# The Babe

## Can a general motor ability be defined and measured?

All sports considered, the Babe ranks as one of the greatest athletes of all time. You may be thinking that I am referring to the baseball legend George Herman "Babe" Ruth, who was also known as the Sultan of Swat, the Great Bambino, and the Home Run King—the guy who powered his way to 714 home runs using hotdogs and beer as his stimulants of choice, rather than amphetamines, steroids, or human growth hormones.

But, no. The Babe that I'm talking about is Mildred "Babe" (Didrikson) Zaharias, another legendary athlete. She did it all, and did it all very, very well. Here is a partial list of her accomplishments: she was a professional athlete in the sports of basketball, baseball, tennis, and bowling; won two gold medals and one silver medal in track and field at the 1932 Summer Olympics; and dominated women's golf at both the amateur and professional levels for two decades until her untimely death from cancer at the age of 45. Babe Zaharias was the quintessential all-around athlete.

But what does the term *all-around athlete* really mean? We all have known people like Babe Zaharias—the kids who starred on the football and basketball teams and won medals in track and field. On the other hand, at the opposite end of the spectrum were those other kids—the all-around *non*athletes. They seemed to have no proficiency in motor skills whatsoever. Is there a simple factor that accounts for the occurrence of these all-around athletes and nonathletes? A popular view, sometimes called the general motor ability view, was that all-around athletes possess a general capability for skilled motor performance; they are good at all kinds of sports because they have an exceptional general capacity to perform motor skills. Conversely, the all-around nonathletes lack this general capability for skilled performance. Not surprisingly, the general motor ability view shared many similarities with views about the generality of other skills, such as cognitive skills (or general intelligence). Cognitive skills represent a person's fundamental potential for intellectual aptitudes and are supposedly captured in terms of an overall, unitary value (such as an IQ score).

One of the pioneering motor control and learning researchers in kinesiology, Franklin Henry (see "Antilock Brakes" in chapter 5), reasoned that if the general motor ability concept were true, a simple statistical prediction could be expected. Specifically, he suggested that if the all-around athlete were someone with an exceptional general motor ability, then an outstanding athlete would reveal excellent performances on a variety of athletic measures. Similarly, a person of good general ability should perform reasonably well on all of the same motor tasks, the average athlete would perform about average on the tests, and so on, with the poor athlete performing very poorly on all of the motor tasks in a motor skills test battery. Specifically, Henry predicted that if, say, 100 people of all abilities were to perform two motor skills tests, it would be expected that the best athletes would rank highest on both tests, the average athletes would rank average on both tests, and the weak athletes would rank poorly on both tests. In other words, their performances would be as shown in figure 8.2.

A statistical analysis called a correlation coefficient (*r*) measures the degree of association between two sets of data, such as the correlation between the performances on one skills test and the performances on a second skills test. If the degree of association is extremely high, then the correlation coefficient will approach a maximum value of $r = 1.0$. Indeed, if the rank of all 100 athletes followed the trend illustrated in figure 8.2, then the correlation coefficient would be a perfect $r = 1.0$.

| Athlete | Task 1 Rank | | Task 2 Rank |
|---|---|---|---|
| Best | 1st | ⟷ | 1st |
| ... | ... | | ... |
| Good | 25th | ⟷ | 25th |
| ... | ... | | ... |
| Average | 50th | ⟷ | 50th |
| ... | ... | | ... |
| Poor | 75th | ⟷ | 75th |
| ... | ... | | ... |
| Worst | 100th | ⟷ | 100th |

**Figure 8.2** An illustration of the prediction made by the general motor ability view. In this view, a person's ranked position on a performance test should be similar in two motor tasks, especially if the motor tasks are relatively similar (e.g., two balance tasks). A correlation measure for the data represented in this figure would reveal a high degree of association between the performances in the two tasks.

Henry and his students performed a number of studies that compared motor skills performance using various forms of balance tasks, speed tasks, and other tests of motor performance. In fact, sometimes the two tasks that were compared were very similar, such as balancing on one foot versus two feet or comparing the speed of responding with a hand (reaction time) versus the speed of moving a hand to a target (movement time) (see "Red Light, Green Light" in chapter 5, for more on the differences between reaction and movement time). The results were nothing at all like those in figure 8.2. Instead, they found something like the results illustrated in figure 8.3. Henry and his students found the correlation coefficients to be near zero ($r$ = 0.0).

These results, together with findings made by researchers in other laboratories, quite effectively refuted the general motor ability view. But, how does one explain the existence of a person like the Babe? Henry interpreted the findings of this research to suggest that the abilities that were responsible for a performance on any particular motor task are specific and unique to that task, and uncorrelated with the abilities required for the performance of a different task. In other words, Henry argued quite strongly that there is no general underlying motor ability. Instead, Henry suggested that people

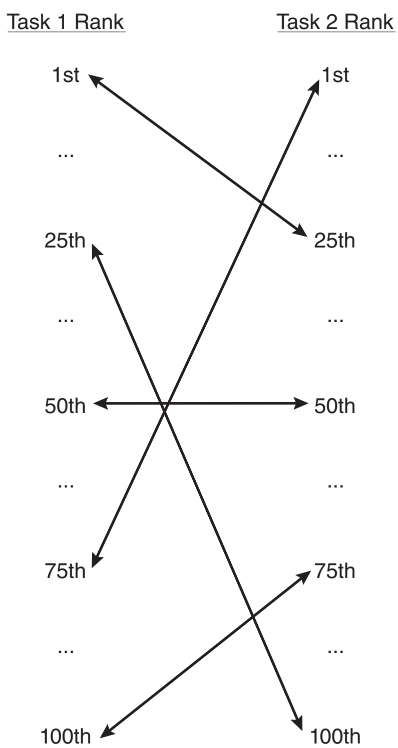


**Figure 8.3** An illustration of the findings of the research conducted by Henry and his colleagues. Performance tests in two motor tasks revealed a very low degree of association, resulting in a correlation coefficient of near zero.

From T.D. Lee, 2011, *Motor control in everyday actions* (Champaign, IL: Human Kinetics).

possess many separate abilities that are independent of one another and at very specific levels. In Henry's view, one's capacity to perform well on a task was a reflection of the level of abilities required to perform that task combined with the skills that have been practiced and are unique to that task. Therefore, the capacity to perform any one task will be specific because the requisite abilities and skills learned will be unique to that task. Hence, the relation between the performances on any two tasks will be uncorrelated.

Henry did not deny that athletes with a large number of exceptional motor abilities, like Babe Zaharias, existed. Moreover, someone like Zaharias, who probably devoted considerable practice time to each of her professional sports, could enhance her capacity to perform well with these specific abilities. But Henry denied that this evidence converged to support the view of athletic prowess as an expression of one single overarching motor ability.

## Self-Directed Learning Activities

1. Explain the general motor ability view in your own words.
2. In what way is a test for a general motor ability similar to an IQ test?
3. Henry termed his view the specificity of individual differences view. What did he mean by that?
4. Suppose you are asked to test a sample group of people for their general capacity to react quickly (i.e., reaction time ability). Suggest a methodology for assessing whether or not such an ability exists in your sample.

## Notes

- The association between two sets of ranks is just one type of correlation coefficient (often measured by a Spearman's Rho rank correlation coefficient), which is applied to ordinal types of data. The Pearson correlation coefficient is another type that is usually applied to data that are scaled, such as time and distance.
- Correlations ($r$ values) between 0.0 and +1.0 are just half of the story. Correlation values can also range between 0.0 and –1.0. In ranked data, for example, a perfect negative correlation of $r = -1.0$ would occur if the first-ranked person on one test scored last on the second test, the second-ranked person on one test scored second to last on the second test, and so on. Negative correlations could occur for scaled data such as when a good score on one test and a good score on another test are in opposite directions because of the nature of the variable measured. An example would be time and distance: a good time score is as low as possible (such as for the 100-meter sprint), but a good distance score is as high as possible (such as for the long jump).

From T.D. Lee, 2011, *Motor control in everyday actions* (Champaign, IL: Human Kinetics).

## Suggested Readings

Cayleff, S.E. (1992). The “Texas Tomboy”: The life and legend of Babe Didrikson Zaharias. *Organization of American Historians, 7*(1), 29-33. www.oah.org/pubs/magazine/sport/cayleff.html.

Henry, F.M. (1968). Specificity vs. generality in learning motor skill. In R.C. Brown & G.S. Kenyon (Eds.), *Classical studies on physical activity* (pp. 331-340). Englewood Cliffs, NJ: Prentice Hall. (Original work published in 1958.)

Hunt, P. (2000). 2. Babe Didrikson Zaharias, 1911-1956: Ultimate multisport athlete won three Olympic medals to go with 31 LPGA titles. http://sportsillustrated.cnn.com/siforwomen/top_100/2.

Park, R.J., Brooks, G.A., & Scott, M.K. (n.d.). In memoriam: Franklin M. Henry, Professor of Physical Education, Emeritus, UC Berkeley, 1909-1993. www.universityofcalifornia.edu/senate/inmemoriam/rranklinmhenry.html.

Schmidt, R.A., & Lee, T.D. (2011). Individual differences and capabilities. In *Motor control and learning: A behavioral emphasis* (5th ed., pp. 297-324). Champaign, IL: Human Kinetics.