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Individualism–collectivism and team member performance: Another look

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Summary This study revisits the commonplace research conclusion that greater team member collectivism, as opposed to individualism, is associated with higher levels of individual-level performance in teams. Whereas this conclusion is based on the assumption that work in teams consists exclusively of tasks that are shared, typical teamwork also includes tasks that are individualized. Results of a laboratory study of 206 participants performing a mix of individualized and shared tasks in four-person teams indicate that heterogeneous combinations of individualism and collectivism are associated with higher levels of team member performance, measured as quantity of output, when loose structural interdependence enables individual differences in individualism–collectivism to exert meaningful effects. These results support the modified conclusion that a combination of individualism and collectivism is associated with higher levels of member performance in teams under typical work conditions; that is, conditions in which the tasks of individual members are both individualized and shared. Copyright © 2011 John Wiley & Sons, Ltd.

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As teams and team-based tasks have grown increasingly prevalent in contemporary work organizations, research has turned toward the investigation of factors that might influence the performance of individuals working in teams (Humphrey, Morgeson, & Mannor, 2009; Shaw, Duffy, & Stark, 2000; Sparrowe, Liden, Wayne, & Kraimer, 2001; Stewart & Barrick, 2000). Among the factors considered in this research is an individual-level difference mapped by the dimension of individualism–collectivism (e.g., Erez & Earley, 1987; Hofstede 2001; Wagner, 1995). Individualism, at one end of this dimension, is the tendency for individuals to think of themselves apart from larger collectivities and subordinate collective interests to personal pursuits, whereas collectivism, at the other end of the dimension, is the contrasting tendency for individuals to think of themselves as parts of larger collectivities and to subordinate personal interests to the pursuit of collective gains (Hofstede, 1980; Triandis, 1995; Wagner, 2002). In over 40 years of research, from Breer and Locke (1965) to the present, studies have produced ample evidence that greater collectivism, as opposed to individualism, is associated with higher levels of individual performance on tasks shared among the members of groups and teams (Earley, 1989; Erez & Somech, 1996; Wagner, 1995). Citing this evidence, a significant number of researchers have expressed support for the general conclusion that member collectivism enhances the performance of individuals working in teams (e.g., Driskell & Salas, 1992; Gundlach, Zivnuska, & Stoner, 2006; Miles, 2000).

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The purpose of this paper is to reexamine this conclusion in light of its dependence on the assumption that work in teams is necessarily shared. We begin by reviewing research on the relationship between team member individualism–collectivism and the performance of individuals in teams. Next, we note that the work of team members often involves a combination of individualized and shared tasks; then, we hypothesize that the performance of individual members in such situations is likely to be highest when the members hold both individualist and collectivist orientations toward their work. In a laboratory investigation of this hypothesis, we also examine an important boundary condition, assessing how level of interdependence (loose, tight) might act as a situational constraint.

Team member individualism–collectivism and performance

The conceptualization of the dimension of individualism–collectivism can be traced to classic sociological theory, wherein theorists contrasted the desires of autonomous citizens with the needs of social institutions (e.g., Durkheim (1969 [1898]); Weber (1947 [1913])). Building on this foundation, Parsons and Shils (1951) offered the dimension of self-orientation versus collectivity-orientation as a primary focus for sociological investigation. Breer and Locke (1965) and Hofstede (1980) later drew from sociological theory to formulate and introduce the dimension of individualism–collectivism to the psychological and organizational sciences.

Empirical research drawing from this conceptual base has identified a number of noteworthy antecedents and effects. For example, greater individualism has been shown to be associated with higher socioeconomic status (Marshall, 1997), urban residency (Freeman, 1997), and North American, Western European, or Australian acculturation (e.g., Gaines, Larbie, Patel, Pereira, & Sereke-Melake, 2005; Hofstede, 1980) and to lead to higher levels of entrepreneurial behavior (Morris, Davis, & Allen, 1994), stronger achievement values (Nelson and Shavitt (2002), and preferences for equitable, personalized rewards (Tower, Kelly, & Richards, 1997). Greater collectivism has been found to be associated with prior success working in groups or teams (Eby & Dobbins, 1997), and Asian, African, or South American acculturation (Gaines et al., 2005; Hofstede, 1980), and to lead to outcomes including stronger work group commitment (Clugston, Howell, & Dorfman, 2000), higher levels of citizenship behaviors (Moorman and Blakely, 1995; Van Dyne, Vandewalle, Kostova, Latham, & Cummings, 2000), and preferences for egalitarian team rewards (Kirkman & Shapiro, 2000).

A significant stream within this body of research has considered the question of how differences in individualism–collectivism might affect the performance of individuals working in teams. Guiding theory suggests that individualistic concern with personal well-being should be associated with a focus on personal pursuits, thus direction of attention and motivated effort toward individualized tasks and related outcomes, and subordination of collective interests and concerns, thus inattention to shared pursuits and outcomes. Conversely, collectivistic concern with joint or collective well-being should be paired with the direction of attention and motivated effort toward shared tasks and gains, and inattention to individualized pursuits and outcomes (Earley, 1989; Triandis, 1995; Wagner & Moch, 1986). It follows that individualistic team members should be expected to perform at higher levels on individualized tasks than on shared tasks and that collectivistic members should be expected to perform at higher levels on shared tasks than on individualized tasks. Research findings lend support to both of these expectations.

Note that the extent to which a task is individualized or shared need not be the same as the degree of interdependence connecting the task with others in its work context. Independent tasks can be shared, for example, if the people performing them decide to step out of task roles and help one another out when assistance is needed. Conversely, interdependent tasks can be individualized by building buffers, mechanical mediators, and so forth that enable task incumbents to decouple and work as individuals. Task individualizing or sharing, on the one hand, and task independence or interdependence, on the other hand, are empirically distinguishable concepts, allowing the separate consideration of the effects of each in this paper.

Several relevant studies have examined the effects of the differences in individualism–collectivism on free riding and social loafing in groups. Free riding is a reduction in the personal effort directed toward shared tasks that occurs in groups when members believe that they can reduce effort and, at the same time, that the others in the group will

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make up for effort they choose to withhold (Kerr, 1983; Olson, 1965; Samuelson, 1954). Social loafing is a reduction in performance on shared tasks that occurs in groups because of beliefs that personal efforts are not easily identifiable or that such efforts are unimportant relative to group success (George, 1992; Kerr & Brun, 1983; Latané, Williams, & Harkins, 1979).

In one such study, Earley (1989) found that social loafing increased among management trainees in the U.S.A. and China who reported themselves to be individualists, especially when the trainees were not held personally accountable and believed that responsibility for task performance was shared with others, but it did not increase among trainees in either country who reported themselves to be collectivists. In another study, Erez and Somech (1996) found that the performance of Israeli urban dwellers, who tended to espouse independent self-definitions consistent with the individualism of Israeli city life, showed evidence of social loafing more than did the performance of Israeli kibbutzniks, who typically held interdependent self-definitions reflecting the collectivism of kibbutz existence. Wagner (1995), in a third study, reported that U.S. college students who identified themselves as individualists were rated by classroom colleagues as less cooperative than were students who reported themselves to be collectivists. Wagner also found that the contextual factors of group size, identifiability, and shared responsibility, all of which influence tendencies to free ride or loaf, had lesser effects on collectivists' than individualists' cooperation.

Considered together, the findings of the three studies indicate that individualism can influence individual performance in teams by reducing the performance of individualist team members on shared tasks. Other research, by Jackson, Colquitt, Wesson, and Zapata-Phelan (2006), examined the opposite side of the coin in assessing the relationship between team member collectivism and performance. In their study, Jackson and colleagues used an Internet survey to collect responses from 186 employees of a computer software firm who worked in teams on shared tasks wherein team members found it necessary to cooperate closely to provide a satisfactory service. An analysis revealed that self-reported collectivism explained 10 per cent of the variance in supervisory ratings of employee performance, with team member collectivism associated with higher levels of member performance on shared tasks.

A final study, by Shaw et al. (2000), produced evidence of both individualist and collectivist effects. In an analysis of 328 U.S. undergraduate students arranged in term-long teams and furnishing confidential ratings of peer performance, the researchers found that individualist team members performed at the highest level when able to work alone, whereas collectivist members performed better when working together with others. These results are consistent with those of Earley (1993), who examined samples of Israeli managers, U.S. managers, and Chinese trainees and found that members of the three samples who reported themselves to be individualists performed better on individualized than on shared tasks, whereas individuals who reported themselves to be collectivists performed better as members of in-groups of others sharing similar traits and attitudes than alone or as members of out-groups of dissimilar others.

To summarize, research on the relationship between team member individualism–collectivism and performance indicates that individualism can increase the performance of team members on individualized tasks and reduce performance (increase free-riding or loafing) on shared tasks, whereas collectivism can enhance the performance of team members on shared tasks and reduce performance on individualized assignments. In generalizing these results, researchers have interpreted them as indicating that collectivism increases performance in teams and that individualism decreases it (e.g., Bell, 2007; Eby & Dobbins, 1997; Gundlach et al., 2006).

However, underlying this interpretation is the assumption that work in teams is necessarily shared; and, as a consequence, that results from individualism–collectivism research related to individualized tasks are not relevant to issues of team performance. In contrast to this assumption, evidence from a variety of sources, both classic (Roethlisberger & Dickson, 1939) and contemporary (e.g., DeShon, Kozlowski, Schmidt, Milner, & Weichmann, 2004; Moon et al., 2004; Porter, 2005) indicates that work in teams includes both individualized and shared tasks. In an analysis of teams of software engineers, for example, Perlow (1999) found that respondents engaged in "real engineering" structured as individualized tasks in which each engineer used scientific principles and personal creativity to solve engineering problems and create software deliverables. The same respondents also engaged in support activities arranged as shared tasks, including helping other engineers deal with intractable problems, working together to integrate separate strings of code, meeting to create plans for future actions, and querying one another

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regarding the status of ongoing projects. According to Perlow, the performance on both individualized and shared tasks was associated with the success of the engineers and the engineering teams she observed.

Available evidence thus suggests that the work of members in teams often consists of some tasks that are individualized and others that are shared. In turn, the assumptive basis of the conclusion that member collectivism enhances performance in teams seems questionable, and the conclusion itself appears subject to reconsideration. In entering into this reconsideration, the study presented in this paper sought to determine what mix or profile of individual-level individualism–collectivism might be associated with higher levels of team member performance on work in teams when such work consists of some tasks that are individualized and others that are shared.

Main effect

Although research on individualism–collectivism has not yet examined situations involving the simultaneous performance demands of both individualized and shared tasks, results indicating that individualism is associated with high performance on individualized tasks and collectivism with high performance on shared tasks appear to suggest that a combination of individualism and collectivism might be associated with high performance on work consisting of both individualized and shared tasks. Evidence that a broader range of perspectives is likely to be associated with higher performance on varied work is provided by dual task research and, in particular, by studies that have examined the allocation of attention among competing task demands by processes of executive control (Pashler, Johnston, & Ruthruff, 2001). Findings have indicated that the allocation of initial attention is not as involuntary or automatic as formerly thought nor as conditional on stimulus salience or attractiveness as previously conceptualized (e.g., Folk, Remington, & Johnston, 1992; Folk, Remington, & Wright, 1994). Instead, as concluded by Folk et al. (1992), the process of attention-to-task is similar to the operation of a furnace thermostat: an individual sets the thermostat's target value; after which, the thermostat automatically activates the furnace when the temperature falls below the target value. Similarly, an individual's motives or intentions determine the range of stimuli that will capture attention without additional cognitive intervention. Otherwise distracting stimuli that do not match the properties of stimuli being sought out will not attract attention. This conclusion suggests the supposition that neither individualism nor collectivism alone is sufficient in directing attention toward a combination of individualized and shared tasks but that both individualism and collectivism together are needed to promote attention and effort on both types of work.

Such intrapersonal heterogeneity in individualism–collectivism is possible because the general dimension is itself decomposable into subordinate dimensions, allowing the possibility that an individual might be an individualist on one sub-dimension and a collectivist on another (Wagner & Moch, 1986). Recently, Wagner (2002) proposed differentiating between the sub-dimensions of utilitarian and ontological individualism–collectivism on the basis of prior theoretical work by Bellah, Madsen, Sullivan, Swidler, and Tipton (1985). According to Wagner (2002), the two sub-dimensions are likely to be influenced by different antecedents and exert relatively independent individual-level effects (for reasons described in the succeeding paragraphs), making the Wagner model ideal for the development of a theoretical argument hinging on the presence of heterogeneity within individuals.

The sub-dimension of utilitarian individualism–collectivism reflects differences in the attention paid to the personal interests of individuals or the shared interests of groups. At one end of this sub-dimension, utilitarian individualism portrays life as an effort to satisfy personal aspirations and concerns through individualized pursuits. At the other end of the same sub-dimension, utilitarian collectivism represents life as an effort by members of collectivities to fulfill shared desires and deficiencies through joint pursuits. The sub-dimension of utilitarian individualism–collectivism thus characterizes human existence as grounded in the pursuit of satisfaction and differentiates individualists from collectivists on the basis of the type of satisfaction being pursued and on the primary means of pursuit.

In contrast, the sub-dimension of ontological individualism–collectivism maps differences in the primacy accorded to individuals or groups as fundamental social entities. At one end of the sub-dimension, ontological individualism is evident in the belief that the individual holds primacy in social reality, whereas social collectivities are

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secondary or artificial constructs. At the other end of the same sub-dimension, ontological collectivism is represented in the belief that collectivities are primary entities in social reality and that the individual is a secondary or derived construct. Following these definitions, ontological individualists see individuals as whole entities and groups as aggregates of these wholes, whereas ontological collectivists see groups as complete entities and individuals as incomplete parts of these wholes (Wagner, 2002).

Wagner (2002) indicated that one's position on either of the two sub-dimensions occurs relatively independently of positioning on the other. In particular, ontological positioning tends to reflect acculturation within societal norms, values, and beliefs, such as that which occurs in the cultural training experienced during childhood, and tends to be relatively fixed throughout life (e.g., Hofstede, 1980, 2001; Erez & Earley, 1993). Utilitarian positioning, on the other hand, is more likely to show the effects of recent experiences working alone or in teams, with successful performance as an individual or collectivity pushing in the direction of utilitarian individualism or collectivism, respectively (e.g., Breer & Locke, 1965; Wagner & Moch, 1986). Thus, it is possible that some people are individualists or collectivists on both dimensions, whereas others are individualists on one dimension and collectivists on the other, suggesting, in turn, that the two dimensions are minimally correlated (Wagner, 2002).

For example, whereas the U.S. national culture is known to be extremely individualistic (Hofstede, 1980, 2001), current practices in many—but not all—classrooms and workplaces involve significant work in groups or teams. It is possible in those circumstances for individuals to be ontological individualists because of societal acculturation but either utilitarian individualists or collectivists depending on educational and workplace experiences. Alternatively, the national culture of the People's Republic of China is often characterized as prototypically collectivistic (e.g., Earley, 1989, 1993); but some individuals living in coastal provinces with open markets have developed individualistic tendencies to pursue personal gain, whereas others have chosen instead to seek the protection of the collectivist state, depending in large part on the degree of personal success in the marketplace. Thus, it is also possible for individuals to be ontological collectivists and either utilitarian individualists or collectivists.

In sum, individualism–collectivism research to date indicates that individualism is associated with attention to individualized activities and that collectivism is associated with attention to shared pursuits. Dual task research suggests that the combination of individualism and collectivism should lead to the direction of attention and effort toward both individualized and shared tasks. The identification of the sub-dimensions of utilitarian and ontological individualism–collectivism allows the possibility that the same individual may espouse both individualism and collectivism, albeit of different denotative types. Consequently, we propose that individuals possessing a mix of either utilitarian individualism and ontological collectivism or utilitarian collectivism and ontological individualism should be more able than individuals lacking similar heterogeneity to direct attention and effort toward the combination of individualized and shared tasks comprising the work of a team. We offer the same prediction for both heterogeneous combinations because both afford the same breadth of variation in individualism–collectivism. It is this variety, irrespective of differences between utilitarian and ontological types, that leads to broadened scopes of attention and activity (Ashby, 1956; Buckley 1968). We hypothesize,

> *Hypothesis 1*: For work consisting of a combination of individualized and interdependent tasks, team member performance will be higher for individuals possessing a mix of individualism and collectivism than for individuals who lack similar heterogeneity.

Boundary condition: Structural interdependence

It appears plausible that elements of the surrounding context might direct or block attention to various tasks or task elements, thereby limiting the generalizability of the main effect just hypothesized. Structural interdependence, for example, is a powerful situational cue that can influence attention to work in teams. As reported by Hollenbeck *et al.* (2002; Hollenbeck & Spitzmuller, in press), teams structured in a manner requiring members to work together in relationships of loose (pooled; Thompson, 1967) interdependence are more susceptible to the effects of personality differences than are teams organized in a way that required members work together in relationships of tight

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(reciprocal; Thompson, 1967) interdependence. Hollenbeck and colleagues interpreted this finding as an instance of the "strong situation" effect described by Mischel (1977; Mischel & Shoda, 1998) in which tight structural interdependence is so suggestive of the appropriate behavior—working together—that individual differences have little significant effect.

A comparable moderator effect appears possible in this study. As a strong situation, tight structural interdependence will require that personal tasks be pursued through collective effort and thus should mask the effects of individual differences in individualism–collectivism specified in Hypothesis 1. In contrast, as a "weak situation" (Mischel, 1977), loose structural interdependence should fail to provide similar behavioral guidance relative to the accomplishment of personal tasks, thus permitting the hypothesized association between individualism–collectivism and performance to be realized:

> *Hypothesis 2*: The relationship between intrapersonal heterogeneity in individualism–collectivism and performance predicted in Hypothesis 1 will be moderated by structural interdependence such that the effect will be stronger under conditions of loose structural interdependence than under conditions of tight structural interdependence.

To evaluate Hypotheses 1 and 2 under controlled conditions, we conducted the laboratory study reported in the succeeding paragraphs.

Method

Participants

Two hundred six undergraduate students enrolled in an introductory management course at a large public university, grouped in 82 teams, comprised the participants of this study. Self-reports indicated that 172 (83.5 per cent) of these students were white or Caucasian, 14 (6.8 per cent) were black or African-American, 15 (7.3 per cent) were Asian or Pacific Islander, 4 (1.9 per cent) were Hispanic or Latino/Latina, and 1 (0.5 per cent) self-identified as a member of "other" racial/ethnic groups; 127 (61.7 per cent) were men; and the average age was 21.7 ($SD = 2.6$) years. The participants received course credit for participation and could terminate their participation at any time without loss.

Task

The task performed in the study was generated within the Michigan State University Distributed Dynamic Decision-making (MSU-DDD) exercise. It is composed of both individualized and shared tasks and has been shown to be readily interpretable as both an individualized and a collective task assignment (Beersma et al., 2003). Following is a brief overview of the exercise as used in this study. Detailed descriptions are available in Hollenbeck et al. (2002) and Beersma et al. (2003).

In the MSU-DDD exercise, teams of four individuals participate in the same room at individual computer terminals to defend a hypothetical geographic territory against entry by rival resources. Each team member is responsible for one quarter of this territory and is charged with keeping rival resources from moving into this region while allowing friendly resources to move about freely. In addition, members move into each other's regions, to work together as needed. Consequently, each member faces a combination of individualized and shared tasks.

To engage rival resources and keep them from advancing, every team has four types of resources, each of which varies in its capacities on four different dimensions—power, speed of movement, duration of operability, and range of vision—and is designed such that greater power is accompanied by lower speed, shorter duration, or reduced

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vision. Each team member operates four of the team's resources. In our study, the mix of resources available to each team member was dependent on experimental conditions of structural interdependence, as described in the succeeding paragraphs.

Each team's overall objective is to identify and eliminate rival resources as quickly as possible while avoiding the errors of disabling friendly resources or attempting to engage rivals with either more power than required or less power than necessary. By design, this objective requires that a mix of the four types of resources be employed in protecting each member's region. We instructed members to keep their own geographic region free of rival resources, an individualized task, and to protect their team's overall score by working with others on their team to protect their regions, a shared task.

Measures and manipulation

Utilitarian individualism–collectivism

Three questionnaire items, comprising the third factor of Wagner's (1995) five-factor measure of individualism–collectivism, served as measures of utilitarian individualism–collectivism: *I prefer to work with others in a group, rather than working alone*; *Given the choice, I would rather do a job where I can work alone, rather than doing a job where I have to work with others in a group*; and *Working with a group is better than working alone*. We collected the data in self-report questionnaires using 7-point agree–disagree Likert response scales. We reverse coded the second item to produce a measure ranging from utilitarian individualism (low score) to utilitarian collectivism (high score), and a coefficient alpha of .84 was obtained. Wagner (2002) identified items such as these as suitable for use in the assessment of utilitarian individualism–collectivism because they tap differences in the extent to which respondents find individualized or group work preferable and rewarding, thus, of utilitarian worth.

Ontological individualism–collectivism

We developed a measure of ontological individualism–collectivism for this study in a factor analysis of 10 items patterned after the measurement suggestions offered by Wagner (2002). All items were intended to tap differences in the degree to which personal uniqueness versus collective solidarity are deemed primary characteristics of self and social reality. We collected data from 305 undergraduate students by using 7-point agree–disagree Likert scales, entered into a principal components analysis, and subjected to varimax rotation. We provide the items included in the analysis and rotated factor loadings in Table 1. Although three factors were extracted with eigenvalues greater than 1.0, an analysis of the scree plot suggested that only the first factor was meaningful. The use of a factor loading of

Table 1. Factor analysis of items for ontological individualism–collectivism measure $N = 305$.

	Factor		
	1	2	3
It is important to me that I am unique (r)	.79	.04	.12
One of my highest values is to be all I can be (r)	.78	−.02	.11
My personal identity, independent of others, is very important to me (r)	.69	.07	.25
My personal skills and abilities are central to my sense of who I am (r)	.56	.17	−.06
My relationships and affiliations may change, but I am still the same person (r)	.51	.34	−.29
People can move from group to group and still maintain an unchanging sense of who they are (r)	.20	.73	−.17
When I look at a group, I see a temporary collection of independent individuals (r)	−.01	.70	.16
When I like a group, it is usually because I am attracted to the group's goals or work	.15	.40	.37
A group's existence depends on the well-being of its members (r)	.08	.32	.68
When I like a group it is usually because I am attracted to the people who belong to it (r)	.06	−.18	.66
Eigenvalues:	2.70	1.22	1.19

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.60 or higher as indicative of inclusion produced a 3-item measure: *One of my highest values is to be all I can be*; *It is important to me that I am unique*; and *My personal identity, independent of others, is very important to me*. We reverse coded all items to produce a measure ranging from ontological individualism (low score) to ontological collectivism (high score). We obtained a coefficient alpha of .70.

Structural interdependence

We manipulated structural interdependence in the study through differences in the allocation of resources among team members. Under the conditions of tight interdependence, each team member controlled four resources of the same single type (i.e., each team member controlled four of one resource—such as tanks—and zero of the other three resources). Under the condition of loose structural interdependence, each team member controlled one each of the four types of resources (i.e., one tank, one helicopter, one fighter, and one airborne warning and control system). As a consequence, the situation required individuals working under conditions of tight structural interdependence to band together to amass the complete range of resources, whereas individuals working under loose structural interdependence possessed the range of resources allowing them to work alone or together, as they saw fit.

Team member performance

Numerous researchers have suggested that human performance is decomposable into the two basic elements of speed and accuracy (Elliott, Helsen, & Chua, 2001; Healy, Kole, Buck-Gengler, & Bourne, 2004; Thurstone, 1937; Woodworth, 1899). A considerable amount of research on organizational behavior has adopted this conceptualization and has differentiated between speed and accuracy of performance (Jenkins, Mitra, Gupta, & Shaw, 1998). In particular, research on performance in teams has suggested that speed and accuracy are separately identifiable components of team member performance (e.g., Beersma et al., 2003) and thus that measures of both components should be employed as indicators of that performance. On the basis of this guidance, we measured performance as both speed and accuracy and performed a separate analysis of hypothesized effects for each measure.

We measured the speed of team member performance as a composite score registering the speed of completion and the total number of completions. On the other hand, we measured the speed of completion as the average elapsed time in seconds from the instant in which a rival resource entered a team member's geographic territory until the instant of its elimination. Also, we measured the total number of completions over the course of the MSU-DDD exercise. We collected both measures as time-stamped keystroke data by the software that managed the MSU-DDD exercise and were converted to *z*-scores in which higher numbers indicated faster speed. The *z*-scores were then averaged to produce a single composite score.

We defined the accuracy of performance as engaging and eliminating a rival with the resource having the correct power. As each rival was assigned a specific power level, known to the team members, an accurate completion was one that exactly matched rival power with resource power. We thus measured accuracy as a composite score consisting of friendly fire eliminations (those engagements that successfully destroyed an incoming friendly resource), come-up-short engagements (those attempted on a rival with greater power resistance than the power of the deployed resource), and waste engagements (those in which the deployed resource had greater power than the resistance level of the rival). The MSU-DDD software collected these indicators and converted them to *z*-scores in which higher numbers indicated higher accuracy. We then averaged the *z*-scores to produce a composite accuracy score.

Control variables

To permit the statistical control of exogenous differences in individual ability and skills, participants completed Form IV of the Wonderlic Personnel Test (Wonderlic and Associates, 1983) and also reported the levels of experience with computers, use of computer mice, and computer-mediated gaming. We entered all four individual differences as control variables in all analyses.

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Procedure

Before the participants entered the laboratory, we randomly assigned them to four-person teams, and we randomly assigned the teams to structural interdependence conditions. The teams assembled in the laboratory, and the participants began the session by completing the Wonderlic test and questionnaires asking for individualism–collectivism and demographic information. Next, the participants trained together in their teams for approximately 90 minutes. During the first 30 minutes, they learned about the objective of the exercise, its scoring, and the capabilities and the characteristics of the resources employed in the exercise. The next 30 minutes of training focused on how to manipulate the four types of resources and how to identify and react to friendly and rival resources. The final 30 minutes was a practice session that enabled the participants to try out their new skills under conditions identical to those of the exercise. The participants could ask questions at any point during the 90-minute training period. In addition, a trainer provided individualized help to the participants who reported difficulties.

The teams then completed the experimental session. During the session, each team encountered the same number, nature, timing, and sequence of rival and friendly resource entries. A total of 100 entries occurred during the experimental session, and each participant experienced 25 entries that originated in his or her region. The participants in teams assigned to the condition of loose (pooled) structural interdependence could react to these entries alone or work with others, depending on personal perceptions of the task situation. In contrast, the participants in teams assigned to the condition of tight (reciprocal) structural interdependence had to work together to deal with the full range of entries. We permitted verbal communication during the session as needed to coordinate intra-team efforts.

Analysis

We hierarchically structured our data with individual-level performance nested within teams, leading us to model the potential dependence using multilevel modeling techniques. Multilevel modeling "provides the correct parameter estimates and significance tests for multilevel and nonindependent data by estimating within-team and between-team variances and covariances separately, and by using the correct standard errors" (Chen, Kirkman, Kanfer, Allen, & Rosen, 2007; p. 337).

We structured the data such that individual-level characteristics and performance were assigned to Level 1, whereas team and interdependence condition were assigned to Level 2. We tested our hypotheses using MLwiN Version 2.02 (Centre for Multilevel Modelling, University of Bristol, Bristol, U.K.; Rasbash, Steele, Browne, & Prosser, 2004). We standardized all measures, which makes all parameter estimates essentially reflect standardized (β) coefficients (Chen, Bliese, & Mathieu, 2005). This process grand-mean centered all variables, which is consistent with normal multilevel modeling conventions.

We present in Tables 3 and 4 a series of models of different relationships with speed of performance and accuracy of performance as focal dependent variables. For each model, we present the coefficients and the standard errors for all the parameters in the model and the variance at each level (individual and team) for the model. We then calculate a pseudo R^2 value that gives us the variance explained (Snijders & Bosker, 1999). When this comparison is combined with the likelihood ratio test, we can determine the explanatory value of the model and the effect size associated with the addition of specific parameters. Given the directional nature of our hypotheses, we utilized one-tailed tests for testing significance levels.

Results

Table 2 reports means, standard deviations, reliability coefficients, and correlations descriptive of the variables included in the study. Worthy of note is the near-zero correlation between utilitarian and ontological individualism–collectivism ($r = -.03$, *ns*), indicating a degree of independence between the two types of individualism–collectivism consistent with

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Table 2. Descriptive statistics and correlations.

Variable	Mean	*SD*	1	2	3	4	5	6	7	8
1. Cognitive ability	26.72	5.58	—							
2. Computer experience	3.52	0.78	.03	—						
3. Mouse experience	4.12	0.88	−.03	.62**	—					
4. Gaming experience	2.39	1.17	.09	.23**	.27**	—				
5. Ontological I–C	2.42	0.84	−.12*	.03	−.01	.17*	.70[a]			
6. Utilitarian I–C	4.41	1.23	−.07	−.12*	−.10	−.01	−.03	.84[a]		
7. Structural interdependence	0.65	0.48	−.01	−.02	.03	−.05	.05	.10	—	
8. Speed of performance	0.00	1.00	.06	.07	.02	.18**	.06	−.10	−.02	—
9. Accuracy of performance	0.00	1.00	.04	.03	.01	.00	.02	.06	.04	−.49**

[a]Coefficient alpha reliability estimate.
*$p \leq .05$.
**$p \leq .01$.

Wagner's (2002) multidimensional conceptualization and providing evidence, when combined with the following results, of acceptable construct validity (Schwab, 1980). Also worth noting is the large negative correlation between speed and accuracy ($r = -.49$, $p \leq .01$), indicating that speed in this study was gained at the expense of accuracy, and *vice versa*, as has also been reported in prior research (e.g., Fitts, 1954; Plamondon & Alimi, 1997; Woodworth, 1899).

Table 3 reports the results of the multilevel analyses described earlier for speed of performance. The findings for Model 2 indicated that the control variables exerted a significant effect on speed of performance ($\Delta R^2 = 0.03$, $p < .05$). We statistically controlled this effect in all the subsequent analyses, nullifying exogenous individual-level ability and experience effects. The model associated with the main effects ($\Delta R^2 = 0.02$, *ns*) and three models testing the two-way interaction effects (i.e., Utilitarian I–C × Ontological I–C, Utilitarian I–C × Interdependence, and Ontological I–C × Interdependence, respectively) failed to attain statistical significance (ΔR^2s = 0.00, 0.00, and 0.00, all *ns*). For the three-way interaction between utilitarian individualism–collectivism, ontological individualism–collectivism, and structural interdependence, the change in R^2 was statistically significant ($\Delta R^2 = 0.03$, $p \leq .01$). A plot of this interaction, shown in Figure 1, indicated that heterogeneous combinations of utilitarian collectivism and ontological individualism or utilitarian individualism and ontological collectivism were associated with higher speed of performance, as expected, but only under conditions of loose structural interdependence.

These results provide support for Hypothesis 1, which posited that for work consisting of a combination of individualized and shared tasks, the speed of team member performance would be higher for individuals possessing a mix of individualism and collectivism than for individuals less varied in individualism–collectivism. However, this support is conditional, occurring only when structural interdependence is loose enough to allow individual differences to exert meaningful effects, as proposed in Hypothesis 2.

Turning next to the results of our analyses for accuracy of performance, presented in Table 4, assessments of the control variables ($\Delta R^2 = 0.00$, *ns*) and main effects ($\Delta R^2 = 0.01$, *ns*) failed to produce evidence of any statistically significant effects. For two-way interaction effects, Models 12 and 13 demonstrated that neither interaction with interdependence produced significant change in R^2 ($\Delta R^2 = 0.01$ for utilitarian individualism–collectivism and interdependence, *ns*; $\Delta R^2 = 0.00$ for ontological individualism–collectivism and interdependence, *ns*), but Model 11 indicated that the interaction between utilitarian and ontological individualism–collectivism was statistically significant ($\Delta R^2 = 0.03$, $p \leq .01$). A plot of this interaction, shown in Figure 2, indicated that the homogenous combinations of utilitarian individualism and ontological individualism or utilitarian collectivism and ontological collectivism were associated with greater accuracy, in contrast to our hypothesis that heterogeneous combinations would be associated with higher performance. Assessment of the three-way interaction between utilitarian individualism–collectivism, ontological individualism–collectivism, and structural interdependence failed to produce evidence of a statistically significant relationship ($\Delta R^2 = 0.01$, *ns*). A possible explanation for these unexpected findings is considered in the following discussion.

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Table 3. Model comparisons for speed of performance.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercept (β_{0ij})	−.006	−.007	−.037	−.039	−.021	−.017	−.035
	(.079)	(.077)	(.135)	(.133)	(.129)	(.129)	(.118)
Cognitive ability		.048	.046	.048	.044	.040	.038
		(.067)	(.068)	(.068)	(.068)	(.068)	(.067)
Computer experience		.080	.070	.075	.077	.076	.068
		(.087)	(.086)	(.086)	(.086)	(.086)	(.085)
Mouse experience		−.065	−.070	−.076	−.088	−.089	−.104
		(.087)	(.086)	(.087)	(.087)	(.087)	(.086)
Gaming experience		.163	.158	.169	.181	.181	.203
		(.071)	(.072)	(.073)	(.073)	(.073)	(.072)
Ontological I–C			.048	.044	.045	.087	−.019
			(.068)	(.068)	(.068)	(.133)	(.134)
Utilitarian I–C			−.110	−.107	.000	.005	.033
			(.067)	(.067)	(.122)	(.122)	(.118)
Interdependence			.045	.048	.033	.029	.048
			(.166)	(.165)	(.161)	(.161)	(.152)
Utilitarian I–C × Ontological I–C				−.055	−.061	−.057	−.413
				(.068)	(.068)	(.069)	(.138)
Utilitarian I–C × Interdependence					−.150	−.156	−.192
					(.147)	(.147)	(.144)
Ontological I–C × Interdependence						−.058	.038
						(.155)	(.155)
Utilitarian I–C × Ontological I–C × Interdependence							.457
							(.157)
Variance (team level)	.172	.153	.172	.172	.160	.157	.136
Variance (individual level)	.826	.806	.777	.775	.780	.782	.764
−2*loglikelihood	579.133	571.664	568.403	567.749	566.762	566.751	559.029
Pseudo R^2	.00	.03	.05	.06	.06	.06	.09
Change in R^2		.03*	.02	.00	.00	.00	.03**

Note: $N = 206$ at individual level, 82 at team level. For variables, the first value in a cell is the beta coefficient, and the value in parentheses is the standard error.
*$p < .05$.
**$p < .01$.

Discussion

We performed the study reported in this paper to reassess the commonplace conclusion that team member collectivism is associated with higher levels of individual-level performance in teams. Whereas this conclusion is based on the assumption that work in teams is shared, everyday team work often includes a significant number of tasks that are individualized. In support of Hypothesis 2 (and offering conditional support for Hypothesis 1), results indicated that heterogeneous combinations of utilitarian individualism and ontological collectivism or utilitarian collectivism

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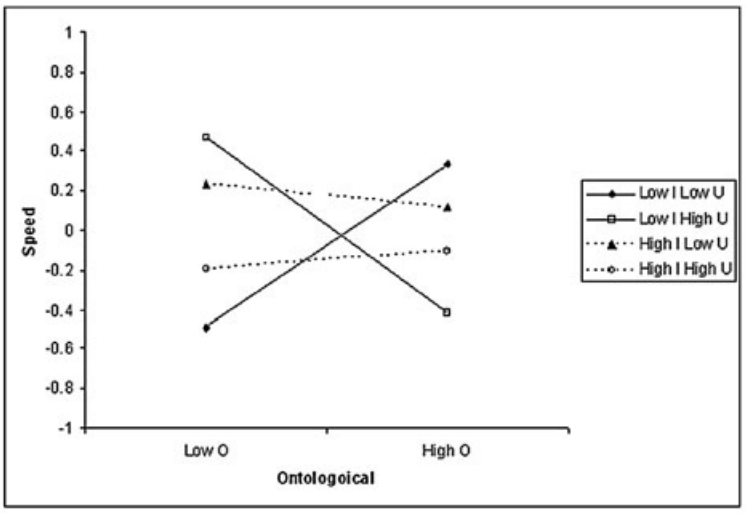

U = Utilitarian Individualism-Collectivism (larger numbers indicate greater collectivism)
O = Ontological Individualism-Collectivism (larger numbers indicate greater collectivism)
I = Structural Interdependence; Low I = Loose, High I = Tight

Figure 1. Interaction of Utilitarian and Ontological Individualism-Collectivism and Structural Interdependence: Speed of performance

and ontological individualism were associated with higher speed of performance than were homogenous combinations of utilitarian individualism and ontological individualism or utilitarian collectivism and ontological collectivism, provided that structural interdependence was loose rather than tight and thus allowed individual differences in individualism–collectivism to exert meaningful effects. Results also indicated that homogeneous combinations of utilitarian individualism and ontological individualism or utilitarian collectivism and ontological collectivism were associated with higher accuracy of performance than were heterogeneous combinations of utilitarian individualism and ontological collectivism or utilitarian collectivism and ontological individualism, in contrast to hypothesized expectations.

Interpreted *post hoc*, the latter findings suggest that the accuracy of performance might depend on something other than the "breadth of attention" effects apparently associated with speed. In particular, accuracy may instead be function of focused cognitive resources and concentrated effort (e.g., Sweizer, 1996). Research has suggested that specialization of effort (i.e., the presence and employment of cognitive resources specifically geared to the requirements of the task at hand) will produce greater accuracy (e.g., Domangue, Mathews, Sun, Roussel, & Guidry, 2004) than will the varied resources required to attend to varied tasks. Analysis has also indicated that an abundance of cognitive resources matched to the demands of the task will strengthen resistance to the effects of cognitive fatigue, which has been shown to reduce the accuracy of performance (e.g., Healy et al., 2004). Finally, research has shown that focused attention makes available more resources for the correction of inaccuracies otherwise undetected (e.g., Schweizer & Moosbrugger, 2004). All these findings suggest that the possibility that depth of understanding and perseverance in interpretation, as provided by homogenous resources, will be more likely than breadth of insight and consideration of varied alternatives afforded by heterogeneous resources to lead to greater accuracy of performance. As this suggestion is purely *post hoc*, it must be considered tentative—an interesting but untested idea. Its verification requires that further research be performed.

Generalization based on the findings of our study is subject to several potential limitations. One of these relates to our decision to use laboratory methods in conducting our analysis. The use of such methods raises questions about external validity because the rigorous control of laboratory experimentation is sometimes depicted as reducing realism and therefore limiting generalizability (e.g., Runkel & McGrath, 1972). Researchers seeking to refute this

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Table 4. Model comparisons for accuracy of performance.

	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
Intercept (β_{0ij})	.013	.013	−.260	−.255	.129	−.006	−.110
	(.077)	(.077)	(.344)	(.339)	(.498)	(.619)	(.623)
Cognitive ability		.035	.040	.033	.036	.032	.031
		(.069)	(.070)	(.069)	(.069)	(.069)	(.069)
Computer experience		.043	.047	.027	.022	.020	.022
		(.088)	(.089)	(.088)	(.088)	(.088)	(.087)
Mouse experience		−.037	−.031	−.013	.000	.000	.006
		(.089)	(.089)	(.088)	(.089)	(.089)	(.088)
Gaming experience		.014	.010	−.018	−.030	−.030	−.037
		(.072)	(.074)	(.074)	(.074)	(.074)	(.074)
Ontological I–C			.010	.023	.023	.074	.134
			(.083)	(.082)	(.082)	(.162)	(.168)
Utilitarian I–C			.048	.042	−.049	−.045	−.052
			(.056)	(.056)	(.102)	(.103)	(.102)
Interdependence			.058	.043	.054	.051	.039
			(.164)	(.163)	(.162)	(.162)	(.161)
Utilitarian I–C × Ontological I–C				.168	.171	.175	.337
				(.069)	(.069)	(.070)	(.146)
Utilitarian I–C × Interdependence					.159	.154	.165
					(.150)	(.151)	(.151)
Ontological I–C × Interdependence						−.058	−.105
						(.159)	(.162)
Utilitarian I–C × Ontological I–C × Interdependence							−.207
							(.164)
Variance (team level)	.132	.137	.131	.132	.124	.124	.122
Variance (individual level)	.864	.857	.858	.830	.831	.831	.825
-2^{*}loglikelihood	580.790	580.180	579.277	573.424	572.310	572.177	570.595
Pseudo R^2	.00	.00	.01	.04	.04	.04	.05
Change in R^2		.00	.01	.03**	.00	.00	.01

Note: $N = 206$ at individual level, 82 at team level. For variables, the first value is the beta coefficient, and the value in parentheses is the standard error.
$^{*}p < .05$.
$^{**}p < .01$.

criticism have responded that comparisons of the findings of laboratory and field research on similar topics have largely failed to uncover systematic differences in results (e.g., Ilgen, 1986; Locke, 1986) and that variations in findings between the two types of studies on a given topic have been shown to be no greater than those found within the subgroups of laboratory and field studies being compared (Locke, 1986). This outcome suggests that the use of laboratory methods in research does not necessarily limit the ability to generalize to field settings. Nonetheless, it seems reasonable to suggest that field research be conducted before our results are generalized without reservation.

Our use of college students as research participants raises a second concern that those characteristics of participants that differ from those of the general population might also limit generalizability (McNemer, 1946; Peterson, 2001). In fact, those students who participated in this study were young adults who differed from the general population especially in terms of education (higher than average) and formal work experience (lower than average). It is

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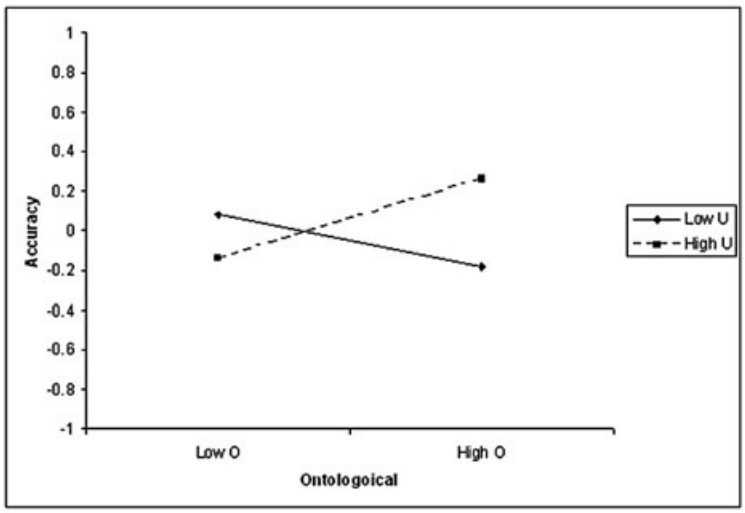

U = Utilitarian Individualism-Collectivism (larger numbers indicate greater collectivism)
O = Ontological Individualism-Collectivism (larger numbers indicate greater collectivism)

Figure 2. Interaction of Utilitarian and Ontological Individualism-Collectivism: Accuracy of performance

conceivable that either or both of these differences could influence research findings, whether the data leading to those findings were obtained in the laboratory or in the field. However, the cognitive processes examined in our study—processes of directing attention toward one task or another—are typically viewed as broadly shared among adult-age individuals regardless of educational differences (e.g., Weick, 1995). With respect to the differences in experience, many of the participants in our study had extensive experience as members of sports teams, social clubs, classroom groups, and so forth and thus had insights into team processes and practices that could be considered comparable in range if not depth with those possessed by their contemporaries in the adult workforce. Participant characteristics are thus a valid concern but probably not as strong in likely effect as might first appear to be the case.

A third possible limitation relates to the tasks performed in our study, as they could restrict generalization to the extent that they differ fundamentally from the tasks and behavioral requirements of everyday work settings (e.g., Runkel & McGrath, 1972). Given that tasks in the MSU-DDD require cognitive effort but little physical exertion, it appears possible that our findings will generalize more readily to work situations involving decision making, problem solving, and similar forms of information manipulation than to jobs that incorporate significant physical requirements. Here, too, additional research seems mandated before our results can be considered generally applicable.

With these limitations in mind, the results of this study cast doubt on the general assertion that team member collectivism but not individualism is associated with higher levels of member performance. Instead, our findings suggest that intrapersonal heterogeneity in individualism–collectivism is more likely to lead to higher levels of performance (speed) on the combination of individualized and shared tasks typically found in the work of contemporary teams. Our results also establish an important boundary condition for this relationship, the level of interdependence among the members of a team, with looser interdependence allowing individual differences in individualism–collectivism to exert meaningful effects.

For practicing managers, this conclusion suggests that performance in typical team settings involving both individualized and shared tasks can be enhanced through the involvement of team members possessing, at the individual level, both individualist and collectivist orientations. Such intrapersonal heterogeneity in individualism–collectivism, as opposed to homogeneity in one orientation of the other, is likely to be associated with stronger team member performance under typical team work conditions when accompanied by loose structural interdependence. This finding suggests the use of selection and placement procedures for the purposes of team formation and

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development that tap utilitarian and ontological differences to create variety in team member individualism–collectivism, particularly when characteristics of the work situation allow this variety to have effect. This recommendation stands in contrast to the received wisdom that member collectivism alone should be associated with the highest level of performance in teams.

For researchers, our findings indicate several ways in which the relationship between member individualism–collectivism and performance is more nuanced and conditional than indicated by prior conceptualization and research. First, it is possible to differentiate between utilitarian and ontological individualism–collectivism, and such differentiation appears capable of uncovering performance effects that might otherwise escape detection. Second, different operationalizations of performance are likely to contribute to the differences in the conclusions supported by individualism–collectivism research. Third, the idea that work in teams can be both individualized and shared, while intuitive and therefore obvious in appearance, has been largely overlooked in research on individualism–collectivism because of assumptions about teams and teamwork that have shaped conceptualizations proposed by individualism–collectivism researchers. We suggest that future analyses continue to promote the development of a fuller appreciation of the complexities of the effects of individualism–collectivism in the workplace.

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