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Submit as 'Letter to the Editor' to Musculoskeletal Science and Practice

Re: The development of a shoulder specific left/right judgement task: Validity & reliability

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Dear Sir or Madam

Re: The development of a shoulder specific left/right judgement task: Validity & reliability

Left/right judgment tasks (LRJTs) have become big news and big business in musculoskeletal practice. A task that has its origins in experimental psychology to investigate the cognitive processes of mental rotation has been adopted by the field of rehabilitation as an assessment and intervention. Much of this has been accomplished with a strong rationale and a sound understanding of the underlying science.

More recently however, the approach has expanded rapidly from using images showing hands and feet to those of the neck (Wallwork et al., 2013), the trunk (Bowering et al., 2014) and now the shoulder (Breckenridge et al., 2017). This expansion appears to make a number of assumptions that are not supported by the underlying science.

There are three important concerns I will raise about Breckenridge et al.'s study. Firstly, one cannot assume that making a left/right judgment about any particular image of the human body requires the observer to perform motor imagery and have an intact body schema. While such a situation is typically true for hand images, where images present multiple body parts such as the shoulder with the head, neck, trunk and associated upper limb all visible (Breckenridge et al., 2017), judgments are more likely to reflect an individual's ability to visually code body parts spatially. This process is known as body structural description (Rumiati et al., 2009) and is performed without any reference to one's own body.

Secondly, if one wishes to make a comparison between response times for images showing different levels of awkwardness/complexity, this must be done on the basis of controlling the perspective from which the image is seen and the amount of visual information provided. Breckenridge et al.(2017) present images of the shoulder in a neutral position from above and

compare related response times with those for other positions (e.g. flexion, abduction) from the side and from behind; perspective is not controlled for. The response times reported are more likely to reflect these changes in perspective rather than any issue relating to the complexity/awkwardness of the shoulder position as claimed. At the very least, these two independent issues are confounded.

My third concern relates to the use of image rotation. For hand-based LRJTs, image rotation is central to creating images that require different amounts of limb movement, or movement simulation (Parsons, 1994). For images presented in the study by Breckenridge and colleagues, the use of image rotation requires an independent spatial transformation of the whole body, and one that is impossible to perform physically. Therefore, even if one accepts that participants imagine moving their arm to the positions presented, response times confound the relative contribution of this and the whole body transformation involved.

The concerns raised here are important because they threaten the validity of LRJTs. The adoption of these tasks by the rehabilitation field provides a potentially powerful tool to help address challenging clinical problems. However, if patients are to benefit optimally, it is important that we develop their use in a prudent manner with a clear understanding of the underlying science that informs their use.

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