40% of retrieval trials, across cues.

Cue Generation. We first examined the personalised cues that participants generated for themselves and for their fellow-participant partner. Following inspection of the cues, we classified them into categories. Cues were coded by two independent raters, with an agreement of 85% and disagreements resolved via discussion. For the 5 "people" cues generated by participants in the Partner condition, we found that the majority were classified as generic (e.g. "sibling", "parent", "mum"; 66.25%), followed by cues personalised to autobiography (e.g. "most disliked teacher", "someone you fell out with"; 25.00%). The remaining few were based on university experiences (e.g. "our psychology lecturer"; 6.25%) or names of famous people (e.g. "Beyonce"; 2.50%). No cues generated in the Partner condition were the names of specific individuals apart from famous people. On the other hand, the 5 "people" cues generated in the Self condition were mostly names of specific individuals (91.50%), with a handful of generic cues (7.84%). For the 5 "place" cues generated by participants in the Other condition, we found that they were most commonly generic (e.g. "beach" "home"; 39.62%), with the remainder spread across cues personalised to autobiography (e.g. "your childhood home"; 20.13%), university-based cues (e.g. "university bar"; 22.64%), and famous places or Sydney landmarks (e.g. "Hyde Park" "Paris"; 17.61%). No cues generated in the partner condition were specific places or addresses. For participants in the Self condition, half the cues were a specific place or address (e.g. "Jim's house", "The Rusty Rabbit Café"; 50.66%), followed by Sydney landmarks or famous locations (26.32%). The remainder were spread across generic cues (10.53%), cues personalised to autobiography (2.63%), and university-based cues (8.55%). Thus, there were

marked differences in the cues generated for oneself vs. a fellow participant, consistent with participants successfully reflecting on sources of meaningful cues for their partner in the study despite their lack of shared experiences to draw on (see also Tullis & Benjamin, 2015).

Retrieval Processes. Our first research question focused on retrieval processes in response to personalised vs. generic cues, for participants in the Self vs. Other conditions. To test reported direct retrieval, we applied a multilevel model with a binary logistic dependent variable (direct retrieval = 1, generative retrieval = 0). This model included Self/Other Condition and Cue Type as predictors, as well as their interaction. The model included Participant and Counterbalancing condition as well as their intercepts as random variables, with individual retrieval trials nested under these grouping variables, to account for the multiple memories each participant contributed to the dataset. This analysis yielded a significant main effect of Self/Other Condition, β =0.55, *SE* = 0.23, *t* = 2.39, *p* = .017, and a significant main effect of Cue Type, β =0.49, *SE* = 0.0.15, *t* = 3.26, *p* = .001, but no interaction between them, β = 0.37, *SE* = 0.29, *t* = 1.28, *p* = .200. Personalised cues (*M* = .62, CI = .56-.67) led to a higher proportion of direct retrieval than generic cues (*M* = .45, CI = .40-.50). Participants in the Self condition (*M* = .58, CI = .51-.64) had a higher proportion of direct retrieval than participants in the Other condition (*M* = .49, CI = .44-.54).

To test the relationship the impact of cues on retrieval speed, we applied a multilevel linear model to the time taken for participants to respond to each cue. This model included Self/Other Condition and Cue Type (Personalised vs. Generic) as well as their interaction as fixed factors, and it included Participant and Counterbalancing condition as well as their intercepts as random variables, with individual retrieval trials nested under these grouping variables, accounting for the multiple memories each participant contributed to the dataset. The multi-level analysis indicated no significant main effect of Cue Type, β =0.03, *SE* = 0.74, *t* = 0.04, *p* = .969, nor Self/Other Condition, β = 1.95, *SE* = 1.23, *t* = 1.59, *p* = .116. However

there was a significant interaction between them, β =2.67, *SE* = 2.57, *t* = 2.57, *p* = .010. Estimated marginal means indicated that generic cues led to similar retrieval speed regardless of Self/Other condition, (*M* = 8.65 seconds, CI = 6.93-10.38, and *M* = 7.93, CI = 6.21-9.66, respectively). However, for personalised cues, those in the Self condition (*M* = 5.96, CI = 4.23-7.68) had faster retrieval than those in the Other condition (*M* = 7.90, CI = 6.18-9.23).

Qualities of Retrieved Memories. Our second research questions focused on the qualities of recalled memories, and how memory phenomenology might vary depending on the nature and source of the cue. We applied a series of multilevel linear models to reported age, and ratings of clarity, rehearsal, significance, emotion, and visuospatial perspective. These models included included Self/Other Condition and Cue Type (Personalised vs. Generic) as well as their interaction as fixed factors, and included Participant and Counterbalancing condition as well as their intercepts as random variables, with individual retrieval trials nested under these grouping variables, accounting for the multiple memories each participant contributed to the dataset. Across analyses, we were interested in the main effect of Cue Type, replicating prior research on the impact of personalised cues, and the interaction between Self/Other Condition and Cue Type, which would indicate a differential impact of self-generated vs. other-generated personalised cues. Table 4 presents descriptives (raw means and standard deviations) for the Self/Other Condition × Cue Type interaction across quality variables. Where we report significant main or interaction effects below, reported statistics in text are estimated marginal means and 95% confidence intervals obtained from the multilevel analysis.

For reported age at the time of the event, the multi-level analysis indicated a significant main effect for Cue Type, β =1.16, *SE* = 0.31, *t* = 3.73, *p* < .001, but no main effect of Self/Other Condition, β =0.99, *SE* = 0.62, *t* = 1.59, *p* = .118, and no interaction between them, β = 0.08 *SE* = 0.44, *t* = 0.19, *p* = .854. Personalised cues (*M* = 17.11 years old,

CI = 16.48-17.73) led to more recent memories than generic cues (*M* = 15.90, CI = 15.28-16.53), regardless of whether the source of the cues was oneself or one's partner, similar to Experiment 1.

For rated memory clarity, the multi-level analysis indicated a significant main effect for Self/Other condition, β = 0.56, *SE* = 0.23, *t* = 2.41, *p* = .018, but no main effect of Cue Type, β =0.22, *SE* = 0.12, *t* = 1.82, *p* = .068. However, there was a significant interaction between Self/other Condition and Cue Type, β = 0.47, *SE* = 0.17, *t* = 2.80, *p* = .005. When cues were generic, there was no difference between clarity ratings in the Self vs. Other condition (*M* = 4.93, CI = 4.60-5.25, and *M* = 4.84, CI = 4.51-5.17, respectively). However, when cues were personalised, memories recalled in the Self condition were rated as clearer (*M* = 5.62, CI = 5.29-5.94) than those recalled in the Other condition (*M* = 5.06, CI = 4.73-5.38).

For rated memory significance, the multi-level analysis indicated a significant main effect for Cue Type, β =0.55, *SE* = 0.14, *t* = 3.99, *p* < .001, and a main effect of Self/Other Condition, β =0.74, *SE* = 0.27, *t* = 2.74, *p* < .001, moderated by a significant interaction between them, β = 0.76, *SE* = 0.19, *t* = 3.88, *p* < .001. When cues were generic, there was no difference between significance ratings in the Self vs. Other condition (*M* = 3.53, CI = 3.15-3.91, and *M* = 3.54, CI = 3.16-3.92, respectively). However, when cues were personalised, memories recalled in the Self condition were rated as more significant (*M* = 4.84, CI = 4.46-5.22) than those recalled in the Other condition (*M* = 4.10, CI = 3.72-4.48).

For rated memory rehearsal, the multi-level analysis indicated a significant main effect of Cue Type, β =0.43, *SE* = 0.13, *t* = 3.28, *p* < .001, and a significant main effect of Self/Other Condition, β =0.47, *SE* = 0.23, *t* = 2.00, *p* = .049, moderated by a significant interaction between them, β = 0.54, *SE* = 0.18, *t* = 2.95, *p* = .003. When cues were generic, there was no difference between rehearsal ratings in the Self vs. Other condition (*M* = 2.91,

CI = 2.58-3.24, and *M* = 2.98, CI = 2.65-3.32, respectively). However, when cues were personalised, memories recalled in the Self condition were rated as more rehearsed (*M* = 3.88, CI = 3.55-4.21) than those recalled in the Other condition (*M* = 3.41, CI = 3.08-3.74).

For rated positive emotion, the multi-level analysis indicated no significant main effect of Cue Type, β = 0.20, *SE* = 0.16, *t* = 1.29, *p* = .199, nor of Self/Other Condition, β = 0.48, *SE* = 0.25, *t* = 1.93, *p* = .057. However, there was a significant interaction between them, β = 0.46, *SE* = 0.22, *t* = 2.09, *p* = .037. When cues were generic, there was no difference between positive emotion ratings in the Self vs. Other condition (*M* = 4.45, CI = 4.10-4.80, and *M* = 4.43, CI = 4.08-4.78, respectively). However, when cues were personalised, memories recalled in the Self condition were rated as higher in positive emotion (*M* = 5.11, CI = 4.76-5.46) than those recalled in the Other condition (*M* = 4.63, CI = 4.28-4.98). For rated negative emotion, there were no main or interaction effects, all *t*s < 0.42, all *p*s > .679, as in Experiment 1.

For rated field visuospatial perspective, the multi-level analysis indicated no main effects or interactions, all *t*s < 1.74, all *p*s > .085. For rated observer perspective, there were no main or interaction effects, all *t*s < 0.82, all *p*s > .417. Overall, memories tended to have a stronger field perspective than observer perspective (see Table 4).

In sum, there was a common pattern across most of the memory retrieval and memory phenomenology measures, in which we identified an interaction between Self/Other condition and Cue Type, in contrast with the findings of Experiment 1. These findings across measures suggested that other-generated cues were less effective than self-generated cues and more similar to generic cues, when participants were strangers to each other.

Table 3. *Frequency of Self Reported Direct vs. Generative Retrieval, by Self/Other Condition and Cue Type in Experiment 2*

Condition	Cue Type	Percentage Direct Retrieval
Self	Personalised	65.94%
	Generic	46.03%
Other	Personalised	56.33%
	Generic	45.05%

Table 4. *Qualities of Elicited Memories, By Self/Other Condition and Cue Type in Experiment 2*

Condition	Cue Type	Latency (seconds)	Age at Event (years)	Clarity (1-7)	Significance (1-7)	Rehearsal (1-7)	Positive Emotion (1-7)	Negative Emotion (1-7)	Field Perspective	Observer Perspective
Self	Personalised	6.13	17.61	5.62	4.82	3.88	5.09	2.57	5.27	3.21
		(8.65)	(4.33)	(1.50)	(1.93)	(1.84)	(2.06)	(2.07)	(2.23)	(2.41)
	Generic	8.82	16.37	4.93	3.50	2.92	4.42	2.60	4.94	3.22
		(11.09)	(5.01)	(1.73)	(1.96)	(1.73)	(2.12)	(1.94)	(2.34)	(2.39)
Other	Personalised	7.98	16.67	5.08	4.09	3.41	4.63	2.47	4.75	3.10
		(10.37)	(4.51)	(1.73)	(2.01)	(1.86)	(2.16)	(1.96)	(2.33)	(2.23)
	Generic	8.01	15.48	4.85	3.52	2.98	4.42	2.43	4.64	2.97
		(10.28)	(4.78)	(1.82)	(2.03)	(1.82)	(2.11)	(1.90)	(2.36)	(2.26)

Note: values are means across elicited memories, and standard deviations in parentheses.

Cross-Experiment Comparison

To address whether the source of other-generated cues influenced retrieval processes , we combined data from participants in the Other condition in Experiment 1, where other-generated cues came from an intimate partner, and participants from the Other condition in Experiment 2, where other-generated cues came from a stranger, acknowledging that any cross-experiment differences must be treated as exploratory since data were not collected within a single experimental block.

To test reported direct retrieval, we applied a multilevel model with a binary logistic dependent variable (direct retrieval = 1, generative retrieval = 0). This model included "Relationship" and "Cue Type" as predictors, as well as their interaction, and it included Participant and Counterbalancing condition as well as their intercepts as random variables, with individual retrieval trials nested under these grouping variables, accounting for the multiple memories each participant contributed to the dataset. This analysis yielded a significant main effect of Relationship, β =1.22, SE = 0.30, t = 4.00, $p < .001$, and a significant main effect of Cue Type, β =0.51, SE = 0.15, t = 3.30, p = .001, moderated by a significant interaction between them, β = 0.71, SE = 0.33, t = 2.13, p = .034. When cues were generic, Couples reported slightly higher rates of direct retrieval than Strangers (M = 0.55, CI = 0.45-0.65, and M = 0.43, CI = 0.36-0.50, respectively). However, when cues were personalised, Couples in Experiment 1 had much higher rates of direct retrieval (M = 0.81, CI = 0.71-0.88) than Strangers in Experiment 2 (M = 0.55, CI = 0.48-0.62).

Discussion

Our aim was to test whether cues from another person could impact autobiographical memory retrieval processes and qualities in the same way as cues generated by oneself (Uzer & Brown, 2017; Harris & Berntsen, 2019). We also aimed to test whether the relationship

between the person generating the cue and the person receiving the cue impacted on the cue's effectiveness via a between-experiment comparison. Overall, in Experiment 1, we found that cues generated by a romantic partner yielded similar rates of rapid, direct retrieval as cues generated by oneself. Moreover, memories recalled in response to cues from a romantic partner were similarly clear, personally-significant, rehearsed, and emotionally positive as memories recalled in response to cues generated by oneself. Therefore, across measures, memories retrieved to a romantic partner's cues were generally no different from memories recalled in response to one's own self-generated cues. This was not the case when the person generating the cues was a stranger instead of a romantic partner: in Experiment 2, cues generated by a stranger were still more effective than generic experimenter cues, but not as effective as cues generated by oneself in terms of retrieval speed, and the qualities of the retrieved memory. These findings were further supported by an exploratory cross experiment comparison suggesting differences between other-generated cues from a romantic partner and cues from a stranger in terms of their impact on retrieval processes. Overall, these results suggest that couples' shared knowledge may increase the likelihood that they recall memories directly and rapidly, without effort or search, and with rich memory phenomenology, when they remember the past in conversation with each other.

Our findings replicate and build upon recent findings on the prevalence and phenomenology of direct retrieval in autobiographical memory (Barzykowski & Staugaard, 2015; Harris et al., 2015; Harris & Berntsen, 2019; Uzer et al., 2012; Uzer & Brown, 2017). Consistently, and across varying methodologies and ways of asking participants to report, participants experience high rates of direct retrieval in autobiographical memory cuing studies, such that they do not need to search for memories but instead, specific events come directly to mind in response to the cue. As in prior studies, self-generated cues, relevant to one's own autobiography, led to higher rates of direct retrieval than generic nouns more

typically used in autobiographical memory cuing studies (Harris & Berntsen, 2019; Uzer & Brown, 2017). Importantly, our findings add a new condition under which direct retrieval is more likely, beyond self-generated cues. Namely, when cues are generated by one's intimate partner, rates of direct retrieval are just as high as for self-generated cues.

Our finding of the potential effectiveness of other-generated cues demonstrates that it is not the act of generating cues per se which enhances retrieval, but instead it is the personalised cue content, relevant to one's autobiography and past experiences which results in high rates of direct retrieval. Our close friends, family, partners and colleagues are the people who are able to provide these cues for us. These results are consistent with Uzer and Brown's (2017) findings regarding the impact of self-generated cues. In their study, self-generated cues were familiar names and places, argued to provide fragments of event-specific knowledge which facilitated direct access to specific events. Since this event-specific knowledge is shared in common across intimate groups who share experiences and many aspects of their autobiographies, these groups can provide effective cues for each other. In our study, we directly asked partners to generate cues designed for the other person. We did note that couples sometimes generated cues in common, by chance, in both the Self and Other conditions. Future research could examine whether one partner's cues are effective when provided to another partner, indicating an overlap in their event specific knowledge.

Previous research has reported that older couples are able to facilitate each others' memory performance when they collaborate, especially for memory tasks related to their shared autobiographical history (Barnier et al., 2018; Harris et al., 2017). These findings are in contrast to the effects of collaboration in groups of strangers, where recall is typically inhibited (for reviews see Harris et al., 2008; Marion & Thorley, 2016). The current findings suggest a mechanism by which conversation in intimate groups can facilitate performance for personally-relevant, autobiographical information. That is, conversations between intimates

are rich with personalised cues and autobiographical information, which may lead autobiographical events to come directly to mind without the need for executively-demanding generative search prior to successful retrieval (Harris & Berntsen, 2019). Future research could examine the experience of direct retrieval within conversations, extending beyond the individual cuing paradigm adopted here to examine more naturalistic cuing contexts in which cues are encountered incidentally within conversation.

The facilitation of direct retrieval instead of generative retrieval may be particularly relevant to the memory performance of older adults, who have difficulty with executively demanding memory tasks (Luo & Craik, 2008; Martinelli et al., 2013). Recent research on spontaneous remembering found that older adults do not show the typical age-related "episodic deficit" when their remembering is spontaneous (Jordão et al., 2020). This suggests that personal cues – either self-generated or provided by a close other – might be able to increase access to specific autobiographical memories for older adults, by increasing the likelihood of direct retrieval. Future research could examine age differences in direct and generative retrieval in response to different cues to examine this possibility.

There were a range of limitations which could be addressed in future research. Most importantly, future research is needed to compare different kinds of cue content. For couples, we used the same instructions as Uzer and Brown (2017), asking them to generate names of specific people and places. For strangers, we gave participants in the Other condition modified instructions, asking them to list "specific people" but not names. These differences were required since strangers by definition would not know the names of specific people. Future research could compare more and less specific content from different sources, as well as personalised content beyond people and places. In addition, we relied on self-report of retrieval processes, and it is not clear whether people can accurately reflect on whether they engaged in direct or generative retrieval. The challenges of relying on self-report were

evident in Experiment 2, where counterbalancing how we asked people to make this rating influenced the results. However, other research has typically found that asking people to rate retrieval processes using a range of different wordings that emphasise different aspects makes little difference to rates of reported direct retrieval (Uzer et al., 2012; Harris & Berntsen, 2019). Moreover, our results were similar when considering retrieval speed as an objective measure of retrieval processes. Future research could examine further the impact of different ways of asking participants to make judgements about their retrieval processes, as well as identify additional objective measures of these processes and how they align with self-report.

In summary, our research replicated previous findings showing presenting participants with self-generated, personally-relevant cues yields high rates of reported direct, effortless, rapid retrieval, and results in memories that are clearer, more personally significant, more rehearsed, and more positive. Novel to the current research, we found that cues generated by a romantic partner yielded similar effects to cues generated by oneself, in terms of both rates of direct retrieval and in memory qualities. Cues from a stranger were more effective than generic cues, but less effective than self-generated cues, suggesting that partners with shared knowledge are particularly able to cue each others' memories. These findings support the conclusion that it is the autobiographically-relevant cue content that facilitates fast, effortless, and rich remembering, rather than the process of generating cues for oneself. Moreover, direct retrieval of rich memories is likely to be a frequent experience in everyday remembering contexts, as we reminisce in the company of our friends and family, surrounded by meaningful cues.

Author Contributions

CBH and ARO jointly conceived of the research project and developed the hypotheses and methods. CBH collected the data with research assistants, and conducted the data analysis, with advice from ARO. CBH drafted the manuscript. Both authors edited and approved the final version of the manuscript.

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