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Original Article

Synchronized behavior increases assessments of the formidability and cohesion of coalitions

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ABSTRACT

Synchronized behavior is a common feature of martial drills and military parades in many societies. Hagen and colleagues (Hagen & Bryant, 2003; Hagen & Hammerstein, 2009) hypothesized that the intentional enactment of synchronized behavior evolved as a means of signaling coalitional strength, as individuals who can synchronize are able to act in concert in agonistic contexts. Previous research has explored either the subjective consequences of synchrony for participants in synchronized behaviors or the effect of synchrony on observers' impressions of rapport among the synchronized actors. Critically, left untested is the central tenet that, by communicating that the individuals constitute a coordinated unit, synchronized behaviors signal elevated fighting capacity. We tested this prediction in two studies by asking large U.S. samples to judge the envisioned physical formidability – previously demonstrated to summarize assessments of diverse determinants of fighting capacity – of U.S. soldiers or terrorists on the basis of audio tracks of either synchronous or asynchronous footsteps. Consonant with the agonistic signaling hypothesis, participants judged the synchronized target individuals to be larger and more muscular than the unsynchronized individuals, an effect mediated by their assessment that the former collectively constitute a single unified entity. Although synchronized footsteps also enhanced listeners' perceptions of social bonding among the target individuals, this assessment did not mediate their judgments of elevated formidability, suggesting that synchrony primarily signals fighting capacity via revealed entitativity rather than inferred motivation.

1. Introduction

1.1. Synchronized behavior: theory and prior research

Across widely diverse cultures, and among societies of very different scales, synchronized behavior is a prominent feature of rituals and collective displays. Over the last two decades a growing literature has explored the psychological effects of synchronized movement and synchronized sound production (reviewed in Keller, Novembre, & Hove, 2014). At an elementary level, the effects of synchrony can be dichotomized into two classes, namely the impact that synchrony has on participants in such activities, and the impact that it has on observers. In a seminal book, McNeill (1995) proposed that synchronized movement enhances social bonding among participants, and that, over the course of human history, this process has played a pivotal role in the rise of cooperation. Pushing the roots of synchrony even farther back in time, Hagen and colleagues (Hagen & Bryant, 2003; Hagen & Hammerstein, 2009) argued that music and dance derive from phylogenetically ancient coordinated territorial defense signals; in humans, these signals were refined to communicate the size, cohesiveness, and capabilities of coalitions, as intentionally enacted synchronized behavior inherently requires both the ability and the motivation to effectively coordinate actions. In both of these accounts, participation in synchrony is associated with positive affects and self-concepts linked to social bonding – subjectively, individuals find participation in synchrony rewarding, experience themselves as closer to their fellow synchronizers, and are thus motivated to both aid their fellows and act in concert with them. However, differentiating their position, Hagen and colleagues propose that the driving force behind this phenomenon is the communicative function of intentionally synchronized behavior – the subjective consequences of participation in synchrony are explicable as the motivational and attitudinal concomitants of a system that exists primarily to convey information regarding the nature of a coalition (see also Merker, 2000; Huron, 2001; Fitch, 2006; Merker, Madison, & Eckerdal, 2009; Phillips-Silver, Aktipis, & Bryant, 2010). If synchrony serves to communicate information regarding coalitional strength, then, logically, there are two categories of recipients of this signal, namely fellow members of the synchronized group and outside observers who constitute either prospective allies or potential enemies. Consonant with their thesis, Hagen and Bryant (2003) demonstrated that listeners attend to musical synchrony in judging the degree of affinity and solidarity obtaining among musicians.

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Musical performance – the focus of Hagen and colleagues' theorizing – is a striking example of intentionally enacted synchronized behavior. However, this is not the only starting point for such theorizing. Coming at the problem of cooperation from the perspective of prior work on postural mirroring (LaFrance, 1985), LaFrance (1990) offered a brief theoretical sketch that, while lacking ultimate explanations or phylogenetic accounts, nevertheless directly parallels Hagen et al.'s perspective on the informational value of synchrony in communicating cohesiveness to both in-group and out-group individuals.

Although Hagen and Bryant's signaling paper has been highly cited in work exploring the psychology of synchrony, consonant with McNeill's initial focus, to date, much of this literature has focused not on outwardly signaling coalitional quality in the service of intimidating rivals and attracting allies, but rather on the subjective and behavioral consequences of participation in synchrony, particularly as they pertain to issues of conformity, cohesion, bonding, solidarity, prosociality, and cooperation (see, for example, Wiltermuth & Heath, 2009; Hove & Risen, 2009; Cohen, Ejsmond-Frey, Knight, & Dunbar, 2010; Kirschner & Tomasello, 2010; Valdesolo, Ouyang, & DeSteno, 2010; Kokal, Engel, Kirschner, & Keysers, 2011; Valdesolo & DeSteno, 2011; Wiltermuth, 2012b; Wiltermuth, 2012a; Fischer, Callander, Reddish, & Bulbulia, 2013; Launay, Dean, & Bailes, 2013; Reddish, Bulbulia, & Fischer, 2013a; Reddish, Fischer, & Bulbulia, 2013b; Kirschner & Ilari, 2014; Cirelli, Einarson, & Trainor, 2014a; Cirelli, Wan, & Trainor, 2014b; Fessler & Holbrook, 2014; Lumsden, Miles, & Macrae, 2014; Sullivan, Rickers, & Gammage, 2014; Dong, Dai, & Wyer, 2015; Rabinowitch & Knafo-Noam, 2015; Sullivan, Gagnon, Gammage, & Peters, 2015; Tarr, Launay, Cohen, & Dunbar, 2015; Zimmermann & Richardson, 2015; Tarr, Launay, & Dunbar, in press; see also Weinstein, Launay, Pearce, Dunbar, & Stewart, 2016). In contrast, the question of the interpretation of signals by non-participants has received less attention in this body of work (see Dong et al., 2015, as well as Lumsden, Miles, & Macrae, 2012, for exceptions).

As noted above, LaFrance's ideas on the communicative affordances of synchrony stemmed from investigations of postural mimicry. LaFrance's work is thus part of a larger literature examining apparently unintentional behavioral entrainment that occurs spontaneously in the course of quotidian social interaction. While differing in both context and emic conceptual framing from consciously orchestrated collective behaviors such as musical performances, rituals, and military drills, what is sometimes termed "interactional synchrony" (Chartrand & Lakin, 2013) nevertheless potentially presents some similar communicative affordances, stemming in this case from the bi-directional causal relationship between positive engagement among interactants and behavioral entrainment (Lakin, Jefferis, Cheng, & Chartrand, 2003). Correspondingly, while apparently unaware of Hagen and colleagues' work on orchestrated synchrony, investigators examining interactional synchrony and related phenomena (e.g., behavioral mimicry) have explored the effects of synchronized movements on observers' impressions of the relationships obtaining between synchronizing actors. Miles, Nind, and Macrae (2009) presented participants with either animated walking stick figures or audio recordings of people walking, varying the degree of synchrony among the walkers in each. Participants judged the walkers to have the greatest degree of rapport with one another when they were the most synchronized (i.e., either entirely in-phase or entirely anti-phase with one another). Lakens (2010) demonstrated that both waving stick figures and videotaped waving people were judged to have greater entitativity (the extent to which individuals are seen as constituting a unified group) when they displayed synchronous movements. Lakens and Stel (2011) obtained similar results for judgments of both rapport and entitativity using videos of waving people, with a follow-up experiment showing that judgments of rapport were greater when participants believed that the synchrony manifested spontaneously rather than as a result of instruction from a third party; in contrast, entitativity judgments were comparatively robust to such information. Using videos of people walking, Edelman and Harring (2014) demonstrated that synchrony enhanced judgments of both entitativity and rapport, with the effect being stronger for the former than the latter. Hence, while the total number of studies to date is limited, and published findings derive from studies of British, Dutch, and U.S. university students (a narrow spectrum from which to generalize about species-typical human psychology [Henrich, Heine, & Norenzayan, 2010]), nevertheless, there is reasonable preliminary evidence that observers indeed interpret synchronized behavior as indicative of coalitional cohesion. Given the relationship between social cohesion and coalitional formidability, such findings in turn provide partial support for the broader thesis that synchronized behavior, whether intentional or spontaneous, offers an avenue whereby the fighting capacity of a coalition can be communicated.

In parallel with the efflorescence of research on synchrony in humans, a growing body of work examines synchrony in other species. In particular, consonant with both Hagen and colleagues' signaling theory and their approach grounded in evolutionary biology, investigators have documented the importance of synchronized behavior in coalitional signaling and aggression in a number of species, including cetaceans (Connor, Smolker, & Bejder, 2006; Cusick & Herzing, 2014; Perelberg & Schuster, 2008; Senigaglia & Whitehead, 2012; Senigaglia, de Stephanis, Verborgh, & Lusseau, 2012), birds (Hall & Magrath, 2007), and primates (Fedurek, Machanda, Schel, & Slocombe, 2013).

Critically, despite the facts that i) researchers studying animal behavior have long identified agonistic conflict as a principal driver of coalitional formation, ii) students of human behavior have similarly viewed inter-group competition and violence as a key selective pressure in the evolution of human cooperation (Choi & Bowles, 2007; Bowles, 2009; Boyd & Richerson, 2009), and iii) such conflict plays a central role in Hagen and colleagues' much-cited papers on synchrony-as-signal, nevertheless, with only a few exceptions, research on synchrony in humans has neglected aggression and conflict. Wiltermuth demonstrated that experimentally induced synchrony increases compliance with instructions to aggress against an outgroup (2012b) or destroy insects (2012a), and we have previously shown that walking in synch with another man decreases men's estimations of the physical formidability of a hypothetical antagonist (Fessler & Holbrook, 2014), a measure that, as we discuss below, has been demonstrated to summarize the threat that a hostile other is seen as posing. However, while addressing aggression and conflict, all three of these findings pertain exclusively to the effects of synchrony on those participating in it, and thus do not speak to a key feature of the signaling model, namely the affordances for communicating features of the synchronized group to outsiders. Hence, against the backdrop of existing theory and empirical findings, a central prediction stands untested, namely that observers will judge a group of synchronized individuals both as more united and as constituting a more formidable fighting force than an equivalent group of unsynchronized individuals. Here, we investigate this prediction.

1.2. Background of the present study

Given strong cultural associations between military training and synchronized behavior, in designing an investigation of the relationship between synchrony and assessments of formidability, care must be taken to avoid demand characteristics. For example, were we to rely principally on overt questions regarding fighting capacity, participants might be more likely to discern the hypothesis at issue. To reduce demand characteristics, we therefore employed as key dependent measures assessments that, on the surface, appear not to be directly linked to fighting capacity in the modern era. Below we explain the logic behind, and evidence supporting, these measures.

In situations of agonistic conflict, individuals must quickly decide whether to fight, flee, appease, or negotiate, with a principal determinant of the optimal decision being the threat that the opponent poses, importantly including the relative fighting capacity of the two parties. In humans, relative fighting capacity is the product of many attributes, including martial skill, access to weapons, and the presence of allies.