

Mixing Individual Incentives and Group Incentives: Best of Both Worlds or Social Dilemma?

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Equity theory emphasizes making distinctions between individual contributions to teams and then recognizing these with differentiations in rewards. However, social interdependence theory emphasizes maximizing cooperation in teams by compensating members equally. Several researchers have advocated offsetting the limitations of individually based incentives and group-based incentives by mixing the two. However, the authors contend that this puts team members in a social dilemma, leading them to focus on the individually based component. The authors find that in comparison to group-based only incentives, mixed individual/group incentives lead team members to perform faster but less accurately and focus on their own taskwork to the detriment of backing up behavior.

Keywords: *interdependence; teamwork; compensation; incentives; teams; groups; social dilemma*

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Over the past few decades, organizations have increased the usage of teams as a basic building block of structure, making salient their importance in organizations (Devine, Clayton, Philips, Dunford, & Melner, 1999; Ilgen, Hollenbeck, Johnson, & Jundt, 2005). The utilization of teams creates many challenges to contemporary human resource management, especially with regards to compensation. Traditionally, compensation practices have been largely guided by equity issues. Equity theory indicates that an important form of equity is the ratio of work inputs to outputs received by employees (Adams, 1963, 1965). Equity theory emphasizes making differentiations between individual contributions to the group and then recognizing these with distinctions in rewards. The overall effect of applying this theory in practice is that each member of the team may receive a different level of overall compensation.

In team contexts, however, concerns arise that individually driven incentive systems lead team members to focus on their own personal outcomes, detracting from teamwork, helping behavior, coordination, and team performance as a whole (Heneman & von Hippel, 1995; Mitchell & Silver, 1990; Shaw, Gupta, & Delery, 2002). In contrast to equity theory, much of the literature on group-based compensation has been driven by social interdependence theory (Deutsch, 1949). Social interdependence theory holds that minimizing group distinctions in rewards promotes collaboration and cooperation. However, the collective effort model (Karau & Williams, 1993) indicates that one potential problem with purely group-based incentives is that they may lead to social loafing, which is defined as the reduction of effort that occurs when individuals work collectively rather than independently.

Recent research indicates that both individual and group incentive systems each have different beneficial effects on team members (Beersma, Hollenbeck, Humphrey, Moon, Conlon, & Ilgen, 2003). Perhaps seeking to capture the best of both worlds, researchers have often advocated compensation systems that contain elements of both individual and group incentives (DeMatteo, Eby, & Sundstrom, 1998; Heneman & von Hippel, 1995; Kozlowski & Ilgen, 2006; Welbourne & Gomez Mejia, 1995). Unfortunately, there are reasons to believe that mixed individual/group incentive systems may act much less like group incentive systems than is generally believed (cf. Quigley, Tesluk, Locke, & Bortol, 2007; Wageman, 1995). Snizek, May, and Sawyer (1990) suggest that mixing individual- and group-level incentives creates a conflict between the individual and collective interests of employees, which fits Komorita and Barth's (1985) definition of a social dilemma. Social dilemma research indicates that people tend to place individual interests above those of the group, a phenomenon referred to as defection (Dawes, 1980; Pruitt & Kimmel, 1977). Although Beersma and colleagues (2003) did not examine mixed incentives, their work suggests that one potential form of defection in the context of team performance is avoiding information sharing and collective problem-solving behaviors that can prevent errors. Similarly, although Barnes and colleagues (2008) did not examine mixed incentives, their work suggests that a second form of defection is avoiding backing up behaviors that would draw cognitive resources away from one's own taskwork. Thus, in the end, mixed systems may promote effort but also defection.

Accordingly, the purpose of this study is to utilize the social dilemma literature to challenge the assumption that a mixture of individual-based and group-based incentives is the best of both worlds. We contend that mixed incentives put team members in a social dilemma and

lead them to focus on the individual component of the incentive system. Thus, mixed incentives lead to greater speed and more completed taskwork than group incentives, but also lead to poorer accuracy and less backing up behavior. Although this does highlight important benefits of mixed incentive systems, it is a far cry from a “best worlds” outcome that captures the benefits of both individual and group incentive systems.

Individual-Based Incentives, Group-Based Incentives, and Mixed Incentives

A seminal theory in the context of group member compensation is the social interdependence theory of cooperation and competition (Deutsch, 1949). According to this theory, group member beliefs about how their goals are related determine the manner in which the group members interact. Such interactions influence the performance of the group. A major premise of social interdependence theory is that situations may be constructed cooperatively in a group-based system, such that the rewards of group members are correlated positively, or competitively in an individual-based system, such that the rewards of group members are correlated negatively. Cooperatively structured situations create perceptions of shared fate, promoting supportive behavior aimed toward the benefit of the group as a whole. In contrast, competitively structured situations lead group members to focus on their own self-interest, even to the point of impairing the progress of others to gain competitive advantage. Thus, social interdependence theory indicates that group members will cooperate most under a group-based compensation system.

An example of a group incentive plan is the system implemented by the Great-Plains Software company (Parker, McAdams, & Zielinski, 2000). Prior to being acquired by Microsoft in late 2000, Great-Plains Software made extensive use of project teams that worked primarily on new software development and release as well as product upgrades. Each team member had a base salary that was not tied directly to performance. However, in addition to their base salary, teams were provided both monetary and recognition-based bonuses, which were primarily allocated for meeting product release deadlines as well as product quality goals after the release. Team members shared team incentives equally among all members (Parker et al., 2000).

An additional example is the system utilized by RR Donnelly & Sons (Baldwin, Bommer, & Rubin, 2007). RR Donnelly & Sons is a large commercial printing company, producing catalogs, phonebooks, and other books. This organization established teams of production workers, with the goal of cutting materials waste from previous levels. Each team selected a mascot (a poster of a professional race car driver) and depicted their progress toward their goal with the visual metaphor of a toy car proceeding around a track. Teams cutting the most waste each month receive cash bonuses to be evenly divided among team members.

However, the shortcomings of such a team-based compensation system are highlighted in the collective effort model and meta-analysis of the social loafing literature conducted by Karau and Williams (1993). The collective effort model indicates that in contrast to individuals working alone, individuals working in a group put forth lower levels of effort. Similarly, team members working cooperatively under a system that compensates each team member

equally should be expected to put forth less effort than team members working under a system that compensates in an equity-based manner. The collective effort model indicates that providing equal rewards to all group members regardless of their individual effort destroys the link between personal effort and the outcomes of that personal effort. The destruction of that link erodes the motivation of any given group member to contribute their effort to the team.

Concern for the strength of the link from individual effort to individual incentives has led many organizations to implement individual incentive plans. An example of such a system is employed by Ann Taylor Stores Corp. This organization recently installed a system that tracks several individual performance metrics for each sales employee, including average sales per hour, units sold, and dollars per transaction. The system schedules the most productive sellers to the busiest hours. Sales employees in this system work based on commission, so the busiest hours provide the most opportunities for income (O'Connell, 2008).

A second example of an individual incentive system is employed in many Applebee's restaurants in Kansas. This system is essentially a two-tiered system of individual-level incentives. Restaurant managers are eligible for individual merit raises and bonuses based on how well they retain employees rated in the top 80%. In order to retain employees rated in the top 80%, managers provide small financial and nonfinancial bonuses to those individuals (Noe, Hollenbeck, Gerhart, & Wright, 2008).

Noting that previous theory and research highlights different benefits of different types of compensation systems, Beersma and colleagues (2003) examined a contingency approach to compensation in teams. They noted that individual rewards and group rewards have different implications for speed and accuracy in performance (see Table 1). They note that in contrast to accuracy, speed is more sensitive to individual effort and thus more under the control of the individual. Thus, a system that strengthens the link between individual behaviors and individual incentives will encourage higher levels of effort and speed than a system that attenuates that link. Moreover, people working in groups tend to take longer to complete tasks than individuals working alone. Thus, as Beersma and colleagues hypothesized, teams that were in an individual incentive system worked faster than teams that were in a group incentive system.

However, Beersma and colleagues (2003) note that accuracy may require skills or abilities that are beyond the individual working alone. Accuracy may require team members to cooperate to pool information or expertise. Group reward systems promote such collaboration, encouraging team members holding such information to share it with others. In comparison, individual reward structures hinder such cooperation. Accordingly, Beersma and colleagues hypothesized and found that in contrast to individual reward systems, group reward systems led to greater accuracy.

Johnson and colleagues (2006) continued this line of research in examining changes in incentive systems over time. In their laboratory experiment, one condition involved teams performing two occasions of a task. In the first occasion, teams performed under an individual-based competitive reward system. They then switched reward structures for a second occasion such that teams were performing under a group-based reward system. In the second occasion, such teams continued to exhibit individually focused behaviors and low levels of cooperation, despite performing that task under a group-based incentive structure intended to encourage cooperation. Teams in that condition behaved similarly to teams that performed under an individual-based competitive reward structure in both tasks. This research indicates the

Table 1
Comparison of Individual and Group Incentive Systems

	Incentive System	
	Individual	Group
Examples	Ann Taylor, Applebee's	Great Plains Software, RR Donnelly & Sons
Proponent theories	Equity theory (Adams, 1963, 1965); collective effort model (Karau & Williams, 1993)	Social interdependence theory (Deutsch, 1949)
Strength	Strong link between individual effort and individual outcome leads to high individual effort and speed	Financial interests of group members are in alignment, which leads to cooperation and accuracy
Weakness	No incentive to cooperate with team members leads to low levels of cooperation and accuracy	Erosion of link between individual effort and individual outcome, leading to social loafing

especially powerful influence of individual-based incentive systems on speed and accuracy. Beersma and colleagues (2003) and Johnson and colleagues provide important theoretical advances regarding compensation in teams. However, much as the majority of previous research examining compensation in teams, these studies did not examine incentive plans that mix both individual and group components.

An examination of social interdependence theory, the collective effort model, and the contingency approach to reward systems indicates that there are tradeoffs between individual incentives and group incentives. Faced with such trade-offs, researchers have searched for solutions that may capture the benefits of individual compensation systems along with the benefits of group compensation systems, without the shortcomings associated with each system. One such solution that has been posed by numerous researchers is to utilize mixed compensation systems that have both individual and group components (DeMatteo et al., 1998; Heneman & von Hippel, 1995). Welbourne and Gomez Mejia (1995) contend that it is reasonable for organizations to utilize multiple layers of compensation simultaneously in the belief that the disadvantages of one plan may be neutralized by the advantages of the other.

It appears that some organizations are taking this advice. One such example is Merck pharmaceutical plant, in Wilson, NC. In a system targeted at supporting and enhancing a team-focused work culture, this organization offers rewards that accrued to individual, team, and plant-wide performance. Employees have a base pay that is not directly contingent on their daily performance. Additionally, employees at the plant can be peer nominated for individual noncash rewards for engaging in behaviors directed at quality teamwork, exerting extra effort, or excellent customer service. These same employees are eligible for team stock options whereby managers rewarded entire teams based on criteria such as team effort, meeting team performance goals, and team innovation. Additionally, a plant-wide pay for performance plan provides financial rewards to employees when the plant as a whole achieves yearly goals related to product quality, customer service, employee safety, and financial performance (Parker et al., 2000).

Another example is a cross-departmental project team at Lotus Software that was formed to improve and consolidate order fulfillment processes for specific Lotus products. Large cash bonuses are tied to a number of critical deadlines and distributed equally among members of the team. In addition to these team incentives, substantial individual performance-based cash bonuses are available for those who show behaviors and performance thought to go above and beyond team norms, with larger awards going to those who seemed to excel the most (Parker et al., 2000).

However, recent research calls into question the assumption that a combination of individual and team incentives captures the best of both worlds. Wageman (2001) suggests that systems that have hybrid incentives can lead group members to spend much of their time on their own pursuits, avoiding interdependent actions in their tasks. Quigley et al. (2007) conducted a laboratory experiment examining 60 dyads of students engaged in a decision-making simulation. Focusing on the negative effects of mixed incentives, Quigley and colleagues found that both mixed and individual incentives led to lower levels of information sharing than did group incentives. Moreover, they found no significant differences in information sharing between individual incentives and mixed incentives. Although Quigley et al. did not examine speed, accuracy, backing up behavior, or conducting one's own taskwork, their findings are consistent with the contention that mixed incentives can undercut cooperation in groups. Indeed, information sharing is an important form of cooperation that may be involved in both accuracy and backing up behavior. Thus, Quigley and colleagues present findings that begin to call into question the accuracy of the assumption that mixed incentives are the best of both worlds.

Wageman (1995) conducted an exploratory study of maintenance employees working in 152 groups that had a history of individual incentives. Groups were assigned to conditions of keeping the individual incentive system, switching to group incentives, or switching to mixed incentives. They did not examine the influence of these incentives on speed and accuracy in performance or backing up behavior and individual taskwork. However, they did find that mixed incentives led to lower effort norms, cooperation norms, and overall performance.

Findings by Johnson and colleagues (2006) indicate that a history of individual incentives can influence behavior under other incentive systems, which make it difficult to interpret Wageman's (1995) study. However, Wageman (1995) casts doubt on the commonly held assumption that the combination of individual and group incentives is the best of both worlds. We contend that the recommendation to implement mixed rewards may have unforeseen consequences and is not without shortcomings of its own. As we detail in the following, we contribute to research on compensation in teams by examining mixed incentives through a more contingent lens than previous research, such that in comparison to group incentives, mixed incentives have some beneficial outcomes and some negative outcomes.

We contend that mixing equity and equality incentives creates a social dilemma such that members of a group are faced with a conflict between maximizing personal interests and maximizing group interests. A social dilemma presents people with a situation where what is desirable for the individual, group or department, firm, community, country, or international system may have undesirable effects at a different level of aggregation (Aram, 1989). In the context of teams, members of such a system are presented with two choices: cooperate or defect. Researchers across many disciplines, including economics (C. M. Anderson & Camerer, 2000),

political science (Olson, 1965), psychology (Dawes, 1980), and management (Murnighan, 1994), have noted that a primary contention of the social dilemma literature is that people tend to defect. Defection often results not only in behavior that is not in the best interests of the group, but *directly opposed* to the best interests of the group (Komorita & Lapworth, 1982). The social dilemma literature indicates that this is because pay-off structures of social dilemma strongly encourage defection. If one group member cooperates but the others defect, the defecting player gets a payoff that Axelrod (1984) refers to as the temptation to defect (which is positive), while the cooperating member gets what Axelrod refers to as the sucker's pay-off (which is negative).

What makes social dilemmas insidious is that for all group members, the noncooperative choice yields a higher pay-off than the cooperative choice no matter how many persons choose cooperation (Komorita, Parks, & Hulbert, 1992). If the group is successful, defectors can share in the rewards without any individual cost, and if the group is unsuccessful, defectors do not lose a cooperative contribution (Probst, Carnevale, & Triandis, 1999). That the individual's actions could critically determine the group's outcome is usually too remote to provide the rationale for contributing, particularly when there are more than two members (Bornstein & Ben-Yossef, 1994). However, if everyone chooses noncooperation, everyone receives an unfavorable outcome. As Kelley and Grzelak (1972) note, what makes this an especially insidious problem is that the advantage gained by selfish behavior is often rather small, and the negative impact at the group level is also often rather small. It is the collective consequences of cumulative selfish behavior that has a detrimental effect on the team (Kelley & Grzelak, 1972).

Social dilemma research indicates that greed and fear are two especially important determinants of defection in social dilemma (Coombs, 1973). Greed refers to the active pursuit of self-interest (Yamagishi & Sato, 1986). As noted by Komorita and colleagues (1992), for each individual group member, defection results in the largest pay-off. To the degree that group members seek the largest pay-off, they will tend to defect. Fear refers to the motivation for uncooperative behavior that is based on the lack of trust and the sense of hopelessness (Yamagishi & Sato, 1986). Even if group members are able to check their greed, the expectation that others will not check their greed leads members to fear that cooperation would be taken advantage of. In particular, Axelrod (1984) notes that an examination of others' outcomes relative to one's own provokes feelings of envy, which in turn lead to vengeful, uncooperative behavior. Rapoport (1987) indicates that either fear or greed may be the predominant motive not to contribute depending on the expectations each person has about the decisions of the other group members. If these expectations are relatively low, fear will be the predominant motive, but if they are relatively high, they can be replaced by greed.

The social dilemma literature indicates that group members are especially influenced by incentives that benefit themselves personally, more so than they are to incentives that benefit the group as a whole (cf. Dawes, 1980; Pruitt & Kimmel, 1977). Essentially, incentive systems that pit individual and collective interests against each other lead group members to pursue their own self-interest to the detriment of cooperation. Thus, including an individual component to an incentive system that also includes a group component may lead members to ignore the group component of the system and focus on the individual component. Building from this research, we contend that incentive systems that mix individual and group

components lead team members to pursue individual self-interests, ignoring the group portion of the incentive system that is intended to promote collective interests. Thus, as indicated by the social loafing literature, team members will put forth more effort in mixed incentives but will cooperate more under group incentives.

Previous research provides support for this contention. As noted previously, research by both Beersma and colleagues (2003) and Johnson and colleagues (2006) indicates a speed/accuracy trade-off between individually based systems and group-based systems. In both studies, individually based systems led to greater speed. Beersma and colleagues noted that this is because speed can be determined in part by individual effort, and individual effort is especially sensitive to individual incentives. However, individually based systems led team members to work less cooperatively, such that they did not share information that would have helped in error avoidance. As Beersma and colleagues note, this is because team members often have to cooperate in order to gather enough information, share cues, and collectively process information to avoid errors. Both Beersma and colleagues and Johnson and colleagues found that group-based incentives led to lower accuracy than individually based incentives.

Because we expect team members to defect in conditions of mixed incentives, we expect that mixed incentives will lead to lower levels of accuracy than group incentives. Thus, in contrast with prescriptions that mixed incentives will lead to the best of both worlds, we hypothesize a trade-off will occur between group incentives and mixed incentives such that mixed incentives lead team members to work faster but less accurately than group incentives.

Hypothesis 1: Team members will work faster under a mixed incentive system than under a group incentive system.

Hypothesis 2: Team members will commit more errors under a mixed incentive system than under a group incentive system.

Taskwork and Backing Up Behavior

As Koole, Jager, van den Berg, Vlek, and Hofstee (2001) note, in order to reap the benefits of interindividual cooperation, individual group members frequently have to make personal sacrifices. In the current context of teams in organizations, this means that team members must often deprioritize their own taskwork so that they may engage in teamwork behaviors that provide aid to fellow team members. Relevant to the current topic is the distinction made by Barnes and colleagues (2008) between conducting one's own taskwork and conducting the taskwork of a fellow team member, which they refer to as backing up behavior. Conducting one's own taskwork entails a team member's interaction with tasks, tools, and machines that is intended to fulfill tasks assigned to them (Bowers, Braun, & Morgan, 1997). Conducting the taskwork of a fellow team member is referred to as backing up behavior and entails provision of resources and task-related effort to another member of one's team that is intended to help that team member fulfill tasks assigned to that team member (Porter, Hollenbeck, Ilgen, Ellis, West, & Moon, 2003).

As Barnes and colleagues (2008) note, one's own taskwork and backing up behavior both draw from the finite cognitive resources of team members. Holding cognitive resources constant, this suggests that teamwork and taskwork compete for limited team member cognitive resources. Barnes and colleagues hypothesized that backing up behavior would lead those engaging in backing up behavior to neglect their own taskwork. Their laboratory experiment supported this hypothesis. Although the theory and data of Barnes and colleagues were at the team level of analysis, we contend that the same logic applies to the individual level of analysis as well.

This is important in the context of mixed incentives, because as we contend in the following, incentives that encourage backing up behavior detract from cognitive resources that can be allocated toward one's own taskwork, and vice versa. Although there is a dearth of research examining how mixed incentive plans influence taskwork and backing up behavior, we echo the contention made by Sniezek et al. (1990) that mixing individual incentives and group incentives creates a conflict between the individual and collective interests of team members. Because conducting one's own taskwork and engaging in backing up behavior compete for the finite resources of team members, there is often a trade-off between the two. As noted by a vast literature spanning the boundaries of several disciplines, people who are placed in social dilemmas tend to defect, pursuing their own interests at the cost of group (C. M. Anderson & Camerer, 2000; Dawes, 1980; Murnighan, 1994; Olson, 1965; Rapoport & Eshedlevy, 1989; Van de Kragt, Orbell, & Dawes, 1983). Thus, we expect that team members in a mixed incentive plan will tend to focus on their own taskwork to the neglect of teamwork.

In contrast, social interdependence theory indicates that group incentive systems promote cooperation among members (Deutsch, 1949). This is because rather than placing individual and collective interests in conflict, as is the case with mixed incentive systems, pure group incentives align the interests of group members. The contention that pure group incentives lead to cooperation has received empirical support (Petty, Singleton, & Connell, 1992; Pfeffer, 1995). Therefore, we expect that because the interests of the group members are aligned, when working under a pure group incentive system, team members will be especially willing to engage in backing up behavior. As noted previously, one's own taskwork and backing up behavior compete for resources. Thus, high levels of backing up behavior promoted by group incentives should come in part at the cost of team members conducting their own taskwork.

Building from this theory and research, we contend group incentive systems and mixed incentives present a trade-off between engaging in teamwork and conducting one's own taskwork that is parallel to the speed/accuracy trade-off. Specifically, we contend that in comparison to group incentives, mixed incentives lead team members to conduct more of their own taskwork but to engage in lower levels of backing up behavior.

Hypothesis 3: Team members will complete more of their own taskwork under a mixed incentive system than under a group incentive system.

Hypothesis 4: Team members will engage in lower levels of backing up behavior under a mixed incentive system than under a group incentive system.

Method

Participants

Participants for this study were 304 undergraduate students in an upper-level management course at a large Midwestern university who were randomly assigned to 4-person teams ($N = 76$ teams). Participation in the study was voluntary; however, in exchange for their participation, participants received course credit. In addition, teams were also eligible for cash prizes (\$10 per participant) on the basis of performance.

Nature of the Task

Participants worked on a networked computer simulation, which was a modified version of the Distributed Dynamic Decision-Making (DDD) simulation. The version of the simulation used in the present study was developed for teams of four members with little or no military experience. We provide a brief description of the simulation in the following (see Beersma et al., 2003, for further details).

Team members played a command and control simulation in which each team member sat at a networked computer. Individual team members were located in the same room but were not able to see the screens of other team members. However, team members were in close proximity and could easily communicate with each other verbally. In the task, the team monitored a hypothetical geographic region. Radar representations of the forces moving through the geographic region were known as “tracks.” The teams’ overall objective was to disable enemy tracks that entered the restricted airspace as quickly as possible and avoid the errors of disabling friendly tracks.

In the task, each team member controlled one of each type of four vehicles, all of which had varying power and capabilities to disable tracks. Thus, the task was structured such that the team operated in a divisional resource allocation structure—meaning that each team member was able to engage and disable any enemy track that encroached on his or her geographical region. In monitoring the geographic space, each team member’s base had radar capacities that covered only a portion of the area that needed to be monitored. Any track outside the radar range was invisible to the team members from their base. If the team members wanted to determine the nature of a track outside this ring, they could ask their teammates to provide that information to them or they could launch a vehicle and move it near the track and manually identify it.

As noted by Porter and colleagues (2003), team members tend not to engage in backing up behavior when there is not a legitimate need for backup. In order to structure the task such that there was a legitimate opportunity to provide backup, we structured the workload of the team such that one team member—the high workload team member—had 50% of the team’s workload. The remaining three team members—the low workload team members—evenly split the other 50% of the team’s workload. This workload structure was such that high workload members had workload that was high enough to require help from the other team members. Thus, the high workload members were the legitimate receivers of backup, and the other three team members were potential backup providers.

Procedures

Upon entering the laboratory for their scheduled 3-hour experimental session, each participant indicated their agreement to participate in the study via a consent form. Participants were informed they would be participating in a study on team performance. Participants were randomly assigned to both a four-person team and one of four computer stations. Participants completed the Wonderlic Personnel Test (Wonderlic Associates, 1983) before the trainer began the training session. Training consisted of declarative knowledge regarding all the various details involved in the simulation, followed by hands-on training where the trainer explicitly walked the participants through the mechanics of the simulation. The teams were also allowed hands-on practice. Participants were then given a short break and immediately following the break, began a 30-minute simulation.

Manipulations and Measures

Incentives. As noted earlier, each participant had the potential to earn up to \$10. Only the top half of performers were compensated, based on comparisons of two teams performing in a given session. However, there were two different incentive systems (see Appendix). In the group incentive system, 100% of compensation was based on team performance. The overall performance scores of two teams were compared. Members of the team that had the higher score were compensated \$10 each. Members from the team that had the lower score did not receive any money.

In the mixed incentive system, based on previous recommendations that equity-based incentive systems and equality-based incentive systems can be combined to offset their respective weaknesses (DeMatteo et al., 1998; Heneman & von Hippel, 1995; Kozlowski & Ilgen, 2006; Welbourne & Gomez Mejia, 1995), half of the incentive system was group based and half of the incentive system was individually based. Namely, 50% of compensation was based on team performance in the exact same manner as the group incentive condition. Thus, teams that scored higher in head-to-head comparisons were compensated \$20, to be evenly divided among the team members (\$5 per member). However, the other 50% of compensation was based on individual performance. Just as with team performance, individual performance outcomes for each role were compared between teams. Equivalent team members (those sitting in the same seat) in each of two teams in a given session were compared, with the higher score earning \$5 that was not shared with other team members. Participants in the mixed compensation condition were informed that there were three potential compensation outcomes: (a) They could receive both the team and individual incentives (\$10 total per participant), (b) one of the two incentives (\$5 per participant), or (c) neither of the incentives (\$0 per participant). In summary, the expected utility was the same for both conditions (50% base rate probability of earning \$10); however, for teams in the group incentive condition, participants were paid based on *only* team performance, and teams in the mixed incentive condition were paid in part based on team performance and in part based on individual performance.

Accuracy. In this task, there were two types of potential targets: enemy targets that were legitimate targets to attack when in the restricted region and friendly targets that participants were instructed not to attack. Participants had the ability to attack both types of targets, although they were penalized for attacking friendly targets or attacking enemy targets outside of the restricted region. We measured errors as the number of times participants attacked friendly targets anywhere or enemy targets outside of the restricted region. This measure was then reverse coded into accuracy (see Beersma et al., 2003).

Speed. Participants in this task were responsible for identifying and engaging enemy targets. Accordingly, we measured speed as the number of seconds it took for participants to identify and engage enemy targets. Number of seconds to identify targets and number of seconds to attack enemy targets were each standardized and then averaged and reverse coded for an overall measure of speed (see Johnson et al., 2006).

Own taskwork. Because participants were responsible for identifying and engaging targets, taskwork was measured as the number of times participants identified targets in the area for which they were responsible plus the number of times participants attacked targets in the area for which they were responsible (see Barnes et al., 2008).

Backing up behavior. Backing up behavior is defined as “the discretionary provision of resources and task-related effort to another member of one’s team that is intended to help that team member obtain the goals as defined by his or her role” (Porter et al., 2003: 391). In the DDD simulation task, each team member is responsible for protecting one of four quadrants of the restricted space from enemy targets; however, all team members are collectively responsible for protecting the entire restricted space. As mentioned, the backup receiver had the heaviest portion of the team’s workload during the simulation, meaning that the other three team members had to help the backup receiver in order to do well as a team. For this study, we calculated backing up behaviors as the total number of times a team member destroyed an enemy target in an area for which a different team member was responsible (see Porter et al., 2003).

Team performance. Team offense and defense scores were captured by the simulation. Team offense went up by 5 points when an enemy target was disabled within one of the restricted zones and dropped by 25 points every time an enemy target was disabled in the neutral space or a friendly target was disabled. Defensive scores went down 1 point for every second an enemy was within the restricted zone and 2 points for every second an enemy resided within the highly restricted zone. Overall team performance was measured by standardizing and combining offense and defense (see Pearsall, Ellis, & Stein, 2009). These were the same scores that were used in determining which teams were compensated in the group incentives condition.

Control variables. Because one would expect that team members with higher cognitive ability to conduct fewer errors, be able to work faster, conduct more taskwork, and have more spare cognitive capacity to engage in backing up behavior, we controlled for cognitive ability. Team member cognitive ability was measured with the Wonderlic Personnel Test (Form IV),

which was completed prior to the DDD training session. Reliabilities on the Wonderlic Personnel Test have ranged from .88 to .94 (Wonderlic Associates, 1983).

As noted previously, the workload in this task was structured such that one team member had 50% of the workload of the entire team, and the other three team members equally divided the remaining 50%. Because this different workload distribution could influence speed, accuracy, backing up behavior, and conducting one's own taskwork, we included a dummy code for these (0 = *low workload*, 1 = *high workload*).

Analyses

Our hypotheses were tested using hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002). At Level 1, the model included individual-level data ($n = 304$). At Level 2, data were examined at the team level ($n = 76$) in order to control for nonindependence of individuals within teams. Coding of the experimental condition was included at Level 2 as well because this variable could not differ among individuals within teams.

Results

Means, standard deviations, and zero-order correlations between each of the study's variables are provided in Table 2. Tables 3 through 6 show the results from the hierarchical linear modeling analyses that were conducted to test the study's four hypotheses.

Hypothesis 1 predicted that team members would work faster under a mixed incentive system than under a group incentive system. The results of the test of this hypothesis are shown in Table 3. Consistent with this hypothesis, we found that individuals working in teams with a mixed incentive system identified and engaged enemy targets more quickly than did individuals working in teams under a group incentive system ($B = 9.94$, $t = 2.58$, $p = .012$).

Hypothesis 2 predicted that team members would commit more errors under a mixed incentive system than under a group incentive system. The results of the test of this hypothesis are shown in Table 4. This hypothesis was also supported, as we found that team members working under a mixed incentive system were less accurate (i.e., attacked more friendly targets) than team members working under a group incentive system ($B = -0.50$, $t = -3.42$, $p = .001$).

Hypothesis 3 predicted that team members would complete more of their own taskwork under a mixed incentive system than under a group incentive system. The results of the test of this hypothesis are shown in Table 5. This hypothesis was also supported, as we found that individuals working in teams with a mixed incentive system completed a greater amount of their own taskwork than individuals working in teams with a group incentive system ($B = 2.76$, $t = 2.32$, $p = .023$).

Hypothesis 4 predicted that team members would engage in lower levels of backing up behavior under a mixed incentive system than under a group incentive system. The results of the test of this hypothesis are shown in Table 6. This hypothesis was also supported, as we found that team members working under a mixed incentive system engaged in lower

Table 2
Means, Standard Deviations, and Zero-Order Correlations Among Study Variables

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Workload ^a	0.75	0.43	—	—	—	—	—	—
2. Incentive condition ^b	0.49	0.50	0.00	—	—	—	—	—
3. Cognitive ability	24.78	4.96	0.01	0.12*	—	—	—	—
4. Accuracy	1.36	1.67	-0.30**	-0.12*	0.07	—	—	—
5. Backing up behavior	4.92	5.29	-0.54**	-0.09	0.17**	-0.01	—	—
6. Own taskwork	59.74	30.31	0.92**	0.05	-0.05	0.17**	-0.50**	—
7. Speed	233.15	35.04	-0.45**	0.13*	0.12*	0.27**	0.08	-0.35**

Note: *N* = 304.

a. Workload coded as follows: 0 = low, 1 = high.

b. Incentive condition coded as follows: 0 = group, 1 = mixed.

**p* < .05.

***p* < .01 (two-tailed).

Table 3
Results of Hierarchical Linear Modeling Analysis Testing the Main Effect of Incentive Condition on Speed

Variables	Estimate	<i>t</i>
Level 1		
Control variables		
Workload ^a	-36.95	-8.89**
Cognitive ability	0.74	1.90
Level 2		
Main effect (β_0)		
Intercept (G00)	-284.74	-29.26**
Incentive condition ^b (G01)	9.94	2.58*

Note: a. Workload coded as follows: 0 = low, 1 = high.

b. Incentive condition coded as follows: 0 = group, 1 = mixed.

**p* < .05

***p* < .01 (two-tailed)

amounts of backing up behavior than did team members working under a group incentive system ($B = -1.28$, $t = -2.50$, $p = .015$).

Supplemental Results

Our research focused on speed, accuracy, backing up behavior, and conducting one's own taskwork. Previous research indicates that each of these variables is important in determining team performance (Barnes et al., 2008; Beersma et al., 2003; Porter, 2005). To date, researchers have given little attention to how speed, accuracy, backing up behavior, and

Table 4
Results of Hierarchical Linear Modeling Analysis Testing the Main Effect of Incentive Condition on Accuracy

Variables	Estimate	<i>t</i>
Level 1		
Control variables		
Workload ^a	-1.03	-8.10**
Cognitive ability	0.03	1.78
Level 2		
Main effect (β_0)		
Intercept (G00)	-1.07	-2.32*
Incentive condition ^b (G01)	-0.47	-2.58**

Note: a. Workload coded as follows: 0 = *low*, 1 = *high*.

b. Incentive condition coded as follows: 0 = *group*, 1 = *mixed*.

* $p < .05$

** $p < .01$ (two-tailed)

Table 5
Results of Hierarchical Linear Modeling Analysis Testing the Main Effect of Incentive Condition on Team Member's Own Taskwork

Variables	Estimate	<i>t</i>
Level 1		
Control variables		
Workload ^a	63.45	33.14**
Cognitive ability	0.25	1.83
Level 2		
Main effect (β_0)		
Intercept (G00)	99.57	24.33**
Incentive condition ^b (G01)	2.76	2.32*

Note: a. Workload coded as follows: 0 = *low*, 1 = *high*.

b. Incentive condition coded as follows: 0 = *group*, 1 = *mixed*.

* $p < .05$

** $p < .01$ (two-tailed)

conducting one's own taskwork all combine to determine overall team performance. This is likely because the manner in which those four variables combine to determine overall team performance may be idiosyncratic to the task. In some tasks, speed may play a very large role and accuracy a small role, and in other tasks, it may be just the opposite.

Nevertheless, it may prove useful to document the influence of individual and mixed incentive plans on overall team performance in the task utilized in this article. Accordingly, we conducted a supplemental analysis of this effect, shown in Table 7. Given that overall team performance is the dependent variable, this analysis was conducted at the team level of analysis. The incentive systems are measured the same as in previous analysis. Cognitive

Table 6
Results of Hierarchical Linear Modeling Analysis Testing the Main Effect of Incentive Condition on Backing Up Behavior

Variables	Estimate	<i>t</i>
Level 1		
Control variables		
Workload ^a	-6.56	-18.92**
Cognitive ability	0.22	4.04**
Level 2		
Main effect (β_0)		
Intercept (G00)	-4.67	-3.64**
Incentive condition ^b (G01)	-1.28	-2.50*

Note: a. Workload coded as follows: 0 = low, 1 = high.

b. Incentive condition coded as follows: 0 = group, 1 = mixed.

* $p < .05$

** $p < .01$ (two-tailed)

Table 7
Results of Analysis Testing the Main Effect of Incentive Condition on Overall Team Performance

Predictors	Team Performance	
	Step 1	Step 2
Cognitive ability	.367**	.408**
Incentive condition ^a		-.176*
R^2	.13	.16
ΔR^2 , Step 2		.03

Note: Values represent standardized regression coefficients. $N = 76$ teams.

a. Incentive condition coded as follows: 0 = group, 1 = mixed.

* $p < .05$

** $p < .01$ (two-tailed)

ability is included as a control variable in the same manner as in previous analysis, with the exception that it is aggregated to the team level (mean team member cognitive ability).

As indicated by Table 7, in this task mixed incentives led to significantly lower overall team performance than group incentives ($\beta = -.238$, $p < .028$). Although we caution readers not to make too strong of an inference from this supplemental analysis, this finding is consistent with our contention that using mixed incentives does not result in capturing the best of both worlds. This finding is also consistent with a field study conducted by Wageman (1995), which found that mixed incentives led to lower overall performance than group incentives.

Discussion

Theoretical Implications

Despite the recommendation provided by several researchers that mixing individual incentives and group incentives can capture the best of both worlds (DeMatteo et al., 1998; Heneman & von Hippel, 1995; Kozlowski & Ilgen, 2006; Welbourne & Gomez Mejia, 1995), we find that this is not the case. As indicated by the social dilemma literature (Dawes, 1980), mixing individual incentives and group incentives places team members in a social dilemma in which individual interests are pitted against collective interests. In comparison to pure group incentives, mixed incentives lead team members to conduct less teamwork and instead focus more on their own taskwork. Moreover, such team members work faster but more inaccurately than those working under group incentives.

This highlights the contingent nature of incentives noted by Beersma and colleagues (2003). They note that individually based incentives and group-based incentives have different strengths and weaknesses, each aiding and hindering different components of team performance. We extend this view by examining further contingencies in incentives provided in group contexts. Much as individual incentives and group incentives each have their strengths and weaknesses, this is also true of mixed incentives. Although our supplemental analysis indicates that the manner in which speed, accuracy, backing up behavior, and conducting one's own taskwork summed up in our particular task led mixed incentives to result in lower overall team performance than group incentives, we caution readers not to make too strong of an inference about how these incentives influence overall performance in other tasks. We think it is more useful to note that group incentives have beneficial and negative effects on components of performance, and mixed incentives have different beneficial and negative effects on components of performance. There are strengths and limitations to each incentive plan. However, it is clear that researchers should revise their assumption that a mixture of individual and group incentives represents the best of both worlds. Our findings indicate that this is not the case.

Moreover, we indicate the applicability of the social dilemma literature to the topic of group compensation. Previous research on this topic has tended to draw from equity theory (Adams, 1963, 1965) or the social loafing literature (Karau & Williams, 1993). However, the large literature examining social dilemmas has been largely absent from this topic. This absence is surprising considering the large role this literature has played in other topics. We contend that social dilemmas are both conceptually and empirically important to the topic of compensation in teams.

Perhaps most interesting theoretically is our finding that social interdependence theory and the social dilemma literature should not be considered in isolation. Consistent with social interdependence theory, teams with pure group-based incentives had team members that engaged in the highest levels of cooperation. However, this is only part of the story. Consistent with the social dilemma literature, team members working under mixed incentives focused on their own taskwork. Examining interdependence theory while ignoring the social dilemma literature may lead researchers to implement group-based incentives even in contexts where conducting one's own taskwork is more important than engaging in teamwork.

Practical Implications

Our findings are also of practical importance to managers of teams. We find that mixed incentives facilitate the rate at which team members work as well as the focus on their own taskwork and hindered accuracy and backing up behavior. In contexts in which accuracy and backing up behavior are of lesser importance than speed and a focus on one's own taskwork, mixed or individual incentives may be an appropriate method of compensation. However, in contexts where accuracy and backing up behavior are especially important, mixed incentives that are intended to aid team performance may have the opposite effect than intended.

It appears that no matter the incentive plan, managers must include consideration of both beneficial and detrimental effects. Our research indicates that no incentive plan that currently exists can simultaneously maximize speed, accuracy, teamwork, and one's own taskwork. In other words, managers should have a sound understanding of what behaviors they want to encourage in each specific team task and a sound understanding of which incentive system encourages which behaviors and then match the appropriate plan to the specific task.

Strengths, Limitations, and Future Research

There are two primary strengths to the design of this study. First, all of our variables were objectively measured. Objective measurement of the variables involved helps to avoid methodological problems associated with self-report data. Second, we were able to objectively and orthogonally manipulate incentive systems. This allows us to more clearly examine cause and effect without some of the concerns regarding alternative explanations and temporal precedent that may come along with field or archival research. Also, the laboratory manipulation of these incentive systems was done in a manner that would lead to concerns regarding practicality and ethicality in field settings.

The fact that this study was conducted in a laboratory context may evoke questions regarding the external validity of the findings. Participants in this study were not randomly selected from any definable population, but rather were college students who volunteered for the study. Although the lack of random selection and the potential homogeneity of our sample may raise concerns, researchers such as Dipboye and Flanagan (1979) and Colquitt (2008) note that samples in field studies typically have similar levels of homogeneity. Moreover, C. A. Anderson, Lindsay, and Bushman (1999) note that the correlations between effect sizes obtained in laboratory settings and field settings generally exceed .70, indicating the similarity between hypothesis tests using field and laboratory studies. Indeed, Jenkins, Mitra, Gupta, and Shaw (1998) conducted a meta-analysis examining the influence of incentives on performance and found that incentives had a more powerful effect on performance in field settings than laboratory settings. This suggests that the findings presented in our study may actually be conservative estimates.

Also, when assessing the relevance of external validity, Mook (1983) notes that one needs to keep the nature of the research question in mind. In this particular study, we are less interested in actual command and control situations and the mundane realism (Berkowitz & Donnerstein,

1982) that would come from an experimental setting and procedure that is nearly identical to what people would face in these situations. Similarly, we are not trying to estimate parameters that can be generalized to entire populations. Rather, we are primarily interested in developing and testing behavior in different compensation systems. This, then, requires high a high degree of experimental or psychological realism (Berkowitz & Donnerstein, 1982), which we believe that our task provides by using a procedure that approximates the psychological experiences that individuals have when working in groups exposed to different types of rewards. In line with this, prior research using this task has suggested that participants do find it psychologically engaging (Hollenbeck et al., 2002). Moreover, participants were aware of the financial incentive that could be achieved by performing well on the task and were interested and motivated by winning the money.

Perhaps most importantly, there are no boundary conditions or any formal aspects of our conceptual model that would imply that the predicted relationships would not work in this specific context that we used to test our theory, and the sole purpose of our empirical experiment was to test our extensions to compensation theory. If the theory had failed to work in this context, then the theory would need to be revised to reflect unique aspects of this context. However, our empirical study lends initial support to our theoretical extension. Although we encourage future researchers to test our extension to compensation theory in other venues, our context provided a legitimate venue within which to conduct an initial test.

A second potential limitation to this study is our task itself and its ability to replicate situations where team members need to make actual “trade-offs” between their own taskwork and team-focused backup behaviors. The importance of group helping and backing up behaviors in general is difficult to dispute. For example, Marks, Mathieu, and Zaccaro (2001) discuss helping or backing up behaviors via assuming and/or completing a task for a teammate as a critical team process, as do Ilgen et al. (2005), who review a number of studies that examine the importance and role of backing up and helping behaviors in teams. Similarly, the prospect and availability of workload sharing and helping behaviors is thought to be one of the key reasons for implementing team-based structures in organizations (McIntyre & Salas, 1995).

More specific to the current study, however, is work by Barnes et al. (2008) that used a similar task and established the importance of taskwork/backing up trade-offs and its potential relevance for a number of different types of teams such as emergency medical teams and air traffic controller groups. Barnes et al. suggest that these are the types of teams where backing up behaviors are important, strict timelines exist, and tasks are resource intensive to a degree that necessitates actual trade-offs in these activities rather than allowing for people to simply devote more effort, multitask, or work longer. Similarly, Hackman (1990) discusses teams, which he labels task forces, that also have strict deadlines and combinations of autonomy and interdependence that would require these types of trade-offs.

Another potential limitation of this study involves the absence of a strictly individual reward condition. However, given that (a) research and theory recommends against the use of individual- or equity-based rewards in interdependent groups (e.g., DeMatteo et al., 1998), (b) we have a reasonable understanding of how individual versus team-based rewards play out in groups (e.g., Beersma et al., 2003; Johnson et al., 2006), and (c) researchers are calling

for the examination of mixed reward systems (e.g., DeMatteo et al., 1998; Heneman & von Hippel, 1995; Kozlowski & Ilgen, 2006), we believe that the current design involving the comparison mixed versus group rewards and forgoing a third, individual-based, reward condition provides an adequate test of our effects of interest while taking into account modern suggestions and research on team reward structures in organizations. We do, however, encourage future research to include multiple types of incentives, such as pure individual incentive systems.

In addition to the limitations noted, it is important to list the boundary conditions associated with this study. First, our mixed rewards condition involved a mixture of 50% individual and 50% group. There are many different proportions of individual to group rewards that could be generated. It may be that these proportions are important in determining responses to mixed rewards. Social dilemma research would indicate that the individual component will probably receive disproportionate influence even if the proportion is varied, unless the proportions are extreme in nature.

Future research will need to investigate these different proportions, as well as more specific and nuanced mixed reward structures. In discussing potential problems with group- or equality-based reward systems, DeMatteo et al. (1998) suggest that one major problem may be that individuals have trouble understanding how their effort translates into group performance and therefore group rewards. While the nature of the task scoring and reward allocation procedures used in this study were fairly transparent, and therefore likely to alleviate some of the problems with tracking individual contributions through group rewards, it is reasonable to surmise that group members in the mixed reward settings were still more influenced by incentives that influenced them personally as opposed to those that influenced them through their overall effects on the group as a whole (e.g., Dawes, 1980; Pruitt & Kimmel, 1977). Given this, mixed reward systems that tie rewards more proximally to individual effort and/or behaviors aimed at benefiting the group as a whole (e.g., backing up behavior) and not to overall group performance in and of itself may help clarify the influence of individual contributions to team performance and thus more strongly influence behaviors aimed at achieving group goals. Thus, future research should examine multiple types of incentive systems, including individual, group, and mixed, that focus on rewarding a full range of potential behaviors.

Another boundary condition is that our reward systems were financial in nature. Previous research indicates that financial rewards can be effective in influencing behavior and performance (Jenkins et al., 1998). However, there may be other types of rewards that may come into play, such as social status, personal reputation, and other types of interpersonal rewards. Our study focused only on financial rewards. Future research should give greater consideration to other types of rewards.

In our study, task type was held constant. The additive task utilized in this research fits under the category of routine decision-making tasks (Barnes & Hollenbeck, 2009), in that potential choices and solutions were potentially demonstrable to other team members. Future research should examine how incentive systems influence team behavior in other types of tasks, such as nonroutine decision-making tasks, convergent problem-solving tasks, divergent problem-solving tasks, disjunctive tasks, and conjunctive tasks. It may be that with other

types of tasks, there is more or less of a trade-off between speed and accuracy and between backing up behavior and conducting one's own taskwork.

In our study, team members were randomly assigned to newly created teams. Random assignment allowed us to examine the effects of incentive systems without confounding them with the effects of various team member characteristics. However, future research may reveal that various team member characteristics, such as personality, values, and demographics, influence team member responses to incentive systems. One place to start is individualism/collectivism. Individualism is a cultural syndrome that emphasizes the idea of individuals as autonomous and the basic unit of analysis (Triandis, 1995). Collectivism, on the other hand, is distinguished by the notion that groups are the unit of analysis and that individuals are highly interdependent parts of these groups (Triandis, 1995). Research indicates that collectivistically oriented group members are less likely to defect and focus on individual interests than individualistically oriented group members (Brann & Foddy, 1987; Wade-Benzoni, Okumura, Brett, Moore, Tenbrunsel, & Bazerman, 2002; Wagner, 1995). This suggests that collectivistic group members may not be influenced by the individual component of mixed incentives to the same degree as individualistic group members. Thus, mixed incentive systems may have different effects when implemented with teams with different cultural backgrounds.

Furthermore, we studied the influence of incentive systems over the course of a single task. Future research may reveal that the effects of incentive systems differ over time as team members gather experience with the task and with each other. It may be that team members learn to trust each other over time. As noted by Yamagishi and Sato (1986), a lack of trust is one reason that people tend to defect in social dilemmas. Allison and Kerr (1994) found that group members who had observed other group members cooperate in the past were less likely to defect in future social dilemmas. Therefore, teams that develop trust over time may not defect as much in mixed incentive systems.

A final boundary condition is that our article focuses on contexts in which the incentive pool is zero sum. This is not unlike many organizations, which have finite resources to utilize in incentive systems. Under conditions of finite resources, although any given individual can receive any given incentive, it may not be possible for all individuals to receive all incentives. For example, in a merit system, where an average raise for a subunit (e.g., department) is set, individual raises are determined as variance around that mean. This is how many organizations control their labor costs. Future research should examine compensation systems under conditions in which there are no financial constraints to the number of people who can earn incentives.

In conclusion, we find that mixed incentives are not the panacea that some researchers have suggested. Rather than the best of both worlds, mixed incentives tend to place team members in a social dilemma that results in some beneficial effects and some detrimental effects. This generally leads group members to pursue their own interests to a greater degree than those working under a pure group incentive system, such that they work harder (greater levels of individual taskwork and greater levels of speed) but less cooperatively (greater errors and less backing up behavior).

Appendix

Instructions Provided to Participants

Both Conditions

If you notice, you have four different scoring bars—two for offense and two for defense. Let's say that an enemy target enters the screen at the top left corner and makes its way into DM2's green zone. Since it is an enemy, DM2 will be losing 1 point per second on his/her individual defensive score and 1 point per second on the team's defensive score. However, no one else's individual defensive scoring bar will go down. Do you notice how the bars are completely filled and a large number is in the box? That means defensive scores can ONLY go down. You can, however, gain offensive points. So if DM2 were to destroy that target he/she would get 5 points on their individual offensive score and the team would get 5 offensive points. However, none of the other individual offensive scoring bars would go up. If one of you shoots down a friendly or shoots an enemy outside of the forbidden zone, *your offensive score* is the one that drops by 25 points.

Destroy enemy targets as soon as they enter the Forbidden Zone. In fact, if you do that, you'll get 5 points. However, you have to be careful not to destroy them before they get into the Forbidden Zone—if you do that you'll actually lose 25 points. You'll also lose 25 points if you accidentally destroy a friendly target, no matter where it is on the screen.

To reiterate the scoring, your offensive score is affected by attacking things. You can either gain 5 points or lose 25 points. Your defensive score is affected by having things in the green or red Forbidden Zones. You can either lose 1 point per second or 2 points per second, per target. Finally, you have three separate scores, one individual, one group, and one team.

Group Incentives Condition Only

As a team, you will be competing for a cash prize against the team in the other room. If you win, you will each receive \$10.

The scoring is as follows. After the simulation, 1 point is given to the team with the highest offensive score, and 1 point is given to the team with the highest defensive score. The team with the most points is the winner. If a tie exists, defensive score will be the tie-breaker.

Mixed Incentives Condition Only

As an individual, you will be competing for a cash prize against the individual in the other room who is in the same role as you. If you win, you will receive \$5. As a team, you will be competing against the team in the other room for a cash prize. If you win, you will each receive a \$5.

The scoring is as follows. After the simulation, 1 point is given to the teams and individuals with the highest offensive score, and 1 point is given to the teams and individuals with the highest defensive score. The teams and individuals with the most points after both games are the winners. If a tie exists, defensive score will be the tie-breaker.

As a result, participants who win both the individual and team scores will receive \$10, participants who win only one of the individual or team scores will receive \$5, and participants who win neither the individual nor the team score will not receive any prize. In summary, your potential reward is based both on your individual performance and your team performance.

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