

Directions: In this section, you are going to read a passage with ten statements attached to it. Each statement contains information given in one of the paragraphs. Identify the paragraph from which the information is derived. You may choose a paragraph more than once. Each paragraph is marked with a letter. Answer the questions by marking the corresponding letter on *Answer Sheet 2*.

What happens when a language has no words for numbers?

- A) Numbers do not exist in all cultures. There are numberless hunter-gatherers in Amazonia, living along branches of the world's largest river tree. Instead of using words for precise quantities, these people rely exclusively on terms similar to "a few" or "some." In contrast, our own lives are governed by numbers. As you read this, you are likely aware of what time it is, how old you are, your checking account balance, your weight and so on. The exact numbers we think with impact everything in our lives.
- B) But, in a historical sense, number-conscious people like us are the unusual ones. For the bulk of our species' approximately 200,000-year lifespan, we had no means of precisely representing quantities. What's more, the 7,000 or so languages that exist today vary dramatically in how they utilize numbers.
- C) Speakers of anumeric, or numberless, languages offer a window into how the invention of numbers reshaped the human experience. Cultures without numbers, or with only one or two precise numbers, include the Mundurucu and Piraha in Amazonia. Researchers have also studied some adults in Nicaragua who were never taught number words. Without numbers, healthy human adults struggle to precisely distinguish and recall quantities as low as four. In an experiment, a researcher will place nuts into a can one at a time and then remove them one by one. The person watching is asked to signal when all the nuts have been removed. Responses suggest that anumeric people have some trouble keeping track of how many nuts remain in the can, even if there are only four or five in total.
- D) This and many other experiments have led to a simple conclusion: When people do not have number words, they struggle to make quantitative distinctions that probably seem natural to someone like you or me. While only a small portion of the world's languages are anumeric or nearly anumeric, they demonstrate that number words are not a human universal.
- E) It is worth stressing that these anumeric people are cognitively(在认知方面) normal, well-adapted to the surroundings they have dominated for centuries. As a child, I spent some time living with anumeric people, the Piraha who live along the banks of the black Maici River. Like other outsiders, I was continually impressed by their superior understanding of the ecology we shared. Yet numberless people struggle with tasks that require precise discrimination between quantities. Perhaps this should be unsurprising. After all, without counting, how can someone tell whether there are, say, seven or eight coconuts(椰子) in a tree? Such seemingly straightforward distinctions become blurry through numberless eyes.
- F) This conclusion is echoed by work with anumeric children in industrialized societies. Prior to being spoon-fed number words, children can only approximately discriminate quantities beyond three. We must be handed the cognitive tools of numbers before we can consistently and easily recognize higher quantities. In fact, acquiring the exact meaning of number words is a painstaking process that takes children years. Initially, kids learn numbers much like they learn letters. They recognize that numbers are organized sequentially, but have little awareness of what each individual number means. With time, they start to understand that a given

number represents a quantity greater by one than the number coming before it. This "successor principle" is part of the foundation of our numerical(数字的) cognition, but requires extensive practice to understand.

- G) None of us, then, is really a "numbers person." We are not born to handle quantitative distinctions skillfully. In the absence of the cultural traditions that fill our lives with numbers from infancy, we would all struggle with even basic quantitative distinctions. Number words and their written forms transform our quantitative reasoning as they are introduced into our cognitive experience by our parents, peers and school teachers. The process seems so normal that we sometimes think of it as a natural part of growing up, but it is not. Human brains come equipped with certain quantitative instincts that are refined with age, but these instincts are very limited.
- H) Compared with other mammals, our numerical instincts are not as remarkable as many assume. We even share some basic instinctual quantitative reasoning with distant non-mammalian relatives like birds. Indeed, work with some other species suggests they too can refine their quantitative thought if they are introduced to the cognitive power tools we call numbers.
- I) So, how did we ever invent "unnatural" numbers in the first place? The answer is, literally, at your fingertips. The bulk of the world's languages use base-10, base-20 or base-5 number systems. That is, these smaller numbers are the basis of larger numbers. English is a base-10 or decimal(十进制的) language, as evidenced by words like 14("four" + "10") and 31 ("three" x "10" + "one"). We speak a decimal language because an ancestral tongue, proto-Indo-European, was decimally based. Proto-Indo-European was decimally oriented because, as in so many cultures, our ancestors' hands served as the gateway to the realization that "five fingers on one hand is the same as five fingers on the other." Such momentary thoughts were represented in words and passed down across generations. This is why the word "five" in many languages is derived from the word for "hand." Most number systems, then, are the by-product of two key factors: the human capacity for language and our inclination for focusing on our hands and fingers. This manual fixation—an indirect by-product of walking upright on two legs—has helped yield numbers in most cultures, but not all.
- J) Cultures without numbers also offer insight into the cognitive influence of particular numeric traditions. Consider what time it is. Your day is ruled by minutes and seconds, but these concepts are not real in any physical sense and are nonexistent to numberless people. Minutes and seconds are the verbal and written representations of an uncommon base-60 number system used in ancient Mesopotamia. They reside in our minds, numerical artifacts(人工制品) that not all humans inherit conceptually.
- K) Research on the language of numbers shows, more and more, that one of our species' key characteristics is tremendous linguistic(语言的) and cognitive diversity. If we are to truly understand how much our cognitive lives differ cross-culturally, we must continually explore the depths of our species' linguistic diversity.
36. It is difficult for anumeric people to keep track of the change in numbers even when the total is very small.
37. Human numerical instincts are not so superior to those of other mammals as is generally believed.
38. The author emphasizes being anumeric does not affect one's cognitive ability.
39. In the long history of mankind, humans who use numbers are a very small minority.
40. An in-depth study of differences between human languages contributes to a true understanding of cognitive differences between cultures.

41. A conclusion has been drawn from many experiments that anumeric people have a hard time distinguishing quantities.
42. Making quantitative distinctions is not an inborn skill.
43. Every aspect of our lives is affected by numbers.
44. Larger numbers are said to be built upon smaller numbers.
45. It takes great efforts for children to grasp the concept of number words.