



FAKES

What role does the psychological refractory period play in sport?

Highlight videos on sport newscasts often feature dynamic plays of the day. Some of the most spectacular of these are the fakes: Steve Nash drives toward the net, looks one way, and makes a no-look pass the other way; or Sidney Crosby fakes a shot to the upper left corner of the goal and then deftly moves the puck to the backhand to slide it past the goalie and into the right corner of the net. What makes the fake so fascinating is the response of the other person: he reacts to the initial move and then seems to be frozen in time, unable to respond to the change in plans when the final move is made.

Why do fakes work, and when don't they work? Many people believe that to make a fake work, the athlete has to sell it well. That is, the initial action has to be believable enough that the defender will react to it, thinking that this will be the action that needs to be defended. However, what comes after the initial move, and when it comes, determines how well the fake works.

One key element in making the fake work is the time between the two actions of the offensive player. Researchers have studied a similar type of experimental situation for many years. Essentially, a fake that works is one in which the defensive player is caught in a kind of cognitive limbo, what researchers refer to as the psychological refractory period. In biology, a refractory period refers to the latency of time following the excitation of a membrane during which it cannot be excited again. The membrane must return to its resting state before a stimulus can once again excite it. The term *psychological refractory period* was meant to convey a similar idea, although the processes involved appear to be more complex.

Research on the psychological refractory period has typically used a particular experimental situation, which I have illustrated in figure 6.2 *a* and *b*, using Steve Nash as an example. The bottom left gray bar in figure 6.2*b* illustrates the time the defender takes to react to the fake look to the right, and the much longer gray bar on the bottom right side of the figure illustrates the reaction to the real pass. The illustration simply shows that the reaction time to the real shot is much slower.

Note, however, that the comparison of the reaction time to the faked pass to the reaction time to the real pass is *not* the appropriate one to make. Rather, the reaction time to the real pass that either follows a fake (figure 6.2*b*) or does not follow a fake (figure 6.2*a*) is the appropriate comparison.

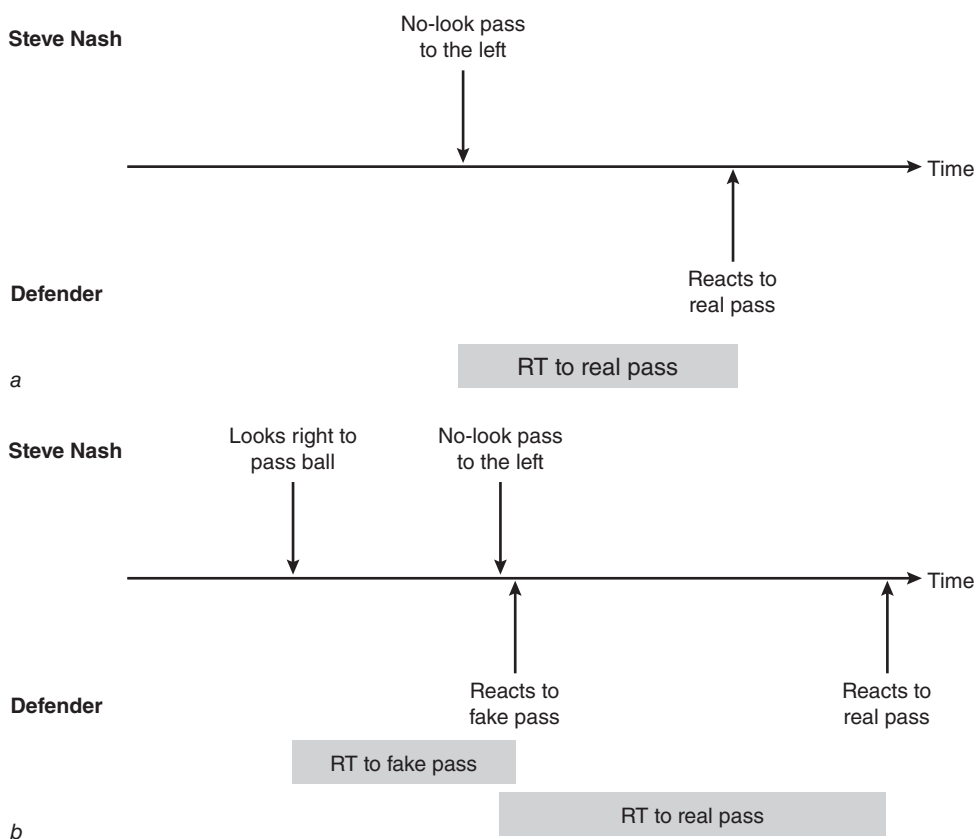


Figure 6.2 When fakes work (the psychological refractory period). The reaction time to a pass without a fake is shown in (a). The reaction time to a pass following a fake (b) is much longer.

In other words, how is the defender's reaction time to the real pass affected by whether it is preceded by the fake to the right or not preceded by the fake? The most important information in figure 6.2 *a* and *b* is the lengths of the gray bars illustrating the reaction time of the defender to the fake shot and the real shot.

The psychological refractory period refers to the (nonspecific) effect of having to respond to a second stimulus before the response to a first stimulus has been completed. In figure 6.2*a*, the reaction time to the real pass was relatively fast because there was no preceding stimulus, thus, no refractory period from which the respondent needed to recover before another reaction could be initiated. However, in figure 6.2*b*, the reaction time was delayed because the defender was trying to recover from processing and responding to the fake. The psychological refractory period refers to that period of time when a reaction to the second move must be delayed until the processing system is ready to go again.

Now, let's deal with the second issue: when do fakes *not* work? Again, research concerning the psychological refractory period provides some good ideas. Essentially, the reaction time to the real pass would be expected to be relatively short if the second move occurred either too soon or too long after the fake. Waiting too long after the fake (see figure 6.3*b*) gives the defender enough time to complete the refractory period, and therefore, the defender should be completely recovered and ready to respond quickly to the real pass.

The situation in figure 6.3*a* represents a case where Steve Nash does not wait long enough after the initial move (the fake look to the right) before starting the real pass to the left. Not waiting long enough after the fake represents a more interesting challenge to explain, and the research is not entirely clear about why this occurs. Perhaps the defender can cancel or inhibit the reaction to the fake before it begins, or perhaps the real shot comes before the defender even begins the reaction, and so he is fully prepared to respond to the real shot. Or maybe time is just an important part of selling the fake. In all, a fake not only is a visually interesting highlight to watch on TV but is fascinating and challenging to study as well.

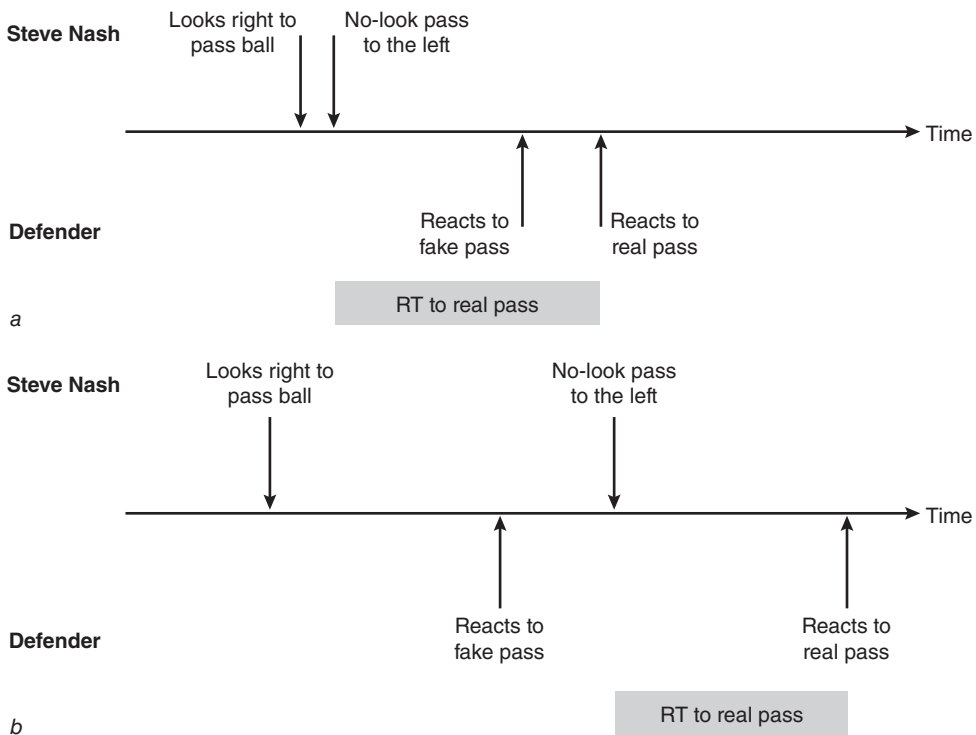


Figure 6.3 When fakes do not work. Reaction time to a pass made either (a) too soon after a fake or (b) too long after a fake will not likely be slowed by a psychological refractory period.

SELF-DIRECTED LEARNING ACTIVITIES

1. Define *psychological refractory period* in your own words.
2. Name two other factors, other than the time between the fake and real stimulus, that would influence the length of the reaction time to the real stimulus.
3. Describe how a psychological refractory period after a fake would work in a sport other than hockey or basketball.
4. Develop a methodology that would allow you to measure the duration of a psychological refractory period in the sport identified in question 3.

NOTES

- Only the defender's reaction time is being discussed here. In fact, the situation is complicated by the fact that the defender has moved to block the (faked) shot, and now is in both a psychological refractory period and at a biomechanical disadvantage to stop the real shot.

SUGGESTED READINGS

- Klein, R.M. (2000). Inhibition of return. *Trends in Cognitive Sciences*, 4, 138-147.
- Lien, M.C., & Proctor, R.W. (2002). Stimulus-response compatibility and psychological refractory period effects: Implications for response selection. *Psychonomic Bulletin & Review*, 9, 212-238.
- Schmidt, R.A., & Lee, T.D. (2011). Attention and performance. In *Motor control and learning: A behavioral emphasis* (5th ed., pp. 97-132) Champaign, IL: Human Kinetics.