

The Language of Pain: Eye Ache in Japanese and English

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要約

痛みは、内部感覚であり、直接的に示すことができない。従って、痛みは比喩的表現で表すことが多い。自分の痛みを相手にうまく伝えることは母国語でも難しく、患者が医師にその痛みを伝える際にも苦勞することは少なくない。ましてや、外国語で痛みを伝えることはより困難であり、辞書も痛みの訳は曖昧である。本稿は、肉体的痛みの1つである目の痛みに注目し、日英語それぞれの痛み表現の意味論的考察を試みた。日英語において、シャンプーが目に入った時の目の痛みに使用する表現等に関するアンケート調査を行い、そのデータを基に論じた。結果として、目の痛みの表現においては、日本語の方がやや表現数が豊富であった。また、プールの水が目にししみる時の表現では、「しょぼしょぼ」と *stinging* が高い頻度で使われていた。しかし、他の多くの痛みの場面では、一方の言語において1つの表現に集中したが、他方の言語では2、3表現に分かれる結果となった。そこでは、前者の言語表現が後者の複数の言語表現の意味合いを兼ね備えている場合が見受けられた。この背景には、日英語それぞれの言語の特徴が関わっていることが考察された。両言語の痛み表現における1対1対応の有無等更なる研究には、痛み表現の持つ痛みの強さや持続性についての考察も必要であると考えられる。

Keywords: pain description, eye ache, one-to-one correspondence, *shobo-shobo*, 'stinging'

1. Introduction

Pain is a private experience. Wittgenstein (1968) argues that we do not have an adequate vocabulary for pain sensations. In fact, he questions the possibility of referring to pain sensations. Virginia Woolf also points out how few words exist to describe pain in her essay, 'On Being Ill' (1926):

‘English, which can express the thoughts of Hamlet and the tragedy of Lear, has no words for the shiver and the headache..... The merest schoolgirl, when she falls in love, has Shakespeare, Donne, Keats to speak her mind for her, but let a sufferer try to describe a pain in his head to a doctor and language at once runs dry.’ (as cited in Melzack & Wall, 1982, p.36).

However, Melzack and Wall (1982) argue that there are plenty of words for describing pain sensations. They found a high agreement between a pain sensation and its description among people. Although Wittgenstein also states that people might mean different sensations from each other by the ‘same’ words, his notion is now contradicted by medical experience. It is generally accepted that people perceive the qualities of pain sensations in the same way. Various methods in medicine have been used to convert pain sensations into descriptions. One of the most successful is the McGill-Melzack Pain Questionnaire (Melzack & Wall, 1982, p.40), which provides information about the intensity of pain as well as the qualities of pain. Melzack and Wall (1982) conclude that pain sensations can be described.

Notwithstanding this, it is true that the medical doctor still has difficulty in understanding his or her patients’ pain described in their native language. It is even more challenging to understand the pain in a foreign language. Indeed, it is sometimes difficult to translate descriptions of pain from one language to another. The reason is that because pain is such an individual and subjective experience, we cannot immediately demonstrate what our pain is. If we talk about a blue sweater, we can point to it and say, ‘That is what I meant by “blue”.’

Nevertheless, there are no objective references for pain descriptions. Because of this property of pain descriptions, Yasui (1978) states that it is inevitable that metaphor is used to describe pain sensations like other inner senses: smell, taste, sight, and hearing. It is impossible to refer directly to a pain sensation as to an object that can be seen or touched.

Yasui (1978) gives an example, “a gnawing pain” that is explained in Webster (the third edition) as follows:

“a persistent pain esp. in the stomach or bowels resembling that caused by gnawing” (as cited in Yasui, 2007, p.73).

Yasui (1978) simplifies this context as follows:

“a pain resembling that caused by gnawing” (Yasui, 2007)

He points out that “that caused by gnawing” refers to “a pain caused by gnawing.” Eventually, the explanation of “a gnawing pain” returns to a reference of “a pain” again. Thus, Yasui (1978) argues that descriptions of inner senses can be explained only by using the concept of inner sense. Because of this characteristic of pain descriptions, requiring sophisticated metaphors, the translation of pain descriptions is challenging.

Except for people with congenital insensitivity to pain, everyone experiences pain and uses words to describe his or her pain sensation to his or her family and doctor. As pain is so close to us, we are generally unaware of using pain descriptions. It seems that we have not investigated well whether people use the same word to describe a pain situation and evaluate the intensity of a pain description at the same level. Even dictionaries do not seem to have sufficient translations of pain descriptions:

“smart (v.i.): 5. *zuki-zuki* [*hiri-hiri*] *suru*, *surudo*i, *shimiru*” (Obunsha, 2008a)

“throb (v.i.): 1. (head, wound, etc.) *zuki-zuki suru*” (Obunsha, 2008b)

“sting (v.i) :3. *zuki-zuki itamu*” (Hornby, 2013)

The same Japanese word *zuki-zuki* is applied to these three descriptions, which gives the impression that these three English descriptions are the same pain.

This paper explores several semantic features of physical pain descriptions in Japanese and English based on extensive data from unpublished research by Debuchi (1998). Additionally, Debuchi conducted the follow-up study as a reference in early 2022. In both studies, only the physical pain we experience daily was studied using quantitative analyses. Furthermore, the sensations described as itchy, numb, irritating, uncomfortable, and sparkling, which Melzack and Wall (1982) partly categorized as pain, were also addressed.

Physical pain can be classified into several categories, such as eye ache, headache, toothache, and skin irritation. (Kiyohara,1967) Among them,

exclusively eye ache is focused on investigating its descriptions in this paper. The author will aim to answer the following questions by analyzing the data of the main study and that of the follow-up study.

1. Do the results agree with Oyama's argument (1990) that there are more pain descriptions in English than in Japanese?
2. Is there any tendency for one pain description to account for a large proportion in a particular pain situation?¹
3. Is there any one-to-one correspondence between these two languages in terms of descriptions of pain?
4. What features are there in the case of one-to-two or one-to-many correspondence between these two languages?

2. The main study (Debuchi, 1998)

This section introduces the part of the main study that is deeply related to this paper.

2-1. Methodology

The questionnaires were conducted in each language (Appendix A). The quantitative analysis was applied to the results. One type of the questions, question A, is about how you would describe your pain sensation in specific situations. The assumption is that the same qualities of pain are perceived by the subjects, irrespective of cultural background, and this is accepted empirically in medical practice. The subjects were asked to choose one or more descriptions from a given table of options specific to each question. These variations of sensation of pain arise from the author's personal experience and examples found in dictionaries and journals. The purpose of this multiple-choice format was to enable questionnaires to be answered quickly and easily and to facilitate analysis.

2-2 Subjects

Fifty-one native English speakers answered the English questionnaire. Eighteen of them were males, and thirty-three were females, ranging in age from 21 to 68 years old. There were forty-three British, five American, one

Singaporean, one Trinidadian, and one German.

One hundred and one native Japanese speakers answered the Japanese questionnaire. All the subjects were Japanese. There were forty-three males and fifty-eight females, ranging in age from 18 to 64 years old.

2-3 Analysis

Physical pain is classified into the following three main categories in clinical practice according to the part of the body where the pain occurs, its cause, and property: 1. Peripheral pain, 2. Central pain, 3. Psychogenic pain² (Yamamoto and Wakasugi, 1971). Peripheral pain is divided into three types depending on whether the pain occurs near the surface of the body or deep inside the body. They are called 'Superficial pain,' 'Deep pain,' and 'Referred pain.'

The categories that are referred to in the survey concentrated on Superficial pain and Deep pain, as two types of Peripheral pain. Superficial pain is the pain that is experienced when the skin or mucus is stimulated, while Deep pain is experienced when the internal organs, joints, or peritonea are stimulated. Eye ache is categorized as superficial pain.

For question A, the results were categorized into the following pain classifications (Figure 1) proposed by Kiyohara. (Kiyohara, 1967) Table B1 in Appendix B showing the results of eye ache was constructed to see whether there is a particular description that was used commonly with a high

Figure 1

Peripheral Pain	Superficial pain	a. Eye ache b. Skin irritation c. Mucus pain
	Deep pain	d. Headache e. Toothache f. Visceral pain g. Joint pain h. Muscle pain i. Pain at the back of throat j. Suppuration pain k. Numbness

frequency, or several descriptions were used with a similar frequency within the categories of pain or pain situations in each language. It also examined whether the distribution of these pain descriptions for each pain situation had a similar tendency in both languages, or not.

2-4 The results: Eye ache (Table B1 in Appendix B)

The total number of different descriptions for eye ache was 31 words in Japanese and 22 words in English.

For the distributions of the descriptions in each pain situation, the results could be divided into three kinds in both languages:

Case 1. Only one description accounts for a large proportion of responses.

Case 2. Two or three descriptions account for a relatively large proportion.

Case 3. Many descriptions are used in small proportions.³

The same type of distribution in both languages, case 1, was found in situation (2), 'when water in a swimming pool irritates your eyes a little,' (shown as ○ in Table B1); 'Stinging' and *shobo-shobo* were the most used words.

Neither case 2 nor case 3 was simultaneously found in both languages in any pain situation.

There were situations where case 1 occurred in one language whilst case 2 or 3 occurred in the other language, such as:

Situation (1) for 'When the smoke of a cigarette gets into your eyes,' (Table B1); Japanese description, *Shimiru* was 67%, a significant proportion response, while 'irritating,' 'smarting,' and 'stinging' had similar proportions of 30% to 36%. As each of these English descriptions accounted for a relatively large proportion, the English distribution was decided as case 2.

Case 3 occurred in situations (2) for 'When the water irritates your eyes severely in a swimming pool,' and (4) for 'When you get shampoo in your eyes,' in Japanese descriptions as opposed to case 1 in English for both situations. Several Japanese descriptions are in small proportions in the

range of 29% to 1% in both situations. Whereas among English descriptions, only one description, ‘stinging,’ was used with large proportions, 57%, and 72%, respectively.

Figure 2 below shows the descriptions that account for relatively large proportions. The figure in brackets [] represents the type of case discussed above.

Figure 2

Pain situation		Japanese	English
(1) Smoke gets in eyes		<i>shimiru</i> 67% [1]	smarting, stinging 30% irritating 36% [2]
(2) When the water irritates your eyes	◎	Several descriptions with small proportions [3]	stinging 57% [1]
	○	<i>shobo-shobo</i> 35% [1]	stinging 50% [1]
(3) When eyelash gets into eye		<i>goro-goro, chiku-chiku</i> 43% [2]	irritating 57% [1]
(4) When shampoo gets in your eyes		Several descriptions with small proportions [3]	stinging 72% [1]
(5) Having a runny nose, your eyes were		<i>shobo-shobo</i> 90% [1]	heavy 46% puffed up 36% [2]
(6) When your eyes were tired		<i>shobo-shobo</i> 82% [1]	heavy 46% sore 20% [2]

3. The follow-up study

The follow-up study was conducted exclusively on university students whose native language is Japanese in early 2022. This study aimed to investigate whether a similar tendency of Japanese pain descriptions to that of the main study would be found within the university students group whose ages were limited to around twenty years old.

Regarding eye aches, only the variety of descriptions was compared to that of the main study, as the question did not have a situation with different pain levels like the main study.

3-1 Methodology

A questionnaire with six questions was conducted only in Japanese. The quantitative analysis was applied to the results. As this questionnaire was applied to only Japanese subjects, it is not valid to compare with English descriptions.

Most of the questions were taken from question A of the main study.

Each question refers to one pain situation from each pain category, such as eye ache and toothache. The questions are as follows.⁴:

1. What was a terrible headache you had like?
{*zuki-zuki* / *zokin-zokin* / *zuun* / *gaan* / other word_____}
2. What feeling do you experience when you are injected with a needle such as COVID-19 vaccination?
{*chikun* / *chikutt* / *jiin* / other word_____}
3. The slight pain in your throat when a cold is starting
{*hiri-hiri* / *zuki-zuki* / *zara-zara* / other word_____}
4. When the water irritates your eyes in a swimming pool,
{*hiri-hiri* / *piri-piri* / *shimiru!* / *chiri-chiri* / other word_____}
5. Muscular problems on the day after having harder exercises, such as sit-ups and running, than usual.
{*jin-jin* / *zuki-zuki* / *kyuun* / other word_____}
6. When a cold drink hurts your teeth,
{*kiin* / *chiin* / *zuun* / *zukiin* / *gaan* / other word_____}

Question 4, which asked about an eye ache, is slightly different from the question of the main study (2) in terms of the way of asking. In the main study, the question asked two different intensity levels of stimulation in the same pain situation, eye irritation in a swimming pool: Circling a word twice ◎ when it irritates severely, and once ○ when it irritates a little. On the other hand, question 4 of the follow-up study did not ask for two different intensity levels of stimulation. Instead, it simply asked, ‘When the water irritates your eyes in a swimming pool.’ As the question did not give a specific level of eye stimulation, the intensity level of eye stimulation may have been perceived differently by each subject.

Thus, the assumption of question 4 is that descriptions in this situation would vary, so the distribution type would be either case 2 or 3.

3-2 Subjects

Seventy-three Japanese speakers answered the questionnaire. All the subjects were university students whose native language is Japanese. There were sixty-six males and seven females, ranging in age from 19 to 21.

3-3 The results

The following is the result of the question on eye ache, the subject of this study. The largest two proportions are shown below.

Figure 3

Pain situation	Japanese descriptions		
When the water irritates your eyes in swimming pool,	<i>shimiru</i>	56%	[1]
	<i>hiri-hiri</i>	21%	

As shown in Figure 3 above, the distribution pattern is decided as case 1: a significant proportion, 56%, of the subjects chose the description *shimiru*. The second most frequently used description was *hiri-hiri*, used by about one-fifth of the subjects. Eight more descriptions were used with a small proportion of less than 7%.⁵ One subject answered with no feeling. In total, ten descriptions were used, which is slightly fewer than the results of the main study, twelve descriptions.

In addition, the result did not agree with the assumption; the description type would be either case 2 or 3.

4. Discussion

Considering the results of the main study and the follow-up study, the total numbers of Japanese descriptions for eye ache were 32 words and 22 words in English. Consequently, in eye ache situations, the results show that Japanese has more descriptions of pain than English. Thus, as far as eye ache is concerned, the answer to the first question of this paper is

that the results contradicted Oyama's argument (1990); there are more pain descriptions in English than in Japanese. Furthermore, the results showed that the total number of pain descriptions in both languages was plenty, contradicting Wittgenstein's argument (1968) that we do not have an adequate vocabulary for pain sensations.

The answer to the second question, 'Is there any tendency for one pain description to account for a large proportion in a particular pain situation?' is affirmative. In the main study, four out of seven pain situations in each language showed case 1. (Figure 2) In other words, in more than half of the pain situations, the results meet the finding of Melzack and Wall (1982); there is a high agreement between a pain sensation and its description among people. Interestingly, in most of the situations, the two languages did not show case 1 at the same time. It means that either one of these languages had case 1 in various situations.

Moreover, the result of the follow-up study was also case 1, which does not agree with the assumption previously mentioned.⁶ Approximately 60% of the subjects used the same description, *shimiru*, in question 4.⁷ What is the reason for this result?

According to dictionaries, the meanings of *shimiru*, translated by the author, are shown as follows:

"2. to feel pain by the stimulation of liquid or gas" (Weblio. n.d.)

"To feel pain in a certain part of the body caused by liquid such as eye drop" (reibuncnt. n.d.)

In both expositions, the intensity of the pain is not given. In the context of question 4, 'When the water irritates your eyes in a swimming pool,' the eye irritation level may have been translated differently according to the subject because the specific irritation level was not given there. If it applies to this case, the description of *shimiru* may have been used for various intensity levels of pain sensation among the subjects. That seems to be one of the reasons why approximately 60% of the subjects used the same description, *shimiru*, in question 4. Some subjects may have chosen *shimiru* for an intense sensation. Other subjects may have chosen this description as a relatively low sensation. Consequently, it may have led to the result that

shimiru accounted for a large proportion.

The second reason may be related to the unified age of the subjects, which is around twenty years old. Many of them may have used the description, *shimiru*, in a fashionable manner.

One more feature in the result of the follow-up study is that in terms of descriptions, the results showed no similarity to either of the results of the pain situation (2) in the main study. (Table B1 in Appendix B) The most frequently used description of the follow-up study, *shimiru*, was not as often as used in either ◎ or ○ of the main study (2). Here again, the author needs to analyze the follow-up study more, including the question itself, the subjects' age group, and the conducting timing of the questionnaire.

The third question is, 'Is there any one-to-one correspondence between the two languages in a certain pain situation in terms of descriptions of pain?' From the result of the main study, there seems to be one in terms of frequency. It is in the situation of (2) ○, 'when the water in a swimming pool irritates your eyes a little.' English description 'stinging' and Japanese description *shobo-shobo* were the most used words with 50% and 35%, respectively. 'Stinging' was also used for the severe irritation in (2) ◎. How can we understand the usage of 'stinging' for eye stimulation of water? According to Oxford Advanced Learner's Dictionary, the meaning of 'to sting' is as follows,

“(of an insect or plant) to touch your skin or make a very small hole in it so that you feel a sharp pain.” (Hornby, 2013)

“A sharp pain” can mean relatively a strong pain. However, the result of the study suggests that 'stinging' was used for both a strong sensation and a weak sensation. To decide on one-to-one correspondence with more certainty, other aspects of pain, such as the intensity of pain represented by a description, will need to be analyzed. Thus, an answer to the third question could be that only in situation (2) ○, *shobo-shobo* corresponds to 'stinging' as far as the distribution of the descriptions is concerned.

As for the fourth question, 'What features are there in the case of one-to-two or one-to-many correspondence between these two languages?', there is a noteworthy aspect. Some of the descriptions with case 1 in one language tend to have several properties of their corresponding descriptions in the

other language. Semantically a description in one language seems to cover the meaning of several descriptions in the other language. *Shobo-shobo* in (5) ‘Having a runny nose, your eyes were...’, for example, was used most with 90% as opposed to the distribution of English descriptions with case 2, ‘heavy’ 46% and ‘puffed-up’ 36%. According to an onomatopoeia dictionary, Giongo · Gitaigo Jiten (2015), *shobo-shobo* means to blink weakly with some difficulty in keeping eyes open due to feelings of tiredness, sleepiness, too bright, tearing, or ageing.⁸ On the other hand, to puff up means “to (cause to) swell: Mustard makes my eyes puff up.” (Longman, 1992). ‘Heavy’ in this context should mean that you feel your eyelids are heavy and have difficulty keeping your eyes open. Hence, in the case of the eyes with a runny nose, semantically Japanese description *shobo-shobo* seems to cover the meaning of heavy and puffed-up in this case.

Another example is the eye irritation caused by shampoo (4). English description ‘stinging’ was used most with 71%, case 1. In contrast, the distribution type of Japanese was case 3: *Hiri-hiri* with 29%, *sasu youni itai* with 26%, and *shobo-shobo* with 22% were the top three. Does ‘stinging’ share the same properties as these Japanese descriptions? ‘Stinging,’ as the dictionary stated earlier, is originally a sharp pain caused by an insect or plant making a small hole in your skin. Nevertheless, as for the intensity level, the results showed that ‘stinging’ was used for severe pain as well as weak pain in (2). Hence, ‘stinging’ seems to partly share the same property of pain as the Japanese description *sasu youni itai*, literally translated as ‘pain like piercing,’ which is a relatively strong pain.

Shobo-shobo, as we have seen previously in (2) ○, was used for weak pain. Notwithstanding, the results showed that *shobo-shobo* was also used for a severe sensation. In (2) ◎, one in four Japanese subjects used it for an intense sensation. The causes of the sensation in (2) and (4) are water in the swimming pool and shampoo, respectively. As both water and shampoo are liquid, the way of stimulating the eyes is similar to each other. Consequently, some subjects who chose *shobo-shobo* for the stimulation caused by shampoo may also have meant a rather strong sensation.

As for *hiri-hiri*, Onomatopedia explains as follows:

“1. When something, such as skin or nerves, keeps hurting with a burning sensation.

2. When one feels a sharp pain continually”. (*Onomatopedia*, n.d.)

The explanation above gives an impression of the vigorous intensity of sharp pain. However, the results of the main study showed the possibility of *hiri-hiri* being used as mild pain, too. *Hiri-hiri* was used in several situations,⁹ such as when smoke gets into the eyes (1) and when the eyes were tired (6). These pain situations can cause not only strong stimulation but also mild stimulation. Thus, from the analysis above, ‘stinging’ may cover all three Japanese descriptions, *sasu youni itai*, *shobo-shobo*, and *hiri-hiri*, or some of them semantically.

As stated in the first section, both English and Japanese-speaking subjects should perceive the pain sensation similarly. So then, the tendency of the distribution type should be similar. Nevertheless, there are cases of one-to-many correspondence. The reason for this could be that the way the subjects describe their sensations in English is different from that in Japanese. Specifically, English descriptions like ‘heavy,’ ‘puffed up,’ and ‘stinging’ seem to be based on more concrete phenomena. In contrast, some Japanese descriptions like *shobo-shobo* and *hiri-hiri*, an onomatopoeia, have an element of an emotional feeling. (*Nihongo o Tanoshimou*, n.d.)

These analyses above seem to endorse the contrasts between Japanese and English that are stated by Nakajima (1987)¹⁰:

Japanese has a tendency towards the intuitive and sensuous and that ellipsis often occurs in an expression that depends on the context of the topic or the situation, whereas English has a tendency towards the logical, analytical, and propositional. (pp.188-189)

Furthermore, Kindaichi (1998) points out the Japanese language’s structural suitability for emotional expressions.

With such distinct differences between the two languages, the answer to the fourth question of this paper, ‘What features are there in one-to-two or one-to-many correspondence?’ is that semantically a description in one language seems to cover several descriptions in the other language in some cases.

Additionally, there may be some cases where physiological differences affect the perception of pain among different races. For example, people with blue or green eyes tend to be more sensitive to light than people with black or brown eyes. (Syashisyai, n.d.) This is because blue or green eyes have fewer melanin granules in their retina, which protect eyes from intense light, than black or brown eyes. For this reason, people with light-colored eyes are more sensitive to light than people with black or brown eyes. Although the pain situation caused by light was not included in the data of the questionnaire in this paper, empirically, the author understands that a kind of pain occurs to people with light-colored eyes by solid light. In such cases, pain descriptions are expected to differ between these two subject groups.

5. Conclusion

In this paper, the author has conducted research on the language of pain, explicitly looking from one angle, pain descriptions of eye aches used in specific pain situations in Japanese and English. The questions discussed are: 1. Do the results agree with Oyama's argument (1990) that there are more pain descriptions in English than in Japanese, 2. Is there any tendency for one pain description to account for a large proportion in a particular pain situation, 3. Is there any one-to-one correspondence between these two languages in terms of descriptions of pain, and 4. What features are there in the case of one-to-two or one-to-many correspondence between these two languages.

As for question one, the results showed that more pain descriptions in Japanese were used than in English, which contradicted Oyama's argument. (1990) Moreover, the total number of pain descriptions in both languages was rich, which did not agree with Wittgenstein's notion that we do not have an adequate vocabulary for pain sensations. (Wittgenstein, 1968) For question two, in more than half of the pain situations, one pain description accounted for a large proportion in each language. The results relatively well meet the claim of Melzack and Wall (1982) that a pain sensation highly corresponds to its description among people. As for a feature of this result, in many pain situations, such a high proportion of one description was not

seen in Japanese and English simultaneously but in either of these languages. Concerning question three, there was only one case. *Shobo-shobo* seemed to correspond to ‘stinging’ for the light pain sensation caused by water in a swimming pool. In question four, semantically, a description in one language seems to cover the meaning of several descriptions in the other language in some cases. In the case of eye irritation caused by shampoo, for example, ‘stinging’ seems to cover all three Japanese descriptions, *sasu youni itai*, *shobo-shobo*, and *hiri-hiri*, or some of them semantically. As the answers to questions three and four show, some descriptions were used for both strong pain and weak pain, like *shobo-shobo* and ‘stinging.’

It has become clear that observing pain descriptions from only one aspect of pain is not sufficient to answer the questions proposed accurately. To obtain more precise answers to the questions, other aspects of pain, such as the intensity and qualities of pain represented by the descriptions of pain, will need to be analyzed. Furthermore, for further research on the language of pain, other categories of pain descriptions, from superficial pain like skin irritation and deep pain, such as toothache and headache, will need to be studied. In addition, cultural differences, selection of age group of subjects, and physiological differences among races should also be carefully considered.

Notes

- 1 According to the finding of Melzack and Wall (1982) that there is a high agreement between a pain sensation and its description among people, it is expected that the subjects tend to use the same description in a particular pain situation.
- 2 Central pain is the pain caused by stimulation given to parts of the central nervous system, such as the spinal cord, the brain stem, and the cerebral cortex. Psychogenic pain is the pain whose cause cannot be detected in any organ. The person who is suffering from psychogenic pain has a psychological illness such as hysteria or schizophrenia.
- 3 A percentage that is less than 29% is regarded as a relatively small proportion.
- 4 The questionnaire was written in Japanese.
- 5 For further detail, please see Table B2 in Appendix B.
- 6 The assumption of question 4 was that descriptions in this situation would vary. As the question did not give a specific level of eye stimulation, the intensity level of eye stimulation was expected to be perceived differently by each subject.

- 7 'When the water irritates your eyes in a swimming pool,'
 8 The English translation of *shobo-shobo* was conducted by the author.
 9 Please see Table B1 and Table B2 in Appendix B.
 10 English translation was conducted by the author.

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Appendix A

Questionnaire of the main study: Exempted questions of eye ache. English and Japanese multiple choices are shown. In the actual survey, the questionnaire was written in each language.

Question A

When you are in the situations below, what does the pain feel like to you? Circle or write the best word in each group, please. Answer only the questions which you have experienced.

- (1) When the smoke of a cigarette gets into your eyes,
 {singing / smarting / irritating / blinding / biting / other word ____}
 {*hiri-hiri* / *piri-piri* / *shimiru* / *chika-chika* / other word ____}
- (2) When the water irritates your eyes in a swimming pool,
 (Please circle a word twice ◎ when it irritates severely, and once ○ when it irritates a little.)
 {stinging / sore / smarting / tingling / other word ____}
 {*hiri-hiri* / *piri-piri* / *shimiru* / *chiku-chiku* / *shobo-shobo* / other word ____}
- (3) When eyelash gets into your eye,
 {uncomfortable / irritating / smarting / other word ____}
 {*goro-goro* / *koro-koro* / *chiku-chiku* / *chikun-chikun* / *chika-chika* / other word ____}
- (4) When you get shampoo in your eye,
 {stinging / smarting / irritating / other word ____}
 {*shobo-shobo* / *chiku-chiku* / *shimiru* / *sasu youni* / *hiri-hiri* / other word ____}
- (5) When you could hardly keep your eyes open because of a runny nose with flu, your eyes were
 {heavy / sore / puffed up / tingling / stinging / throbbing / other word ____}
 {*hiri-hiri* / *shobo-shobo* / *jūin* / *omoi* / *jūin-jūin* / other word ____}
- (6) When your eyes were tired,
 {smarting / sore / heavy / tired / twitchy / other word ____}
 {*zuki-zuki* / *hiri-hiri* / *shobo-shobo* / *jūin* / *omoi* / other word ____}

Appendix B

Table B1 The results of the main study

English descriptions are in the first line, and Japanese descriptions in *italic* are in the second line in each situation. The figure in the parentheses refers to the question number in question A. The figure immediately after a description/s refers to the percentage of the subjects who answered. The figures at the right end of each pain situation represent the number of other words in small portions and the total number of subjects.

	1	2	3	4	
(1) When smoke gets into the eyes	irritating 36%	smarting, stinging 30%	watering, burning, biting, 6%	0%	0/ 51
	<i>shimiru</i> 67%	<i>chika-chika</i> 14%	<i>chiku-chiku</i> 5%	<i>hiri-hiri</i> 1%	5/100
(2) In a swimming pool the water irritates ◎ severely ○ a little	stinging 57%	smarting 29%	irritating, parched 8%	0%	0/ 14
	<i>jin-jin</i> 29%	<i>chika-chika</i> 25%	<i>shobo-shobo</i> 24%	<i>goro-goro, chiku-chiku, jiwaatto,</i> 9%	5/ 55
	stinging 50%	sore 27%	smarting 20%	burning, tingling 2%	0/ 41
	<i>shobo-shobo</i> 52%	<i>chika-chika, chiku-chiku</i> 25%	<i>jiwatto</i> 9%	<i>shibui</i> 6%	3/ 67
(3) An eyelash gets into your eyes	irritating 57%	uncomfortable 27%	smarting 12%	surprising, itching 2%	0/ 49
	<i>goro-goro, chiku-chiku</i> 43%	<i>chika-chika</i> 7%	<i>chikun-chikun</i> 4%	<i>koro-koro, kayui, iga-iga</i> 1%	0/100
(4) Shampoo into your eyes	stinging 71%	smarting 16%	irritating 14%	0%	0/ 51
	<i>hiri-hiri</i> 29%	<i>sasu youni</i> 26%	<i>shobo-shobo</i> 22%	<i>chiku-chiku</i> 14%	3/ 96
(5) Having a runny nose with flu	heavy 46%	puffed up 36%	sore 14%	stinging 6%	4/ 51
	<i>shobo-shobo</i> 90%	<i>hiri-hiri</i> 2%	0%	0%	6/ 79
(6) When eyes are tired	heavy 46%	sore 20%	tired 16%	smarting 12%	3/ 51
	<i>shobo-shobo</i> 82%	<i>zuki-zuki</i> 11%	<i>hiri-hiri</i> 3%	0%	7/101

Other words with a small proportion

English

- (5) throbbing, bleary, heavy and sore, smarting 2%
(6) twitchy 6%, prickly, solid 2%

Japanese

- (1) *chiri-chiri, chiin, shobo-shobo, kemutai* 2% *shika-shika* 1%
(2) ◎ *shibui, biri-biri, jika-jika, shimiru, itai* 1%
○ *goro-goro, tsun-tsun, shimiru* 1%
(4) *jin-jin, chika-chia, tsun-tsun* 1%
(5) *goro-goro, itai, boyatto suru, gusu-gusu, guju-guju, me ga akan* 1%
(6) *me no oku ga zuun to, itai, jin-jin, bootto, jiwatto, omoi* 1%

Table B2 The results of the follow-up study

Question4. 'When the water irritates your eyes in a swimming pool,':

The number of subjects: 73 subjects

Total number of words: 10 words

1	2	3	4	5
<i>shimiru</i> 58%	<i>hiri-hiri</i> 22%	<i>piri-piri</i> 7%	<i>shiba-shiba</i> 4%	<i>chika-chika,</i> <i>chiri-chiri,</i> 1% <i>zuki-zuki,</i> each <i>shupa-shupa,</i> <i>uwaa, tsuun</i>