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Outside Influence

Researcher Gabriele Wulf and CrossFit trainers explain how external cues can help athletes move better.

By Emily Beers

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Shaun Cleary/CrossFit Journal

Pat Barber is a member of CrossFit Inc.'s Seminar Staff and part of the coaching-development team at NorCal CrossFit.

He was tired of watching Jim round his back during a deadlift. He had tried every cue in the book to fix the problem.

But Pat Barber found his client was stubborn and always seemed to oppose his coach's requests. This time, Barber—a longtime member of CrossFit Inc.'s Seminar Staff—tried a different approach.

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Shaun Cleary/CrossFit Journal

Pat Barber (third from right) is unafraid to try creative cues to get his clients to move better.

“So I said, ‘Jim, this next one, round your back on this deadlift,’” Barber said. “And then he’s like, ‘Screw you, Pat,’ and he keeps his spine neutral suddenly.”

When Barber facetiously told his client to perform a deadlift incorrectly, he wasn’t worried about sounding smart or impressing Jim with an articulate cue or his long list of coaching credentials.

Instead, Barber had one mission: He wanted Jim to keep a neutral spine. In that moment, a seemingly incorrect cue—“round your back”—was the right one to achieve the goal, Barber explained.

This approach is straight out of the “[CrossFit Level 2 Certificate Course Training Guide and Workbook](#)”:

“Any cue that results in improved movement mechanics is successful and therefore, a ‘good’ cue. There is no specific formula, format, or rules to follow for cues, and their value is based on the result. Cues are not meant to accurately describe correct mechanics in a movement, and therefore, should not be judged based on technical

accuracy. Rather cues are used to help the athlete execute correct mechanics.”

Barber said being able to adapt your coaching commands to help a client move better is what sets good coaches apart from great ones. Echoing the Level 2 material, Barber said coaches should be less concerned about finding the most theoretically perfect coaching cue and more focused on discovering a way to help their athletes learn skills and move efficiently.

Similarly, most clients don’t care what their coach scored on his or her biochemistry or anatomy final exam in college—or if he or she went to college at all.

“Trainers may also rely on more technical language in their cues (i.e., ‘You are losing your midline!’), which assumes the athlete has a significant amount of fitness-related knowledge. While such language may give the appearance of being more technical (and perhaps an attempt to be more intelligent), it is at best a vague verbal cue. Cues should be kept to simple language that is easily understood by anyone,” according to the Level 2 handbook.

Knowledge of which muscles are flexing and which ones are extending provides only a lens for your own understanding, Barber explained.

“Cueing an athlete to move well is completely independent of that,” he said.

This usually means a 52-year-old accountant who is new to CrossFit will tune out when asked to “focus on the psoas” during a couch stretch. And cueing a group of athletes who don’t know their quads from their hamstrings to “activate the glutes” is sure to create blank stares. But when you tell a person to squeeze his butt cheeks as if someone were trying to stick a pencil in his bum, he’ll understand the cue, maybe let out a laugh and instantly respond by squeezing the glutes.

After 11 years of CrossFit, Barber has learned there is no such thing as the foolproof cue.

“The best cue is the one that works,” he said. “It doesn’t matter if you read it in a book or made it up on the spot.”

“Any cue that results in improved movement mechanics is successful and therefore, a ‘good’ cue.”

—“CrossFit Level 2 Certificate Course Training Guide and Workbook”

External vs. Internal Focus

While a foolproof cue might not exist, Gabriele Wulf, a researcher from the University of Nevada, Las Vegas (UNLV), has devoted nearly two decades to discovering how human beings best learn movements.

Wulf became interested in the topic when she was learning to windsurf in the mid-1990s. Before hitting the water for the first time, she turned to a magazine with an instructional article containing careful details about where

to place her feet and hands and how to shift her weight and flip the sail.

“I studied the magazine article and tried to do everything right, and it didn’t work very well,” Wulf said.

After a frustrating afternoon, she decided to scrap everything she had read and focus on the board instead. That simple change brought her instant success.

Since Wulf’s experience windsurfing, her career has been dedicated to unearthing what people should focus on when they’re performing physical skills. An article published in 2013 in the [International Review of Sport and Exercise Psychology](#) detailed her findings over the last 15 years.

Wulf’s research suggests people learn and retain skills more effectively when their focus is external as opposed to internal. This means when people are cued to focus on a movement’s effect or intended outcome (external focus), they learn and develop consistency with physical skills more effectively than when they’re tasked to concentrate



Courtesy of Gabriele Wulf

Gabriele Wulf struggled to learn to windsurf until she moved her focus from her body to her board.



Emily Beers/CrossFit Journal

Verbal cues often work very well, but great coaches also use tactile or visual cues to get athletes to move better.

on how their bodies are moving in space (internal focus), Wulf explained. For example, when an athlete is setting up for a back squat, it might be better to cue him to “push the bar up with your shoulders” than to “activate your traps.”

Cueing an athlete to focus on the outcome of the movement—external focus—usually means directing his attention to a piece of equipment or an area in space away from his body, Wulf said. For example, Wulf said if you’re teaching someone to golf, his performance is better when you ask him to focus on the swing of the club, the club face or the intended ball trajectory as opposed to cueing him to think about his arms, his wrists or the angle of his feet. Or when you’re teaching someone how to shoot a free throw in basketball, it’s best to cue the athlete to concentrate on the target—the hoop—rather than bogging the athlete down with internal details, such as how high his “shot pocket” should be in relation to his face.

“Or when you ski or rollerblade, for instance, and you focus on your knees and your feet, it’s less conducive to good performance. But if you focus on the skis, or the rollerblades, people learn better,” Wulf said.

When it comes to cueing for body-weight gymnastics movements, Wulf explained cues need to be creative because the movements don’t involve focusing on a physical object like a windsurfing board or skis.

One study she conducted involved acrobats who were tasked to perform a 180-degree turn in the air.

“We put a marker on the chest and we asked them to pay attention to the direction the marker was pointed,” Wulf said.

Focusing on the mark on the chest allowed the athlete to have greater body awareness in the air and successfully complete the 180-degree turn, Wulf explained.

When it comes to a simpler gymnastics movement such as a handstand, Wulf suggested telling the athlete to focus on the pressure he should exert into the floor as opposed to asking the athlete to activate his shoulders when he’s upside down.

From golfing and skiing to rollerblading, swimming and gymnastics, Wulf is convinced people learn and perform better when they’re given externally focused cues. This is the case for any physical task, she explained.

“Essentially, it’s a psychological phenomenon. . . . (An athlete becomes) less bogged down with all the little details, and it allows you to just focus on one thing,” Wulf said.

How She Got There

Through her research, Wulf has examined different general physical skills in relation to external versus internal focus. Specifically, she has studied balance, accuracy and movement efficiency.

In each study, participants were divided into groups. One group was given external cues, while another was given internal cues.

The study that tested for balance used a ski stimulator. Participants were asked to focus on their feet or on the pressure they were exerting on the wheels of the platform they were standing on. Those given the external coaching cues—focusing on the pressure being exerted on the wheels—demonstrated more effective balance than those asked to focus internally.

Other studies that tested for accuracy asked participants to perform various tasks, such as throwing darts and Frisbees or shooting basketball free throws. Meanwhile, studies that tested for movement efficiency looked at sprinting, swimming and rowing, as well as a vertical jump and a standing long jump.

During a study on vertical and long jumping, participants jumped higher and farther when their focus was external, and the right muscles also fired as they jumped—meaning their movement efficiency increased, too, Wulf explained.

“When you focus externally, movements are more automatic. And you don’t recruit the wrong muscles. You end up recruiting the necessary motor units or muscle fibers,” she said.

Wulf and her colleagues were able to measure jump efficiency by looking at an athlete’s maximum force production, which increased with external focus.

“The production of maximum forces requires an optimal activation of agonist and antagonist muscles, as well as optimal muscle fiber recruitment. Unnecessary co-contractions, imperfect timing, and/or direction of forces would result in less-than-maximal force output,” Wulf wrote in the article [“Attentional Focus and Motor Learning: A Review of 15 Years,”](#) published online in 2012.

She explained her findings don’t just apply to skill acquisition. They also apply to skill retention. Many of her studies have involved testing and re-testing athletes. Upon re-testing, athletes who were given external focuses retained their skills—even without further instructions—more often than those given internal focuses, Wulf said.

Greater retention, Wulf explained, means her external-focus theory applies to both beginners and more experienced athletes. One study found intermediate and expert swimmers with multiple years of competitive swimming experience also benefited from external focus.



Colleen Baz/CrossFit Journal

Kelly Brown often works with children and has found they respond very well to external cues.

Although her research is widely accepted in motor-behavior literature today, Wulf said the majority of coaches in different sports continue to cue their athletes with internally focused cues.

“When you focus externally, movements are more automatic.”

—Gabriele Wulf

“A central question for any athlete or coach is: How can skill learning be facilitated, and how can performance be optimized?” Wulf asked in “Attentional Focus and Motor Learning.” The article went on to cite the 2010 study “[Focus of Attention and Verbal Instructions: Strategies of Elite Track and Field Coaches and Athletes](#),” which suggested 84.6 percent of national-level track-and-field athletes said their coaches’ cues were mostly about body and limb corrections.

This gap between what her research shows and how coaches cue athletes in the real world should be bridged to help athletes of all levels maximize their performance, Wulf said.

“It makes so much sense to simplify (cues),” she said.

She added: “If you find the right instructions, they’ll be more successful.”

Putting It Into Practice

Kelly Brown is a CrossFit Kids Trainer Course coach and the owner of CrossFit Agoge in Montrose, Colorado.

“My life’s work has been getting kids to move,” Brown said, “on both ends of the health-wellness spectrum.”

Brown works with generally healthy, injury-free children at CrossFit Agoge, but she’s also a pediatric physical therapist and has worked with both injured and disabled children.

Children learn movements more effectively when they’re cued using words and concepts to which they can relate, Brown has discovered. Usually this means externally focused cues.

“Asking people to activate muscle groups tends not to work unless they have a real good idea of human anatomy,” said Brown. She noted that children do not. “So giving them something they can visualize, or an object they can figuratively steer toward, (works better).”

Instead of telling children to keep their elbows up, for example, Brown might say something like, “Pretend you have laser beams in your elbows and you’re trying to shoot laser beams across the room.”

Or if a kid is bottoming out during a squat because he’s not keeping tension, she’ll ask the athlete to squat to a box while pretending the box is smoking hot.

“If you’re thinking about burning your bum on a box, (the athlete) naturally tenses up and tightens up,” Brown said. “Trying to give them a visual that they can experience in a sensory way really helps, even if it’s in their imagination.”

While Brown is speaking specifically about children, the CrossFit Level 2 handbook (referenced above) notes that



While tactile cues aren’t an option when working with children, they often help adults “get out of their heads” and find success.

Emily Beers/CrossFit Journal



Colleen Baz/CrossFit Journal

Kelly Brown cautioned trainers to avoid trying to sound smart when cueing. Simple, direct language will work better, she said.

few adults require detailed anatomical descriptions in cues. Instead, simple but direct language is preferred and will produce the desired results.

Brown has also discovered she needs to be especially creative with children because she doesn't have the option of tactile cueing.

"You never want to put your hands on somebody's kids. We try to do everything visually and verbally because it's safer," she said.

With adults, trainers generally have more options and don't need to limit themselves when cueing if an athlete is OK with tactile cues.

"Corrective strategies should include verbal (i.e., speaking), visual (i.e., showing), and tactile (i.e., touching) cues, all of which may be employed to fix the same fault but may be interpreted differently among athletes. ... The greater the number of strategies a trainer can employ for any fault, the more likely he or she will be successful in correcting the fault," according to the Level 2 handbook.

While Brown spends much of her time coaching children, she said her coaching philosophy is generally the same for adults.

"I just try to make my cues less cutesy with adults," she said.

With both children and adults, Brown said the key is to focus on what you want and avoid getting too detailed and internally focused.

"Giving people the simplest language is best ... because they don't understand the context if you go all technical on them," Brown said.

This hasn't been an easy lesson for Brown to learn. When she first started coaching, she would catch herself giving her clients too many anatomical cues.

"(There's) an innate need to not sound like a dumb personal trainer. I understand human movement and I wanted to tell my clients about it. But the average person doesn't care."

She added: "Stick to telling them what they need to know. Don't get buried in the biomechanics of their mistake."

"Giving people the simplest language is best ... because they don't understand the context if you go all technical on them."

—Kelly Brown

Creative Cueing

Wulf's research gives coaches a template for how to best cue their athletes, but she explained it's only a template. She said she believes it's important for coaches to constantly discover new ways to relate to their athletes personally.

"Use creativity with your words and your mind," Wulf advised.



Emily Beers/CrossFit Journal

Coaches might be tempted to cue this athlete to “use the glutes,” but simply asking him to push the barbell toward the ceiling might be more productive.

She added: “And use images that people can relate to so that it makes them focus on the outcome instead of focusing on body movements.”

Barber, too, said he believes relating to his athletes is one of the most important aspects of cueing. He said one of the biggest mistakes coaches can make is repeating one command they think should always work.

“I see people with vast amounts of knowledge, and they think this cue should work, but then it doesn’t work with 90 percent of people,” Barber said.

Instead, like Wulf, he said he thinks it’s important to focus less on the particular command and more on the intended outcome of the movement.

“I see a huge misconception between cueing and what you actually want from an athlete,” Barber said.

He sees this a lot during Olympic weightlifting.

“Coaches who say, ‘There’s no such thing as a jump in an Olympic lift,’ I think, ‘Fuck off.’ We’re trying to get someone to extend their hips, and if they are cued to jump they’ll extend their hips,” Barber said. “Saying there’s no jump, that confuses the athlete.”

Although technically Barber doesn’t want his athletes jumping half a foot off the ground during a clean, if saying “jump” gets the job done, Barber believes it should be used.

“I’m not afraid of (a cue) not working,” he said. “I’m willing to try new things.”



About the Author

Emily Beers is a CrossFit Journal contributor and coach at *CrossFit Vancouver*. She finished 37th at the 2014 Reebok CrossFit Games.