

## Zen and psychology

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**Abstract:** The history of the study of Zen and psychology is divided into four periods based on Kato (1999). The contributions of the psychophysiological study of the body and mind, such as the use of the electroencephalogram during Zen meditation, are described. Key names in this field are K. Sato and Akishige, who organized the project team for the study of Zen and endeavored to give these studies international recognition through the publication of books and the journal, *Psychologia*. Not only the practice of Zen meditation, but also the day-to-day practices of monastic life, are given equal priority in the attempt to understand our true self and real nature. The year 1978 marks the turning point in the study of Zen and psychology because Akishige introduced the idea of Zen psychology; which is the amalgamation of Zen thought with the study of psychological problems, particularly related to the control of emotions. The metascience of the study of Zen is cited by first-, second- and third-person psychology (Watanabe, 1994). Finally, the significance of the idea of all three-person psychology is emphasized.

**Key words:** Zen, meditation, electroencephalogram, person psychology (first-, second-, third-), metascience.



This paper examines the study of the relationship between Zen and psychology, and the development of a body of research that can be described as psychological studies on Zen.

Buddhism is a philosophy that originated in India approximately 2500 years ago. Its founder was Gautama Buddha. Bodhidharma, a Buddhist missionary, introduced Buddhism to China in the sixth century. Zen Buddhism developed in China through a fusion with Confucianism and other native Chinese ideas. As a result, it was separate from other sects. The term Zen comes from the Sanskrit dhyāna, which is translated as meditation. Zen meditation is defined as the practice of mental concentration in which the reasoning process of the intellect is interrupted and consciousness is heightened by the exclusion of extraneous

thoughts, except for thoughts that are the subject of meditation (Iwano, 1991).

There are three sects of Zen Buddhism in Japan: Rinzai-sect, Soto-sect and Obaku-sect. Both the Rinzai-sect by Zen master Eisai (1141–1215) and the Soto-sect by Zen master Dōgen (1200–1253) were established during the Kamakura era (1192–1333). Later, the Obaku-sect was established in the Edo era (1603–1867) by the Chinese Zen master Ingen (1592–1673). Although the Obaku-sect was strongly influenced by Chinese culture and tradition, the Rinzai-sect and the Soto-sect were colored by native Japanese culture. Therefore, these sects are often compared for their differences. In the Rinzai-sect, mainly “Zazen,” and to a lesser extent “Koan,” is practiced. Zazen is a type of meditation during which the

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person sits cross-legged in the lotus posture to meditate quietly. While Koan is a statement used as a test of whether the disciple has really attained enlightenment or reached the state of kensho (i.e., to see into one's original nature). The Soto-sect, in contrast, relies solely on Zazen.

### History of studies on Zen and psychology

The history of studies on Zen and psychology are divided into four periods (Kato, 1999).

I The period of one psychology of Zen  
From 1893, the year of Inoue's first publication on Zen, to the 1940s marks the first period. In this period, there was no distinction between the study of Zen and Zazen.

II The period of Zen and psychology  
The 1950s, when there was confusion regarding the methods of researching on Zen. During this period discussions took place on Zen and psychotherapy.

III The period of psychological studies on Zen

From the 1960s, when the electroencephalogram (EEG) was used to study Zen, until the year 1977.

IV The period of Zen psychology  
In 1978 Akishige proposed the concept of Zen psychology.

An outline of the history of Zen psychology was written during this period. For instance, "The period of one psychology of Zen" and "The period of Zen and psychology" are dealt with in Akishige (1968, 1977b) and Onda (1992d). Nakamura (1992) also summarized the history of "The period of the psychological studies on Zen." Furthermore, Taniguchi (1992) gives a detailed explanation, particularly regarding the psychophysiological studies of Zen.

### The period of one psychology of Zen

#### *The first contact of psychologists with Zen*

The publication, "Psychology of Zen Sect" by Inoue (1893) is probably the first article concerning Zen and psychology. He founded the

institute of philosophy, which was known as "Tetsugaku-kan" and is today known as Toyo University. This publication was written to elucidate enlightenment from the perspective of psychology. Inoue explained that Zen meditation prevented the intellect, emotion, and will from arising. In 1895, Motora Yujiro (who created the psychological laboratory at Tokyo University in Japan having studied scientific psychology under G. S. Hall in the USA), wrote a diary after practicing Zen meditation for a week at the Enkakuji temple of the Rinzai-sect. In this diary, he traced the movement of the mind throughout the whole day while practicing Zen meditation with a given Koan statement: "What is the sound of clapping with only one hand." During Zen meditation, Motora thought of various answers to this question that would prove his enlightenment, and let him pass the oral examination. He failed 15 times before finally passing with the help of a hint given by the Zen master. Later he insisted that Zen was not enigmatic, but rational, and was not to be taught by a master, but was to be understood through personal experience (Motora, 1895). Consequently, Motora's experience with the practice of Zen had a tremendous influence on the later psychological theory and thought in Japan (T. Sato, 2001).

In 1905, Motora made a presentation on the idea of self in Zen under the title, *An Essay on Eastern Philosophy: Idea of Ego in Eastern Philosophy*, at the meeting of the 5th International Congress of Psychology in Rome (T. Sato, 2002). In this presentation, Motora (1905) put forward the psychological explanation for his experience with Zen.

#### *The first psychological approach to Zen*

In 1920, Iritani made the first psychological approach to the study of Zen using empiric evidence by administering a questionnaire to 43 persons. He also conducted interviews with more than 10 persons. In addition, he used the invaluable documents written by 195 Zen masters. By using these three methods of questionnaire, interview, and documentation, he tried to show the mental processes involved in

the realization of Kensho or enlightenment, and the physical and mental activities that take place after attaining this goal.

"Psychology of Zen" by Ataka (1934) is the first article containing the keyword of Zen in the PsycINFO Psychological Abstracts database on the Internet. He devoted his studies to the interpretation of two issues: (a) the psychological processes involved in attaining enlightenment; and (b) the psychological states that occur after reaching enlightenment.

Kuroda (1937) divided the psychological approach to Zen into two aspects. One is the philology for analyzing the results of questionnaires. The other is the experiment for investigating physical reactions, particularly respiratory movement and other body movements, after the administration of some stimuli during Zen meditation. Kuroda also regarded the study of the psychological approaches to Zen and the study of the psychology of Zen as two different aspects. He thought that the former must be based on objective methods. In contrast, the purpose of the latter is to explain the state of mind after reaching enlightenment. After Kuroda, the study of Zazen and the study of Zen became distinct. Gestalt psychologist Sakuma (1948; a friend of K. Lewin) predicted that there would be a possibility of measuring the electrical potential of the cerebral cortex during Zazen.

### The period of Zen and psychology

In the early 1950s two Western psychoanalysts, Karen Horney and Erich Fromm, became interested in Eastern philosophy, particularly Zen. Horney visited Japan in 1952 with D. T. Suzuki, the most famous Zen missionary in the West. While in Japan, they met Kora Takehisa, a leading disciple of the originator of Morita therapy. Morita therapy was established in the 1920s by Dr Morita Shoma and further developed by Dr Kora of Jikei University to treat patients who suffered from hypochondriac neurosis and anxiety neurosis. Morita therapy is characterized by not relieving the person of the symptom of anxiety, but similar to the practice of Zen, accepting the anxiety as it is, and positively participating in daily life.

In 1957, K. Sato published a new Journal, *Psychologia: An International Journal of Psychology in the Orient*, to introduce the study of psychology in Asia. Because of this publication, psychologists all over the world became familiar, not only with the studies of general psychology in each Asian country, but also with the psychological studies on Eastern philosophy and thought in English. Famous psychologists such as Bruner (1959), Fromm (1959, 1967), and Jung (1960) have contributed articles to the *Psychologia*. A special edition of this journal on the "Psychotherapies in East and West" was published from 1958 to 1961. In the same year as the first publication of *Psychologia*, 1957, a symposium of Zen and psychoanalysis was held in Mexico. The proceedings of the symposium and a lecture delivered by Suzuki and Fromm was published (Fromm, Suzuki, & De Martino, 1960). Hisamatsu Shinichi, a Zen Philosopher, visited Jung to talk about Zen and psychology in 1958 (Jung & Hisamatsu, 1968; K. Sato, 1961). Some articles based on this dialogue have also been published (Muramoto, 1998a, 1998b).

As a result of the opportunity to contact many psychologists, psychoanalysts, and Zen priests through the publication of *Psychologia*, Sato (1959) was able to summarize the study of Zen and psychology in Japan and in the world. In this publication, Sato pointed out six approaches to the study of Zen and psychology. The first is the phenomenological approach to the experiences of Zen. Here, each stage of the state of the mind should be dealt with separately. This approach includes the study of processes for attaining enlightenment, and the study of one's experiences after realizing the "true self." The second approach is the study of the behavior and personality of Zen masters or martial artists, such as masters of Japanese archery. The third, is the general semantics approach, which is the study of Zen practice, particularly with Koan statements. The fourth is the psychophysiological approach using EEG, or the concept of autonomic balance. This approach includes both the tonic factor and the phasic factor. The fifth is the psychotherapeutic approach. This includes psychotherapy using

the theory of Zen, such as in Morita therapy, and a psychoanalytical or existential approach. The last approach is the approach to motivate people to practice Zen. It is believed that through the above-mentioned publication, Sato turned the entire direction of the study of Zen and psychology into the psychological studies of Zen.

#### *The period of psychological studies on Zen*

Bagchi and Wenger (1957) were the first to examine the effect of yoga exercises on the human brain through the use of the physiological equipment that measure brain waves. Later in the 1960s, Kasamatsu and Hirai attempted a landmark study of Zen by measuring brain waves through EEG based on the research of Bagchi and Wenger (Hirai, 1960; Kasamatsu & Hirai, 1963, 1969). In this study, which was supported by the Ministry of Education, it was found that alpha waves appeared in the EEG even when the subjects kept their eyes open. Moreover, the habituation of alpha blocking to a fixed interval clicking sound did not occur in expert priests during Zen meditation. There was a reduction in the frequency of breathing. Some reverse or different consequences of this study were, however, reported later.

Following this study, the Ministry of Education provided grants to representatives to commence research projects on the "Medical and psychological studies of Zen" in eight laboratories (Sakuma, 1962), shown in Appendix I. These early joint scientific studies on Zen were conducted in several laboratories, covering various subjects, such as psychiatry, physiology, and psychology. Some of the results of these studies are published in English (Akishige, 1968, 1977b; Kasamatsu & Hirai, 1963; Sugi & Akutsu, 1968). Sugi and Akutsu (1964, 1968) found that the frequency of respiration rapidly decreased by 2–4 b.p.m. during Zen meditation. The amount of ventilation and the consumption of oxygen also decreased. These results suggest that Zazen-Zen meditation makes expert priests relax and feel fresh in any surroundings through avoiding habituation.

Kasamatsu and Hirai produced an English film titled "Science of Zazen," and the transcript was also published (Kasamatsu & Hirai, 1963). This film was produced chiefly on the basis of the following two studies: (a) the results of the "Medical and psychological studies of Zen" by grantees of the Ministry of Education in 1961 and 1962; and (b) the results of "An electroencephalographic study of Zazen." This film contains an explanation of the history and the nature of Zen, and the presentation of the following four approaches to Zen: (a) Rorschach test, (b) visus (vision), (c) respiration and energy metabolism, and (d) EEG.

Akishige, who had originally devoted his time to the study of the constancy of perception, continued his studies of Zen and presented the results at academic meetings every year. In his presentations of these studies, he used the subtitle, "Psychological studies on respiration- and mind-regulation."

As soon as he retired from Kyusyu University, Akishige established a graduate school of Psychology at Komazawa University in 1968, in order to continue his studies on Zen. Komazawa University originally belonged to the Soto Zen sect. Many famous researchers, such as Sakuma, Kasamatsu, Hirai, Sugi, Akutsu, and Chiba served here in the capacity of professor or part-time instructor. Chiba proposed the idea of original thought and proper consciousness influenced by vijñapti-matrata (consciousnesses only) and Zen meditation. In this school, all the faculties and graduate students took part in psychological studies on Zen and a special lecture class on Zen psychology was started. In 1970, Akishige added the phrase "body-regulation" to the subtitle, "Psychological studies on respiration- and mind-regulation" to his presentations at academic meetings. Later, these studies of Zen were published in two books and a journal, and sent to universities and institutes in various parts of the world (Akishige, 1977a, 1977b, 1977c), as shown in Appendix II.

The year 1978 marks the turning point in the study of Zen and psychology. Because Akishige put forward the view that while scientific approaches to the psychological studies

on Zen continue, the thought and philosophy of Zen should also be introduced to the study of psychology as well. Akishige emphasized the need to reconsider psychological problems, particularly the control of emotions, in the light of Zen psychology. Therefore, the subtitle of presentations in the studies on Zen at academic meetings was changed from psychological study of "body-, respiration- and mind-regulation" to the study of "Zen psychology." Unfortunately, however, Akishige died in 1979, shortly after he proposed this change.

One other important feature about this period of psychological studies on Zen, which may not have been purely coincidental, was the publication of two important journals reflecting a new paradigm in the study of psychology: *The Journal of Humanistic Psychology*, published in 1961, and the *Journal of Transpersonal Psychology*, published in 1969. They provided publicity to studies of ecstasy, bliss, self-actualization, transcendence of the self, and so on.

Onda continued to work on studies that mirrored these new ideas by writing numerous articles about Zen and psychology. These included topics such as satori (enlightenment) and creativity, Zen as a technique for self control, altered states of consciousness, counseling and psychotherapy, autogenic training, etc. (Onda, 1962, 1967, 1992a, 1992b, 1992c). More recently, Onda attempted to deal with both Zen-concentrative meditation and vipassana (mindful meditation; Onda, 2000). He also had many personal experiences of Zen, vipassana, jodo (the pure land teachings), yoga, and Western psychotherapy.

Table 1 is a list of authors who have written on Zen in Japan, ranked according to the number of publications. Onda wrote the greatest number of articles, up to 61, Akishige is next with 56 and K. Sato is third with 40 articles. The table continues in rank order up to 10 articles.

### The period of Zen psychology

For many years after 1978, when Akishige proposed the idea of Zen psychology, psychological studies of Zen continued, revealing the states of the human mind and body.

**Table 1.** Quantity of literature by author

Rank	Name of author	Quantity of literature
1	Onda, Akira	61
2	Akishige, Yoshiharu	56
3	Sato, Koji	40
4	Nakamura, Shoji	33
5	Chihara, Tadashi	22
6	Shinohara, Eiju	17
7	Hirai, Tomio	16
7	Muramoto, Shoji	16
9	Yamaoka, Tetsuo	14
10	Taniguchi, Yasutomi	13
11	Motora, Yujiro	11
11	Sasaki, Yuji	11
13	Kuroda, Teruhiko	10
13	Takahashi, Yoshihiro	10

Table 2 and Table 3 provide a numerical list of the literature published in each decade in Japan and the rest of the world.

On PsycINFO, the online database of Psychological Abstracts, 410 journals and books were found under the keyword "Zen" from 1872 to 1999. There is also an increasing trend in the literature on Zen for each decade. However, because this literature is in peer-reviewed journals, there must be other publications besides those listed on PsycINFO. In Kato's (2002) bibliography, there are 697 publications on Zen and psychology published in Japan in Japanese or in English from 1893 to 1999.

**Table 2.** Quantity of literature in each decade until the 1990s on PsycINFO

Period	Quantity of literature
1930s	3
1940s	0
1950s	17
1960s	33
1970s	95
1980s	105
1990s	157
Total	410

**Table 3.** Quantity of literature in each decade until the 1990s in Japan

Period	Quantity of literature
1800s	4
1900s	11
1910s	3
1920s	3
1930s	15
1940s	8
1950s	36
1960s	139
1970s	167
1980s	153
1990s	158
Total	697

The psychophysiological approach of the 1960s is the start of the upward trend in Zen publications. In the period of Zen psychology, there are some books and special issues on psychological studies on Zen. A book titled *The Psychology of Meditation* provides an introduction and an overview of meditation (West, 1987). This book contains the history, approaches, results of research, and effects of meditation as a form of psychotherapy.

A special feature article in English is also found in *Japanese Health Psychology*, Volume 1 (1992). This issue is in two parts: (1) Eastern techniques for mental and physical health practiced around the world; and (2) Eastern approaches to mental and physical health. Another special article is found in *Japanese Psychological Review* titled "Psychology of Eastern Mental/Physical Practices" (1992). This special issue consists of six articles, as can be seen in Appendix III.

Moreover, two significant meetings concerning Zen and psychology were also held. In 1998, there was the meeting about Buddhism, psychology and psychotherapy at Kofuku Temple (the consciousness-only sect) at Nara in Japan. At this meeting, the relationship between early Buddhism, consciousness-only, jodo (the pure land teachings) and depth psychology, psychotherapy, and psychology was discussed. In 1999, the symposium of "Zen Buddhism and Depth Psychology" was held by The International Research Institute for Zen Buddhism at Hanazono University, which led to the origin of the Rinzai-sect in Kyoto (Young-Eisendrath & Muramoto, 2001).

## Discussion

### *The significance of psychophysiological approaches to Zen*

In the above text, the history of the study of Zen and psychology was shown. In the second period beginning in the 1950s, there was a distinction between the study of the Zen priest as an individual on the one hand; the person leading a monastic life while engaging in various activities, as well as the effect of these activities on his personality, behavior, emotions, motivation, cognition, and mental state; and on the other hand, the mental state of the person during Zen meditation. Of these four periods, the most achievements in the study of Zen and psychology were accomplished in the 1960s through the use of physiological approaches such as the EEG, electromyography, galvanic skin response, respiration and pulse rate, plethysmogram, minor tremor, etc. Recently, however, there has been an attempt to introduce neuroscientific approaches to the

**Table 4.** Eight consciousness and unconsciousness

Sanskrit	English	Level of consciousness
pañca-vijñāna	The five consciousnesses of the organs of the body	The first six of the eight consciousnesses
mano-vijñāna	The thought-consciousness	The sixth of the six or eight consciousnesses
manas-vijñāna	The manas-consciousness	The seventh of the eight consciousnesses-unconsciousness
ālaya-vijñāna	The store-consciousness	The eighth of the eight consciousnesses-unconsciousness

study of Zen. Arita (2001) believed in the hypothesis that the changes in body and mind while practicing Zazen were explained by the activation of serotonin- a biogenic amino acid- released during breathing while doing Zazen.

Austin, a neuroscientist and Zen practitioner, in 1998 published a book titled *Zen and the Brain*, which uses Zen Buddhism as the opening wedge for an extraordinarily wide-ranging exploration of consciousness. Furthermore, an article by Higuchi, Kotani, Higuchi, Minegishi, and Momose (1999) provides an interesting record of measuring natural killer cell activity. A series of studies on Zen and time experiences by Chihara (1977, 1984, 1985, 1986, 1987, 1989, 1999) is also a unique experiment, because research on time theory and ontology is one of the fundamental problems in Zen. Time was underestimated during Zazen even though EEG changes were not reported in his study.

These psychophysiological approaches to Zen are most useful because they resulted in the accumulation of research on the subject. In this respect, the study of drawings of 10 bulls with a verse drawn by the Zen Master Kao-an Shih-yüan (K'uo-an) during the period 960–1126 is also a unique approach in that it did not use Zazen meditation itself (Takahashi, 1999). Nakamura (1977) emphasized that one's daily activities in the monastery are more important for practicing the right method and understanding the mechanism of Zen than one's state of mind while practicing Zen meditation. The entire day-to-day life in the monastery is treated as part of the education system for monks to reach the goal of their religious experiences: to attain satori or enlightenment.

### *The significance of the metascience of psychology for Zen and psychology*

Let me discuss the significance of the metascience of psychology for the purposes of this paper. The article titled "A Review of the Psychological Research on Meditation That Can Be Observed Through PsycLIT" by Nakamura (1998) is a novel means of finding out the state of research by examining the database of abstracts. In this article, 104 keywords con-

cerning meditation are selected, and the keyword "meditation" itself is retrieved using PsycLIT from articles published from 1974 to 1997. Each keyword is related to meditation, such as, technique of meditation, research areas in psychology, different physiological indexes, the mechanism of meditation, psychotherapy, the effects of meditation, a variety of related personality traits, and some questionnaires. In all there are 994 entries. The number of articles and the percentages for each keyword accounted for are listed in all cases.

From the point of view of the metascience of psychology, the three-person psychology of Watanabe (1994) is useful to cope with the study of Zen. The three-person psychology consists of a first-, second- and third-person psychology. The first-person psychology is to reveal and describe the structure of an experience of consciousness by means of introspection. The second-person psychology is to understand and explain the denotation and connotation of various activities and expressions of a human being by the use of interpretation. The third-person psychology is to explain the law of behavior of organisms, including human beings, by the use of natural scientific methods. The typical first-person psychology is consciousness psychology or introspective psychology. Comprehensive psychology or psychoanalysis partly represents the second-person psychology. The third-person psychology implies modern scientific psychology using experimentation.

Empiric psychology (a first-person psychology), like introspection or meditation to reflect on one's own self developed in the East from early prehistoric times. For the most part, this empiric method of meditation has continued to be practiced even after the advent of scientific psychology. Buddhism has a well-developed classification system for the mind. Levels of consciousness and unconsciousness are divided into eight stages known as "manas-consciousness" and "store-consciousness."

The movement of the mind from the moment of feeling a stimulus to developing consciousness of the stimulus is also divided into four stages: the Sanskrit *vedanā* (sensation),

samjñā (perception), samskāra (will), and vijñāna (a mental quality as a constituent of individuality) in Buddhism, compared with sensation, perception, and cognition in psychology. The significance of the first-person psychology is to deal with direct experiences, not to convert them into objective secondary indexes verbalized or symbolized as a numerical value. The direct experiences are original and singular and they are not to be experienced twice. Researchers such as Matora, K. Sato, Akishige, Onda, and Nakamura realized the significance of first-person psychology well and had numerous direct experiences through Zen.

The approach of second-person psychology is also important to know the exact person in your presence. This description is not meant to undermine the importance of third-person psychology, but to reiterate the importance of using all aspects of the three-person psychology. It is considered that each person of the three-person psychology will achieve a different consequence. The concept of pratitya-samutpāda, the Sanskrit term for “arising from a cause” or idampratayayātā, the Sanskrit term for being “causally connected,” that is, matter “A” exists due to the existence of matter “B” and “B” exists because of “A.” This is a central concept of Buddhism. These concepts are different from the causal relationship that can be expressed through third-person psychology. This is why first-person psychology and second-person psychology are equally as important as third-person psychology. All three are essential for completely understanding the physical, psychological, and spiritual existence.

### Conclusion

It is accepted that Hirai and his colleagues initiated the scientific study of Zen and psychology by the use of EEG. K. Sato and Akishige are the key persons in this research because they organized the project team for the study of Zen and spread it around the world by the publication of books and the journal, *Psychologia*. Both K. Sato and Akishige also took a keen interest in Zen as a vehicle for psychotherapy.

The psychophysiological approaches to Zen expanded the knowledge of the subject, and will, no doubt, influence further study on this important topic. However, it must be mentioned that, not only the practice of Zazen meditation, but also the day-to-day practices of monastic life, are equally necessary for realizing the Zen practitioner’s goals. Besides, for a comprehensive understanding of Zen, the complete three-person psychology must be used. Researchers who study the meditation must also be aware of the difference between Zen (concentrative meditation) and vipassana (mindful meditation) for understanding the real nature of meditation. But, researchers devoted to the study of meditation with all three-person psychology must accept that the goal of the study of meditation is not merely to discover its effects, such as deep concentration, relaxation, and psychotherapy. Our true goal is not only to understand the mechanisms of Zen meditation but also to understand our true self and actualize it in daily life.

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## Appendix I

*Recipients of Ministry of Education grants for “Medical and psychological studies of Zen”*  
Joint research on Kasuisai temple at Shizuoka prefecture in 1961 (Soto-sect, Zen master Hashimoto).

1. Tokyo University of Education (Sugi Yasusaburo). The study on Zen using electromyogram.
2. Nagoya University (Takagi Kentaro). The study on the function of autonomous nervous system during Zazen-Zen meditation.
3. Kyusyu University (Akishige Yoshiharu). Psychological studies on breath regulation.
4. Kyoto University (Sato Koji). Psychological studies on mind regulation.
5. Tokyo University (Kasamatsu Akira). The study of electroencephalogram on Zazen.
6. Kyoto University (Kataoka Hitoshi). A comparative study of the nondirective method of instruction and the directive method of instruction in Zen.
7. The Jikei University (Kora Takehisa). A comparative study on the experience of Zazen and Morita therapy while resting in bed.
8. Toyo University (Sakuma Kanae). Psychological studies on creative activities and creative processes through the experience on Zen.

Joint research on Joubokuin temple at Tokyo in 1962 (Soto-sect, Zen master Ishiguro).

1. Tokyo University of Education (Sugi Yasusaburo). The study of the effect Zen on respiration using electromyogram.
2. Nagoya University (Takagi Kentaro). The study on the function of the autonomous nervous system and eyes during Zazen, and physiological study about kensho (enlightenment).
3. Kyusyu University (Akishige Yoshiharu). Psychological studies on breath regulation.
4. Kyoto University (Sato Koji). Psychological studies on mind regulation.
5. Tokyo University (Kasamatsu Akira). The study of electroencephalogram on Zazen.
6. Kyoto University (Kataoka Hitoshi). A comparative study of the nondirective method of instruction with the directive method of instruction in Zen.
7. The Jikei University (Kora Takehisa). The comparative study on the experience of Zazen and Morita therapy while resting in bed.
8. Toyo University (Sakuma Kanae). Psychological studies on creative activities and creative processes through the experience of Zen.

## Appendix II

### *Titles and authors of two books and 28 research articles on Zen*

Akishige, Y. (Ed.) (1977). *Psychology of Zen I. Psychological studies on Zen I*. Komazawa University, Tokyo: Maruzen.

1. Akishige, Y.: A historical survey of the psychological studies on Zen.
2. Koga, Y., & Akishige, Y.: Psychological study on Zen and counseling.
3. Kawashima, K., & Akishige, Y.: Psychological studies on faith and practice.
4. Harada, T.: Psychological study on the mind-body relation.
5. Ikegami, R.: Psychological study of Zen posture.
6. Nakamizo, S.: Psychophysiological studies on respiratory pattern.
7. Matsumoto, H.: A psychological study of the relation between respiratory function and emotion.
8. Miike, D.: Psychological study on the individual differences of electroencephalography.
9. Yamaoka, T.: Psychological study of mental self-control.

### *Glossary*

Akishige, Y. (Ed.) (1977). *Psychology of Zen II. Psychological studies on Zen II*. Komazawa University, Tokyo: Maruzen.

1. Akishige, Y.: The principles of psychology of Zen.
2. Ono, K.: Psychological study on attitude of belief.
3. Shinohara, E.: A psychological study on Lotus-posture and Zen meditation.
4. Nakamura, T.: A psychological study on the body regulation in Zen.
5. Tomura, H.: A psychological study on "Kinhin" in Zen.
6. Nagashima, C., Ikawa, Y., & Akishige, Y.: Studies on "Josoku."
7. Nagashima, C.: The physiological considerations on the relationship among extracellular fluid of cerebral cortex, hypo- or hyperventilation and PaCO<sub>2</sub> from the viewpoint of Zazen.
8. Ando, S.: A psychological study on the effects of breath regulation to mental self-control.
9. Takeda, S.: A psychological study on "ZENJO" and breath regulation.
10. Doi, M.: Psychological study of the relation between respiratory function and mental self-control.
11. Yamaoka, T.: Psychological study of mental self-control II.
12. Taniguchi, Y.: Psychological studies on concentration and no-contrivance.
13. Majima, H.: Psychological study on "Joshin."
14. Sato, N.: Psychophysiological study on "Zenjo."

15. Chihara, T.: Psychological studies on Zen meditation and time-experience.
16. Nakamura, S.: A psychological study of life in a Zen monastery.
17. Akishige, K.: Developmental-psychological studies on Zazen of children.
18. Sasaki, Y.: Possibilities of Zen therapy.
19. Zamami, M., & Okada, M.: Psychiatric consideration on Zen therapy.

### Appendix III

*Titles and authors of six articles in the special issue of the Japanese Psychological Review*

1. History of research on Eastern spiritual practices in Japan. By Akira Onda.
2. A review of the psychological research on Eastern techniques in Japan. By Shoji Nakamura.
3. The recent studies on Eastern mental/physical practices in foreign countries. By Yasutomo Ishii, Masaya Ichii, Akiko Saito, and Yutaka Haruki.
4. Psychophysiological consideration on Zen meditation. By Yasutomi Taniguchi.
5. Studies on meditation using questionnaires. By Yosuke Sakairi.
6. Developments in the Zen therapy based on Zen meditation: An overview. By Yuji Sasaki.

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