WHAT WE SAY MATTERS
"What We Say Matters"
The Truth About Cueing

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Director of Movement and Education
NFL Combine Development Director

EXOS
THANK YOU

- Gabriele Wulf
- Athletes/Clients
Why...
  - Superior Coaching
  - Optimize Learning
  - Maximize Results

What...
  - Attention...Filter
  - Attention...Focus
  - Attention...Findings

How...
  - Performance Cueing...Strategies
  - Performance Cueing...Amplifiers
  - Performance Cueing...Framework
ATTENTION PLEASE

"The mechanism by which our brain registers information is what we call attention." - Mihaly Csikszentmihalyi
Attention...
"Limited Capacity Resource"

"You dispose of a limited budget of attention that you can allocate to activities, and if you try to go beyond your budget, you will fail."
When you're looking for a gorilla, you often miss other unexpected events.
When you're looking for a gorilla, you often miss other unexpected events
Attention Applied to Coaching

Adapted From: Magill, R., 2011-
Motor Learning and Control- Concepts and Applications 9th Edition
Short-Term Sensory Store:
Peripheral memory system, which holds incoming information until identified (last after .25-.5s)

Long-Term Memory:
Memory system that holds information and life experience...Unlimited Capacity

Short-Term (Working) Memory:
Allows retrieval, practice, processing, and transfer of information...Limited Capacity (7 +/- 2 items & lost after 10-20s)
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Long-Term Memory:

Memory system that holds information and life experience...Unlimited Capacity
"It is not simply the case that the longer a piece of information stays in STM then the more likely it is to go into LTM. Instead, the more significant a stimulus or event is then the greater likelihood it is retained in LTM"

"While LTM stores apparently limitless information (compared to STM), it has been argued that STM and LTM are not separate systems, but rather a unitary phenomenon that spans seconds to years."

Williams et al. (2008)
Strategies for coaching?

- Be a minimalist
- Create Context
- Make Mental Monsters
NOW What?!
Focus of Attention

The conscious effort of an individual to focus their attention through explicit thoughts and feelings in an effort to execute a task with superior performance.
Categories

Internal Focus:
  • Primary focus on the body (ex. muscles) and associated movement process (ex. extend hips)

External Focus:
  • Primary focus on movement outcome (ex. jump high) and associated affect on the environment (ex. push the ground)

Neutral Focus:
  • No explicit focus (ex. flow state)
Internal Focus
"Explode through your hips"

External Focus
"Explode off the blocks"
"Focus on squeezing your shoulder blades and pulling your elbows in"

"Focus on pulling the handles into your pockets"
"Hips Up and Squeeze Your Glutes"

"Get Long and Touch the Wall"
So who are you betting on???
Instructions for Motor Learning: Differential Effects of Internal Versus External Focus of Attention

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ABSTRACT: The effects of different types of instructions on complex motor skill learning were examined. The instructions were varied either in the participant’s own body movements (internal focus) or in the effects of those movements on the apparatus (external focus). The hypothesis tested was that external-focus instructions would be more beneficial for learning than internal-focus instructions. In Experiment 1, the participants (N = 33) performed state-type movement on a ski simulator. The instructions referred to the way in which force should be exerted on the platform that the participant was standing on. The instructions given to a control group referred to the participants’ own feet (internal focus), whereas the instructions given to another group referred to the wheels of the platform, which were located directly under the feet (external focus). The control group was given no focus instructions. All participants practiced the task on 2 consecutive days and performed a retention test on Day 3. Compared to the effects of internal-focus instructions and no instructions, external-focus instructions enhanced learning. Internal-focus instructions were not more effective than no instructions. In Experiment 2, an attempt was made to replicate the differential effects of external versus internal-focus instructions with a different task (shooting at a target). Consistent with Experiment 1, internal-focus learners (N = 16) to focus on 2 markers on the platform of the simulator (external focus) led to more effective learning than instructing them to focus on their feet (internal focus) as measured by a retention test after 2 days of practice. Practical and theoretical implications of these results are discussed.

Key words: focus of attention, instructions, motor learning, ski simulator

In an effort to identify variables that affect the learning of motor skills, researchers have been concerned with various aspects of the learning situation. Those include, for example, the organization of practice (for reviews, see Magill & Hall, 1992; Shapiro & Schmidt, 1982), the frequency or kind of feedback given to the learner (for reviews, see Salmon, Schmidt, & Walter, 1984; Schmidt, 1991), the presentation of a model (for a review, see McCullagh, 1993; McCullagh, Weiss, & Ross, 1989), or the provision of physical guidance (e.g., Winston, Poll, & Leibowitz, 1994; Wulf, Shea, & Whitelock, in press). One factor that has been largely ignored in motor learning research is the instruction given to the learner who is in the process of acquiring a new motor skill. Instructions are given before or during practice and include information about how to perform the skill. Instructions may be particularly relevant for the learning of complex skills—for example, in sports—in which often, several movement sequences have to be coordinated or many degrees of freedom must be controlled.

Experiments 1 & 2: Int: "Outer Foot" Ext: "Outer Wheels" Practice & Retention (Ext>Int=Control)

Experiments 1 & 2: Int: "Keep Feet Same Height" Ext: "Keep Markers Same Height" Retention (Ext>Int)
Attential focus and motor learning: a review of 15 years

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(Received 12 April 2012; final version received 20 August 2012)

Over the past 15 years, research on focus of attention has consistently demonstrated that an external focus (i.e., on the movement effect) enhances motor performance and learning relative to an internal focus (i.e., on body movements). This article provides a comprehensive review of the extant literature. Findings show that the performance and learning advantages through instructions or feedback inducing an external focus extend across different types of tasks, skill levels, and age groups. Benefits are seen in movement effectiveness (e.g., accuracy, consistency, balance) as well as efficiency (e.g., muscular activity, force production, cardiovascular responses). Methodological issues that have arisen in the literature are discussed. Finally, our current understanding of the underlying mechanisms of the attentional focus effect is outlined, and directions for future research are suggested.

Keywords: external focus; instructions; feedback; motor performance; movement effectiveness; movement efficiency
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1998

External focus superior during practice and retention for novice golfers
Wulf et al. (1999)

External focus improves reaction time during balance task (CAH-Support)
Wulf et al. (2001)

External focus increases speed and reduces iEMG during biceps curl
Vance et al. (2004)

External focus increases free throw accuracy and reduces associated iEMG
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External focus increases free throw accuracy and reduces associated iEMG

Zachry et al. (2005)
External focus increases shot accuracy in expert golfers

Wulf and Su (2007)
External focus improves balance in those with Parkinson's Disease

Wulf et al. (2009)
External focus reduced co-contraction during single joint exercise

Lohse et al. (2011)
External focus improved simulated driving performance with higher HRV levels and lower HR compared to Internal focus

Mullen et al. (2012)
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CONSTRAINED ACTION HYPOTHESIS

Internal..."Constrains motor system by interfering with automatic control process that would 'normally' regulate the movement"

Wulf et al., 2001

External..."allows the motor system to more naturally self-organize, unconstrained by the interference caused by conscious control attempts"
Constrained Action Hypothesis Cont...

Internal "focus on SELF"

"This activity may produce what amounts to a series of 'microchoking' episodes with attempts to right thoughts and bring emotions under control."

"Efforts to manage self-related thoughts and emotions may be so demanding that available attentional capacity is exceeded and performance suffers."

Wulf and Lewthwaite, 2010
Neurophysiology of Motor Learning

Cognitive Processing
- Frontal Cortex: Attention to motor action processing; sensory processing of visual & proprioceptive info
- Associative Striatum: Spatial Attention; Spatial Working Memory; and Chunking of motor sequence
- Cerebellum: Error detection, prediction, and anticipation of movement

Automatization
- Frontal Cortex
- Associative Striatum: Sensorimotor Striatum
  - Habit-like behavior; Automatization of motor skills
- Dentate Nucleus of Cerebellum
  - Long-term storage of execution of motor plan

Novice (Cognitive Stage) — Expert (Autonomous)

Adapted From: Katie Wadden et al. "Motor skill learning and its neurophysiology"
How can I apply this to coaching?!
Performance Cueing

...Strategies

“WHAT WE THINK, WE BECOME.”

-BUDDHA
SPEED
Directing attention externally enhances agility performance: a qualitative and quantitative analysis of the efficacy of using verbal instructions to focus attention

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The primary purpose of this study was to investigate if focusing attention externally produced faster movement times compared to instructions that focused attention internally or a control set of instructions that did not explicitly focus attention when performing an agility task. A second purpose of the study was to measure participants’ focus of attention during practice by use of a questionnaire. Participants (N = 20) completed 15 trials of an agility “L” run following instructions designed to induce an external (EXT), internal (INT) attentional focus or a control (CON) set of instructions inducing no specific focus of attention. Analysis revealed when participants followed the EXT instructions they had significantly faster movement times compared to when they followed the INT and CON set of instructions; consistent with previous research the INT and CON movement times were not significantly different from each other. Qualitative data showed when participants were in the external condition they focused externally 67% of the time. When they were in the internal condition they focused internally 76% of the time, and when they were in the control condition they did not use an internal or external focus of attention 77% of the time. Qualitative data also revealed participants in the EXT, INT, and CON conditions switched their focus of attention at a frequency of 27, 35, and 51% respectively.

Keywords: skill assessment, directions, practice

Control:

"Run through the course as quickly as you can with maximum effort"

External:

"Focus on pushing off the ground"

Internal:

"Focus on planting foot firmly"
"The line is your enemy"

"Push the line (ground) away"

"Snap (bounce) off the line (ground)"

"Angle in... Angle out"
"Push...drive...snap explode...bound"

"Away" ← [ ] → "Toward"
"Snap...spring...explode...spin..")

"Up & Lift"

"Down and back"
Internal Cues...External Cues

"Sit under the roof"

"Bend through your hips/knees"

"Drive the ground away"

"Weight on inside leg"

"Lean into the wall"

"Drive off outside foot"
STRENGTH & POWER
Specifically, attention should be directed onto the movement of the object being moved and away from the specific bodily movement involved in the action.

- Marchant et al. 2009

Focus On:
"Go hard or go home. I didn't get here with high reps and low weight!" 

"Stand...jump...punch...accelerate to ceiling (sky)"

"Push the ground"

"Pull...snap...throw...push...drive the bar"
External focus of attention is associated with improved jump height and distance.

Improved power is associated with a reduction in EMG, increased ground reaction forces and improved joint kinetics (i.e. efficiency) (Makaruk et al. 2012) showed similar results during a plyometric training program.
Focus on rim or highest reach point
Focus on line of farthest jump point
Internal Cueing... External Cueing

"Sit into your hips"

"Sit behind the bar"

"Push the bar back"

"Elbows/Chest Up"

"Knees Out"

"Push into miniband"
How do I maximize my cueing?!
Performance Cueing...

...Amplifiers
AMPLIFIERS
Increasing the Distance of an External Focus of Attention Enhances Standing Long Jump Performance

Jared M. Porter, Philip M. Anton, and Will F.W. Wu

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Abstract

Porter, J.M., Anton, P.M., and Wu, W.F.W. Increasing the distance of an external focus of attention enhances standing long jump performance. J Strength Cond Res 28(8): 2389–2393, 2014—Numerous studies have demonstrated that using verbal instructions to direct a performer's attention externally (i.e., toward the effect of the movement) significantly enhances motor skill performance. Limited research has also demonstrated that increasing the distance of an external focus relative to the body magnifies the effect of an external focus of attention. The purpose of this study was to investigate the effect of increasing the distance of an external focus of attention on standing long jump performance. Using a counterbalanced within-participant design, recreationally trained male subjects (n = 36) performed 2 standing long jumps following 3 different sets of verbal instructions (total of 6 jumps; each separated by 1 minute of seated rest). One set of instructions was designed to focus attention externally near the body (EDN); another set of instructions directed attention externally to a target farther from the body (EXF); the last set of instructions served as a control condition (CON) and did not encourage a specific focus of attention. The results indicated that the EDN and EXF conditions elicited jump distances that were significantly greater than the CON condition. In addition, the subjects in the EXF condition jumped significantly farther than those in the EDN condition. These findings suggest that increasing the distance of an external focus of attention, relative to the body, immediately improves standing long jump performance.

Key Words skill assessment, verbal instructions, motor learning, motor control

Introduction

Numerous studies have demonstrated that consciously directing attention externally rather than internally enhances motor skill performance (for a review, see [15]). An external focus of attention is achieved when conscious attentional resources are directed toward the result of a movement or the effect the movement has on the environment [18]. Conversely, when an internal focus of attention is used, cognitive resources are consciously directed inward toward the performer’s movement. Recent studies have demonstrated that standing long jump (11.14) and vertical jump (16.12) performance are enhanced by directing the performer’s attention externally rather than internally during the jumping action. Similar findings have been demonstrated using a variety of tasks (for a review, see [15]), and populations (9,19,21).

The benefits of an external focus of attention are typically explained using the constrained action hypothesis (20). This hypothesis suggests that directing attention externally facilitates nonconscious automatic cognitive processing, which allows the motor control system to produce fast and accurate movements. The automaticity that is facilitated by an external focus of attention promotes efficient neuromuscular activation (5), optimal movement patterns and elevated force generation (16), and enhanced agility performance (18). In contrast, when attention is directed internally, automatic processing is interrupted. This interruption “constraints” the motor control system, negatively influencing motor skill execution. Numerous studies have been conducted to validate the predictions made by the constrained action hypothesis (e.g., see [15]). McNevin et al. (6) demonstrated that the manipulation of the external focus distance relative to the body resulted in an amplification of motor skill learning and performance. In their study, the participants performed a balance task on...
Towards vs. Away

Focus Direction
Use action words that create images

Quick

Spin

Snap

Drive

Sharp

Explode

Bounce

Fluid

Focus Description
Words for the Wise

To make your message heard, it's best to paint a verbal picture.

Why do some CEOs inspire their people to outstanding performance, while Delaware—used two hallmarks of leadership as proxies: charisma and greatness.
### Images Versus Concepts

<table>
<thead>
<tr>
<th>Image-Based Words</th>
<th>Concept-Based Words</th>
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<tbody>
<tr>
<td>sweat</td>
<td>work</td>
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<td>hand</td>
<td>help</td>
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<td>clamor</td>
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<td>sweet</td>
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Source: Martindale's Regressive Imagery Dictionary

The stars, conquer the disease, tap the ocean depth. Encourage the arts and commerce. Here's a comparison that with Jimmy Carter's address: “Let our recent national history, a resurgent commitment to our principles of our nation, reflect the fact that if we despise our own future we have no future.” The data is striking. Kennedy’s speech pictures – close your eyes and see the night sky, a barren place, the murky waters. Carter's words prompt no such image. Quickly from memory.

What does that mean for business? “Business leaders,” explains, “tend to think in terms of goals, like boosting revenue. But they need to speak about change in terms of how they will
Analogy Learning

Feel like...  Be like...

Focus Description
AMPLIFIERS
Performance Cueing...

...Framework

ATTENTION! Lab
CUEING FRAMEWORK

- Performance Cueing
  - External
    - Distance
      - Proximal (Close)
      - Distal (Far)
    - Direction
      - Toward
      - Away
    - Description
      - Action (Visual) Words
      - Analogy (Feel vs. Be)
  - Internal
    - Set-Up Cues
    - Single Joint Movements?
    - Bodybuilding (Hypertrophy)
"Drive the Bar Towards the Ceiling Explosively"
"Snap the Bar to the Ceiling"

Description: "Just Like You Were Trying to Snap a Towel"
Final Thoughts...
The Big Question?

Can we trust the results of studies that have and continue to adopt internal cueing strategies?

What Next?

Continue to harden our knowledge of cueing and instruction and build-out a coaching framework... Periodization of Coaching
"Monday Morning Takeaways"

_Cueing = Words
_Words = Thoughts
_Thoughts = Images
_Images = Feelings
_Feelings = Actions
_Actions = Goals
_Cues = Goals
Final Thought
WHAT WE SAY MATTERS
Thank You for Your

ATTENTION

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