

## **Keeping in touch: play fighting and social knowledge**

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### **Introduction**

Play is usually thought of as a phenomenon of childhood (Burghardt 1998; Power 2000). In some species, playful modes of behavior are retained into adulthood (Pellis and Iwaniuk 1999b). Most often, adult-adult play involves play fighting (Aldis 1975; Fagen 1981). Unlike play fighting in juveniles, where the evidence for its functions has been difficult to discern, play among post-pubertal individuals is more clearly associated with fitness enhancing consequences. The literature shows that when it occurs in subadults and adults, play fighting is used in two general contexts -- social bonding and social testing (Pellis and Pellis 1996; Pellis and Iwaniuk 2000). That is, play fighting is a tool that can be used to assess and manipulate conspecifics (Breuggeman 1978). A comparison of species with and without this tool offers some insight into the value of such play.

While an adult male mouse or rat will attack a male intruder (Blanchard and Blanchard 1994), there is a striking species difference when they encounter one another in a neutral arena. Mice follow one of two options: aggressively attack the opponent or ignore him (Brain 1981; Blanchard et al. 1979). Rats have a third option: engage in playful fighting akin to that of juveniles (Smith et al. 1999).<sup>1</sup> Such play fighting may lead to the establishment of a dominance relationship as in colonies (Pellis and Pellis 1992; Pellis et al. 1993). If such play fails to resolve the relationship, the encounter may escalate into a serious fight (Smith et al. 1998, 1999).

In rats, unlike mice, such play fighting leads to a social world with more shades of gray, and so a greater demand for more sophisticated information processing (Whishaw et al. 2001). Therefore, play fighting among adults can be used as a window into social cognition. Two questions arise from the finding that adults use play fighting so as to assess and manipulate others (Breuggeman 1978; Pellis and Iwaniuk 2000). What kind of information about the other animal can be acquired via play, and what are the structural properties of play fighting that make it a suitable means of assessment and social manipulation? Studies in my laboratory of play fighting among adult rats illustrates some of the possibilities.

### **Play and social information**

Within a colony, adult male rats form a dominance hierarchy (Blanchard and Blanchard 1990; Calhoun 1963; Flannery and Lore 1977). When two unfamiliar male rats confront one another in a neutral arena, the home-status of the unfamiliar opponents affects the pattern of play and aggression that ensues (Smith et al. 1999). All males initiate play with a subordinate less often than with a dominant, and are more likely to evade the playful contact of a subordinate. However, they are more likely to engage a dominant in more prolonged physical contact. That is, during these encounters, the unfamiliar animals appear to recognize each other's respective home-colony status. What is unknown is whether the unfamiliar pairmates actually need to engage in playfighting to make that determination, or whether non-playful cues can provide such information. Rats are known to recognize dominant males by use of olfactory cues (Brown 1985). Indeed, before play fighting begins, rats engage in mutual anogenital investigation. It is also possible that visual cues may be involved (Calhoun 1963), such as a 'macho' swagger (Dittman 1992) or hypermasculine body proportions (Karen Dean, pers. comm.). Recent studies in my laboratory have shown that whatever these cues are, rats can make these judgements at a distance.

Under laboratory conditions, rats are typically maintained on a nutritious, but boring, diet of processed rodent chow. Therefore, when offered a fat-rich and delectable treat such as a sun flower seed, they take it readily. However, they must first husk the seed, a task which takes them several days of practice before achieving a high level of proficiency. When done properly,