

Development of Spontaneous Focusing on Numerosity in Kindergarteners

Helping children to master basic numerical skills has long been one of the major objectives of the kindergarten mathematics curriculum. Enhancing the *accuracy* of the skills is the key to mathematical success. Yet, what is often overlooked is children's *tendency* to use the skills. The tendency to make sense of numerosity (i.e., the number of items in a set) in the surroundings is known as spontaneous focusing on numerosity (SFON). When seeing some books on the teacher's desk, some children may spontaneously pay attention to their numerosity (i.e., how many books are there?), whereas others may pay attention to other aspects such as color and size. Importantly, those who tend to focus more on numerosity show better mathematical achievement later. Hence, the tendency to focus on numerosity matters in children's mathematical development. However, SFON is seldom included in traditional mathematics curricula. A major reason is that our current knowledge of SFON is rather insufficient. With the long-term goal to include SFON in the agenda of supporting children's mathematical development, this project aims to help us better understand what SFON is and how it develops over time.

To clarify what SFON is, Study 1 will differentiate between kindergarteners' tendency to focus on small numerosity and their tendency to focus on large numerosity. Because processing of small numerosity and that of large numerosity rely on different cognitive systems, it makes sense to expect that SFON for small numerosity is different from SFON for large numerosity. If that is the case, a child who has high tendency toward one type of SFON may not be necessarily as high on the other type of SFON as well. We will examine how the two types of SFON (for small and large numerosity) are related to different numerical skills. Study 2 will move on to examine the development of SFON. This is a longitudinal study with five phases, each separated by one semester across the three years of early childhood education in Hong Kong. In particular, we will ask whether children who start with a higher SFON will show a faster growth in SFON over time, thus widening the individual gap. We will also examine the potential reciprocal relation between SFON and numerical skills across development. Together, both studies will help us better understand what SFON is and when to support children's SFON in preschool years.