

Spatial Representation of Totally Blind People: The Late Developmental Stages

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Summary

Development in spatial representation has been an important topic in developmental studies. However, on the subject of the development in pictorial, spatial representation by the blind, there have been fewer studies reported.

Of the available literature on blind people's spatial representation, two distinct sets of results were observed. One, represented by John M. Kennedy and colleagues, suggested that vision could be replaced by tactility. It was stated that blind people shared the same developmental route as the sighted. It was reported that the blind subjects of this line of research created oblique projection, foreshortening, or perspective (Kennedy, 1984; Kennedy & Juricevic, 2003), and could draw similar to the sighted people (Kennedy, 1980; Kennedy, 1983; Kennedy, 1984; Kennedy, 1993a; Kennedy, 2003; Kennedy & Juricevic, 2003, Kennedy & Juricevic, 2006). The second set of results, represented by Asian researchers (I & Shiu, 2001; 寺島博 cited in 佐藤泰正, 1983, 44-47), reported quite different observations. These authors argued that vision was critical for drawing obliquely or with perspective. Without visual experience and proper education, blind people could not draw in the same manner as the sighted people. The debate about blind people's later developmental stages and 3D spatial representation has continued.

This paper is intended to articulate the late stages of spatial development and drawing

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strategies of the blind through different tactile drawing tasks. 16 fully-blind subjects, ages 17 years and 11 months to 23 years and 3 months, participated in the research. These subjects were divided into three groups according to their respective sight conditions. The first group included 6 congenital blind subjects born with no eyesight at all. The second group included 5 congenital blind subjects with sense of light. The third group included 5 acquired blind subjects with light sense and sense of hand movement through 10 years of visual experience. A total of 135 drawings were collected for the analysis of this research. The results were as the following.

1. There existed differences in the increment of spatial representational development between the blind and the sighted. The drawing development of the blind persisted until after 18 years of age. Their final stage came slower than the sighted people whose drawing development generally stopped around adolescence.
2. There existed differences in the strategies used and the sequence of developmental stages between the blind and the sighted. In the late stages of development, the blind subjects adopted strategies such as global units, orthographic projection, mixed views, fold-out pictures, and X-ray pictures which appeared in relatively early stages of the sighted. In contrast, some other unique strategies used by the blind in their late stages, such as: marking out; stamping and tracing; and structural depiction were infrequently seen in sighted people's drawings.
3. There existed differences in the projection systems used in the late stages of the blind and the sighted. Without visual experience, blind people tended to adopt orthographic projection and mixed-viewpoint approaches. Those who adopted near-oblique projection as well as oblique projection were the ones who had previous visual experience. None of the 135 drawings showed perspective or any sign of perspective. It appeared that vision was a critical condition to the development of perspective drawing among the blind.
4. Compared to the results of the present research, Kennedy's findings was unstable. Kennedy's study showed that his 4th stage (featured by vantage point drawings) required earlier visual experiences; his 5th stage (featured by metaphoric drawings) was absent; and the sixth stage (featured by diagrammatic drawings) was apparent only when the subjects showed an interest in realism after 18 years of age. In contrast

to these findings, the developmental stages suggested by I & Shiu (2001) were more stable. They were applicable to all 3 groups of subjects of the present research.

Hence, it could be stated that the developmental characteristics of the late stages, the developmental increments, and sequencing, the drawing strategies, and the projection systems adopted in the spatial representation of blind people's drawings were all significantly different from the drawings of the sighted people.

It could also be stated that tactility could not replace vision in providing necessary information for the blind to adopt advanced projection systems. Observing factors like age, condition of blindness, and characteristics of stimuli, the present results supported I & Hsiu's (2001) suggestion while rejecting Kennedy and colleagues' claims. In addition, it was found that earlier visual experience, personal interest, and proper art education were really the key reasons behind drawing advancement among the blind.

Keywords: spatial representation, blind, tactile development, drawing development

