

Trait Emotional Intelligence as an Individual Difference  
in the Effectiveness of (Non) Emotion-Involved Semantic Processing:  
Potential Interplay between Macro- and Micro-Level Emotion  
in Foreign Language Vocabulary Learning and Acquisition<sup>1)</sup>

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**Abstract**

According to the Emotion-Involved Processing Hypothesis (Kanazawa, 2017), emotional elaboration effectively enhances memory formation. Furthermore, it has been reported that the effectiveness of emotional elaboration on memory differs depending on Emotional Intelligence (EmInt), which is one of the psychological constructs of individual learner differences. The present study incorporates trait EmInt as a between-participants factor and investigates whether and how trait EmInt affects second language (L2) vocabulary memory under two conditions: Emotion-Involved Processing (EmInvProc<sup>+</sup>) and non-emotional semantic processing (EmInvProc<sup>-</sup>). Experiment A was implemented in an experimental laboratory setting, whereas Experiment B was implemented in a classroom setting to ensure higher ecological validity and pedagogical applicability. The results of both experiments showed that the EmIntProc<sup>-</sup> performance was significantly worse for low-EmInt students, indicating that low-EmInt learners need to be explicitly elicited to activate and utilize their emotional perception. This will benefit their enhanced cognition and their successful vocabulary retention and acquisition.

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1) This paper is based partly on Kanazawa (2016 b) and Kanazawa (2018 a).

## I. Individual Differences and Emotional Intelligence

Empirical studies have been conducted on the effect of emotion in L2 vocabulary acquisition (Kanazawa, 2016 a; 2017). There is, however, a limitation in these previous studies, i.e., they failed to investigate the effect of individual differences, which are an important factor to consider. Individual differences such as aptitude and personality were one of the biggest targets of inquiry in Second Language Acquisition (cf. Skehan, 2014). As Prior and Kasper (2016) note, “the *individual differences* (ID) literature has perhaps most directly engaged with affect, often grouping it together with attitudinal-motivational variables as part of a larger ‘personality profile’ to explain successful and unsuccessful learning outcomes” (p.5). VanPatten and Benati (2015) even generalize that “any use of affective refers to the ‘personal’ side of things in acquisition” (p.92). Although problems regarding individual difference perspectives have been revealed, and recent research has tended to move away from static perspectives of individual differences toward dynamic systems approach (Larsen-Freeman, 2015), individual differences in emotionality should not be ignored.<sup>2)</sup>

In order to incorporate individual differences of emotionality into an empirical study, it is essential to carefully create an emotion-related index of individual differences. Several examples include neural correlates (Bauer-Wu et al., 2017), the capacity to understand others’ emotions (Pons & Harris, 2005), the capacity to regulate one’s own emotions (John & Gross, 2007), a global versus local processing style (Dijkstra, van der Pligt, & van Kleef, 2014), growth versus fixed mindsets (Yeager & Dweck, 2012), and even a growing environment and family conversation (Dunn et al., 1991). However, these indices are either technically difficult to implement or unsuited to quantitative operationalization.

Auspiciously, one notable concept is emotional individual difference, which has been suitably cultivated and utilized in various research paradigms, and has a high feasibility and practicality. This concept is called Emotional Intelligence (EmInt), and refers to “the subset of social intelligence that involves the ability to monitor one’s own and others’ feelings and emotions, to discriminate among them and to use this information to guide one’s thinking and actions” (Salovey & Mayer, 1990,

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2) Prior and Kasper state the limitation of individual differences (ID) research as follows: “ID research, based on its own definitions, assumes an impossible stability and generalizability of variables across people and contexts” (2016, p.5). Ushioda (2009) criticizes individual differences research as being depersonalized, saying they “may be able to tell us something about certain types of learner in an abstract collective sense. But individual difference research can tell us very little about particular students sitting in our classroom, at home, or in the self-access centre, about how they are motivated or not motivated and why” (pp.215-216).

p.189). EmInt was popularized by Daniel Goleman's eloquent argument on its importance in his best-selling book, *Emotional Intelligence*. For instance, he claims that:

in a sense we have two brains, two minds – and two different kinds of intelligence: rational and emotional. How we do in life is determined by both – it is not just IQ, but *emotional* intelligence that matters. Indeed, intellect cannot work at its best without emotional intelligence. Ordinarily the complementarity of limbic system and neocortex, amygdala and prefrontal lobes, means each is a full partner in mental life. When these partners interact well, emotional intelligence rises – as does intellectual ability. (Goleman, 1995, p.28)

Scientifically, neurological substrates of EmInt have also been reported (Yao et al., 2018), and EmInt has been found to be related to emotion recognition ability (Matthews, Zeidner, & Roberts, 2002).

EmInt was one of the approaches used in positive psychology (Salovey, Mayer, & Caruso, 2002). Now, its importance is widely acknowledged, and it has been applied in various fields ranging from theoretical study to practical study, such as leadership (Goleman, Boyatzis, & McKee, 2013), interpersonal effectiveness (Nowack, 2017), negotiation outcomes (Sharma, Bottom, & Efenbein, 2013), economic outcomes (Schlegel et al., 2018), coaching (Wolfe, 2007), psychiatry (Parker, 2000), and psychotherapy (Stohl et al., 2007). EmInt is still one of the most remarkable theoretical constructs in folk psychology and self-help, with a growing number of books on EmInt being published continuously (e.g., Goldman, 2017). For example, one of the newest collections in a series of prestigious business reviews is centered on EmInt (Harvard Business Review, 2017). Furthermore, in terms of education and learning, EmInt has been associated and incorporated into parenting (Stern & Elias, 2007), teaching in higher education (Mortiboys, 2012), school curriculums (Zins, Travis., & Freppan, 1997), educational policy making (Mayer & Cobb, 2000), and professional training (Gribble, Ladyshevsky, & Parsons, 2017). Higher cognitive capacity, such as critical thinking, is reported to correlate with higher EmInt (Yao et al., 2018), corroborating the synechistic relationship between emotion and cognition (Kanazawa, 2019).

In terms of L2 learning, EmInt has been applied in relation to Howard Gardner's (1999) Multiple Intelligence Theory (e.g., Morgan & Fonseca, 2004; Hayashi, 2011). EmInt has been reported to affect not just L2 communication (Dewaele, Petrides, & Furnham, 2008), but also the effectiveness of emotional elaboration on memory (Toyota & Sato 2009). EmInt is one of the pertinent perspectives in language-teacher education (Gregersen & MacIntyre, 2017), and it

has been reported that EmInt is a crucial personality factor in L2 use in language learning (Ożańska-Ponikwia, 2016).

Due to its relatively static nature as an individual difference index, and its self-reportable nature, EmInt may well be regarded as a phenomenon related to macro-level emotion, in contrast to subtle here-and-now micro-level emotion (Kanazawa, 2016 a; 2018 b). Taking EmInt into account would broaden the perspectives of multi-level emotion, and the possible interplay between micro-level emotion and macro-level emotion. Although EmInt is not devoid of theoretical criticism (e.g., emotional granularity by Barrett, 2017), EmInt may well be an appropriate individual difference to consider.

## II. Objective and Hypothesis

In this section, a type of macro-level emotion that is a between-participant factor (i.e., EmInt) is introduced to re-evaluate the effect of Emotion-Involved Processing.<sup>3)</sup> The purpose of the analysis was to investigate whether and how emotional intelligence (macro-level emotional individual difference factor) affects the incidental lexical retention of either EmInvProc<sup>+</sup> or EmInvProc<sup>-</sup> (micro-level emotional phenomenon). The following research questions were posited:

RQ1 Is there any difference in the effectiveness of Emotion-Involved Processing related to emotional intelligence, which is a macro-level emotional individual difference?

RQ2 If there is any difference, what is the nature of this difference?

Judging from the fractal structure of emotional multileveledness (Kanazawa, 2016 a), emotion as well as cognition may well be a synechistic phenomenon, and thus the hypothesis of RQ1 is affirmative (Kanazawa, 2019). As this is an explorative investigation, the result of RQ2 was not hypothesized.

## III. Measurement of Emotional Intelligence

There are various methods of assessing the EmInt of an individual, ranging

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3) It has been theoretically postulated and empirically corroborated that semantic processing can be even more “deeper” (i.e., resulting in stronger memory trace and thus more successful learning) when *micro-level emotion* is involved (Kanazawa, 2017). Semantic processing involved with emotional cognition (i.e., paying attention to the emotional aspect or mental association to the stimuli) can be termed Emotion-Involved Processing (EmInvProc<sup>+</sup>), while semantic processing devoid of emotion can be termed non-emotional semantic processing (EmInvProc<sup>-</sup>).

from social approaches to vocal acoustic perspectives (Bachorowski & Owren, 2002). The theoretical distinction between trait emotional intelligence and ability emotional intelligence, as put forward by Petrides and Furnham (2003), has been proposed to be practically important. Their difference originates in how the EmInt scores are estimated: “The former is measured through self-report questionnaires, whereas the latter is measured through maximum-performance tests, i.e. tests that are based on items that have correct and incorrect answers” (Petrides & Furnham 2003, p.40). It has been suggested that trait EmInt is not only easier to test and more amenable to flexible operationalization, but also more trustworthy than ability EmInt from the perspective of education (e.g., Roy, 2015). On the other hand, ability EmInt is difficult to test, has less practicality in experimental design, and does not reflect phenomenological perceptions. For these reasons, the present analysis operationally equates trait EmInt with EmInt.

Trait EmInt, measured via self-report questionnaires, can be regarded as a form of macro-level emotion. One such questionnaire is the Japanese version of Wong and Law’s Emotional Intelligence Scale (J-WLEIS; Toyota & Sakurai, 2007). J-WLEIS is the Japanese translated version of WLEIS (Wong & Law, 2002), which consists of 16 question items designed to estimate the trait EmInt. These questions are made up of scales of self-emotion appraisals, others-emotions appraisals, the use of emotion, and the regulation of emotions (Toyota & Yamamoto, 2011). In view of its empirically-proven validity and reliability, its high practicality, and its suitability for Japanese participants, J-WLEIS was adopted in the present investigation to estimate the emotional intelligence of the participants.

#### **IV. Experiment A (L2 Lexical Retention): Analysis and Result**

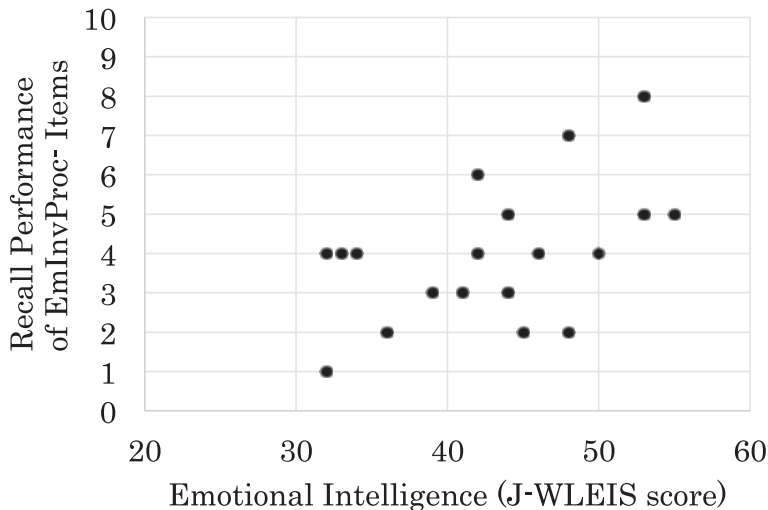
Data collection was implemented synchronously to empirical studies investigating the Emotion-Involved Processing (Kanazawa, 2017). The first target of analysis was Experiment A in Kanazawa’s (2017) study. The participants were Japanese users of English, among whom a high-EmInt group ( $N = 11$ ; EmInt  $M = 48.45$ , EmInt  $SD = 3.65$ ) and a low-EmInt group ( $N = 11$ ; EmInt  $M = 37.64$ , EmInt  $SD = 4.07$ ) were analyzed (Table 1). Their EmInt scores were estimated using the J-WLEIS questionnaire (Toyota & Yamamoto, 2011). As a 4-point Likert scale was adopted, the theoretically possible score ranged from 16 to 64. In the study session, English words were presented one by one on a computer screen, and they were asked either (a) to judge the emotional valence (EmInvProc<sup>+</sup> condition) or (b) to judge the lexicality of the words (EmInvProc<sup>-</sup> condition). In the following test session, they were instructed to recall as many of the words that had been presented in the study session as possible. The variables were the recall performance in the

test session per the different learning conditions. Statistical analysis was performed using SPSS Version 23.

Due to the limited amount of data, a Wilcoxon signed-rank test was implemented for statistical analysis. Although EmInvProc<sup>+</sup> resulted in better memory performance regardless of EmInt, the statistical significance and the effect size for the low-EmInt group ( $Z = -2.85$ ,  $p < .01$ ,  $r = -.86$ ) were bigger than those for the high-EmInt group ( $Z = -2.26$ ,  $p < .05$ ,  $r = -.68$ ). The correlational analysis revealed a weak yet significant positive correlation between EmInt and the recall performance of words in the EmInvProc<sup>-</sup> condition, with  $\rho = .49$  ( $df = 21$ ,  $p < .05$ ). The descriptive statistics are provided in Figure 1.

**Table 1** Descriptive Statistics of the Results of the Free Recall Performance

Participant Group	High-EmInt		Low-EmInt	
	EmInvProc <sup>+</sup>	EmInvProc <sup>-</sup>	EmInvProc <sup>+</sup>	EmInvProc <sup>-</sup>
<i>M</i>	9.18	5.64	8.36	3.45
<i>SD</i>	3.45	4.20	3.20	1.30



**Figure 1** Positive correlation between individual EmInt score and the recall performance of EmInvProc<sup>-</sup> items

## V. Experiment B (L2 Vocabulary Acquisition): Analysis and Result

The second target of analysis was Experiment B in Kanazawa's (2017) study. The participants were Japanese learners of English, among whom the high-EmInt group ( $N = 10$ ; EmInt  $M = 52.50$ , EmInt  $SD = 3.72$ ), the middle-EmInt group ( $N =$

10; EmInt  $M = 44.50$ , EmInt  $SD = 1.86$ ), and the low-EmInt group ( $N = 10$ ; EmInt  $M = 38.60$ , EmInt  $SD = 1.56$ ) were the target of the analysis. Their EmInt was estimated using the J-WLEIS questionnaire with a 4-point Likert scale. The study session was implemented via a pre-class electronic vocabulary activity, in which either (a) the valence judgment (EmInvProc<sup>+</sup> condition) or (b) the imageability judgment (EmInvProc<sup>-</sup> condition) were elicited. The test session was implemented as an in-class vocabulary quiz. Each participant was instructed to take the vocabulary test, in which their knowledge of the words presented at the study session was questioned. The variables were the participant's memory performance in the test session per their different learning conditions. Statistical analysis was performed using SPSS Version 23.

Due to the limited amount of data, the Kruskal-Wallis test was implemented for statistical analysis. The matching performance of the EmInvProc<sup>-</sup> words significantly differed between the different EmInt groups,  $H(2) = 8.89$ ,  $p = .01$ , although there was no significant difference for the EmInvProc<sup>+</sup> words (Table 2).

**Table 2** Descriptive Statistics of the Results of the Matching Performance of EmInvProc<sup>-</sup> Items for Each Emotional Intelligence Group

Participant Group	High-EmInt	Middle-EmInt	Low-EmInt
<i>N</i>	10	10	10
<i>M</i>	100.00	100.00	87.50
<i>SD</i>	0.00	0.00	19.40

The EmIntProc<sup>-</sup> performance was significantly worse for low-EmInt students. Spearman's rank-order correlational analysis revealed a significant positive correlation between EmInt and matching performance for EmInvProc<sup>-</sup> words ( $\rho = .51$  [ $df = 29$ ,  $p < .01$ ]). In other words, the higher a participant's emotional intelligence score, the higher the memory performance of the items that were studied in a non-emotional manner.

## VI. Discussion

Both of the results indicate that, concerning L2 lexical retrieval, low-EmInt individuals benefit even more from Emotion-Involved Processing than those with high-EmInt. A possible generalization is that the more emotionally intelligent one is, the more likely it is that they remember L2 words without elicited emotional elaboration. Considering the relatively superior performance of non-emotionally studied items for the high-EmInt participants, the likely rationale is that as people with high emotional intelligence can better regulate and make use of their emotions,

they may have consciously or unconsciously “woven” their micro-level emotional disposition into lexical semantic processing, even when the task was not designed to elicit the involvement of micro-level emotion while encoding.

## VII. Conclusion

It can be concluded that macro-level emotional individual differences (i.e., trait emotional intelligence) can determine how effectively and voluntarily micro-level emotional resources are harnessed, utilized, and “woven” into cognition. It is implied that emotional intelligence can be an important factor, which deserves mindful attention not just as a macro-level emotional factor *per se* (e.g., in L2 anxiety or identity), but also as a factor influential to micro-level emotional phenomena (e.g., processing and learning/acquisition of L2 words; cf. Kanazawa, 2016 a; 2018 b). The connection between the micro-level emotion and the macro-level emotion has been uncovered with a thought-provoking pedagogical implication: learners with low emotional intelligence need to be explicitly elicited to activate and utilize their emotional resource to enhance cognition.

Further research is needed to delve deeper into the mechanisms of this micro-macro interplay of emotion, and its more elaborate application to pedagogy.

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