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Hand preference patterns in expert basketball players: Interrelations between basketball-specific and everyday life behavior

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ABSTRACT

In the present study we examined the interrelation of everyday life handedness and hand preference in basketball, as an area of expertise that requires individuals being proficient with both their non-dominant and dominant hand. A secondary aim was to elucidate the link between basketball-specific practice, hand preference in basketball and everyday life handedness. Therefore, 176 expert basketball players self-reported their hand preference for activities of daily living and for basketball-specific behavior as well as details about their basketball-specific history via questionnaire. We found that compared to the general population the one-hand bias was significantly reduced for both everyday life and basketball-specific hand preference (i.e., a higher prevalence of mixed-handed individuals), and that both concepts were significantly related. Moreover, only preference scores for lay-up and dribbling skills were significantly related to measures of basketball-specific practice. Consequently, training-induced modulations of lateral preference seem to be very specific to only a few basketball-specific skills, and do not generalize to other skills within the domain of basketball nor do they extend into everyday life handedness. The results are discussed in terms of their relevance regarding theories of handedness and their practical implications for the sport of basketball.

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1. Introduction

In general, hand preference in human is lateralized with a strong bias towards the right side. This can be inferred from large cohort studies (e.g., Bryden, 1977; Gilbert & Wysocki, 1992; Perelle & Ehrmann, 1994; Raymond & Pontier, 2004), in which individuals were asked to report their preferred hand for activities of daily living (e.g., writing, throwing a ball or hammering). Reviewing hand preference patterns in a large number of individuals (i.e., over one million) from 81 international samples (Bryden, 1977; Gilbert & Wysocki, 1992; Perelle & Ehrmann, 1994), Raymond and Pontier (2004) found 85–93% right-handed and 7–15% left-handed individuals. Variations were explained by cultural differences. Gabbard and Iteya (1996) provided a trichotomous distribution of handedness in adults with around 84% right-handed, 6% left-handed and 10% mixed-handed individuals. Since half of the mixed-handed individuals tended to be more right-handed, while the other half tended to be more left-handed, this distribution is within the ranges of western societies shown by other studies (see Raymond & Pontier, 2004). Although it is commonly accepted that the hand bias is determined by genetics (Annett, 2002; Corballis, 1997; McManus, 2002) along with cerebral asymmetries (e.g., Goodale, 1988; Knecht, 2000; Schluter, Krams, Rushworth, & Passingham, 2001), little is known about its potential adaptability in response to lateralized or bilateral practice (e.g., Mikheev, Mohrb, Afanasiev, Landis, & Thut, 2002; Stöckel & Weigelt, 2012; Teixeira & Okazaki, 2007; Teixeira, de Oliveira, Romano, & Correa, 2011) and the interrelation between hand preference for activities of daily living (subsequently referred to as everyday life handedness) and hand preference in areas of expertise that require individuals being as proficient with their non-dominant as with their dominant hand.

In a recent study, Stöckel and Weigelt (2012) found that in competition professional basketball players use their non-dominant hand more frequently (up to 26.3% of all ball-contacts in a game) and with greater success than players from lower competitive levels. Likewise, the use of the dominant hand was reduced to 48.8% in professional players as compared to amateurs (59.2%). In particular, the higher non-dominant hand use of professional players compared to amateurs appeared for dribbling actions (47.0% versus 19.9%) and to a much lesser extent for passing (11.5% versus 4.4%) and catching actions (8.6% versus 2.0%). They assumed that the extensive basketball-specific practice (i.e., training of the dominant and non-dominant hand) accounts for the reduced one-hand bias (i.e., the strong tendency to prefer either the right or the left hand) in professional basketball players (i.e., in terms of a training-induced plasticity of handedness). However, in the absence of any measures of players' everyday life handedness and basketball history their assumption is disputable for at least two reasons: First, it is possible that individuals with a less pronounced hand preference in everyday life activities have an advantage over strongly lateralized individuals to advance to higher leagues in basketball (cf. Bale & Scholes, 1986). Second, the amounts of basketball-specific practice and/ or experience are not essentially related to players' competitive level (e.g., the basketball-specific experience of young talents playing in higher leagues can be substantially lower than that of older amateurs). In their view the higher prevalence of mixed-handed individuals (based on everyday life handedness) among professional basketball players shown elsewhere (cf. Bale & Scholes, 1986), would be ascribed to training-induced changes of lateral preference that extend into everyday life handedness. However, to date there is no evidence that domain-specific bilateral practice modulates hand preference for activities of daily living.

In that regard, the purpose of the present study was to examine whether the reduced one-hand bias in professional basketball players is specific to the domain of basketball or separate skills thereof, or if it depends on (or extends into) everyday life handedness. A secondary aim was to elucidate the role of basketball-specific practice (i.e., training on both the dominant and non-dominant hand) on hand preference in basketball and everyday life handedness. Therefore, 176 male basketball players from the three highest German leagues self-reported their hand preference for activities of daily living (i.e., everyday life handedness) via the Edinburgh Handedness Inventory (EHI; Oldfield, 1971) and their basketball-specific hand preference as well as details about their basketball-specific history via the Basketball Laterality Questionnaire (BLQ, a modified version of the Aberdeen Football Laterality Questionnaire, Carey et al., 2009). We hypothesized that professional basketball players would report a reduced one-hand bias for both, hand preference in basketball (cf. Stöckel & Weigelt, 2012) and