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The cultural background of the non-academic concept of psychology in Japan: Its implications for introductory education in psychology

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No research has empirically explored the non-academic concept of psychology itself (implicit theories) in non-Western cultures despite a widely held belief that this understanding differs cross-culturally. This study examined whether the non-academic concept of psychology among inexperienced Japanese students differed from the concept held by students of other countries. In Japanese, psychology is referred to as 心理学, which includes the ideographic character 心, literally meaning heart. This fact led us to hypothesize that psychology will be disproportionately associated with emotion among Japanese students. Indeed, our findings among Japanese students produced a J-curve, indicating that our prediction was true. We posit that this issue has never been discussed in Japan because a majority of people share this concept of psychology. In our second study, we examined not only preference in students' association of intelligence or emotion but also heart or mind with psychology. Finally, we identified whether students believe that psychology encompasses both the heart and the mind. We conclude with a discussion of the importance of explicitly defining the non-academic concept of psychology in early psychology education in Japan.

Keywords: Non-academic concept of psychology; J-curve hypothesis; Introductory education; Japan; Implicit theory.

Cross-cultural research has significantly furthered our understanding of the concepts of the self and intelligence (e.g., Chen, 1994; Markus & Kitayama, 1998). Although several studies have examined the concepts of intelligence and personality at a non-academic level as implicit theories (e.g., Chiu, Hong, & Dweck, 1997; Sternberg, Conway, Ketrn, & Bernstein, 1981), to our knowledge, no studies to date have focused on the concept of psychology itself as an academic discipline (implicit theories of psychology). It is predicted that the concept of non-academic psychology held by persons in non-Western countries who lack experience in academic psychology will be culture-specific because academic psychology was founded in Western countries in the 19th century and subsequently introduced to other countries. Countries in the East are no exception, and many studies have identified differences in concepts between Western and Eastern countries regarding, for instance, personality and human relations (e.g., Berry, Poortinga, Segall, & Dasen, 2002; Guthrie & Bennett, 1971). Thus, the concept

of non-academic psychology held by individuals lacking formal training in academic psychology may indicate an underlying cultural difference. These discrepancies may create difficulties in introducing psychology to university students in such countries in the introductory psychology lectures, because these students may possess a culturally specific understanding of psychology that differs from that of academic psychology. In this case, teachers of introductory psychology classes must be aware of and address these cross-cultural differences.

THE PRESENT STUDY

The present study examined how the understanding of psychology held by introductory psychology students without formal academic training in psychology in Japan differs from that of their counterparts in other countries. Awareness and knowledge of the notions that are specific to Japanese students will allow educators

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to more effectively introduce the concept of academic psychology to students of introductory psychology.

In Japanese, the word for psychology is 心理学, which consists of three kanji (Chinese characters, /si.N.ri.ga.ku/). Because Chinese characters are essentially ideographic scripts, each character has its own meaning. Furthermore, large portions of Chinese characters originated from pictograms. The word 心理学 consists of the characters 心, 理 and 学. Two of the kanji, 理 and 学, are unproblematic and refer to logic and academic discipline, respectively. However, 心 refers to the heart (the big red organ in the body) and originates from the pictogram representing the anatomical structure.

The issues surrounding why and when the word psychology was translated into the term 心理学 hint at other important issues regarding Japanese psychology (e.g., Nishikawa, 1995) that are beyond the scope of this study. The term 心理学 has been exported from Japan to other countries that share the same Chinese script (e.g., China), where psychology is referred to as 心理学. It is undeniable that 心 typically refers to the dictionary definition of heart as the big red organ in the body (心臟). Moreover, because academic psychology treats the mind, 心 is also defined as mind in English-Japanese and Japanese-English dictionaries (e.g., Kunihiko & Konishi, 1993), although the heart and mind are considered dualistic concepts in the dictionary definition. Although the term 心 is representative of the inclusiveness of the Japanese language and encompasses the heart, soul, spirit and mind, people may interpret it primarily to literally mean heart, particularly for beginners, unless they had a particular knowledge of academic psychology. The term 心 implies centre and core just as heart in English. However, this issue may not only be due to its dictionary definition; it may also be rooted in a deeper cultural background. Recently, Mizuno (2011) published an interesting association frequency table based on a cognitive psychology study in which approximately 600 Japanese college students including psychology majors, were presented with target letters, including 心, and asked to write three words associated with each of the presented cues. The word associated with 心 with the highest value was 心臟 (heart as the big red organ in the body). The concepts associated with intelligence, such as mind, were notably absent at least in the results table.

Another complicating issue involves the orthographic system in the Japanese language. Japanese kanji involves two types of reading: On-reading, the Chinese reading of a kanji character, and Kun-reading, the native Japanese reading. Furthermore, Japanese language not only includes kanji as an ideographic script but also two types of syllabic scripts (*kana*): *hiragana* and *katakana* (see Leong & Tamaoka, 1998). These scripts represent

syllables (*morae*) as phonological units of the Japanese language (see e.g., Tamaoka & Makioka, 2004). The former is used in Japanese pronunciation, while the latter is primarily used in the pronunciation of words imported from Western countries. For example, 心 in isolation in Japanese kanji is pronounced as /si.N/¹ in On-reading (Chinese reading) and /ko.ko.ro/ in Kun-reading. Japanese people generally do not understand the meaning of /si.N/ in On-reading. In other words, unless a phrase or two more characters such as 心理学 are presented as spoken words, 心 /si.N/ typically does not appear in isolation in On-reading (Chinese reading) because this pronunciation originated from old Chinese. Furthermore, /ko.ko.ro/ as a pronunciation (Kun-reading) of Japanese kanji 心, is denoted as ころ in hiragana syllabic script. The word ころ /ko.ko.ro/ is based on the Japanese traditional culture and is not related to the intellectual and rational mind, but rather, the whole heart (wholeheartedness). ころ is emphasized in a subject's uncontrolled, natural emotional state. Furthermore, Japanese people generally consider ideal interpersonal communication to involve a natural, mutual understanding of one another's uncontrolled or unexplained emotion (i.e., heart-to-heart communication) because there has historically been cultural stability within individual ethnic groups in the narrow islands for a long time (see Markus & Kitayama, 1991, for interdependent self). The kanji character 心 is a basic word that Japanese children learn in the first grade at elementary school.

Thus, many introductory psychology textbooks in Japan bear a title, including ころ or 心. A Google search of 心理学 and ころ in Japanese books revealed 26,400 hits. These results highlight a lack of awareness of Japanese-specific concepts of ころ, which suggests the existence of a specific Japanese concept of psychology not only among introductory psychology students but also among students in Japan who take psychology courses that do not offer explicit definitions of psychology. Thus, if the Japanese students consider psychology to be strongly associated with emotion, this consideration may be reflective of the Japanese traditional, cultural concept ころ in the absence of mental control, although psychology generally involves emotion.

In the present study, our aim was to address some of these linguistic issues involved in introductory psychology education at Japanese universities. In Japan, students taking introductory psychology courses may experience difficulty in grasping the core concepts of academic psychology because they have a preconceived association between psychology and the concept of ころ or 心. Introductory students are seldom taught in English, and they learn about psychology exclusively

¹In the present article, the notation of morae as phonological units follows the method of Hino, Kusunose, Lupker, and Jared (2013). Alternatively, there is another notation method, /shiN / (Verdonschot et al., 2011).

in Japanese through translations. Thus, the students' individual scholastic ability level may affect the concept of psychology as defined in the dictionary.²

In this article, we report two studies that were designed to shed light on the specificity of non-academic concepts (implicit theories) in psychology among Japanese students. Study 1 focused on a cross-cultural comparison between the concept of psychology among Japanese students and students in other countries. Study 2 examined whether Japanese introductory students chose intelligence or emotion as the concept they more closely associated with psychology. Indeed, the former is supposedly associated with the mind and the latter with the heart. Furthermore, the other survey directly examined whether Japanese students choose heart or mind as the concept that they believe to be more closely associated with psychology.

STUDY 1: INTERNATIONAL COMPARISON OF NON-ACADEMIC CONCEPTS OF PSYCHOLOGY

This study used a Likert-type scale to conduct a cross-cultural comparison of the concept of psychology between Japanese and international students in an introductory course, none of whom had ever attended a psychology lecture. Although this method has been criticized with regard to cultural issues and the use of 5- or 7-point scales (e.g., Chun, Campbell, & Yoo, 1974; Heine, Lehman, Peng, & Greenholtz, 2002; Hui & Triandis, 1989), we could not directly ask questions about psychology because the term psychology is often translated. Although this method is imperfect, it is the best method for this specific area of research because the term psychology itself involves translation into other languages. Cross-cultural comparisons are only possible using pre-selected association words from psychology because a free-association method would result in a vast variety of associated words and further confound the problem.

Regarding statistical issues with the Likert scale, previous studies have argued that it produces insufficient data for statistical testing based on its population normality and homogeneity of variance (Nanna & Sawilowsky, 1998, p. 56) because the Likert scale utilizes an ordinal scale and addresses a discrete rather than continuous volume (e.g., 1- to 5-point or 1- to 7-point scale; for similar arguments, see Floyd & Widaman, 1995). Nanna and Sawilowsky noted that data measured on an ordinal scale should be analysed with a non-parametric statistic. These authors provided evidence that Likert data yielded higher comparative power using the Wilcoxon rank-sum test rather than the *t*-test as a

parametric statistic. We concur with this argument, and we used Likert data as an ordinal scale.

Using this method, we examined whether non-academic concepts of psychology among Japanese students reveal a significant emphasis on emotion compared to other countries. In the present study, we administered a questionnaire on non-academic concepts of psychology as a cross-cultural comparison between students in Japan and those in other countries. We expected that when we treated our Likert scale response data on the concept of psychology as ordinal, the ratings for Japanese students would reveal an unbalanced and skewed distribution favouring the association with heart.

Method

Participants

This study invited 455 students from various countries (Japan, 259; Turkey, 89; China, 22; other countries, including India, Middle Eastern countries and African countries, 85). None of the participants were psychology majors. To participate, one must not have previously attended any lectures on psychology. The students were enrolled in the maritime academy, except for students from Japan and China. Japanese participants were college freshmen from two general universities (one national university and one private university as a function of the scholastic ability level), while those from China were overseas students from People's Republic of China (PRC) studying at Japanese universities. Owing to the small sample size, data from Chinese and Japanese participants were only compared if they shared a common ideographic character.

Materials and procedure

The participants completed a questionnaire. The questionnaire consisted of 16 items on a 5-point Likert scale. The participants were asked the following question: When you read the word psychology, what words immediately come to mind? Please check the appropriate box according to the extent of association. The stems of the Likert items included animal, information, language, studying, religion, emotion, playing, thinking, psychic power, human relations, literature, children, brain, engineering, computer and sensation. The order of the items was counterbalanced across participants. Anchors for the Likert scale included (1) *strongly disagree*; (2) *disagree*; (3) *neither agree nor disagree*; (4) *agree*; (5) *strongly agree*. In Japan and China, the questionnaire

²In Japan, the required scholastic ability level at the entrance examination of a given university is indicated as the deviation scores (*T*-scores) based on the trial exams. The scores for the national university used in the current study were approximately 60–70, whereas those for the private university were approximately 45–55.

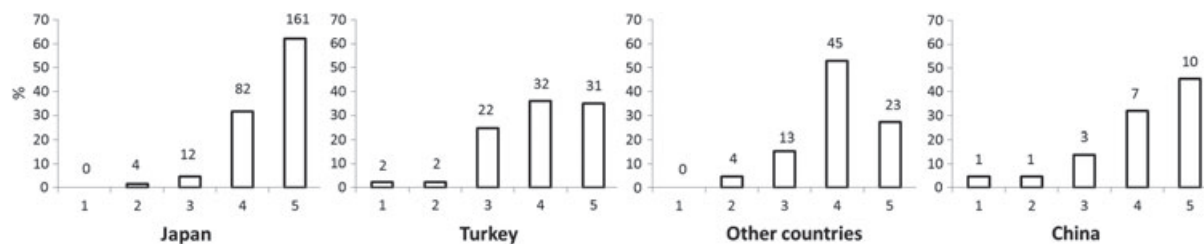


Figure 1. The distribution of ratings of emotion associated with psychology in Study 1. The abscissa represents the Likert score as a 5-point scale (see main text). The vertical axis and the numbers above the bars represent the percentage of those who chose the given rate relative to the given sample numbers and the number of participants who chose that category, respectively.

was written in Japanese and Chinese languages, respectively.

Results and discussion

We computed the mean (with standard error), standard deviation (*SD*) and mode of the scales as well as the skewness and kurtosis representing the distribution pattern for each stem for the three countries (see Table S1, Supporting Information). Next, we investigated the extent to which the sample distribution of ratings deviated from a normal distribution for each item. Because Likert scales are ordinal, we adopted the following five criteria to determine the peculiar distribution in terms of the normality hypothesis: (1) the mean of the 5-point scale is >4 or <2 (implying an approximate maximum or minimum); (2) the mode involves 5 or 1 (representing the maximum or minimum on the scale); (3) the *SD* is <1 (representing an extreme lack of variance); (4) the skewness value is $>+1$ or <-1 (with the minus sign representing a distribution in which low scores pull the mean towards the left tail [negatively skewed distribution] and the plus sign representing a mean that is pulled towards the right tail [positively skewed distribution]); (5) the absolute value of the kurtosis statistic is >1 .³

We extracted the items corresponding to these criteria as follows (note that in Table S1, the values corresponding to each of the criteria are denoted in bold). Only a single item (emotion 感情) in Japan fulfilled all criteria across all items and countries. For this item (emotion), the mean was 4.54, the mode was 5, the *SD* was .660, the skewness was -1.47 and the kurtosis was 2.21. For Turkey and for the other countries, the means were 3.99 and 4.04, the modes were 4 and 4, the *SD*s were .947 and .786, the skewness values were $-.80$ and $-.64$, and the kurtosis statistics were .58 and .31, respectively. These results show specificity among Japanese students compared with students from Turkey and other countries (Figure 1).

A Wilcoxon rank-sum test revealed that this finding in the Japanese sample was highly statistically significantly

different compared with Turkey and the other countries ($p < .001$; $p < .001$; Japan Vs. Turkey and Japan Vs. other countries, respectively). Using the same non-parametric test, we found no significant differences between Turkey and the other countries ($p > .05$). Moreover, we examined the difference between the samples from the two types of universities (national Vs. private university; see Figure 2). Figure 2 shows the extremely negatively skewed distribution in both samples. For national and private universities, the means were 4.68 and 4.44, the modes were 5 and 5, the *SD*s were .588 and .694, the skewness values were -2.22 and -1.10 , and the kurtosis statistics were 6.26 and .90, respectively. A Wilcoxon rank-sum test revealed a significant difference between the two samples ($p < .01$). Virtually all of the participants (97.3%) from the national university, who required a higher level of scholastic ability for their university entrance examination, assigned emotion a Likert-scale rating of 4 or 5 on level of association with psychology in contrast to only 91.2% of their counterparts from the private university. These findings suggest that the ideographic dictionary definition affected the skewness because the high-scoring students were able to confirm the dictionary definition. To investigate this further, we performed the same analysis on the data from the Chinese students studying overseas ($n = 22$) because the two languages share some characteristics of the ideographic script 心理学. As expected, the distribution of Likert scores for emotion resembled that of the Japanese participants. The mean was 4.04, the mode was 5, the *SD* was 1.107, the skewness was -1.19 and the kurtosis was 1.17 (Figure 1).

STUDY 2: NON-ACADEMIC CONCEPTS OF PSYCHOLOGY IN JAPAN

Study 1 revealed an extremely skewed distribution of emotion associated with psychology in the Japanese participants in comparison with participants from other countries. Similar findings emerged when studying the

³The kurtosis of a normal distribution is usually treated as zero. Thus, we defined the criterion concerning deviation from the normal distribution as >1 of the absolute value of the kurtosis.

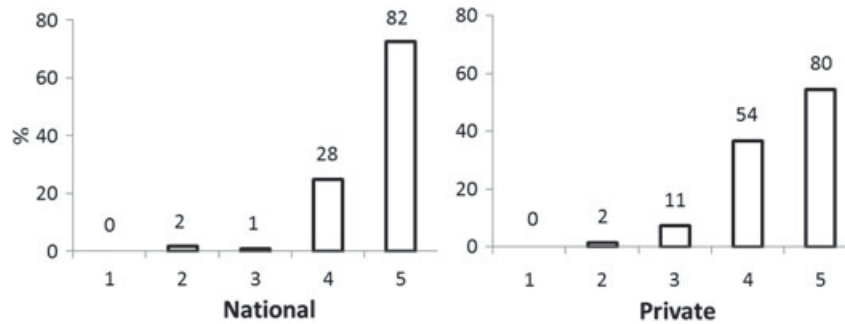


Figure 2. The distribution of ratings of emotion associated with psychology for Japanese samples as a function of university type (national versus private) in Study 1.

responses of Chinese overseas students. In addition, among the Japanese students, these striking results were even more pronounced in the group with higher entrance examination scores when compared to the lower-scoring group. These results suggest that a greater understanding of the dictionary definition of 心 as heart influences how strongly students associate this term with psychology. However, strictly speaking, there might have been an issue with translation into English because Japanese and Chinese students received the questionnaire in their own native languages, whereas the students in the other countries received them in English. In study 2, we conducted a survey of freshman students in Japan in which the participants were asked to indicate whether heart or mind was the concept that they believed was more closely associated with psychology followed by the explanation of the English words “heart” and “mind” in Japanese (Question B). In another survey, we asked the Japanese freshman students directly whether they expressed that psychology encompasses the heart and the mind together, or either one of these components alone (Question C).

Method

Participants

Five hundred and ninety-nine students were selected from the same population as Study 1, but none of them had participated in it (195 and 404 Japanese students from the national university and the private university, respectively). None of the participants were psychology majors. All participants were freshman students who had never attended a formal psychology class.

Materials and procedure

The participants were divided into three groups: (1) national university students ($n = 195$) for questionnaire A, (2) private university students ($n = 270$) for questionnaire B, and (3) private university students ($n = 134$) for

questionnaire C. Each student completed only one of the three questionnaires.

Questionnaire A. This questionnaire consisted of the following two questions in Japanese: (1) Do you associate intelligence or emotion with psychology? (2) Have you obtained any knowledge about psychology through TV programmes or books? (translated from Japanese).

Questionnaire B. This questionnaire consisted of the following question in Japanese. 心 distinguishes between the heart and the mind as follows: the *heart* is the emotional part of 心 that we cannot regulate, whereas the *mind* constitutes the intellectual part of 心 that is involved with cognitive processing and language acquisition. Please rate whether the *heart* or *mind* is primarily associated with the word 心理学. (translated from Japanese; italic characters presented in English). This question concerns subtle differences in meaning in English. Thus, the question requires a background explanation of the English words *heart* and *mind* in Japanese preceding the questioning because some Japanese students do not have a strong understanding of these words in English.

Questionnaire C. This questionnaire was identical to Questionnaire B with the exception of the last question, which changed as follows: Do you think that 心理学 treats either the *heart* or *mind*? Alternatively, do you think that 心理学 involves both the *heart* and *mind*? If you agree with the former, is the *heart* or the *mind* more relevant? (translated from Japanese; italic characters presented in English).

Results and discussion

We computed two answers to the questionnaire A. Of these participants, 86 reported that they had obtained knowledge about psychology through TV programmes or books. The vast majority of students

(82.1%) chose emotion as more strongly associated with psychology, $\chi^2(1) = 80.1$, $p < .001$, regardless of preliminary knowledge of psychology gained from TV programmes or books, $\chi^2(1) = .29$, $p > .05$. These data further strengthen our finding that the non-academic concept of heart associated with psychology is prevalent among introductory psychology students on the basis of its ideographic dictionary definition.

We collected the data from questionnaire B. We excluded non-answers and invalid answers ($n = 30$). A statistical analysis was conducted to examine the data for the remaining participants ($n = 240$). Overall, 144 participants chose mind (60%), and 96 students chose heart (40%). Although the number of students who chose mind was significantly greater than the number who chose heart, $\chi^2(1) = 9.60$, $p < .01$, we focus on the finding that 60% of the students chose mind, suggesting that the background definition of the English word 'mind' influenced the students' perception of a stronger association between the mind and psychology.

More importantly, questionnaire C revealed the results for the Japanese participants specifically. We excluded non-answers and invalid answers ($n = 14$). Later, we found that 114 of the remaining 120 students (95%) answered that psychology involves both the mind and heart, $\chi^2(1) = 97.2$, $p < .001$. Of the final six students, three responded that psychology involves the heart and three responded that psychology involves the mind.

We presented the participants with a background explanation of the English words heart and mind in Japanese preceding the questioning, and we included cognitive processing and language acquisition as being involved in the definition of psychology. However, 40% of the students chose heart, suggesting the robustness of the association with the heart of psychology. More importantly, Japanese students almost universally expressed that psychology in fact encompasses both the heart and mind.

GENERAL DISCUSSION

A typical J-shaped pattern

This study demonstrated that Japanese students in introductory psychology differed significantly in their ratings of the non-academic concept of psychology in the following aspects in comparison with students from other countries. Japanese students' rating of emotion was found to have an extremely negatively skewed distribution. The majority of Japanese students (more than 75%) chose strongly to agree on a 5-point Likert scale, indicating that emotion was perceived to be most closely associated with psychology. Moreover, among Japanese students, the distribution of ratings for emotion formed a typical J-shaped pattern. As outlined in the introduction, the

word 心理学 translated from psychology includes the character 心 in Japanese. Heart in English implies the red organ in the body that is at the core and centre of the body. 心 in Japanese (and Chinese) implies all of these meanings simultaneously. Furthermore, mind is also known as 心 because psychology indicates 心理学. However, because this issue has not been previously examined or explicitly discussed in Japan, most Japanese psychological researchers are unaware of it. The J-curve hypothesis proposed by Allport is often applied to explain social norms and attitudes, such as stereotypes (Allport, 1962; Allport & Solomon, 1939).

The extreme skewness of the ratings may reflect cognitive decision-making, indicative not only of social attitudes but also of conceptions based on associations with words such as psychology. Cognitive decisions about the concepts associated with non-academic psychology may simply reflect the participants' cultural backgrounds. Thus, if the majority of people share a common understanding of a concept that is rooted in their common cultural background, the members of this group may truly share a commonality. Although the participants may be unaware of this, their behaviour and decisions may nevertheless conform to social norms and reflect cultural influences that are self-evident to members of that culture. This may hold true for the Japanese students of introductory psychology.

The J-curve hypothesis has been applied to social psychology to explain the formation of and conformity to social norms. In line with this hypothesis, the understanding of psychology observed among introductory students in Japan may have not been previously studied in Japan because this understanding represents the prevailing notion among the majority of group members and is considered self-evident.

Our studies revealed that the non-academic concept of psychology among Japanese students was stereotypically oriented towards emotion, which may result in a non-academic understanding of the concept of psychology among Introductory Psychology students in Japan. The heart and mind can be conceptually understood as polar opposites. This non-academic conceptual understanding may interfere with students' ability to understand cognitive operations, thinking, memory and language. Study 2 revealed the robustness of the Japanese concept of heart. Despite the presentation of our explanation of both mind and heart, only 40% of the students chose heart as being associated with psychology. Without explanation, the Japanese students almost universally chose emotion rather than intelligence as the word that is more closely associated with psychology. More crucially, most students expressed that psychology in fact encompassed both the heart and the mind.

There has been no previous discussion of this issue in Japan. We infer that the lack of awareness of this

issue may be due to the literal definition of psychology, which is based on the ideographic meaning of the kanji characters and is almost unanimously accepted by the majority of people in Japan.

Our current studies are the first to explore this topic in detail. Although this study included limited samples of introductory learners from developed countries, and although there might potentially have been the issue of translation because the participants in the other countries received questions in English (probably their non-native language; Study 1), comprehensively, a specific concept of psychology was observed among students in Japan. Further studies are needed to acquire additional data from developed nations. As Mizuno's (2011) study suggests, even students in the psychology department appeared to adhere to this concept, which was strongly oriented towards emotion. Implied theory in psychology may be too deeply rooted in culture to be affected by mere exposure to coursework in psychology classes. These results were consistent with the preceding research, indicating that both professional psychologists and amateurs identified a concept such as intelligence in the same way (e.g., Sternberg et al., 1981). Based on the lack of prior research on this issue in Japan, we posit that a lack of awareness of this trend may be pervasive not only among students but also among researchers in Japan. Moreover, researchers themselves may be unaware of this issue. In Japan, students usually do not encounter psychology as an academic discipline in formal education until they enter a university. Generally, understanding psychology is said to be difficult for students. Furthermore, many students tend to be disappointed with academic psychology upon attending a psychology class because their own concept of psychology is often inconsistent with the academic discipline they first encounter (Tada, Takigami, Kawabata, & Sugino, 1980). However, this issue has yet to be explored more deeply. Thus, as described in the introduction, many psychology books include *こころ* in the title to more easily introduce psychology to students. Although out of goodwill many authors will use Japanese terms in their efforts to encourage students to study psychology, this approach may in fact impede the development of students' understanding.

Instead, we suggest using *マインド* /ma.i.N.do/ (mind) in katakana script representing only the English pronunciation as an exotic word for mind (it does not refer to meaning) rather than using *こころ* in introductory education in Japan. There are many katakana scripts in Japan, particularly computer terms (e.g., *マウス* /ma.u.su/ for mouse). In fact, Japanese researchers in business science often use *マインド* to show that business managers' mind translates as *マインド* rather than as *こころ* in the Japanese language. If the top management of a certain company intends to merge with another company, it is understood that this decision is a matter of

mind (*マインド*) rather than of *心* in Japanese companies. However, Japanese psychologists are biased regarding the implicit theory of psychology because psychology indicates *心理学*. People in Japan should be aware that *心* could be applied to bullied children in school but not to the president, who administers government policies; instead, *マインド* is applied to the president. *心* has an affinity for the person in a vulnerable state. We suggest that people use the term *マインド* rather than *心* or *こころ* because *マインド* in katakana script is more familiar to the Japanese people. This approach might help not only students but also researchers to understand the difference between *心* or *こころ* and the mind and may help to encourage their awareness of this difference.

Future studies should examine the extent of the robustness of this concept by studying more psychology majors in the student population. We often neglect the cultural background that influences non-academic concepts of psychology when discussing introductory psychology education, especially in Japan. Historically, on its way to becoming a developed country, Japan was an early adopter of Western culture. Thus, the Japanese people generally are not aware of the uniqueness of their culture in contrast to the proposal of the concept of indigenous psychologies from Asia researchers (e.g., Ho, 1998). However, the implicit theories of psychology in Japan had exactly culture-specific characteristics. This study suggests that it is important that researchers teach Introductory Psychology based on an understanding of the non-academic concepts held by introductory students in Japan.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

TABLE S1 Mean, standard error, mode, standard deviation, skewness, and kurtosis for each item

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