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It Depends on the Partner: Person-related Sources of Efficacy Beliefs and Performance for Athlete Pairs

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Abstract

This study explored person-related sources of variance in athletes' efficacy beliefs and performances when performing in pairs with distinguishable roles differing in partner dependence. College cheerleaders (*n* = 102) performed their role in repeated performance trials of two low- and two high-difficulty paired-stunt tasks with three different partners. Data were obtained on self-, other-, and collective efficacies and subjective performances, and objective performance assessments were obtained from digital recordings. Using the Social Relations Model framework, total variance in each belief/assessment was partitioned, for each role, into numerical components of person-related variance relative to the self, the other, and the collective. Variance component by performance role by task-difficulty RM-ANOVAs revealed the largest person-related variance component differed by athlete role and increased in size in high-difficulty tasks. Results suggest the extent athlete performance depends on a partner relates to the extent the partner is a source of self-, other-, and collective efficacy.

Keywords: Self-efficacy, Other-efficacy, Collective efficacy, Performance role, Dyad

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For athlete-athlete dyads, the partner is an important feature of one's performance environment (Kenny, Mohr, & Levesque, 2001). The performance of a given task can feel subjectively easier or more difficult depending upon the partner. For example, as much as an American football receiver might be renowned for his ability to make unlikely catches, the possibility of success remains largely dependent on the quarterback being able to deliver the ball within the receiver's "catchable zone." One can imagine, therefore, that the receiver's confidence in successful pass completion on a certain route can vary according to which quarterback is passing the ball. In fact, elite athletes have reported that how a partner performs will influence both personal and team strategies (Wickwire, Bloom, & Loughead, 2004). It is reasonable to posit, as a consequence, that each athlete in a performance dyad will likely have beliefs about self-performance (e.g., self-efficacy), the partner's performance (e.g., other-efficacy), and their dyadic performance (e.g., collective efficacy) as postulated in theory (Bandura, 1977, 1997; Lent & Lopez, 2002). Unfortunately, how these beliefs are specifically dependent on perceptions of others in performing dyads remains an understudied aspect of team dynamics research (Back & Kenny, 2010; Kenny et al., 2001). The purpose of this study was to examine the person-related sources of variance in self-, other-, and collective efficacy beliefs and performances for dyad athletes performing in a low- versus high-dependence role during both low- and high-difficulty tasks.

Efficacy Beliefs

Self-efficacy refers to the belief in one's own capabilities to execute action (Bandura, 1977) and, as indicated by Feltz and Lirgg (2001), is one of the most important psychological constructs thought to affect performance outcomes (for review see Feltz & Lirgg, 2001; Feltz, Short, & Sullivan, 2008). Meta-analyses support self-efficacy is a moderate predictor of individual sport performance (Moritz, Feltz, Fahrbach, & Mack, 2000; Woodman & Hardy, 2003). These beliefs are grounded in interpretations of personal successes, vicarious and imagined modelling, verbal persuasion, and personal emotional and physiological responses (Bandura, 1977). Verbal persuasion and vicarious modelling, typically requiring input from outside the self, tend to be less influential sources of efficacy beliefs (Bandura, 1997; Feltz & Lirgg, 2001). Nonetheless, athletes can believe more strongly in their own abilities when performing with talented partners because, as argued by Katz-Navon and Erez (2005), self-action lacks distinction from collaborative actions to some degree in group performance. International-level athletes performing in dyads have indeed reported that their perceptions of their partner and dyad help to regulate their self-efficacy beliefs (Jackson, Knapp, & Beauchamp, 2008). Sources focused on the self, independent of others, are theorized to have the most potential impact on self-efficacy (Bandura, 1977).

Other-efficacy is a construct that relates to one's belief in a specific partner's capabilities (Lent & Lopez, 2002). For example, in a paired-skating "throw jump" task, the female may be highly confident in her male partner's ability to throw her into the air for takeoff (i.e., other-efficacy) regardless of how confident she is in her abilities to land without assistance (i.e., self-efficacy; for review see Jackson, Bray, Beauchamp, & Howle, 2015). Initial evidence supports other-efficacy contributes uniquely to the prediction of both personal and dyadic performance beyond what self-efficacy contributes (Beauchamp & Whinton, 2005; Dunlop, Beatty, & Beauchamp, 2011). Other-efficacy beliefs are theorized to emerge from perceptions of a partner's previous performances, beliefs about similar others, third party views, and social stereotypes (Lent & Lopez, 2002). Dyad athletes suggest that levels of other-efficacy result from comparing a current partner to previous partners while also considering past mastery achievements and experience as a dyad (Jackson et al., 2008). Perceptions regarding the self, however, were not a reported source suggesting other-efficacy beliefs are not influenced by focusing on one's personal performance abilities (Jackson et al., 2008; Jackson, Knapp, & Beauchamp, 2009).

Finally, the collective efficacy construct is focused upon perceptions of joint performance capabilities (Bandura, 1997). Lent and Lopez (2002) asserted that collective efficacy was important for conjoint consequences because levels of collective efficacy moderately influence group performance (Bandura, 1997; Stajkovic, Lee, & Nyberg, 2009). In parallel to self-efficacy, collective efficacy beliefs are subject to group-related mastery and vicarious experiences, verbal persuasion, and interpretations of emotional/physiological states (Bandura, 1997). Perceptions of the dyad have been indicated as a source of both self- and other-efficacy (Jackson et al., 2008, 2009). However, Lent and Lopez' (2002) suggestion of self-, other-, and collective efficacy being complimentary and mutually influential towards conjoint consequences has been essentially overlooked on this account. Interpersonal behavior studies have tended to be focused on larger size groups minimizing the focus of collective efficacy towards dyad performance (Gaudreau, Fecteau, & Perreault, 2010). Nonetheless, two-person teams are by definition the smallest size group (Williams, 2010). Collective efficacy, irrespective of a team's size, has been observed to be partially predicted by self-efficacy beliefs (Gully, Incalcaterra, Joshi, & Beaubien, 2002; Katz-Navon & Erez, 2005; Magyar, Feltz, & Simpson, 2004) and at times depend on pivotal members in one's group (Bandura, 1997; Damato, Grove, Eklund, & Cresswell, 2008), yet is proposed to be mostly influenced by group-level determinants (Bandura, 1997).

Dyad Task Structure

Dyadic interactions come in many forms with the extent of interdependence and the relationship between dyad roles serving to differentiate among dyad types (Gaudreau et al., 2010; Kenny, Kashy, & Cook, 2006). There are many influences (e.g., social and structural interdependence) that make individuals in a dyad more or less dependent on one another.

Task interdependence is implicated when group members have a common goal and each individual's performance in pursuit of that goal is affected by the other athlete (Katz-Navon & Erez, 2005). Typologies of task interdependence can vary (see Wageman, 2001 for further discussion), but the general consensus is that task interdependence exists on a continuum from actions that are entirely independent contributions towards the outcome through actions involving complex coordination between performers. For dyads with high task interdependence, the actions of each individual in the dyad elicits and constrains the actions of the other (Wageman, 2001) which then also shapes individuals' psychological processes including their efficacy beliefs (Katz-Navon & Erez, 2005).

Dyad performance tasks require each athlete to have a role in the dyad with a relationship existing between those roles (Bray, Brawley, & Carron, 2002). When athlete roles are equivalent, the dyad is classified as an *exchangeable dyad* (Kenny et al., 2006). In contrast a *distinguishable dyad* involves athletes who have distinct roles from one another in the performance (Gaudreau et al., 2010). In the distinguishable case, the level of dependence each athlete has on his or her partner may not always be mutual or symmetric (Kenny et al., 2006; Lent & Lopez, 2002). Competitive college cheerleading, for example, involves a variety of dyad tasks with distinguishable roles wherein breakdowns in performance can have injurious consequences. Many of the two-person acrobatic stunts require the smaller athlete to stand on the hands of his or her partner and/or be tossed into the air with the larger athlete responsible for the tossing and catching of the smaller athlete. An error from either partner can result in catastrophic injury (Jacobson, Redus, & Palmer, 2005; Mueller, 2009), but each athlete's role clearly includes different responsibilities for safe performance execution. In summary, dyads with distinguishable roles can have asymmetrical dependencies because of the task structure even while partners are seemingly equal in status in the partnership (Bray et al., 2002; Gaudreau et al., 2010; Katz-Navon & Erez, 2005).

A dyad task structure with distinguishable roles is particularly important to the current study because efficacy beliefs emerge in respect to an athlete's role and that role is linked to a level of dependence on the partner (Bray et al., 2002). Athletes in a high-dependence role need to concentrate on partner cues so as to enhance control of their personal contribution to dyad performance (Fiske, 1993; Snyder & Stukas, 1999). At the same time, athletes in a low-dependence role tend to concentrate less on a partner, instead focusing attention on the self because fulfillment of personal performance contributions fundamentally determines overall performance of the dyad. In competitive cheerleading dyads, both members' perceptions are likely focused on the larger athlete because the quality of performance actions from the larger athlete (e.g., poor "throwing") determines the potential quality of the dyad's performance. As a consequence of asymmetric dependence, the larger low-dependence athlete is more strongly self-focus oriented and the smaller high-dependence athlete is more strongly other-focus oriented. The extent to which information about a partner influences one's perceptions is determined, at least in part, by the athlete being in a high- or low-dependence role in the dyad (Back & Kenny, 2010; Kenny et al., 2001; Snyder & Stukas, 1999).

Finally, the difficulty of a task may also shape the extent to which perceptions are influenced by a partner. Efficacy beliefs are grounded in perceptions of difficulty and vary relative to changes in difficulty demand (Bandura, 1997, 2006). In dyadic tasks requiring one high- and one low-dependence role, asymmetrical dependence is likely exacerbated in more difficult tasks because the abilities of the low-dependence athlete have greater potential influence on prospective dyad success. As a consequence, compared to easier tasks, the self- and other-focus orientations may be intensified in more difficult tasks.

The Social Relations Model

Multi-dyad paradigms that allow for the changing of partners across repeated interactions have been commonly employed in Social Relations Model investigations (SRM;

Kenny, 1994; Kenny & La Voie, 1984). The SRM is an analytical framework that isolates the self, other, and collective sources of a construct by partitioning the total observed variance of a measured variable into actor, partner, and relationship variance components (Kenny, 1994; Kenny et al., 2001). The conceptual interpretations of these three components are provided in Table 1 with examples of how each component relates to dyad athlete's efficacy beliefs and performances. By definition, the *actor variance* represents personal consistencies occurring across a variety of partners while *partner variance* represents a tendency for a partner to be perceived (or behaved with) by all others in a consistent manner (Kenny, 1994). *Relationship variance* represents uniqueness occurring from a particular pairing of two athletes. Altogether, the observed variances across components numerically represent the extent to which an efficacy belief or performance is guided by reference to the self, the other, and/or the collective (Kenny, 1994; Kenny et al., 2001).

In the present study, we examined person-related sources of variance in self-, other-, and collective efficacy beliefs and performances among competitive cheerleading athletes performing in their low- or high-dependence role during low- and high-difficulty tasks. Theoretically, the actor, partner, and relationship variance components should generally account for the most variance in, respectively, self-, other-, and collective efficacy beliefs and performance (Bandura, 1977, 1997; Lent & Lopez, 2002). As a related matter, previous literature indicates that the size of variance components may differ by role for distinguishable dyads with asymmetric dependence because the low-dependence athlete has a self-focus and the high-dependence athlete has an other-focus orientation of attention (Bray et al., 2002; Gaudreau et al., 2010; Back & Kenny, 2010). Finally, in consideration of task difficulty, asymmetric dependencies should intensify the self- and other-focus orientations of attention required of each role. Taken together, our first hypothesis was that the actor variance component would be largest for the low-dependence athletes' self-perceptions during more difficult tasks. Our second hypothesis was that the partner variance component would be largest for the high-dependence athletes' other-perceptions during more difficult tasks. Our third hypothesis was that the relationship variance would be largest in collective perceptions for both members of the dyad during more difficult tasks. Finally, we hypothesized that the profile of variance partitioning for each role's objective performance would parallel the expected profiles for each role's subjective evaluations.

Method

Participants

Male (n = 51) and female (n = 51) college cheerleaders aged 18-25 years (M_{males} = 20.5 years, SD = 1.69; M_{females} = 19.1 years, SD = 1.10) from teams with national collegiate competition experience participated in the study. In accordance with the American Association of Cheerleading Coaches and Administrators (AACCA, 2015), dyad tasks require one *base* (i.e., the partner in direct contact with the performing surface while supporting the other dyad member's weight) and one *flyer* (i.e., the partner being supported and/or tossed into the air by the other dyad member). In this study, males always performed in the base role and females always performed in the flyer role. Females are traditionally introduced into the sport at an earlier age than males (Clifton & Gill, 1994), so unsurprisingly flyers in this study averaged over twice the duration of general cheerleading experience as bases (M_{bases} = 3.7 years, SD = 2.97; M_{flyers} = 9 years, SD = 3.82). Experience in co-ed cheerleading was comparable across roles (M_{bases} = 2.9 years, SD = 1.71; M_{flyers} = 2.8 years, SD = 1.71). Participants were in the beginning of their first (n = 48; 47.1%), second (n = 29; 28.4%), third (n = 18; 17.6%), or fourth (n = 7; 6.9%) year with their respective teams. These teams were members of National Collegiate Athletic Association Division I (n = 4), Division II (n = 1) and National Junior College Athletic Association Division I (n = 1) from the Midwest (n =1), Northeast (n = 2) and Southeast (n = 3) regions of the United States.

Procedures

After obtaining approval from the Human Subjects Committee at the University of Stirling, information sheets were emailed to 15 coaches at addresses gathered from respective team websites. Seven coaches responded to the invitation, and six agreed to their athletes being involved in data acquisition during a regularly scheduled practice at the beginning of the sport season. After participants provided informed consent, coaches placed three flyers and three bases into each group so as to provide each participant with three partners varying in experience levels while minimizing issues potentially impacting upon safety (e.g., participants' strength, size). Participants completed personal information sheets on age and experience before receiving a questionnaire packet on efficacy beliefs completed immediately before each task performance and subjective performance completed immediately after each task performance. For the remainder of the study, participants were asked to refrain from any verbal and nonverbal communication as is typical for cheerleaders performing in front of an audience. Participants performed four tasks with the same three partners, for a total of 12 performances, with the partner order being randomized. For all performance tasks, the lead author counted off the sequence for all dyads to perform simultaneously in front of a video camera. Objective performance, using video images of a front-view angle of each team of dyads set-up by the first author, was assessed post-data collection.

Performance Tasks

Four cheerleading paired-stunt tasks were employed in this investigation (see Figure 1). These dyadic tasks were selected from established early learning progressions for college-level cheerleading (AACCA, 2015). Tasks were performed at a standard pace requiring three full 8-counts for completion (i.e., approximately 9 seconds in duration). As illustrated in Figure 1, all tasks followed the same sequence including: (a) the flyer being freely tossed from her hips into the air by the base, (b) the flyer's feet landing on the base's hands in an overhead position, and (c) the base releasing the flyer's feet and catching the flyer's hips to assist her two-footed landing on the performance surface. The variation across tasks occurred in the overhead position with each subsequent task being somewhat more challenging in difficulty than the preceding task. Tasks 1 and 2 were relatively low in difficulty for cheerleaders at this competitive level (i.e., the flyer was held up by two feet) with Tasks 3 and 4 being higher in difficulty (i.e., the flyer was held up by only one foot). As was expected with these participants, self-reported experience on a scale ranging from 0 (*not experienced*) to 10 (*extensively experienced*) in performing the tasks was quite high (M_{bases} = 7.6 - 9.6, *SD* = 1.52 - 2.97; M_{flyers} = 8.8 – 9.7, *SD* = 1.25 - 1.91). Consistent with AACCA (2015) safety guidelines, respective team coaches automatically assigned spotters to athletes who were less experienced in a small proportion of performances (*n* = 93; 15% of the total number of tasks). These spotters were instructed to provide safety for the flyers with minimal task interference.

Measures

Efficacy Beliefs. Participants' responses to self-, other-, and collective efficacy were obtained using single-item measures. Previously, Feltz' (1982) measure of self-efficacy across four performance trials consisted of a four-item measure with each item quantifying one's confidence to perform a dive task of a certain difficulty. Subsequently, an extension of Feltz' (1982) study by LaForge-MacKenzie and Sullivan (2014), used a single-item measure of self-efficacy across the same skill performed for six trials. In the current study, single-item measures were employed because participants reported their efficacy related to the self, other, and collective across twelve performance trials (i.e., a requirement of 36 responses from each participant). Evidence suggests these measures are satisfactory in demonstrating relationships with performance of small to moderate effects (Moritz et al., 2000). Participants responded to the same question format for each efficacy belief with slight changes in the reference to provide target-specific efficacy beliefs (Dunlop et al., 2011; Jackson, Beauchamp, & Knapp, 2007; Jackson, Grove, & Beauchamp, 2010; Katz-Navon & Erez, 2005). Participants responded to the questions, “To what extent are you confident in [YOUR/ your PARTNER’s / YOU AND YOUR PARTNER’s collective] ability to perform the skill?” Each item was anchored at 0 (*not at all confident*), 5 (*moderately confident*), and 10 (*completely confident*). The presentation order of the three efficacy items was randomized within and between participants to manage potential order effects across response periods.

Subjective Performance. Participants rated self, other, and collective performances in a similar format to the efficacy inventory. Participants were asked to *please describe the performance* and then respond to the questions, “To what extent was [YOUR/ your PARTNER’s / YOU AND YOUR PARTNER’s collective] performance of the skill successful?” Each item was anchored at 0 (*not at all successful*), 5 (*moderately successful*), and 10 (*completely successful*). The presentation order of the three subjective performance items was randomized within and between participants.

Objective Performance. Standardized behavioral assessments of base and flyer performance were employed as described by Habeeb and Eklund (2016). The protocol involves assessing an individual’s performance on nine facets; three temporal phases of the performance task (as outlined in the task description) by three segments of the athlete’s body (arms and shoulders, core and hips, and legs and feet). Each of the nine facets were assessed on a four-point Likert-type scale representing *no errors* (0), *minor errors* (-1), *major errors* (-2), and *complete failures* (-3). The nine facet scores were then summed. Accordingly, the lowest possible score (i.e., -27) indicated poor performance and the highest possible score (i.e., 0; no errors) indicated excellent performance. All task performances (n = 1,224) were assessed by the first author and a second independent rater assessed a sample of performances to evaluate performance assessment objectivity. The second rater assessed 72 performances (i.e., 36 base, 36 flyer performances) from one team for the purpose of training and provision of feedback with the objective performance evaluation protocol. The second rater then independently assessed another 336 performances (i.e., 168 base, 168 flyer performances) from the remaining teams (i.e., 27% of the total number of performances within the current study). A high level of objectivity across raters was observed in the independently rated sample of performance evaluations as indicated by the absolute agreement interclass correlations (i.e., base performance ICC = .87; flyer performance ICC = .90).

Analyses

A SRM asymmetric half-block design (Kenny et al., 2006) was employed in this investigation wherein groups are divided by a meaningful variable (e.g., role, as occurred in this study) and members of each subgroup (e.g., flyer) are paired with all members of the other subgroup (e.g., base). Data were analyzed using Kenny's (1990) BLOCKO program to allow for the required by-role analyses. The SRM is focused on partitioning observed variance into components with any variance not partitioned into the actor or partner components being automatically assigned to the relationship variance component (Kenny et al., 2001). The relationship variance component is, therefore, contaminated by error variance. This is remedied when variance components are observed to be stable across two or more indicators of a single construct (Kenny et al., 2006; Kenny, 1994). In this study, tasks were used as indicators to generate low-difficulty (i.e., Tasks 1, 2) and high-difficulty (Tasks 3, 4) constructs to allow for error variance to be partitioned into a separate component.

Actor, partner, relationship, and error variance component means were estimated at the group-level (n = 17) within BLOCKO. Absolute variance component values were used for hypothesis testing, but the more easily understood relative values were also calculated for informative purposes. A relative variance value is equal to a component’s absolute variance value divided by the total absolute variance for that measured variable. Construct means computed within BLOCKO were then extracted for further hypothesis testing. One-sample

Wilcoxon signed-rank tests were conducted within SPSS version 21 for inferential tests on each variance component because one-sample t-tests were inappropriate given the marked skewness of the distributions (i.e., normality was rejected based on Shapiro Wilk tests; Hollander, Wolfe, & Chicken, 2013). Tests on the variance components were one-tailed because a negative variance is theoretically impossible (Kenny, 1994). Rejection of the null hypothesis, therefore, indicated that an observed variance was significantly larger than zero.

Comparisons of the magnitude of variance components at the construct level were subsequently conducted using 4 x 2 x 2 mixed-model RM-ANOVAs to examine variance component (actor, partner, relationship, error) by role (flyer, base) by task difficulty (low, high) interactions for efficacy and performance. A significant three-way interaction can be interpreted as the interaction between two variables differing across levels of the third variable. Kirk (1995) suggests that a series of tests of simple main effects should be performed to better understand significant three-way interactions. In this study, the two-way interaction between variance component and role was separately examined for low-difficulty and high-difficulty tasks. Next, for any significant two-way interaction, the one-way variance component interactions were separately examined for the base and the flyer roles. Finally, for any significant one-way interaction, within role pairwise comparisons were conducted in accordance to the hypotheses with the referent category for self-, other-, and collective perceptions being, respectively, the actor, partner and relationship variance components. The partial eta-squared effect sizes were interpreted using Cohen’s guidelines for small (.01), medium (.06), and large (.14) effects (Richardson, 2011).

Results

Descriptive statistics for the efficacy variables, and subjective and objective performances are reported in Table 2 for the low- and high-difficulty tasks.[1] The estimated SRM variance component means for low- and high-difficulty tasks are presented in Tables 3 and 4 for, respectively, the efficacy and performance variables.[2] Descriptively, there were very different profiles of variance partitioning patterns when comparing the bases and flyers. Inferentially, all variance components were significantly different than zero based on the Wilcoxon signed-rank tests, *Zs* = 2.21 - 3.62, $ps \leq .001$ - .031, except for the components relating to self-efficacy in low-difficulty tasks for flyers' partner variance, $Z = 0.00$, $p = 1.00$, and relationship variance, $Z = 1.60$, $p = .125$.

The results from the three-way mixed-model RM-ANOVAs conducted for the efficacy and performance variables are presented in Table 5. Mauchly's test indicated the assumption of sphericity was violated, χ^2 (5) = 10.96 – 171.58, $p < .001$ - .05, in all but two instances, χ^2 (5) = 7.05 – 8.65, $p = .12$ - .22, so Greenhouse-Geisser adjustments on the degrees of freedom were used for a more conservative test of the effects. The three-way interactions were significant in all instances with medium to large sized effects ($\eta_p^2 = .09$ - .19). Results of the simple main effects from these analyses are subsequently reported within self-, other-, and collective perceptions followed by objective performance.

Self-perceptions. It was expected that within ratings of self-efficacy, the bases' actor variance components would be larger than all other variance components and this would be more pronounced in the high-difficulty tasks. Results of the simple main effects pertaining to self-efficacy are presented in the upper panel of Table 6. The two-way variance component by role interaction was significant for high task-difficulty, but not low task-difficulty. Within high task-difficulty, the one-way variance component interaction was significant for the bases, but not the flyers. Pairwise comparisons indicated for the bases within high task-difficulty, the actor variance component was significantly greater than the partner variance component, $t(16) = 2.84$, $p = .012$, and relationship variance component, $t(16) = 2.70$, $p = .016$ (see Figure 2a). In contrast, however, the flyers' variance components were similar within and between low- and high-difficulty tasks.

The variance partitioning of self-performance evaluation ratings resulted in a profile similar to that of the self-efficacy ratings. Results of the simple main effects pertaining to subjective self-performance are presented in the upper panel of Table 6. Pairwise comparisons revealed for the bases within high task-difficulty, the actor variance component was significantly greater than the partner variance component, $t(16) = 3.30$, $p = .005$, and relationship variance component, $t(16) = 3.25$, $p = .005$ (see Figure 3a).

Other-perceptions. It was expected that within ratings of other-efficacy, flyers' partner variance components would be larger than all other variance components and this would be more pronounced in the high-difficulty tasks. Results of the simple main effects pertaining to other-efficacy are presented in the middle panel of Table 6. The two-way variance component by role interaction was significant for high task-difficulty, but not low task-difficulty. Within high task-difficulty, the one-way variance component interaction was significant for the flyers, but not the bases. Pairwise comparisons indicated for the flyers within high task-difficulty, the partner variance component was significantly greater than the actor variance component, $t(16) = 3.28$, $p = .005$, and relationship variance component, $t(16) = 2.98$, $p = .009$ (see Figure 2b). In contrast, the bases' variance components were similar within and between low- and high-difficulty tasks.

The variance partitioning of other-performance evaluation ratings resulted in a profile similar to that of the other-efficacy ratings. Results of the simple main effects pertaining to subjective other-performance are presented in the middle panel of Table 6. Pairwise comparisons revealed for the flyers within high task-difficulty, the partner variance component was significantly greater than the actor variance component, $t(16) = 2.91$, $p = .010$, and relationship variance component, $t(16) = 2.29$, $p = .036$ (see Figure 3b).

Collective perceptions. It was expected that within ratings of collective efficacy, the relationship variance component would be larger than all other variance components, regardless of role, and this would be more pronounced in the high-difficulty tasks. Results of the simple main effects pertaining to collective efficacy are presented in the lower panel of Table 6. The two-way variance component by role interaction was significant for high task-difficulty, but not low task-difficulty. Within high task-difficulty, the one-way variance component interaction was significant for both the bases and flyers. Pairwise comparisons indicated for the bases within high task-difficulty, the relationship variance component was significantly smaller than the actor variance component, $t(16) = -2.66$, $p = .017$, but not significantly different from the partner variance component, $t(16) = -.07$, $p = .947$ (see Figure 2c). Pairwise comparisons indicated for the flyers within high task-difficulty, the relationship variance component was significantly smaller than the partner variance component, $t(16) = -3.00$, $p = .008$, but not the actor variance component, $t(16) = -1.03$, $p = .317$ (see Figure 2c).

The variance partitioning of collective performance evaluation ratings resulted in a profile similar to that of collective efficacy ratings (see the lower panel of Table 6). Pairwise comparisons revealed for the bases within high task-difficulty, the relationship variance component was significantly smaller than the actor variance component, $t(16) = -3.08$, $p = .007$, but not significantly different from the partner variance component, $t(16) = .34$, $p = .738$ (see Figure 3c). Pairwise comparisons indicated for the flyers within high task-difficulty, the relationship variance component was significantly smaller than the partner variance component, $t(16) = -2.179$, $p = .045$, but not the actor variance component, $t(16) = 2.04$, $p = .058$ (see Figure 3c).

Objective performance. It was expected that the profile of variance partitioning for each role's objective performance would parallel the expected profiles for each role's subjective evaluations. Results of simple main effects pertaining to objective performance are presented in the upper panel of Table 6. The two-way variance component by role interaction was significant for low and high task-difficulty. Within low and high task-difficulty, the one-way variance component interaction was significant for both the bases and flyers. Pairwise comparisons indicated for the bases within low task-difficulty, the actor variance component was significantly larger than the partner variance component, $t(16) = 3.49$, $p = .003$, and relationship variance component, $t(16) = 2.93$, $p = .010$. Pairwise comparisons indicated for the bases within high task-difficulty, the actor variance component was significantly larger than the partner variance component, $t(16) = 2.39$, $p = .030$, but not the relationship variance component, $t(16) = 1.54$, $p = .142$ (see Figure 3d). Pairwise comparisons indicated for the flyers within low task-difficulty, the partner variance component was significantly larger than the actor variance component, $t(16) = 2.51$, $p = .023$, but not the relationship variance component, $t(16) = 1.00$, $p = .332$. Pairwise comparisons indicated for the flyers within high task-difficulty, the partner variance was not significantly different from the actor, $t(16) = 1.77$, $p = .096$, or relationship variance components, $t(16) = 1.42$, $p = .176$ (see Figure 3d).

Discussion

The purpose of this study was to examine the person-related sources of variance in athletes' self-, other-, and collective efficacy beliefs and performances across athlete role and task-difficulty. The findings were largely, but not completely, consistent with what was hypothesized. First, the actor variance was largest for self-perception ratings by the bases indicating levels of self-efficacy for the low-dependence role remained mostly consistent, irrespective of a partner, and in line with a self-focus orientation. A different profile of variance partitioning was evident in self-perception ratings by the flyers who appeared to rely upon multiple sources of person-related information (i.e., self, partner, and dyad). Second, the partner variance was largest for other-perception ratings by the flyers indicating levels of other-efficacy for the high-dependence role were mostly varied, specific to a partner, and in line with an other-focus orientation. A different profile of variance partitioning was evident in other-perception ratings by the bases. Interestingly, the variance partitioning profiles in collective perception ratings paralleled the expected focus orientations for each role. Overall, the person-related sources of efficacy beliefs, as indicated by the differing profiles of variance partitioning, were not equivalent across roles, a finding similar to research on efficacy beliefs in coach-athlete dyads (Jackson & Beauchamp, 2010; Jackson et al., 2009).

As expected, role differences observed in the profiles of variance partitioning for objective performance paralleled role differences observed for athlete's subjective ratings. Bases' performances were mostly consistent across partners indicating their performances were least dependent on a partner whereas flyers' performances mostly varied with each partner indicating their performances were most dependent on a partner. The profiles observed for objective performance were indicative of one partner's performance being more dependent on the other partner's performance. The results support Snyder and Stukas' (1999) contentions that asymmetrical dependencies within dyads can result in the quality of Partner A's individual performance contributions being the boundary for the quality of Partner B's individual performance contributions. Parallel patterns of variance profiles across subjective and objective performance evaluations and efficacy beliefs also suggest asymmetric dependence in a performance task has a reasonable link to whom athletes form efficacy beliefs around within a dyad. In the current study, athletes' objective performances were not equally dependent on one another, especially in high-difficulty, which helps clarify Gaudreau et al.'s (2010) argument that task structure can meaningfully distinguish the dyad partners.

Contrary to theoretically based expectations, collective efficacy ratings were not observed to be relationally-oriented. Instead, profiles of variance partitioning paralleled the expected focus orientations associated with the high- and low-dependence roles. It may be that in dyads, collective efficacy is simply analogous to individual-level perceptions because each individual has more personal control of group coordination compared to when performing in larger size teams (Wickwire et al., 2004). As a related matter, early season collection of data could have resulted in collective efficacy beliefs having some equivalence to group members' beliefs about individual-level abilities (Feltz & Lirgg, 1998). So, in hindsight, it may have been improbable to assume collective perceptions would be mostly reflective of relationship uniqueness given the nature of dyad performance and time of season data were acquired. The use of distinguishable dyads in this study has provided results in line with Damato et al.'s (2008) findings and Bandura's (1997) assertions that a group's collective efficacy may depend on the athlete most essential to performance. Additional research, such as conducting the same study at season end, because collective efficacy beliefs emerge with the passing of time, might clarify the extent to which dyad athletes interpret collective abilities as akin to independent abilities (Feltz & Lirgg, 1998).

The current findings may have implications in larger team settings and should be considered for future research directions. Bandura (1997) asserts that one cannot assess personal capabilities towards a group task without making assessments of the entire group's capabilities. Yet, uncertainty exists for how an athlete will simultaneously weigh, process, and separate evidence among several related types of efficacy across team members (Feltz & Lirgg, 2001). The current findings suggest dependence on others to perform may help explain under what circumstances, and for which athletes, qualities related to the self, other, or group will be integrated into self-, other-, and collective perceptions. Variations of the SRM such as the round-robin design target one-to-one perceptions existent within groups of at least three members (Kenny et al., 2006). Such an investigation, although complex, would start to broaden understanding of the one-to-one relationships existent within larger teams.

For future research, studies with different dyad sports (e.g., paired sailing, synchronized diving) and relationships (e.g., coach-athlete, parent-athlete, and consultant-athlete) would clarify the way in which both task and formal dependencies shape athlete cognitions. First, comparisons made across exchangeable and distinguishable dyads would help depict how athlete cognitions emerge in regards to the asymmetry between performance roles (Bray et al., 2002; Gaudreau et al., 2010). Second, the examination of coach-athlete relationships has revealed differences across roles in the antecedents and consequences of efficacy beliefs (Jackson & Beauchamp, 2010; Jackson et al., 2009). Role differences can be further examined within a SRM analysis of any dyad involving one member who assumes a formal leadership role to provide a numerical representation of the extent to which efficacy beliefs vary across relationships for the leader and subordinate roles.

This study has limitations that occurred as a consequence of task structure and sport culture. The performance roles of the athletes inherently implicated other relatively stable factors (i.e., overall cheerleading experience, gender) that were not controlled for in this investigation. Even though average overall cheerleading experience was higher for flyers, task-specific experience was not a distinguishable factor between the roles because the average experience in co-ed cheerleading was comparable. Moreover, support for a gender explanation for differences in athletes' cognitive-performance relationships has not been previously observed in both athlete-athlete and coach-athlete dyads (Jackson & Beauchamp, 2010; Jackson, Beauchamp, & Knapp, 2007). Female cheerleaders have been reported to be more confident than males in feminine typed cheerleading tasks (i.e., cheers and motions, jumps, dance), but no differences in confidence were observed between females and males in the performance of partner-stunts such as those employed in this study (Clifton & Gill, 1994). This suggests the partners were distinguishable by role, but future research using the SRM should examine same gender dyads with distinguishable roles to more formally test the hypothesis that gender, rather than performance role, might have been a crucial factor in the findings observed in this study.

It is difficult to tease apart the network of interactive efficacy beliefs within a particular relationship (Feltz & Lirgg, 2001; Lent & Lopez, 2002). Findings from this study provided evidence that efficacy beliefs, subjective performances, and objective performances vary across performance pairs. Further, the results suggest the extent athlete performance depends on a partner, an aspect of one’s performance role, relates to the extent a partner is a source of athlete self-, other-, and collective efficacy beliefs.

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Footnotes

[1] The task-level descriptive statistics are reported in Table S1 of the online supplemental materials associated with this report.

[2] As noted in the analyses subsection, relationship variance components are contaminated by error variance for individual tasks so they are uninterpretable on individual tasks. However, the actor, partner, and relationship variance components at the task-level are reported in Table S2 of the online supplemental materials associated with this report.

1

Table 1. The interpretation of person-related variance components within the Social Relations Model for dyad athlete's efficacy beliefs and performance.

Variance Component	Person- Source	General Interpretation	Efficacy Example	Performance Example
Actor	Self	Athlete's average rating across all partners.	An athlete reports a consistent level of confidence regardless of partner.	An athlete performs at a consistent level regardless of partner.
Partner	Other/Partner	Athlete's average rating elicited from all partners.	An athlete reports a level of confidence with a partner because all athletes report that certain level of confidence when with that partner.	An athlete performs at a particular level with a partner because all athletes perform at that particular level when performing with that partner.
Relationship	Collective/Dyad	Athlete's average rating unique to a particular partner beyond what is associated with actor or partner tendencies.	An athlete reports a unique level of confidence with a particular partner.	An athlete performs at a unique level with a particular partner.

Table 2. Means and standard deviations for efficacy and performance variables within the low- and high-difficulty performance tasks.

		Base		Flyer	
		M	*SD*	*M*	*SD*
Self-Efficacy					
	Low-Difficulty	9.59	1.04	9.69	.72
	High-Difficulty	8.56	2.28	9.13	1.30
Other-Efficacy					
	Low-Difficulty	9.50	1.09	9.29	1.43
	High-Difficulty	9.00	1.80	8.48	1.94
Collective Efficacy					
	Low-Difficulty	9.46	1.15	9.09	1.44
	High-Difficulty	8.40	2.20	8.25	1.90
Self-Performance					
	Low-Difficulty	9.16	2.03	9.39	1.16
	High-Difficulty	7.61	3.22	8.53	2.30
Other-Performance					
	Low-Difficulty	9.51	1.42	8.99	1.89
	High-Difficulty	8.70	2.33	8.13	2.58
Collective Performance					
	Low-Difficulty	9.22	2.02	9.01	2.06
	High-Difficulty	7.67	3.14	8.05	2.69
Objective Performance					
	Low-Difficulty	-7.42	3.87	-4.09	3.58
	High-Difficulty	-11.05	5.35	-5.85	4.24

Note. The reported means are a product of each participant (*n* = 51 bases, 51 flyers) reporting three observations (*n* = 153 bases, 153 flyers) across two tasks (Tasks 1, 2) for low-difficulty and two tasks (Tasks 3, 4) for high-difficulty.

Table 3. Absolute and relative variance component means of efficacy beliefs for the base and flyer roles.

		Bases' Variance Components				Flyers' Variance Components			
Variable		Actor	Partner	Relationship	Error	Actor	Partner	Relationship	Error
Self-Efficacy									
	Low-Difficulty	.78 (.36)	.10 (.04)	.09 (.04)	1.22 (.56)	.47 (.52)	.00 (.00)	.06 (.06)	.37 (.41)
	High-Difficulty	5.54 (.75)	.07 (.01)	.29 (.04)	1.49 (.20)	1.27 (.51)	.08 (.03)	.30 (.12)	.81 (.33)
Other-Efficacy									
	Low-Difficulty	.39 (.21)	.54 (.29)	.21 (.11)	.73 (.39)	.34 (.11)	1.54 (.51)	.42 (.14)	.72 (.24)
	High-Difficulty	1.63 (.41)	.92 (.23)	.61 (.15)	.84 (.21)	.47 (.08)	3.65 (.60)	.68 (.11)	1.32 (.22)
Collective Efficacy									
	Low-Difficulty	.62 (.27)	.36 (.16)	.26 (.11)	1.04 (.46)	.40 (.13)	1.08 (.36)	.41 (.14)	1.15 (.38)
	High-Difficulty	3.70 (.60)	.63 (.10)	.58 (.09)	1.28 (.21)	.91 (.17)	2.59 (.48)	.61 (.11)	1.32 (.24)

Note. The relative variances are reported in parentheses. Low task difficulty = Tasks 1, 2. High task difficulty = Tasks 3, 4.

Table 4. Absolute and relative variance component means of subjective and objective performances for the base and flyer roles.

		Bases' Variance Components				Flyers' Variance Components			
Variable		Actor	Partner	Relationship	Error	Actor	Partner	Relationship	Error
Self-Performance									
	Low-Difficulty	1.22 (.22)	.49 (.09)	.89 (.16)	2.99 (.53)	.27 (.10)	.28 (.11)	.17 (.06)	1.94 (.73)
	High-Difficulty	7.74 (.61)	.67 (.05)	.96 (.08)	3.37 (.26)	.62 (.09)	1.97 (.29)	1.89 (.28)	2.21 (.33)
Other-Performance									
	Low-Difficulty	.37 (.11)	.37 (.11)	.73 (.22)	1.83 (.55)	.29 (.07)	1.11 (.27)	.52 (.12)	2.25 (.54)
	High-Difficulty	2.02 (.32)	.87 (.14)	1.20 (.19)	2.14 (.34)	.59 (.06)	4.96 (.51)	2.00 (.20)	2.23 (.23)
Collective Performance									
	Low-Difficulty	.96 (.17)	.49 (.09)	1.10 (.19)	3.09 (.55)	.23 (.04)	.91 (.16)	1.18 (.21)	3.19 (.58)
	High-Difficulty	5.92 (.45)	1.09 (.08)	1.26 (.10)	4.79 (.37)	.54 (.05)	4.63 (.43)	1.89 (.17)	3.73 (.35)
Objective Performance									
	Low-Difficulty	5.32 (.25)	.89 (.04)	1.20 (.06)	13.48 (.65)	.53 (.04)	2.66 (.21)	1.93 (.16)	7.31 (.59)
	High-Difficulty	13.75 (.43)	2.53 (.08)	5.27 (.17)	10.22 (.32)	2.21 (.10)	6.88 (.32)	2.75 (.13)	9.77 (.45)

Note. The relative variance is reported in parentheses. Low task difficulty = Tasks 1, 2. High task difficulty = Tasks 3, 4.

Table 5. Results of the three-way RM-ANOVAs for efficacy beliefs, subjective performances, and objective performance.

		Efficacy					Subjective Performance					Objective Performance				
Target	Effect	df1	df2	*F*	*p*	η_p^2	df1	df2	*F*	*p*	η_p^2	df1	df2	*F*	*p*	η_p^2
Self																
	Role	1	32	5.24	.029	.14	1	32	7.98	.008	.20	1	32	9.73	.004	.23
	Difficulty	1	32	16.73	.000	.34	1	32	18.70	.000	.37	1	32	14.25	.001	.31
	Component	1.10	35.34	9.57	.003	.23	1.90	60.85	7.33	.002	.19	1.90	60.84	12.24	.000	.28
	Role by Difficulty	1	32	4.87	.035	.13	1	32	1.45	.238	.04	1	32	0.10	.752	.00
	Role by Component	1.10	35.34	3.36	.072	.10	1.90	60.85	8.77	.001	.22	1.90	60.84	5.87	.005	.16
	Difficulty by Component	1.17	37.55	8.61	.004	.21	1.87	59.87	3.96	.027	.11	2.62	83.95	1.91	.142	.06
	Role by Difficulty by Component	1.17	37.55	5.33	.022	.14	1.87	59.87	6.99	.002	.18	2.62	83.95	2.99	.042	.09
Other																
	Role	1	32	1.75	.196	.05	1	32	2.48	.125	.07					
	Difficulty	1	32	14.59	.001	.31	1	32	16.20	.000	.34					
	Component	1.86	59.41	3.84	.030	.11	2.33	74.65	4.54	.010	.12					
	Role by Difficulty	1	32	0.51	.479	.02	1	32	1.58	.218	.05					
	Role by Component	1.86	59.41	3.94	.027	.11	2.33	74.65	5.58	.004	.15					
	Difficulty by Component	2.17	69.32	1.83	.166	.05	2.45	74.47	2.96	.047	.09					
	Role by Difficulty by Component	2.17	69.32	3.56	.031	.10	2.45	74.47	4.39	.010	.12					
Collective																
	Role	1	32	0.00	.997	.00	1	32	.49	.491	.02					
	Difficulty	1	32	25.63	.000	.45	1	32	23.87	.000	.43					
	Component	1.93	61.79	3.28	.046	.09	2.21	70.85	6.51	.002	.17					
	Role by Difficulty	1	32	1.58	.218	.05	1	32	0.68	.417	.02					
	Role by Component	1.93	61.79	6.69	.003	.17	2.21	70.85	6.69	.002	.17					
	Difficulty by Component	1.97	63.13	6.37	.003	.17	2.63	84.07	1.81	.159	.05					
	Role by Difficulty by Component	1.97	63.13	7.26	.002	.19	2.63	84.07	4.85	.005	.13					

Note. The degrees of freedom (df1, df2) are reported for the Greenhouse-Geisser adjustment.

Table 6. Results of the tests of simple main effects within the three-way RM ANOVAs

		Efficacy					Subjective Performance					Objective Performance				
Target	Effect	df1	df2	*F*	*p*	η_p^2	df1	df2	*F*	*p*	η_p^2	df1	df2	*F*	*p*	η_p^2
Self																
	Component by Role (low-difficulty)	1.90	60.78	.22	.795	.011	2.19	70.11	.12	.901	.004	2.05	65.71	3.78	.027	.085
	Component by Role (high-difficulty)	1.10	35.09	11.59	.001	.253	1.76	56.46	16.59	<.001	.328	2.10	67.10	10.48	<.001	.207
	Component for Base Role (low-difficulty)											1.69	27.03	20.22	<.001	.289
	Component for Flyer Role (low-difficulty)											1.94	31.03	8.56	<.001	.093
	Component for Base Role (high-difficulty)	1.07	17.06	36.47	<.001	.509	1.24	19.84	33.28	<.001	.412	1.50	24.07	16.57	<.001	.229
	Component for Flyer Role (high-difficulty)	1.49	23.78	1.15	.320	.043	1.79	28.67	1.11	.338	.032	1.62	25.88	7.88	<.001	.132
Other																
	Component by Role (low-difficulty)	1.44	45.96	1.804	.184	.036	2.01	64.29	.52	.589	.013					
	Component by Role (high-difficulty)	2.00	64.13	14.27	<.001	.292	2.05	65.72	13.83	<.001	.266					
	Component for Base Role (high-difficulty)	1.40	22.42	2.99	.086	.057	1.99	31.87	2.03	<.001	.049					
	Component for Flyer Role (high-difficulty)	1.43	22.84	32.39	<.001	.400	1.51	24.15	23.12	<.001	.308					
Collective																
	Component by Role (low-difficulty)	2.36	75.50	.72	.510	.026	2.46	78.81	.23	.835	.006					
	Component by Role (high-difficulty)	1.68	53.63	25.86	<.001	.407	2.36	75.48	14.13	<.001	.284					
	Component for Base Role (high-difficulty)	1.17	18.66	42.07	<.001	.437	1.49	23.87	19.46	<.001	.257					
	Component for Flyer Role (high-difficulty)	1.76	28.21	9.77	<.001	.213	1.64	26.27	9.83	<.001	.161					

Note. The degrees of freedom (df1, df2) are reported for the Greenhouse-Geisser adjustment.

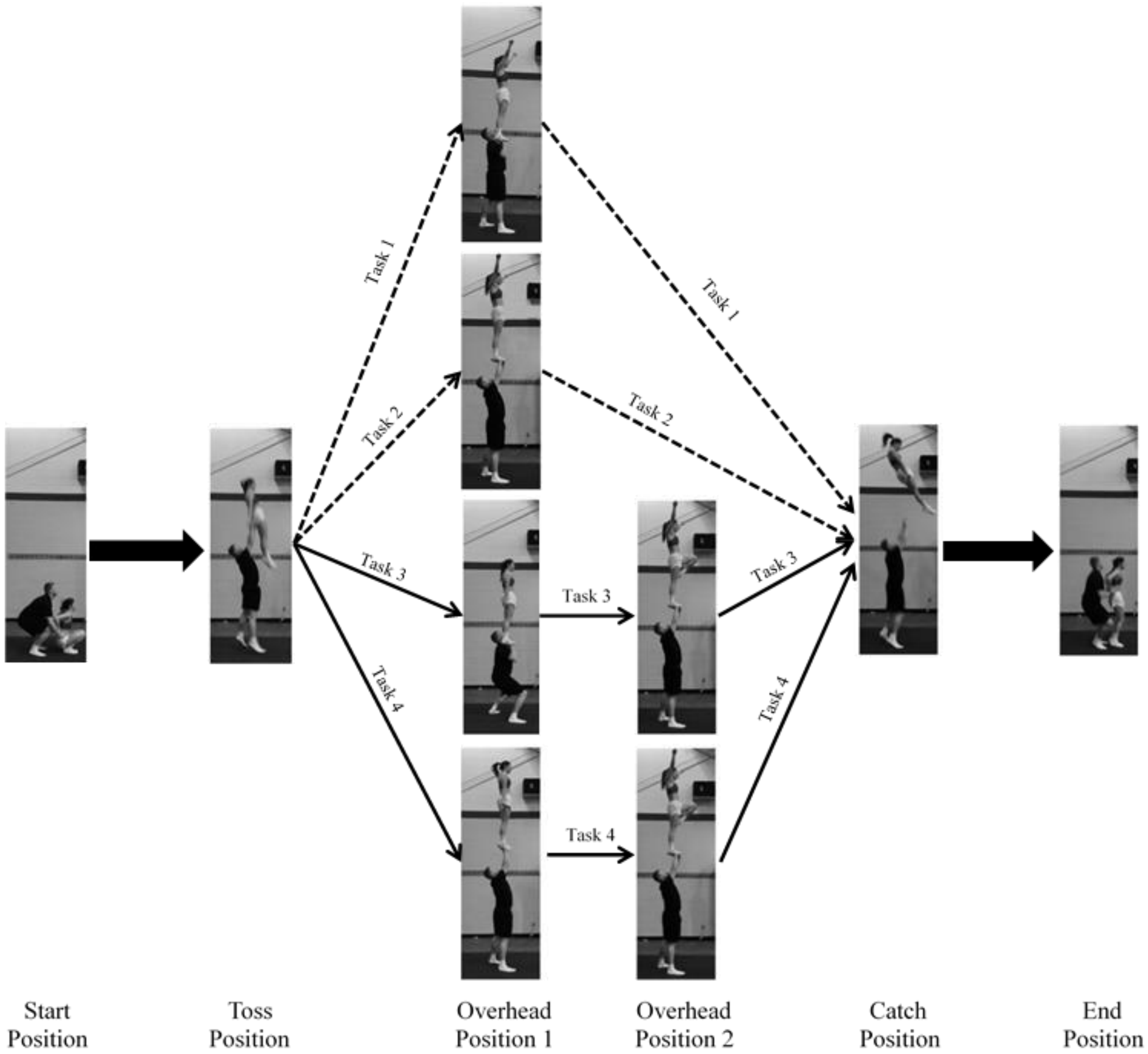

Figure 1. The sequence of positions, from start to end, for the four performance tasks are represented by arrows and pictures. *Thick black arrows* indicate the sequences (i.e., start to toss, catch to end) required for performance in all four tasks. *Dashed arrows* indicate sequences of low-difficulty requiring the base to catch the flyer's feet (one in each hand, shoulder width apart) at shoulder height (Task 1) or full extension (Task 2). *Solid black* arrows indicate sequences of high-difficulty requiring a transition from overhead position 1 at shoulder height (Task 3) or full extension (Task 4) to a second overhead position requiring the base to hold the flyer's right foot with both hands at full extension. In overhead position 2, the flyer stands on her right leg with the left leg bent (left foot placed at the right knee).

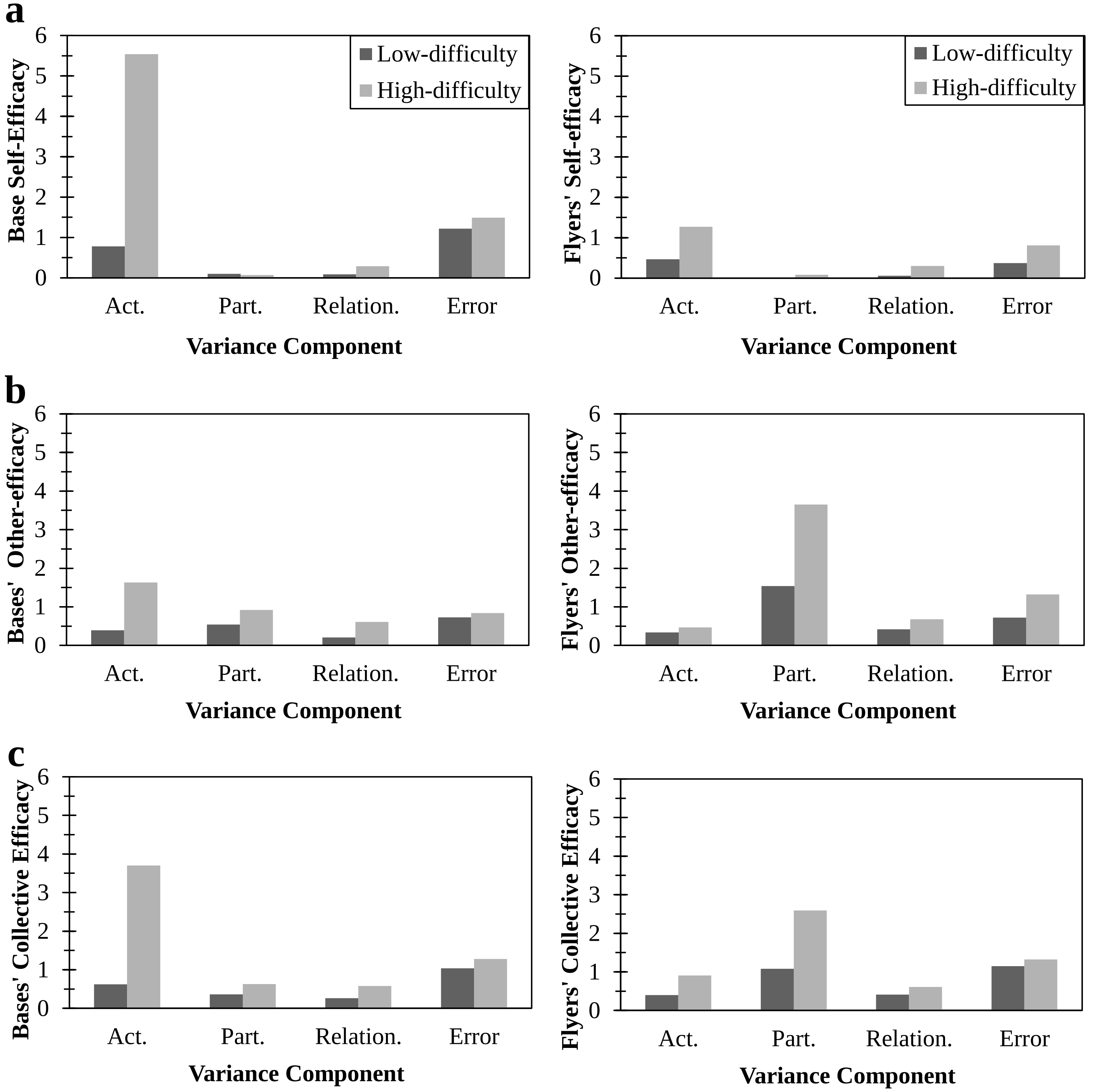

Figure 2. The bases' (i.e., low-dependence role) and flyers' (i.e., high-dependence role) variance components (Act. = actor, Part. = partner, Relation. = relationship, Error) by low and high task-difficulty for (a) self-efficacy, (b) other-efficacy, and (c) collective efficacy.

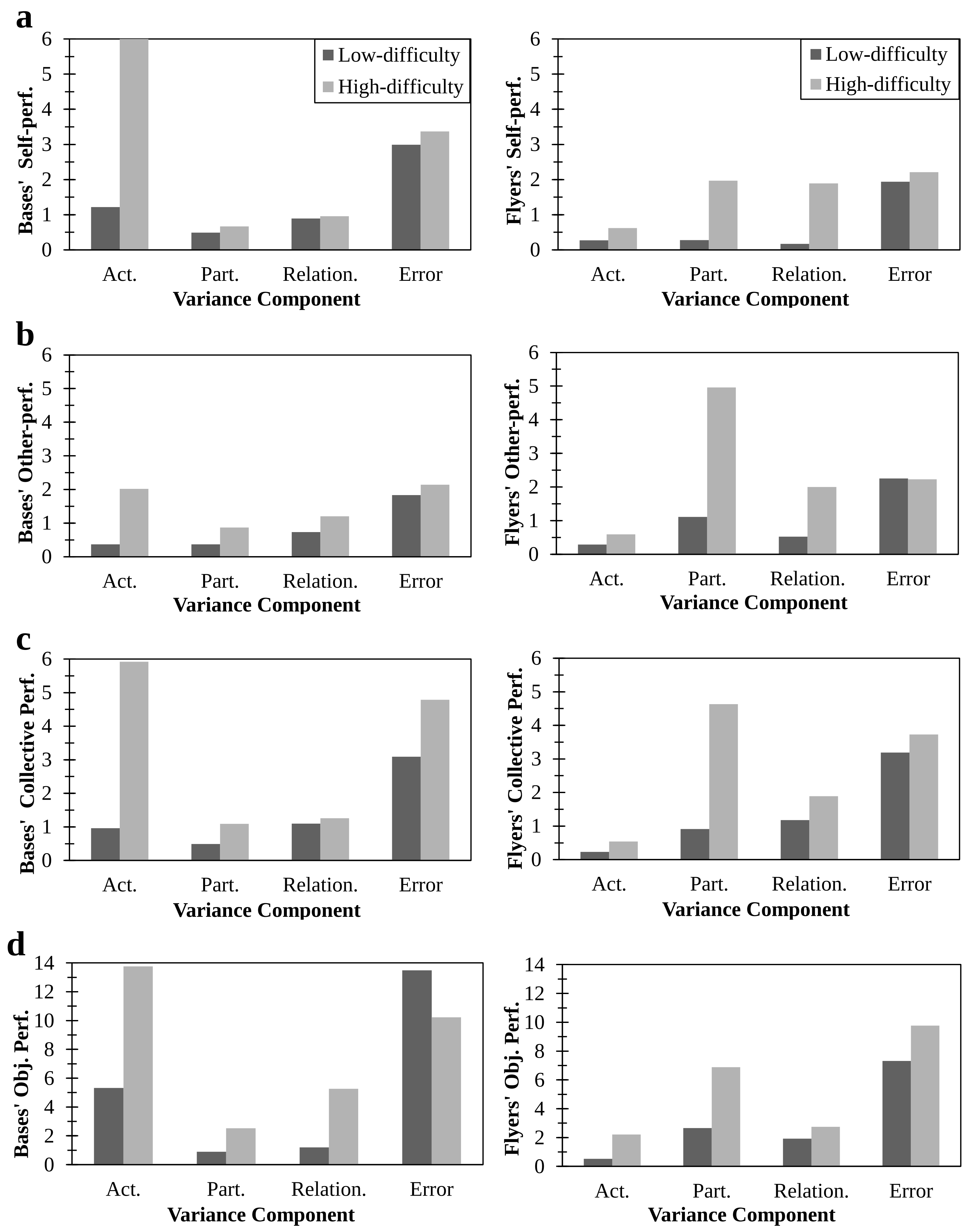

Figure 3. The bases' (i.e., low-dependence role) and flyers' (i.e., high-dependence role) variance components (Act. = actor, Part. = partner, Relation. = relationship, Error) by low and high task-difficulty for (a) self-performance, (b) other-performance, (c) collective performance, and (d) objective performance.

Online supplements for

It Depends on the Partner: Person-related Sources of Efficacy Beliefs and Performance for Athlete Pairs.

Authors' note:

These online technical appendices are to be posted on the journal website and hot-linked to the manuscript. If the journal does not offer this possibility, these materials can alternatively be posted on one of our personal websites (we will adjust the in-text reference upon acceptance).

We would also be happy to have some of these materials brought back into the main manuscript if you deem it useful. We developed these materials mostly to provide additional technical information and to keep the main manuscript from becoming needlessly long.

Table S1. Means, standard deviations, range, and skewness values for efficacy beliefs, subjective performance, and objective performance variables.

	Base				Flyer			
	M	*SD*	Range	Skew	*M*	*SD*	Range	Skew
Self-Efficacy								
Task 1	9.59	1.04	4-10	-3.20	9.69	0.72	6-10	-2.69
Task 2	9.00	1.72	3-10	-1.91	9.37	1.19	4-10	-2.16
Task 3	8.56	2.28	0-10	-1.96	9.13	1.30	3-10	-1.83
Task 4	8.02	2.93	0-10	-1.60	8.82	1.79	1-10	-2.09
Other-Efficacy								
Task 1	9.50	1.10	5-10	-2.40	9.29	1.43	1-10	-2.74
Task 2	9.03	1.61	2-10	-1.80	8.81	1.83	0-10	-2.20
Task 3	9.00	1.80	2-10	-2.13	8.48	1.94	0-10	-1.61
Task 4	8.64	2.23	0-10	-2.08	8.05	2.58	0-10	-1.52
Collective Efficacy								
Task 1	9.46	1.15	3-10	-2.79	9.09	1.44	2-10	-2.02
Task 2	8.69	1.74	2-10	-1.45	8.58	1.93	1-10	-1.94
Task 3	8.40	2.20	0-10	-1.84	8.25	1.90	0-10	-1.37
Task 4	7.82	2.78	0-10	-1.36	7.75	2.55	0-10	-1.24
Self-Performance								
Task 1	9.16	2.03	0-10	-3.44	9.39	1.16	1-10	-3.61
Task 2	8.29	2.43	0-10	-1.72	8.99	1.89	0-10	-2.91
Task 3	7.61	3.21	0-10	-1.31	8.53	2.30	0-10	-2.14
Task 4	7.43	3.43	0-10	-1.05	8.32	2.55	0-10	-1.92
Other-Performance								
Task 1	9.51	1.42	0-10	-4.69	8.99	1.89	0-10	-2.89
Task 2	8.92	1.88	2-10	-1.81	8.61	2.15	0-10	-2.12
Task 3	8.70	2.33	0-10	-2.16	8.13	2.58	0-10	-1.55
Task 4	8.55	2.45	0-10	-1.84	7.80	3.07	0-10	-1.38
Collective Performance								
Task 1	9.22	2.02	0-10	-3.58	9.01	2.06	0-10	-3.31
Task 2	8.31	2.44	0-10	-1.68	8.41	2.53	0-10	-2.05
Task 3	7.67	3.14	0-10	-1.34	8.05	2.70	0-10	-1.64
Task 4	7.46	3.49	0-10	-1.10	7.56	3.34	0-10	-1.28
Objective Performance								
Task 1	-7.42	3.87	-23--1	-1.43	-4.09	3.58	-23-0	-3.04
Task 2	-8.90	4.33	-24-0	-0.76	-4.63	3.45	-23-0	-2.40
Task 3	-11.10	5.35	-25--1	-0.72	-5.85	4.24	-21-0	-1.15
Task 4	-12.10	5.84	-24-0	-0.39	-6.41	4.41	-21-0	-0.99

Note. The reported means are a product of each participant (*n* = 51 bases, 51 flyers) reporting three observations (*n* = 153 bases, 153 flyers).

Table S2. Absolute and relative variance component means of efficacy beliefs for the bases and flyers.

		Bases' Variance Components				Flyers' Variance Components			
Variable	Task(s)	Actor	Partner	Relationship	Error	Actor	Partner	Relationship	Error
Self-Efficacy									
	Task 1	.32 (.30)	.23 (.22)	.50 (.48)		.41 (.79)	.01 (.02)	.10 (.19)	
	Task 2	2.60 (.83)	.08 (.03)	.45 (.14)		.79 (.62)	.06 (.05)	.42 (.33)	
	Low-difficulty	**.78 (.36)**	**.10 (.05)**	**.09 (.04)**	**1.22 (.56)**	**.47 (.52)**	**.00 (.00)**	**.06 (.07)**	**.37 (.41)**
	Task 3	4.43 (.87)	.01 (.00)	.66 (.13)		1.27 (.78)	.03 (.02)	.33 (.20)	
	Task 4	7.94 (.87)	.20 (.02)	1.01 (.11)		1.54 (.50)	.30 (.10)	1.26 (.41)	
	High-difficulty	**5.54 (.75)**	**.07 (.01)**	**.29 (.04)**	**1.49 (.20)**	**1.27 (.52)**	**.08 (.03)**	**.30 (.12)**	**.81 (.33)**
Other-Efficacy									
	Task 1	.29 (.24)	.45 (.38)	.46 (.38)		.22 (.10)	1.28 (.55)	.81 (.35)	
	Task 2	.57 (.26)	.83 (.38)	.80 (.36)		.61 (.17)	2.01 (.57)	.89 (.25)	
	Low-difficulty	**.39 (.21)**	**.54 (.29)**	**.21 (.11)**	**.73 (.39)**	**.34 (.11)**	**1.54 (.51)**	**.42 (.14)**	**.72 (.24)**
	Task 3	1.14 (.37)	.67 (.22)	1.26 (.41)		.24 (.06)	2.65 (.64)	1.24 (.30)	
	Task 4	2.40 (.53)	1.06 (.23)	1.08 (.24)		.40 (.06)	5.14 (.71)	1.67 (.23)	
	High-difficulty	**1.63 (.41)**	**.92 (.23)**	**.61 (.15)**	**.84 (.21)**	**.47 (.08)**	**3.65 (.60)**	**.68 (.11)**	**1.32 (.22)**
Collective Efficacy									
	Task 1	.47 (.34)	.18 (.13)	.73 (.53)		.44 (.21)	.82 (.38)	.87 (.41)	
	Task 2	1.32 (.47)	.69 (.25)	.80 (.28)		.61 (.18)	1.33 (.39)	1.48 (.43)	
	Low-difficulty	**.62 (.27)**	**.36 (.16)**	**.26 (.11)**	**1.04 (.46)**	**.40 (.13)**	**1.08 (.36)**	**.41 (.13)**	**1.15 (.38)**
	Task 3	2.91 (.64)	.65 (.14)	.96 (.21)		.65 (.19)	1.63 (.47)	1.20 (.34)	
	Task 4	5.44 (.72)	.92 (.12)	1.22 (.16)		1.24 (.18)	3.92 (.58)	1.56 (.23)	
	High-difficulty	**3.70 (.60)**	**.63 (.10)**	**.58 (.09)**	**1.28 (.21)**	**.91 (.17)**	**2.59 (.48)**	**.61 (.11)**	**1.32 (.24)**

Note. The relative variances are reported in parentheses. Low-difficulty = Tasks 1, 2. High-difficulty = Tasks 3, 4.

Table S3. Absolute and relative variance component means of subjective and objective performances for base and flyer.

		Bases' Variance Components				Flyers' Variance Components			
Variable	Task(s)	Actor	Partner	Relationship	Error	Actor	Partner	Relationship	Error
Self-Performance									
	Task 1	.52 (.14)	.00 (.00)	3.32 (.86)		.17 (.18)	.08 (.08)	.72 (.74)	
	Task 2	2.35 (.41)	.90 (.16)	2.54 (.44)		.30 (.09)	.34 (.11)	2.57 (.80)	
	Low-difficulty	**1.22 (.22)**	**.49 (.09)**	**.89 (.16)**	**2.99 (.53)**	**.27 (.10)**	**.28 (.11)**	**.17 (.06)**	**1.94 (.73)**
	Task 3	6.23 (.62)	.46 (.05)	3.41 (.34)		.75 (.14)	1.24 (.23)	3.29 (.62)	
	Task 4	8.74 (.73)	.00 (.00)	3.29 (.27)		.26 (.04)	2.73 (.40)	3.88 (.56)	
	High-difficulty	**7.74 (.61)**	**.67 (.05)**	**.96 (.08)**	**3.37 (.26)**	**.62 (.09)**	**1.97 (.29)**	**1.89 (.28)**	**2.21 (.33)**
Other-Performance									
	Task 1	.02 (.01)	.00 (.00)	2.11 (.99)		.00 (.00)	.65 (.19)	2.82 (.81)	
	Task 2	.83 (.23)	.95 (.26)	1.82 (.51)		.64 (.17)	1.27 (.33)	1.90 (.50)	
	Low-difficulty	**.37 (.11)**	**.37 (.11)**	**.73 (.22)**	**1.83 (.55)**	**.29 (.07)**	**1.11 (.27)**	**.52 (.12)**	**2.25 (.54)**
	Task 3	1.29 (.25)	1.26 (.24)	2.64 (.51)		.32 (.04)	3.96 (.53)	3.23 (.43)	
	Task 4	2.88 (.48)	.47 (.08)	2.60 (.44)		.88 (.08)	6.60 (.61)	3.32 (.31)	
	High-difficulty	**2.02 (.32)**	**.87 (.14)**	**1.20 (.19)**	**2.14 (.34)**	**.59 (.06)**	**4.96 (.51)**	**2.00 (.20)**	**2.23 (.23)**
Collective Performance									
	Task 1	.20 (.05)	.00 (.00)	4.13 (.95)		.00 (.00)	.90 (.20)	3.56 (.79)	
	Task 2	2.15 (.37)	1.20 (.21)	2.50 (.43)		.13 (.02)	1.96 (.37)	3.27 (.61)	
	Low-difficulty	**.96 (.17)**	**.49 (.09)**	**1.10 (.20)**	**3.09 (.55)**	**.23 (.04)**	**.91 (.17)**	**1.18 (.21)**	**3.19 (.58)**
	Task 3	3.96 (.41)	.87 (.09)	4.93 (.51)		.46 (.06)	3.36 (.43)	3.92 (.51)	
	Task 4	7.77 (.62)	.53 (.04)	4.25 (.34)		1.06 (.09)	6.31 (.53)	4.47 (.38)	
	High-difficulty	**5.92 (.45)**	**1.09 (.08)**	**1.26 (.10)**	**4.79 (.37)**	**.54 (.05)**	**4.63 (.43)**	**1.89 (.18)**	**3.73 (.35)**
Objective Performance									
	Task 1	7.49 (.49)	.00 (.00)	7.79 (.51)		.74 (.06)	3.49 (.28)	8.31 (.66)	
	Task 2	7.07 (.40)	2.36 (.13)	8.19 (.46)		.74 (.07)	3.00 (.27)	7.31 (.66)	
	Low-difficulty	**5.32 (.25)**	**.89 (.04)**	**1.20 (.06)**	**13.48 (.65)**	**.53 (.04)**	**2.66 (.21)**	**1.93 (.16)**	**7.31 (.59)**
	Task 3	10.37 (.44)	.74 (.03)	12.62 (.53)		2.09 (.12)	6.04 (.36)	8.80 (.52)	
	Task 4	15.52 (.54)	1.24 (.04)	11.91 (.42)		.46 (.03)	5.76 (.33)	11.17 (.64)	
	High-difficulty	**13.75 (.43)**	**2.53 (.08)**	**5.27 (.17)**	**10.22 (.32)**	**2.21 (.10)**	**6.88 (.32)**	**2.75 (.13)**	**9.77 (.45)**

Note. The relative variances are reported in parentheses. Low-difficulty = Tasks 1, 2. High-difficulty = Tasks 3, 4.