

# Early psychological studies on touch in France

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In France, early psychological studies on touch belong to two domains which developed quite independently in the 18th, 19th and the first part of the 20th century. The first one concerned speculative (philosophical) and/or informal considerations made by practitioners and observers on the functioning of touch in early blind people, and more incidentally in cognitively impaired children. In the middle of the 19th century, studies on blindness led to the major invention by Louis Braille (1829 and 1837) of the raised-dot alphabet, universally used today, which allows early blind persons to have tactually access to written culture. The second trend is scientific and experimental. In the 19th century, this research concerned mainly the anatomy and physiology of somesthetic sensory receptors, neural pathways and cortical projections. Simultaneously, the methodological bases for experimental sciences were established. Further, and especially during the first half of the 20th century, studies labelled 'physiological psychology' were introduced in the academic institutions in Paris. Finally, thanks to the French psychophysicist and psychologist Henri Piéron (1881–1964), true experimental psychology appeared in France at the beginning of the 20th century. Regarding touch, these experimental works were mainly psychophysical and concerned the cutaneous and kinaesthetic sensibility of sighted adults, but higher levels of touch functioning were also studied. After the Second World War, the two trends mentioned above were associated and the experimental psychology of touch extended to blindness and sensory compensations [1, 2].

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## Early analyses of touch and touch-vision relations in blindness and education

Although the nature of the sensory experiences and the mental representations of complete congenitally blind people were already questioned in the Greek and Roman literature, thinking about blindness became central in a number of eminent philosophers' writings during the 18th century (the 'Enlightenment'). Initially, the reasons for this interest were not to provide practical help to the blind, but to obtain philosophical arguments challenging the dominant innatist conception of the origin of knowledge proposed by Descartes and others. Later, this focus on the blind and the observation of the capabilities of some of them led to the search of how the use of touch could allow them to receive instruction and train for a job.

### Diderot and the 'Letter on the Blind for the use of those who see' (1749)

The first main French contribution to these questions is the *Letter on the blind for the use of those who see* published in 1749 by Denis Diderot [3]. This philosopher belonged to the empiricist trend developed by Locke, Berkeley or Condillac, and was very interested by the discussion raised by the Irish philosopher William Molyneux. In his well-known letter (1693) to Locke, Molyneux asked whether a born-blind man whose sight

would be suddenly restored would immediately identify visually a cube and a sphere without first touching them. An affirmative answer would show the innate nature of perceptual knowledge whereas a negative answer would demonstrate that experience is necessary and that no cross-modal transfer is possible without previous visual-tactual association. Of course, Locke's [4] empiricist answer was that there would be no immediate shape identification by the blind and that learning was necessary to acquire knowledge by vision. By this time, there was not yet successful cataract surgery and this question was purely theoretical. It is noteworthy that, since 1728 and further, when some blind adolescents and adults recovered sight after surgery, their visual behaviour confirmed Locke's answer: Except for figure-ground segregation, no shape, size, orientation or number identifications were possible [5, 6].<sup>1</sup>

Diderot agreed with Locke's answer to Molyneux but, in his *Letter on the blind*, his theoretical considerations were based not on speculations but on the direct observation of a born-blind man living in a small city (Puisseaux) in the centre of France. Diderot was fascinated by the capabilities of this person who was married, had a son and made a living by selling the liquors he prepared. Diderot described very genuinely how this blind man could thread a needle and explore tactually volumetric lines and figures, with a preference for symmetrical ones. He noted his high ability to discriminate weights and textures, and how he could detect the presence of an obstacle near him by using the air movements sensed on the face. This was the first mention of the 'sense of obstacles' attributed to the blind in literature and named 'facial vision'. When Diderot asked the blind man if he would be glad to recover vision, the surprising answer was that he would prefer having longer arms to explore better around him by touch. In the same *Letter on the blind* Diderot also described how Saunderson, another early blind man living in England (who had died 10 years before) became a well-known mathematician, taught geometry and published a number of scientific articles.

Diderot was particularly interested by the cubes and small tactile materials used by Saunderson to carry out complex calculus.

This set of observations led Diderot to comment on the role of vision and touch and more generally of the different senses. He insisted on the fact that the intensive use of touch by blind people enhances in them its discriminative capacities and therefore demonstrates the crucial role of experience. This 'sensory compensation' supported the empiricist and sensualist views of the philosopher who stated that "*the assistance given by the senses to each other prevents them to improve*" (1749). Based on these observations, in his *Letter on the Blind*, Diderot also proposed some general philosophical considerations on the origin of knowledge, and on the reasons to reject the assumption of the intervention of God as Creator of the world. After this publication, Diderot was arrested and spent four months in prison because, according to the police, he wrote things going against morality and religion.

### **Valentin Haüy and the first school for blind children (1785)**

Valentin Haüy (1745–1822) was very impressed by the work of the abbey Charles-Michel de l'Épée (1712–1789). L'Abbé de l'Épée imagined a method, using manual signs and vibratory stimulations, in order to teach deaf-mute children to speak and write and he opened the first school for them in Paris. Encouraged by this success and very influenced by Diderot's (1749) *Letter on the Blind*, Haüy tried to find methods allowing blind children to read and write tactually. He conceived volumetric displays accessible to touch and potentially adapted for the blind. Mainly, he used enlarged wooden roman letters of our alphabet to emboss hard paper, thus obtaining characters in relief on the back of the sheet, and he designed tablets and cubes to support arithmetic operations.

In the early 1780s, Valentin Haüy met a young early blind boy (François Le Sueur), aged 17 years, who begged near the church. V. Haüy