Running head: MEMORY SPECIFICITY AND DETAIL

Specificity and detail in autobiographical memory retrieval: A multi-site (re)investigation.

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Abstract

This investigation examined conflicting suggestions regarding the association between problems retrieving specific autobiographical memories and the tendency to retrieve the details of these memories. We also examined whether these tendencies are differentially related to depression symptoms. U.S., Belgian, Hong Kong and Japanese participants retrieved memories related to cue words. Responses were coded for if they referred to a specific event (i.e., an event lasting less than 24 hours) and their details (What? Where? Who?). Across sites, and in meta-analyses, the retrieval of more specific memories was associated with retrieval of more details. Memories that were specific included more detail than non-specific memories. Across sites, retrieval of more specific memories and more detail was associated with less severe depression symptoms. Episodic specificity and detailedness are related but separable constructs. Future investigations of autobiographical memory specificity, and methods for alleviating problematic specificity, should consider measures of episodic detailedness.

Keywords: autobiographical memory; episodic specificity; episodic detail; memory specificity; depression; meta-analysis; detailedness

Introduction

Problems recalling specific autobiographical events have been found amongst people with a range of psychiatric disorders, including Major Depressive Disorder (Farina et al., 2019). These problems can also predict disorder emergence (Kleim & Ehlers, 2008) and a worsening of symptoms over time (Sumner et al., 2010). They are typically operationalised as the number or proportion of specific events – i.e. personally experienced events lasting less than 24 hours – that people retrieve from memory (Griffith et al., 2012). The level of detail in autobiographical memories also appears to be reduced in clinical depression (Söderlund et al., 2014), although there is relatively less research in this regard. These two dimensions of autobiographical thinking, specificity and detail, have largely been studied separately in research, but appear to have convergent associations with other psychological and behavioural variables. For example, studies have indicated that producing relevant and effective steps when problem-solving is related to higher specificity (Goddard et al., 1996; Marx et al., 1992) and higher detailedness (Madore & Schacter, 2014; McFarland et al., 2017) while social support is related to higher specificity (Barry, Vinograd, et al., 2019; Chiu et al., 2019) and the intention to engage in social interactions with higher levels of episodic detail (Gaesser et al., 2017). In addition, neuroimaging studies also indicate that specific memory retrieval activates the same brain areas associated with the retrieval and re-experiencing of sensory-perceptual and contextual details (Barry et al., 2018; Levine et al., 2004). This supports the intuitive assumption that people that can recall more event-specific memories are likely to recall more episodic details too and that specific memories are experienced as particularly detailed compared to non-specific memories.

As noted, surprisingly little empirical research to date has examined whether specificity and detail are correlated. In a recent study, Kyung et al. (2016) administered the widely used cue-word behavioural task, the Autobiographical Memory Test (AMT)(Williams

& Broadbent, 1986) to a large, community sample. They coded the responses for specificity and for detail using a coding scheme for episodic (internal) details similar to that which is used within the Autobiographical Interview (Levine et al., 2002). They reported that higher proportions of specific responses did not correlate with higher detail within specific responses. They also found that reduced specificity was related to higher depressive symptoms, as previously found, but that higher detailedness uniquely predicted worse depression symptoms (Kyung et al., 2016). Another study, by Habermas and Diel (2013), also reported no correlation between specificity of a memory and detail. Notably though, they used an ordinal scale of specificity ratings not used elsewhere, and their separate detail ratings for person, place, and time failed to correlate with one another, suggesting they were not assessing an underlying factor of episodic detail. Regardless, these findings contrast with theoretical suggestions that specific memories are characterised by rich details that distinguish them from other events and life-periods stored in memory (Conway & Pleydell-Pearce, 2000) and the converging neurological and behavioural evidence cited above. They also contrast with the notion that failure to retrieve specific memories could be due to avoidance of details (Williams et al., 2007). lnterventions for deficits in specificity commonly train people to recall specific past events, and presume that one aspects that makes this effective is eliciting rich episodic detail (Barry, Sze, et al., 2019; Raes et al., 2009). If these constructs are independent, then this approach may be somewhat contra-indicated, and different remediation strategies would be needed. Given the implications of this for clinical practice, replication and extension of previous findings is warranted.

The present investigation therefore replicated methodology from Kyung et al. (2016) in terms of the memory measures and coding schemes used, and examined the relations between specificity, detailedness and depression symptoms amongst participants. Our analysis principally explored the association between internal or episodic details and the

tendency to retrieve specific memories. In addition, building on the coding framework proposed by Levine et al. (2002) and the analysis conducted by Kyung et al. (2016), our analysis takes the additional step of examining the association between semantic or external details (e.g., general knowledge, metacognitive statements etc.) and autobiographical memory specificity. This analysis intended to establish whether any association between detail and specificity that emerged was unique to episodic detail or whether it was true of all kinds of detail that a participant could report.

This analysis was conducted using samples of data from four countries: The United States (U.S.), Belgium, Hong Kong and Japan. This approach enabled us to assess whether any observed effects were replicable across sets of data gathered using slight variations on the original AMT (e.g., different cue word sets) and, whether these effects were also independent of variations in cultural context that have otherwise been found to influence the way autobiographical memories are reported (Humphries & Jobson, 2012). For example, previous studies have indicated that individuals differ in their specificity on the basis of cultural differences pertaining to independence and interdependence (Jobson, 2009), and that, relative to European Americans, people of Chinese heritage report fewer specific memories (Wang & Conway, 2004) and internal details (Wang et al., 2011, 2018). Therefore, the current study tested for the association between episodic specificity and detailedness, and their association with depression symptoms, whilst also accounting for any potential moderating effect of cultural context in these associations.

Method

Participants

U.S. participants (N = 368) were community-dwelling English-speakers recruited through Mechanical Turk and paid US$1. 77.8% identified as Caucasian (white/European), 4.9%

identified as Asian, 6% identified as Latino or Hispanic, 7.9% identified as African, 3.3% identified as Arab or Middle Eastern, 0.8% identified as *Other*.

Belgian participants (N = 400) were Dutch speaking community-dwellers residing in Belgium and recruited via social media adverts. Participants were entered into a lottery to a win a shopping coupon. Ethnic data were not available for these participants.

Hong Kong participants (N = 272) were undergraduate students from Hong Kong who were native users of Traditional Chinese. Participants received course credit or entry into a cash prize draw involving three prizes of HK$500, HK$300 or HK$200. The study was advertised through a departmental system and flyers placed around campus. Ethnic data were not available for these participants.

Participants in the Japanese sample (N = 314) were Japanese people currently residing in Japan, recruited from a larger participant pool maintained by an online-survey company (Macromill Inc). Participants were invited to participate via email and received an online shopping coupon for participation. Ethnic data were not available.

Samples larger than 270 participants can detect small-to-moderate correlational effects (r = .15) – such as those presented previously (Kyung et al., 2016) – with 80% power and alpha level of .05. Although our samples exceed this threshold, the specific sample size for each country was informed by power analyses for other investigations in which those data were included.

Measures

Depression symptoms

Participants in the Belgian and U.S. samples completed the 21-item version of the Depression Anxiety Stress Scale (DASS; Lovibond & Lovibond, 1995), validated in both of these contexts (Sinclair et al., 2012; Wardenaar et al., 2018) while participants in Hong Kong completed the 42-item version which has also been validated in this cultural context (Wen et

al., 2012). Within both versions there are seven questions assessing to what extent respondents experienced each of seven typical depression symptoms in the past week. Participants respond on four-point scales from zero (*Did not apply to me at all*) to three (*Applied to me very much, or most of the time*). For consistency between the samples only the seven items in common between the 21- and 42-item versions were analyzed. These seven items from the 21-item version have the same psychometric properties as the full version (Antony et al., 1998), and this replicates the depression measure used in Kyung et al. (2016). Internal consistency in each of the samples was good ($\alpha_{u.s.} = .93$; $\alpha_{belgium} = .86$; $\alpha_{hongkong} = .84$).

Participants in Japan completed the 20-item Centre for Epidemiological Studies Depression Scale (CESD; Radloff, 1977) which has been validated in the Japanese context (Umegaki & Todo, 2017). Participants are presented with a range of depression symptoms and they rate how frequently they experienced each of them within the past week from zero (*Rarely or none of the time*) to three (*Most or all of the time*). Internal consistency was good ($\alpha = .83$).

Autobiographical Memory Test (AMT)

The AMT asks participants to recall a memory of an event related to each of several cues. In the U.S., participants were given five negative (*bored*, *failure*, *hopeless*, *lonely*, *sad*) and five positive cues (*happy*, *excited*, *lucky*, *relaxed*, *relieved*), as were Belgian participants (Negative: *mad* (*boos*), *hurt* (*gekwetst*), *angry* (*kwaad*), *awkward* (*onhandig*), *disillusioned* (*ontgoocheld*); Positive: *pleasant* (*aangenaam*), *interested* (*belangstellend*), *proud* (*trots*), *social* (*sociaal*), *enthusiastic* (*enthousiast*)) and Hong Kong participants (Negative: *alone* (孤單), *desperate* (絕望), *jealous* (妒忌), *ashamed* (羞恥), *failed* (失敗); Positive: *confident* (有信心), *capable* (能幹), *success* (成功), *surprised* (驚喜), *satisfied* (滿足)). Participants in Japan were given 27 cues: eight neutral (*trip* (旅), *phone* (電話), *train* (電車), *television* (テ

レビ), *school* (学校), *garden* (庭), *shop* (店), book (本)), 12 positive (*grateful* (感謝した), *completed/achieved* (完成した), *pleasurable* (楽しい), *enthusiastic* (熱心な), *cheerful* (陽気な), *funny* (おもしろおかしい), *safe* (安全な), *proud* (誇らしい), *pleasant* (快い), *passionate* (熱中した), *relaxed* (リラックスした), *worked-hard* (頑張った), *brave* (勇気のある)) and six negative (*ashamed* (恥ずかしい), *unpleasant* (不快な), *bored* (退屈な), *stressful* (ストレスフルな), *lazy* (なまけた), coward (臆病な)).

Procedure

Each study was approved by the relevant ethics committees for that institution and as such each study was performed within the regulations and guidelines for those institutions and their regions (U.S.: HEAG-H 13_2017; Belgium: G 2015 12 419; Hong Kong: EA1705032; Japan: no registration number assigned). Participants in all studies provided informed consent before they completed the study measures, and all measures were completed online.

Participants in all sites completed the AMT online. In the U.S. and Belgium cues were presented using Qualtrics (Qualtrics, 2005). In Hong Kong cues were presented through Inquisit Web (Millisecond Software, 2017). In Japan, the cues were presented using a HTML webform. In each of the studies participants entered their responses in a text box below each cue word. Participants were instructed to retrieve a memory related to each cue word and enter it into the box. There was no time limit. Participants were shown examples of responses, but they were not given instructions to retrieve specific memories.

Memory Coding

Memories were coded for specificity and detailedness. There were five possible specificity codes: *specific* if they referred to a discrete event that occurred in a specific place for 24 hours or less (e.g., for the cue *happy*, a participant might respond ‘when I walked my dog last week’); *categorical* if they referred to an event that occurred on multiple occasions (e.g., ‘The times I walk my dog’); *extended* if they referred to an event that occurred once but over

a period longer than 24 hours (e.g., ‘when I owned a dog’); *semantic associate* if they referred to a concept associated with the cue (e.g., ‘dogs’); and, *omission* if they did not answer. The proportion of specific responses relative to the total number of cues minus the number of omissions was calculated for each participant in accordance with the procedure of Kyung et al. (2016).

Each response was also segmented into informational bits or details. The same standardized coding schemes used in Kyung et al. (2016) and the Autobiographical Interview (Levine et al., 2002), were used in the current study in all samples. In these schemes, a detail is defined as a unique occurrence, observation, or thought. For instance, “I dropped my car keys in the car park last Wednesday” contains three details: an event (dropping the keys), a location (car park), and a time (last Wednesday). Two separate indices for *internal* and *external* details were then coded in accordance with the procedures of Levine et al. (2002) and others that measured internal or episodic detail (Kyung et al., 2016; Roberts et al., 2018). Internal details are those regarding the event (individuals present, weather conditions, physical/emotional actions of participant, reaction of others), time (time of year, season, month, day of week, time of day), place (information on city, street, building, room, part of a room (e.g., near the window)), sensory-perceptual information (auditory, olfactory, tactile, taste, visual and visual details, body position, duration) and thoughts or feelings that occurred during the event. In the previous example regarding keys there were three internal details. External details regard semantic information (general knowledge or facts, ongoing events, extended states of being), repetition or details pertaining to other autobiographical events, as well as metacognitive statements or editorializing. For example, in the previous example, if the person had also responded “In retrospect I wish this had not happened”, then this would count as an external detail.

The mean number of internal and external details was computed for each across all memory types for each participant and the mean number of internal and external details within responses coded as specific was also computed for each participant. We note that for memories that were non-specific 'internal' details were coded using the same scheme (e.g., people, place, actions, thought, feelings), but these details did not have to pertain to one spatiotemporally located event. Although this does not accord exactly to the conceptualization of internal and external detail, this coding scheme was adopted in order to extend upon Kyung et al.'s (2016) analysis, and to analyze these details in relation to depressive symptoms.

U.S. responses were coded by a trained researcher and 300 of these responses were coded by a second researcher. Inter-rater agreement was good for specificity (Kappa = .81) and detailedness indices ($ICC_{internal}$ = .90; $ICC_{external}$ = .83). In the Belgian study, specificity was coded by a trained research assistant and 200 of these responses were second coded by a trained research assistant (Kappa = .73). The third author coded all Belgian responses for detail. Another researcher double coded a subsample of 60 of these responses for detail and agreement for internal details was high (ICC = .89). Both raters agreed that there were no external details in the subsampled responses and so agreement for external details was perfect. In the Japanese study, the sixth and seventh authors and another researcher coded the AMT data for specificity. A set of 200 memories were coded by each of the three coders with good interrater consistency (Kappa = .73). The sixth and seventh authors additionally coded for detail with both coders coding the same subsample of 100 responses ($ICC_{internal}$ = .84; $ICC_{external}$ = .84). In the Hong Kong study, all of the responses were coded by two trained research assistants working together, and disagreements were resolved through discussion. A third researcher coded a subsample of 100 responses to ensure reliability ($Kappa_{specificity}$ = .92, $ICC_{internal}$ = .91; $ICC_{external}$ = .87).

Statistical analysis

In the Belgian dataset, four participants were missing one DASS item, and two participants were missing all seven items. In the U.S. dataset, nine participants were missing one item and one participant was missing all DASS items. There was no missing data in the Hong Kong or Japanese datasets. Participants missing all data on the DASS were excluded from depression analyses. Missing data for other participants was imputed using a person-level mean derived from other available items.

Analyses were conducted using R (3.5.1) (R Core Team, 2020) metafor (Viechtbauer, 2010) and lmerTest (Kuznetsova et al., 2017) packages. The analysis presented here replicates that of Kyung et al. (2016) with some additional analyses examining the relations between specificity, detailedness and depression symptoms in greater depth. First, correlations between specificity, internal details and external details, and the correlations between these variables and depression symptoms (DASS or CESD) were examined within each of the sites. Correlations were performed for both the total number of internal and external details reported across all memory types and also the number of internal and external details reported within specific memories. The former analysis examined whether the tendency to retrieve specific memories was associated with the tendencies to retrieve internal and external details. The latter analysis is a replication of the analysis performed by Kyung et al. (2016), examining whether the retrieval of specific memories was associated with the retrieval of more detail within these memories. We additionally analysed the ratio between internal and total details, and external and total details for the memories in order to control for overall length of responses. These analyses were largely consistent in terms of direction, magnitude, and statistical significance with other internal detail metrics and so are not reported here but are available in the Supplementary Materials (see Tables S1-4).

Second, these data were meta-analysed to examine the size and consistency of the correlations across sites. Raw correlation coefficients were transformed into Z scores using Fisher's *r*-to-*z* transformation. Then, a random-effects model was fitted using a Restricted Maximum Likelihood estimator. A *Z* test tested the extent to which pooled effect sizes differed from zero. Meta-analyses with few studies such as four, as was the case here, can yield unstable heterogeneity estimates but as these estimates can nonetheless be informative, they are presented here. *Tau-squared* and *I-squared* estimates of heterogeneity were generated, and a *Q* test tested whether there was significant between-study heterogeneity.

Thirdly, we examined whether the specificity of a response was associated with the number of internal and external details given within that response. Here we considered specificity as a dichotomous variable contrasting specific vs. non-specific memories (extended and categorical). Two Poisson-family linear mixed models were computed with internal and external details as dependent variables. These models included a random intercept and slope to capture person-level variability in the dependent variables and the effect of specificity on these variables whilst also measuring the fixed effect of specificity on detailedness.

Lastly, to assess for differences based on country, we assessed group differences in the proportion of specific responses and detail using between-groups ANCOVAs, controlling for differences in gender (given the imbalance between samples in the proportion of females). We used the proportion of specific responses as the dependent variable rather than total specific responses, given that there were more cue words in the Japanese sample than the other samples.

To control for type 1 errors, Holm's correction for multiple tests was applied to correlation analyses within groups (Holm, 1979). The false discovery rate procedure (Benjamini & Hochberg, 1995) was used for the meta-analytic tests. All inferential tests

significant at the $p < .05$ level survived this correction. When comparing group differences, Tukey's HSD method was used to control type 1 errors.

Results

Internal details and specificity

There was a positive correlation between the proportion of specific memories recalled and the number of internal details given within the U.S. ($r = .66$, $p < .001$), Belgian ($r = .50$, $p < .001$), Hong Kong ($r = .54$, $p < .001$), and Japanese ($r = .72$, $p < .001$) samples (Figure 1; see also Table S1). In a meta-analysis across the four samples, the pooled effect size was significantly different from zero, $Zr = .713$, $SE = .086$, $p < .001$, 95% CI[.54, .88] with evidence of heterogeneity between sites, $Q(3) = 29.50$, $p < .001$, $\tau^2 = .026$, $I^2 = 89.74\%$.

Correlations between the proportion of specific memories recalled and the number of internal details given *within specific memories* were also positive amongst U.S. ($r = .50$, $p < .001$), Belgian ($r = .38$, $p < .001$), Hong Kong ($r = .31$, $p < .001$), and Japanese ($r = .15$, $p = .007$) participants. In a meta-analysis across the four studies, the pooled effect size was significantly different from zero, $Zr = .357$, $SE = .084$, $p < .001$, 95% CI[.19, .52] with evidence of heterogeneity between sites, $Q(3) = 25.94$, $p < .001$, $\tau^2 = .025$, $I^2 = 88.71\%$.

Generalized linear mixed models predicting internal details suggested that the more specific a participant's response, the more internal detail that they included in their response. This was the case for participants in the U.S., $b = .26$, $SE = .02$, $p < .001$, Belgium, $b = .11$, $SE = .04$, $p < .001$, Hong Kong, $b = .35$, $SE = .03$, $p < .001$, and Japan, $b = .44$, $SE = .03$, $p < .001$.

Participants who were better able to recall specific memories were also better able to recall internal details across all memory types and their specific memories also included more internal detail. The amount of internal detail participants retrieved was also associated with the specificity of their response.

External details and specificity

The results for the correlation between external detail and specificity were mixed with a non-significant positive correlation within the U.S. (r = .09, p = .085), a significant positive correlation in Hong Kong (r = .14, p = .021), a non-significant negative correlation in the Belgian study (r = -.06, p = .231) and a small to moderate, significant, negative correlation in the Japan study (r = -.26, p < .001). As such, in a meta-analysis across the four samples, the pooled effect size was not significantly different from zero, Zr = -.026, SE = .089, p = .770, 95% CI[-.20, .15] and there was evidence of substantial heterogeneity between sites, $Q(3)$ = 29.70, p < .001, τ^2 = .029, I^2 = 90.51%.

The correlations between the proportion of specific memories recalled and the number of external details given *within participants' specific memories* also yielded mixed findings, with significant positive correlations within the U.S. (r = .18, p < .001) and Hong Kong (r = .21, p < .001) samples, a non-significant positive correlation in the Belgian sample (r = .09, p = .072) and a non-significant negative correlation in the Japanese sample (r = -.07, p = .216) samples. Again, within the meta-analysis of these studies, this inconsistency was represented by significant heterogeneity, $Q(3)$ = 13.91, p < .001, τ^2 = .013, I^2 = 79.86%. The pooled effect size did not differ significantly from zero, Zr = .103, SE = .063, p = .103, 95% CI[-.02, .23].

The findings for the generalized linear mixed models predicting external details were also less consistent than those predicting internal details. There was a significant effect of specificity on external details for participants in the U.S., b = -.41, SE = .09, p < .001, Hong Kong, b = -.75, SE = .08, p < .001, and Japan, b = -2.20, SE = .12, p < .001, but not in Belgium, b = -1.01, SE = .85, p = .230. Importantly, the direction of the significant effects was in the opposite direction to those for internal detail, suggesting that the more specific a participant's response, the less external detail they included in their response.

Participants' recall of specific memories was not consistently related to their reports of external details. Some studies reported that the recall of more specific memories was associated with reporting of fewer external details and others reporting the opposite.

The relation between internal and external details

Internal and external details were positively correlated in the U.S. (r = .38, p < .001), Belgian (r = .38, p < .001), Hong Kong (r = .58, p < .001), and Japanese (r = .12, p = .034) analyses. In a meta-analysis across the four dataset, the pooled effect size was significantly different from zero, Zr = .395, SE = .110, p < .001, 95% CI[.18, .61], with evidence of heterogeneity between sites, $Q(3)$ = 42.16, p < .001, τ^2 = .045, I^2 = 93.69%. Participants who reported more internal details also reported by external details.

Similarly, participants who recalled more internal details in their specific memories also recalled more external details in these memories in the U.S. (r = .42, p < .001), Belgium (r = .44, p < .001) and Hong Kong (r = .48, p < .001). However, the correlation in the Japan study was near zero and non-significant (r = .03, p = .596). Despite this inconsistency, the pooled effect size for these correlations differed significantly from zero, Zr = .369, SE = .113, p = .001, 95% CI[.15, .59], with evidence of heterogeneity between sites, $Q(3)$ = 43.96, p < .001., τ^2 = .050, I^2 = 93.97%.

Although there was variability between studies, participants who reported more internal details, across all memories and within specific memories in particular, also reported more external details within their memories.

Relations with depression symptoms

Specificity

There were non-significant negative correlations between specificity and depression symptoms in the U.S. (r = -.08, p = .126), Belgian (r = -.06, p = 231), Hong Kong (r = -.06, p = .324) or Japanese (r = -.09, p = .111) analyses. Nevertheless, the consistency of these

findings meant that the pooled effect size was significantly different from zero, *Zr* = -.074, *SE* = .027, *p* = .007, 95% CI[-.13, -.02], with no evidence of heterogeneity between sites, $Q(3) = 0.228$, $p = .973$, $\tau^2 = 0.00$, $I^2 = 0.00\%$.

Internal details

Again, non-significant negative correlations were evident between internal details and depression symptoms in the U.S. (*r* = -.10, *p* = .055), Belgian (*r* = -.01, *p* = .842), Hong Kong (*r* = -.03, *p* = .622) or Japanese (*r* = -.10, *p* = .077) analyses. However, again the consistency of these findings meant that the pooled effect size was significantly different from zero, *Zr* = -.061, *SE* = .027, *p* = .026, 95% CI[-.11, -.01], with no evidence of heterogeneity between sites, $Q(3) = 2.456$, $p = .483$, $\tau^2 = 0.0$, $I^2 = 0.00\%$.

Correlations were close to zero between internal details reported *within specific memories* and depression symptoms in the U.S. (*r* = -.04, *p* = .444), Belgian (*r* = .04, *p* = .425), Hong Kong (*r* = -.03, *p* = .622) or Japanese (*r* = .03, *p* = .596) analyses. The pooled effect size was not significantly different from zero, *Zr* = .002, *SE* = .028, *p* = .951, 95% CI[-.05, .06] and there was no evidence of heterogeneity between sites, $Q(3) = 1.753$, $p = .625$, $\tau^2 = 0.00$, $I^2 = 0.00\%$.

External details

There was evidence of non-significant correlations between external detail and depression symptoms in the U.S. (*r* = .04, *p* = .455), Belgian (*r* = -.04, *p* = .463), Hong Kong (*r* = .05, *p* = .410) and Japanese (*r* = -.01, *p* = .813) analyses. In meta-analysis, the pooled effect size was not significantly different from zero, *Zr* = .007, *SE* = .027, *p* = .808, 95% CI[-.05, .06], with no evidence of heterogeneity between sites, $Q(3) = 1.768$, $p = .621$, $\tau^2 = 0.00$, $I^2 = 0.00\%$.

There were also non-significant correlations between the number of external details reported *within specific memories* and depression symptoms in the U.S. (*r* = .02, *p* = .776),

Belgian (r = -.05, p = .342), Hong Kong (r = .02, p = .772) and Japanese (r = -.09, p = .120) analyses. The pooled effect size was not significantly different from zero, Zr = -.027, SE = .028, p = .332, 95% CI[-.08, .03] and there was no evidence of heterogeneity between sites, $Q(3) = 2.541$, p = .468, $\tau^2 = 0.00$, $I^2 = 0.00\%$.

To summarise, there was some evidence that retrieving a higher number of specific memories was related to lower depression symptoms and reporting more internal details overall was also related to lower depression symptoms. However, the number of internal details that participants reported within their specific memories and the number of external details that participants reported were not related to their depression symptoms.

Mean Differences Based on Country Group

The results indicated there was an omnibus effect for proportion of specific memories, $F(3, 1346) = 390.2$, $p < .001$, with contrasts indicating the following differences: Belgium sample > U.S. sample > Hong Kong > Japan (all group differences $p < .001$; see also Table S2). The result for internal details *within specific memories* was also significant, $F(3, 1274) = 266.2$, $p < .001$, with contrasts indicating similar group differences (U.S. > Belgium > Hong Kong > Japan, all group differences $p < .001$). The results for internal details across all memories was significant, $F(3, 1343) = 390.3$, $p < .001$, with the same significant differences between groups (U.S. > Belgium > Hong Kong > Japan). The result was also significant for external details *within specific memories*, $F(3, 1274) = 81.1$, $p < .001$, (Hong Kong > U.S. > Japan = Belgium) and for external details for all memories, $F(3, 1341) = 130.9$, $p < .001$, (Hong Kong > U.S. = Japan > Belgium). To summarize, the U.S. and Belgium samples reported higher proportions of specific memories and more internal details compared to the Hong Kong and Japanese samples, whereas for external details the Hong Kong sample consistently reported more than other country groups.

Discussion

Previous research suggests that autobiographical memory specificity and detail are separable constructs that do not correlate with one another and that they have unique associations with depression symptoms (Kyung et al., 2016). The present investigation extends these earlier findings by meta-analysing data from four countries across the world whilst also conducting some novel analyses to examine the relations between specificity and detailedness.

Contrary to earlier findings (Kyung et al., 2016), but consistent with theories (Conway & Pleydell-Pearce, 2000) and neuroscience (Levine et al., 2004), specificity and episodic detailedness were related to one another. This association was evident for the amount of internal (episodic) details reported within specific memories. Unlike previous investigations, we included an analysis of all memory types and not just specific memories. These analyses showed that participants who could retrieve more specific memories also reported more internal detail across all memory types and that memories which were higher in specificity – those referring to a single discrete event – were also richer in internal detail than less specific memories that referred to longer-term or multi-occurrence events. Our findings also build upon those of Kyung et al. (2016) who did not report on associations with external (semantic) details. Our analysis showed inconsistent evidence regarding the association between specificity and reports of external details related to general or unrelated knowledge, or metacognitive statements.

In addition, our findings corroborate those of Kyung et al. (2016) regarding the weak or non-significant association between memory specificity/internal detail and individual differences in depression symptoms. Our findings in this respect were mixed with small correlation coefficients but an overall significant pooled effect size in meta-analysis. Also, these relations only held for participants' overall tendency to retrieve internal details as the correlations with reports of internal details within specific memories were not significant. Again, our study extends upon the findings of Kyung et al. by showing that these associations

were also weak and non-significant for the amount of external detail retrieved. It is of note, however, that Kyung et al. (2016) showed evidence of an association between the amount of internal detail retrieved following neutral cue words – but not positive or negative cue words – and probable depression diagnoses. Only one sample (Japan) in the present analysis included neutral cue words, preventing us from conducting a robust analysis of these neutral cue effects. Furthermore, the self-report depression measures included in the present study, and the sample sizes within each site, prevented us from examining associations with diagnostic status. Nevertheless, these findings are in line with suggestions that autobiographical memory performance is only weakly associated with depression symptoms in community samples (Farina et al., 2019). Given that effects in the current study only emerged in meta-analyses, and given the small magnitude of the association, the clinical relevance of this finding is not clear. As has been indicated previously, the association between autobiographical memory specificity and depression appears to manifest clearly only when comparing people diagnosed with Depression and healthy diagnoses-free samples, suggesting that there may be deficits in memory recall that emerge only when psychopathological processes are fully realised, rather than there being an association with depressive symptoms in a linear, or continuous manner (Farina et al., 2019).

When comparing the countries, the most consistent finding was that the countries from Western cultures reported a higher proportion of specific memories and details in these memories and all memory types compared to the groups from Asian cultures. This replicates previous findings comparing Chinese and European American samples (Wang et al., 2011, 2018; Wang & Conway, 2004), and further extends these differences to a Japanese sample. Although these differences were not the primary focus of this study it has previously been suggested that they may be due to cultural differences in narrative practices in early parent-child interactions, with Euro-American mothers engaging in more highly-elaborated memory

conversations (Wang et al., 2011). However, it must be noted that there were some methological differences across sites (e.g., the number and valence of cues) that prevent us from making conclusive statements about cross-cultural variation in the association between specificity and detail. Future investigations may explore these associations in greater detail by using more standardised procedures.

We note that there were some minor methodological differences between the current study and Kyung et al.'s. Although a different depressive symptom inventory was used in the Japanese sample, we note that this is still a validated and psychometrically robust measure of depression, and the direction and magnitude of correlations with memory dimensions was the same as those in the remaining samples. Another difference was that measures were written online instead of in a booklet. However, it is unclear how this difference could affect the findings presented here.

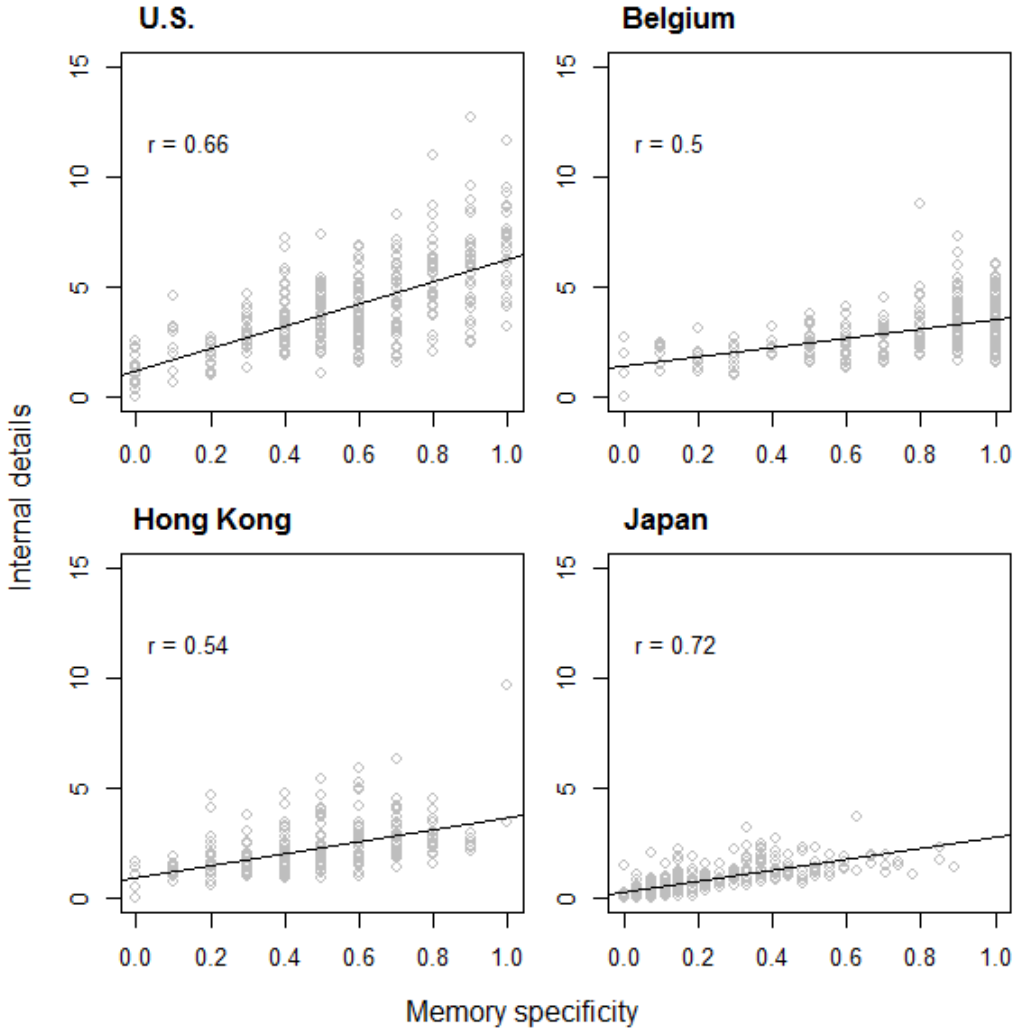
These findings do not suggest that specificity and episodic detailedness are the same construct. Instead, they indicate that problems in recalling specific autobiographical events may be related to difficulties in recalling the episodic details associated with them. This adds further support to Memory Therapeutic interventions, especially as they seek to improve specificity by asking participants to retrieve the details of these memories that make them unique and vivid (Barry, Sze, et al., 2019).

Table 1. Participant Characteristics

	Country/Territory							
	U.S.		Belgium		Hong Kong		Japan	
Variables	*M*	SD	*M*	SD	*M*	SD	*M*	SD
Age (years)	36.5	11.9	29.9	12.8	19.7	3.0	44.6	19.1
Depression Symptoms	12.24	5.68	11.04	4.16	5.12	4.34	14.46	10.67
Memory Specificity	0.60	0.26	0.87	0.20	0.46	0.22	0.26	0.21
Internal Details	4.19	1.99	3.15	1.05	2.16	1.14	0.86	0.65
External Details	0.63	0.65	0.05	0.16	1.08	1.24	0.62	0.32
N	368		400		272		314	
Females (%)	65.2		86.0		74.6		49.4	

Note. The mean and standard deviation (SD) for the proportion of specific memories recalled by participants and the mean amount of internal and external detailedness reported by participants. For U.S., Belgian and Hong Kong studies, depression symptoms were measured using the Depression Anxiety Stress Scale (DASS) and for the Japan study depression symptoms were measured using the Centre for Epidemiological Studies Depression Scale (CESD).

Figure 1. Scatter plots



Note. Internal details (across all memory types) as a function of the proportion of specific memories retrieved by participants in each of the four sites (United States, Belgium, Hong Kong and Japan).

Author contributions

All authors were responsible for designing the study. D.J.H. and S.D. gathered and pre-processed the U.S. data, F.R., E.B. and K.T. gathered and pre-processed the Belgian data, T.J.B gathered and pre-processed the data in Hong Kong, K.T. and Y.N. gathered and pre-processed the data in Japan. E.B. and K.T. prepared the first *R* script. T.J.B. refined the script and conducted the analyses. D.J.H. and T.J.B. wrote the first draft. All authors reviewed subsequent drafts of the manuscript.

Open practices statement

The data and analysis scripts for each site are available at https://osf.io/xrjwn/?view_only=19db49492d98466dae8127309da6faba. The data presented here were part of other investigations and so these studies were not pre-registered.

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