



A counterbalanced version of Ainsworth's Strange Situation Procedure reveals secure-base effects in dog–human relationships

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Accepted 4 April 2007

Available online 18 May 2007

Abstract

It has been proposed that the dog–human relationship constitutes an infantile-like attachment. However, previous empirical support based on Ainsworth's Strange Situation test has proved inconclusive due to order effects inherent in the original procedure. In particular, these order effects compromise the ability to establish an essential facet of attachment: whether or not owners function as a secure base for their pet dogs. Order effects were counteracted in the present study by including a second condition in which the order of owner and stranger presence was counterbalanced. Hence, 38 adult dog–owner pairs were randomly placed in two conditions, both comprised of six 3-min episodes. In condition A, dogs entered an unfamiliar room with their owner; a stranger entered; the owner left the dog with the stranger; the dog was left alone in the room; the owner returned; and finally the dog was left with the stranger again. In condition B, the order in which owner and stranger were present was reversed. Secure-base effects were indicated in that the dogs explored, remained passive, played with the stranger and engaged in individual play more when in the presence of their owner than when left with the stranger or alone. Therefore, the dogs' behaviour provides evidence consistent with the hypothesis that the dog–human bond constitutes an attachment. The possible role of attachment in canine separation anxiety is briefly discussed.

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Keywords: Dog–human bond; Attachment; Ainsworth's Strange Situation; Separation anxiety

Despite evidence of a long and symbiotic history, few empirical studies have investigated the nature of the bond domestic dogs form with their human owners (Millot, 1994; Clutton-Brock, 1995; Wayne and Ostrander, 1999). Researchers have noted that much behaviour exhibited by

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young and old dogs alike toward their owners seems to elicit parental-like care (Hart, 1995; Askew, 2003). Indeed, some authors (Topal et al., 1998; Prato-Previde et al., 2003) have suggested that the dog–human bond is an infantile attachment (referred to as just attachment hereafter) which for the dog extends beyond infancy into adulthood.

Attachment refers to a particular type of bond that develops between an infant and its primary caregiver, usually the mother (Bowlby, 1958). Attached individuals tend to maintain proximity and contact and become distressed when involuntary separation occurs (Cassidy, 1999). In addition, caregivers provide the security and comfort needed to function as a secure base from which an infant can move off to engage confidently in other activities such as play or exploration (Ainsworth, 1989; Waters and Cummings, 2000).

The most commonly used empirical test for attachment is Ainsworth's Strange Situation Procedure (ASSP) (e.g., Ainsworth and Bell, 1970; Bard, 1991). In ASSP, an infant and his or her caregiver enter an unfamiliar room and are introduced to a stranger prior to experiencing three short episodes of separation and two of reunion. Typically the stress of separation activates the attachment system so that the infant becomes distressed and seeks to regain proximity and secure comfort on reunion.

Topal et al. (1998) were the first to show that adult dogs behave in a remarkably similar way to human infants during ASSP. However, most of Topal et al.'s findings provide evidence of no more than that dogs possess a preference for their owner over a stranger. In order to establish the relationship as an attachment, it is necessary to go beyond establishing a preference and to focus on behaviours that indicate security-, proximity- and comfort-seeking (Cassidy, 1999) and in particular one must show that the dog's owner functions as a secure base (Ainsworth, 1989).

Prato-Previde et al. (2003) used ASSP to look for specific attachment patterns, particularly secure-base effects. Despite detailed analyses, due to order effects inherent in ASSP, they were still unable to provide clear evidence that the dog–human bond constitutes an attachment. For example, they surmised that the significant decline in exploration from the first episode, when dogs were alone in the room with their owner, compared to episode 2, when the stranger entered, may simply have been due to lessening curiosity rather than wariness of the stranger. Furthermore, the decrease in social play with the stranger that occurred from between the last minute of episode 2 (owner and stranger present) and episode 3 (stranger present, owner absent) could possibly have been due to fatigue or reduced interest rather than the absence of the dog's "attachment figure". In short, the researchers concluded that the standardised order of ASSP episodes compromised their ability to isolate specific secure-base effects.

The present study addressed the issue of order effects by introducing a second counterbalanced condition which reversed the order of owner and stranger presence. Counterbalancing allowed us to be confident that any evidence indicating a secure-base effect, such as elevated levels of exploration in the presence of the owner versus the stranger, would be due to the identity of the person present and not just the order in which they appear during the course of the procedure. Additionally, in order to encourage an extended opportunity for exploration, a partition was pulled back at the end of the third episode allowing the dogs access to a second unfamiliar room. The inclusion of this novel modification to the procedure gave us further occasion to detect the secure-base effect of dogs returning to normal activity upon reunion with their owner.

In summary, we hypothesised that if owners function as attachment figures, we would find evidence not only of proximity-seeking, search behaviours and comfort-seeking, but also of specific secure-base effects. We predicted that: (1) the presence of the owner, over and above the stranger, would encourage calm passive behaviour, exploration, social play and independent play; (2) the dogs would exhibit similar stranger wariness as found in human infants and look

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