AMERICAN PSYCHOLOGICAL ASSOCIATION

Psychological Bulletin

© 2021 American Psychological Association
ISSN: 0033-2909

2021, Vol. 147, No. 5, 504–534
https://doi.org/10.1037/bul0000251

Together, Everyone Achieves More—Or, Less? An Interdisciplinary Meta-Analysis on Effort Gains and Losses in Teams

Ann-Kathrin Torka, Jens Mazei, and Joachim Hüffmeier
Department of Psychology, TU Dortmund University

This preregistered meta-analysis theoretically and empirically integrates the two research strands on effort gains and effort losses in teams. Theoretically, we built on Shepperd's (1993) framework of productivity loss in groups and Karau and Williams' (1993) Collective Effort model (CEM) and developed the Team member Effort Expenditure model (TEEM), an extended Expectancy × Value framework with the explicit addition of an individual work baseline. Empirically, we included studies that allowed calculating a relevant effect size, which represents the difference between an individual's effort under individual work and under teamwork conditions. Overall, we included 622 effect sizes (N = 320,632). We did not find a main effect of teamwork on effort. As predicted, however, multilevel modeling revealed that the (in-)dispensability of the own contribution to the team performance, social comparison potential, and evaluation potential moderated the effect of teamwork versus individual work on expended effort. Depending specifically on the level of (in-)dispensability and the potential to engage in social comparisons, people showed either effort gains or losses in teams. As predicted, we also found that people's self-reports indicated effort gains when they had objectively shown such gains, whereas their self-reports did not indicate effort losses when they had shown such losses. Contrary to our hypotheses, team formation (i.e., ad hoc vs. not ad hoc teams) and task meaningfulness did not emerge as moderators. Altogether, people showed either effort gains or losses in teams depending on the specific design of teamwork. We discuss implications for future research, theory development, and teamwork design in practice.

Public Significance Statement
This meta-analysis revealed that teamwork is neither motivating nor demotivating per se. We found that the way in which teamwork is designed determines whether people show more or less effort during teamwork as compared with individual work. For more effort during teamwork to emerge, people need to have an indispensable contribution to the team performance or be able to compare themselves with moderately stronger teammates.

Keywords: effort gains, effort losses, groups, meta-analysis, teams

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

Is working together with others a motivating experience—one that leads people to "go the extra mile"? Or, rather, is working together with others a demotivating experience, such that people are prompted to let others do the hard work for them? How working in a team[1] influences people's effort is among the oldest research questions in psychology (Köhler, 1926; Ringelmann, 1913). Teamwork is also omnipresent in everyday life, as people work in teams, for instance, in organizational (Hollenbeck et al., 2012), educational (e.g., cooperative learning; Slavin, 2011), and sports (Reinboth & Duda, 2006) settings. Thus, a comprehensive understanding of how teamwork affects people's effort is needed.

Much research has focused on the effect of working in a team versus working alone on expended effort and also on how this effect is moderated. The often-observed effort losses in teams (i.e., lower effort during teamwork vs. individual work) are a long-standing phenomenon (Karau & Wilhau, 2020), and the notion that effort losses prevail during teamwork (e.g., Karau & Williams, 1993; Latané et al., 1979) has long dominated thinking about effort in teams (cf. Karau & Wilhau, 2020; Larson, 2010). This notion is still prominent, as is reflected in widely used

Ann-Kathrin Torka https://orcid.org/0000-0002-8259-9867
Jens Mazei https://orcid.org/0000-0003-3579-6857
Joachim Hüffmeier https://orcid.org/0000-0002-0490-7035
This research was supported by a Grant from the German Research Foundation to Joachim Hüffmeier (HU 1772/3-1). The full dataset is publicly available under https://osf.io/c6djr/?view_only=fbb8cf9ad0994cd3a1e0dbece31d80b0.
Correspondence concerning this article should be addressed to Ann-Kathrin Torka, Department of Psychology, TU Dortmund University, Emil-Figge-Straße 50, 44227 Dortmund, Germany. Email: ann-kathrin.torka@tu-dortmund.de

[1] In line with pertinent conventions, we use the terms *group* and *team* interchangeably (e.g., Devine & Philips, 2001; Kozlowski & Bell, 2003).

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

psychology textbooks (e.g., Aronson et al., 2010; Crisp & Turner, 2020). By contrast, the phenomenon of effort gains (i.e., higher effort during teamwork vs. individual work) has received more research attention only in recent years (Kerr & Hertel, 2011; Weber & Hertel, 2007).

The research strands on effort gains (Weber & Hertel, 2007) and losses (Karau & Williams, 1993) have been meta-analyzed separately in the past, and the two strands remained mostly disintegrated. This disintegration is problematic because key questions on effort expenditure during teamwork have remained unanswered: For instance, do people typically show effort losses, so that this phenomenon is still predominantly studied and observed in the literature? Alternatively, has research of and evidence for effort gains caught up with research on effort losses? Furthermore, are effort gains and losses attributable to different levels of the same moderators (e.g., the [in-]dispensability of the own contribution; Hertel et al., 2000; Kerr & Bruun, 1983) or to different moderators (e.g., missing evaluation potential leading to effort losses vs. social support by fellow members leading to effort gains; Harkins & Jackson, 1985; Hüffmeier et al., 2014)? Moreover, how can the tipping points—from effort losses in teams to comparable effort levels in teamwork and individual work and from such comparable effort levels to effort gains in teams—be explained? Altogether, we need to better understand and to more precisely predict when effort gains or losses occur during teamwork.

Our meta-analysis offers four contributions: First, we explore whether research still emphasizes and mostly reveals effort losses. For instance, Larson (2010; p. 19) stated that the "literature on small-group performance gives rather strong emphasis to the weaknesses of groups while largely ignoring their strengths." Similarly, Kerr and Tindale (2004; p. 625) concluded that "the ubiquitous finding across many decades of research . . . is that groups usually fall short of reasonable potential productivity baselines—in Steiner's terminology, they exhibit process losses." Especially for individual effort in teams, Karau et al. (2000; p. 179; see also Karau & Wilhau, 2020) echoed this notion: "while motivation losses in groups have been fairly easily to identify and replicate, the search for motivation gains in groups has been far more elusive." To illuminate whether research still emphasizes and primarily reports effort losses, we go beyond the prior meta-analyses on either effort losses (Karau & Williams, 1993) or effort gains (Weber & Hertel, 2007) by analyzing the whole literature on individual motivation within teams.

Second, we extend Shepperd's (1993) framework of productivity loss in groups and Karau and Williams' (1993) Collective Effort model to explain the full spectrum of effort-related findings, ranging from effort gains to effort losses in teams. Given the lack of research on effort gains available at the time, the two prior approaches focused on explaining effort losses. Yet, with our extended framework—termed the Team member Effort Expenditure model (TEEM)—we cannot only make general predictions about the direction of moderating effects (i.e., more vs. less effort) but also more precise predictions about when people show (a) effort gains, (b) comparable effort levels in teamwork and individual work, or (c) effort losses. We realize this greater precision in the TEEM by explicitly adding an individual work baseline, as individual work is the relevant comparison standard for assessing expended levels of effort during teamwork and as effort expenditure during individual work also varies depending on situational features. The TEEM carefully elaborates on the consequences of the added baseline of individual work. Moreover, the TEEM organizes and subsumes relevant theories (e.g., Social Comparison Theory; Festinger, 1954) and, thereby, overall provides a parsimonious overarching account of effort in teams (see Tindale et al., 2012; for another example of the search for parsimony in small group research).

Third, we examine a potential dissociation between objectively and subjectively measured effort. Prior research (e.g., Karau & Williams, 1993; Williams et al., 1981) has suggested that people might not provide accurate self-reports of their objectively assessed effort losses in teams. Yet, Karau and Williams (1993) only found inconsistent related results, and the meta-analysis on effort gains by Weber and Hertel (2007) did not examine a potential analogous dissociation at all. Learning more about such a possible dissociation for both effort gains and losses is relevant, however, because it could point to differences between the two phenomena: People may be unwilling or unable to report their objectively assessed effort losses, whereas they may accurately report their effort gains. We thus provide new insights into this issue.

Fourth, we generally provide an updated overview of the research domain, which informs additional questions. For instance, whereas older studies were mostly conducted in the laboratory (see Karau & Williams, 1993; Kerr & Hertel, 2011), recent studies were often conducted in field settings (e.g., Hüffmeier et al., 2017; Lount & Wilk, 2014). Thus, we examine whether laboratory findings generalize to field settings, and we do so with many more effect sizes than were available for prior meta-analyses (i.e., from $k = 178$ in Karau & Williams, 1993; and $k = 122$ in Weber & Hertel, 2007; to $k = 622$ in our meta-analysis). Likewise, we include research from a variety of disciplines (e.g., different psychological disciplines, behavioral medicine, business, and economics). Finally, we identify key directions for future research and provide practical guidance for the design of teamwork.

Theoretical Background

Widely accepted definitions of teams share the following elements: (a) teams comprise two or more individuals, who (b) work in the real or imagined presence of others, (c) share a common goal, and (d) are interdependent in their outcomes (i.e., they combine their inputs to form a single team product; e.g., Kozlowski & Bell, 2003; Larson, 2010).[2] We focus on the difference between effort spent on a collective task and effort spent on an individual or a coactive task. A *collective task* is performed in a team (Karau & Williams, 1993). In contrast, an *individual task* is performed without the real or imagined presence of others,[3] and a *coactive task* is performed in the real presence of others performing the

[2] Because we do not restrict our analyses to organizational settings and include laboratory studies as well as studies from sports and educational contexts, we do not consider the criterion of a shared organizational context (see Kozlowski & Bell, 2003; Marks et al., 2001).

[3] Our included primary studies hardly ever realized "true" individual conditions without the physical presence of others ($k = 84$). For most individual conditions, at least an experimenter was physically present ($k = 281$). For all other individual conditions ($k = 214$), it was unclear whether there were other people present. Thus, as in studies using a coactive baseline, many studies using an individual baseline also control for people's arousal (see Zajonc, 1965).

same task but without a common goal or outcome interdependence (Karau & Williams, 1993).

The construct of motivation explains the direction, intensity, and persistence of people's behavior (Geen, 1995; Larson, 2010). Research on individual motivation within teams typically focuses on the intensity and persistence of behavior. These two aspects concern people's effort expenditure, either via trying to accomplish "more during a fixed period of time (intensity)" (Larson, 2010; p. 259) or via "working longer at a given task (persistence)" (Larson, 2010; p. 259). Research typically utilizes simple tasks to examine people's effort expenditure, such as holding a weight above a trip rod (Hertel et al., 2000) or clapping as loudly as possible (Harkins et al., 1980). There are both individual- (e.g., obtain/maintain a positive self-concept) and group-based (e.g., achieve a favorable group performance) reasons for people to expend effort during teamwork, yet expending effort can also be costly (e.g., unpleasant or uninteresting), both physically and psychologically. Thus, people make decisions on their effort expenditure depending on the features of their current work situation—be it a teamwork or an individual situation—to avoid depleting their personal resources (cf. Hobfoll, 1989; Meijman & Mulder, 1998; Sackett et al., 1988).

The Team Member Effort Expenditure Model

Currently, there is no suitable framework that makes precise predictions on the full spectrum of effort-related phenomena during teamwork (i.e., from effort losses via comparable effort to effort gains during teamwork). Extant accounts such as the Collective Effort model (CEM; Karau & Williams, 1993) or the analysis of productivity loss in performance groups by Shepperd (1993) clearly have merit in explaining the emergence and reduction of effort losses in teams. Yet, because they originally focused on explaining effort losses in teams (cf. Karau & Williams, 1993; Shepperd, 1993), they leave unexplained the two critical *tipping points* in the effort-related spectrum during teamwork: (a) the conditions under which effort losses in teams turn into comparable effort levels in teamwork and individual work and (b) the conditions under which comparable effort levels turn into effort gains in teams. Therefore, we build on, further specify, and extend Shepperd's (1993) analysis and the CEM (Karau & Williams, 1993) to obtain a framework that allows making precise predictions on the full spectrum. Thus, the TEEM, the resulting extended Expectancy × Value framework, focuses not only on the causes of effort losses but also—and very explicitly—on the causes of effort gains.[4] Moreover, the TEEM guides the derivation of our hypotheses, organizes our meta-analytic findings, and helps to identify new avenues for future research.

Shepperd (1993) conceptualized contributing effort during teamwork as a social dilemma (see also Stroebe & Frey, 1982; Kerr, 1983): Provided that other team members contribute sufficient effort for securing a good team outcome, the behavior that is best for an individual team member is withholding effort, as doing so helps the team member to save resources (e.g., Hobfoll, 1989; Meijman & Mulder, 1998). Yet, if all team members withhold effort, a poor outcome for the team may result.

Shepperd's (1993) analysis and the CEM (Karau & Williams, 1993) are based on Expectancy × Value theory (e.g., Tolman, 1932; Vroom, 1964). Shepperd (1993) focused on three factors to organize and explain findings on effort losses in teams: (a) the value that team members attach to the behavior they perform during teamwork and to the outcome of teamwork, (b) the perceived contingency between team member's behavior and the outcome, and (c) the perceived physical and/or psychological costs of contributing to teamwork.[5] Shepperd (1993; cf. Karau & Williams, 1993) argued that positive changes to any one of the three factors—increasing the perceived value of the behavior or the outcome, strengthening the perceived contingency between behavior and outcome, or reducing the perceived costs of contributing—address the described social dilemma and, thereby, increase team members' willingness to contribute effort.

In our TEEM, we extend the valuable approaches not only by Shepperd (1993) but also by Karau and Williams (1993) to explain the full spectrum of effort-related findings during teamwork[6]: First, we explicitly integrate the relevant baseline of working individually (and, where applicable, working coactively) into each factor of Shepperd's (1993) framework.[7] Hereby, we obtain a framework that allows making precise predictions on team member effort—particularly on the above noted two central tipping points[8] (for an overview, see Table 1). In keeping with Expectancy × Value approaches (e.g., Tolman, 1932; Vroom, 1964) and their extensions to teamwork (e.g., Karau & Williams, 1993; Shepperd, 1993), we also assume a multiplicative linkage between the TEEM factors: Thus, the motivational impact of one particular factor can be even enabled (e.g., Hüffmeier et al., 2012), reduced (e.g., Shepperd & Taylor, 1999), or augmented (e.g., Earley, 1989) by another factor. As a second extension of the prior approaches, and also building on Karau and Wilhau (2020), the

[4] Karau et al. (2000, p. 182) and Karau and Wilhau (2020, pp. 33–34) also extended the CEM to the domain of effort gains in teams. In these extensions, they refer to the valence of the outcomes in individual work and also to the instrumentality of individual work as relevant baseline information, which is similar to our proposed extension. Yet, the authors only refer cursorily to individual work, and they do not fully develop it as a central element of their extended Expectancy × Value framework. Thus, we build on and fully articulate this valuable idea by explicating previously implicit assumptions on the role of individual (and coactive, where applicable) work for the emergence of all types of effort-related findings during teamwork (see Table 1).

[5] Given the parsimony of Shepperd's (1993) framework, we rely on his terminology. Yet, the CEM factors can be located therein: Shepperd's (1993) expectancy component subsumes the CEM's expectancy component and its three instrumentality facets, and the value and the cost component reflect different facets of the CEM's valence component. Please also note that there is only little empirical work on the more differentiated facets of the CEM (Karau & Williams, 1993), such as the relationship between team and individual outcomes.

[6] We stress that the CEM has been used to explain both effort gains and effort losses in teams (e.g., Hüffmeier et al., 2017; Williams & Karau, 1991). This application has been successful in that the predicted effects were observed, yet there remained uncertainty, for instance, regarding the precise conditions under which comparable effort levels in team and individual work turn into effort gains in teams. This uncertainty is especially evident in the study by Hüffmeier et al. (2017), in which the authors did not make precise predictions as to which team members show comparable effort levels and which show effort gains. This uncertainty exists because the reference to individual work (or coactive work, where applicable) in the CEM had not yet been fully developed.

[7] Our theoretical extension of extant Expectancy × Value models of team member motivation is, of course, also applicable to the CEM.

[8] Please note that we use tipping points as a stylized term to describe the analyses. It is not an exact measure of net performance.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

Table 1

The Team Member Effort Expenditure Model (TEEM; Building on Karau & Williams, 1993; Shepperd, 1993) With the Addition of an Individual Work Baseline

Effect	Expectancy component	Value component	Cost component
Effort gains are predicted if team members . . .	. . . perceive the relationship between their behavior and the outcome as stronger during teamwork than individual work.	. . . perceive the value of the behavior and/or the outcome as higher during teamwork than individual work.	. . . perceive the cost/benefit ratio of effort expenditure as more favorable during teamwork than during individual work.
	Example: indispensability among later relay swimmers (Hüffmeier et al., 2020).	Example: continuous social comparison with a slightly superior fellow team member (Hertel et al., 2008).	Example: social compensation among stronger team members (Williams & Karau, 1991).
Comparable effort levels during teamwork and individual work are predicted if team members . . .	. . . perceive the relationship between their behavior and the outcome as comparable during teamwork and individual work.	. . . perceive the value of the behavior and/or the outcome as comparable during teamwork and individual work.	. . . perceive the cost/benefit ratio of effort expenditure as comparable during teamwork and individual work.
	Example: working on an additive task without information about coworker's ability or effort (Hardy & Crace, 1991).	Example: offering a small group incentive while individual contributions are not identifiable (Shepperd & Wright, 1989).	Example: convincing team members that their fellow members' efforts will be equitable (Jackson & Harkins, 1985).
Effort losses are predicted if team members . . .	. . . perceive the relationship between their behavior and the outcome as weaker during teamwork than individual work.	. . . perceive the value of the behavior and/or the outcome as weaker during teamwork than individual work.	. . . perceive the cost/benefit ratio of effort expenditure as less favorable during teamwork than during individual work.
	Example: dispensability of individual contributions (free riding; Kerr & Bruun, 1983).	Example: nonidentifiability of contributions (social loafing; Latané et al., 1979).	Example: effort reduction as a response to free-riding fellow members (sucker effect; Kerr, 1983).

Note. We use Shepperd's (1993) terminology given its parsimony (for a detailed explanation, see footnote 5). To keep Table 1 as simple as possible, we only mention individual work as relevant baseline. Yet, if studies use coactive work as control condition, working coactively serves as baseline.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

TEEM explains the ulterior personal tendencies, drives, and motives that underlie team members' reduction, maintenance, or increase in effort during teamwork (see also Hertel & Hüffmeier, 2020).

To make precise predictions on team member effort, it is according to the TEEM, first, essential to realize that effort expenditure during *individual work* also varies depending on situational features. For instance, these include self-efficacy, the perceived relationship between individual efforts and individual outcomes, or the presence of others (Karau & Williams, 1993; Shepperd, 1993). In turn, comparing teamwork situations to individual work (or coactive work, where applicable) highlights the multitude of veraciously *social* processes that are not available during individual work (e.g., "hiding in the crowd"; Davis, 1969; or being evaluated by fellow members; Harkins & Jackson, 1985). This analysis reveals that, relative to individual work, teamwork can yield higher or lower *benefits* of contributing effort, a heightened or reduced *perceived relationship* between the members' behavior and the outcome, and higher or lower *costs*. These insights (see also Karau et al., 2000; p. 182) explain why people can even show effort gains (see Table 1).

The TEEM's rationale also allows for identifying the tipping points mentioned above. To identify the tipping point from effort losses to equivalent effort levels during team and individual work, factors are decisive that change in teamwork versus individual work (e.g., a weaker relationship between individual behavior and resulting outcomes during teamwork vs. during individual work). Moreover, factors are equally relevant that play a role only in one (e.g., teamwork), but not in the other situation (e.g., individual work), such as a low identifiability of individual contributions that only applies to teamwork. Likewise, to identify the tipping point from equivalent effort levels to effort gains, factors are decisive that change in teamwork versus individual work (e.g., a stronger relationship between individual behavior and resulting outcomes in teamwork as compared with individual work; see Karau et al., 2000). Factors are also decisive that occur only in one, but not in the other situation (e.g., social comparison with a moderately stronger fellow member during teamwork).

Another important insight that follows from the TEEM is that contributing effort does not always pose a social dilemma, which is in contrast to Shepperd's (1993) analysis. In certain teamwork situations, such as when social comparison is possible during teamwork, the individual and collective interests are aligned (i.e., both the individual and the team benefit from high effort of the focal member). This insight again helps to explain why people even show effort gains during teamwork.

Based on the TEEM, we predict that effort gains emerge, for instance, if team members perceive more value in contributing effort during teamwork as compared with individual work (see Table 1). To illustrate, when team members could continuously compare their own performance to the performance of a moderately superior fellow member in the study by Hertel et al. (2008), they received social comparison information that was not available during individual work, rendering contributing effort more valuable. Furthermore, we predict that comparable effort levels during teamwork and individual work emerge, for instance, if team members perceive comparable value in contributing effort during teamwork and individual work (see Table 1). The prospect of expecting a small team incentive while the own contribution is not identifiable exemplifies this constellation (Shepperd & Wright, 1989). Finally,

we predict that effort losses in teams emerge, for instance, if team members perceive a behavior–outcome relationship that is less strong during teamwork as compared with individual work (see Table 1). The classic study by Kerr and Bruun (1983) demonstrating free-rider effects when the individual contribution during teamwork was dispensable illustrates this tenet.

The Present Research

Based on the TEEM, we expect that the impact of teamwork versus individual work on effort is affected by different moderators. Thus, most of our hypotheses concern moderators of the team versus individual main effect on expended effort.[9]

(In-)Dispensability of the Own Contribution

The relation between individual and team performance (see expectancy component, Table 1) concerns the (in-)dispensability of the own contribution to the team performance (Weber & Hertel, 2007). Indispensability perceptions can result, for instance, from being the weaker team member under conjunctive task demands (i.e., the weakest member determines the team performance; Steiner, 1972) or the stronger team member under disjunctive task demands (i.e., the strongest member determines the team performance; Steiner, 1972), or working late or last during sequential teamwork (e.g., Hüffmeier et al., 2017; Hüffmeier & Hertel, 2011b). When the own contribution is perceived as indispensable, the behavior–outcome relationship can be stronger than during individual work. Thus, we expect people to show effort gains (e.g., Gockel et al., 2008; Hüffmeier et al., 2020). Because team outcomes impact not only the focal individual team member, and because people "often care about making a positive difference in other people's lives" (Grant, 2007; p. 393), a prosocial motive may underlie effort gains. Members then not only make a "prosocial" difference (Grant, 2007; Grant & Berry, 2011) but also obtain or maintain a positive self-concept (i.e., seeing oneself as competent, helpful, and socially valued). By contrast, if the relation between individual and team performance is weaker during teamwork than individual work or if it is even absent (i.e., the own contribution is perceived as dispensable), then we expect effort losses to emerge (e.g., Erev et al., 1993; Kerr & Bruun, 1983). This expected finding may be attributable to people's drive to save resources when their contribution is not needed (see Hobfoll, 1989).

> *Hypothesis 1a:* Team members expend more effort the more indispensable as compared with dispensable the own contribution to the team performance is.
>
> *Hypothesis 1b:* Specifically, team members exhibit effort gains when the own contribution to the team performance is indispensable.
>
> *Hypothesis 1c:* Team members exhibit effort losses when their own contribution to the team performance is dispensable.

Social Comparison Potential

Following Social Comparison Theory (SCT; Festinger, 1954), we argue that being able to compare the own performance to the performance of a moderately stronger teammate provides a benefit that is not available during individual work (see value component, Table 1), resulting in effort gains. This benefit is attributable to the desire for positive self-evaluation—a core principle of SCT: People strive to meet or exceed their teammates' performance because such social comparisons can result in a favorable reputation, feelings of success, and self-affirmation, whereas performing worse can lead to reduced status, frustration, and feelings of failure (Hertel & Hüffmeier, 2020; Karau & Wilhau, 2020). Social comparison thus serves to enhance one's self-concept (Gregg & Sedikides, 2018; Karau & Wilhau, 2020). The satisfaction of the need for competence (Deci & Ryan, 1980; Ryan & Deci, 2000) is another motive underlying the benefit of social comparisons. As another process at the group level, the CEM suggests that collective work triggers effort gains when it offers team outcomes relevant to self-evaluation (Karau & Williams, 1993; see also Goethals & Darley, 1987; Tajfel & Turner, 1979). In sum, people should show effort gains when social comparisons are possible (Kerr et al., 2007). This effect may be less likely, however, when the performance dimension is personally irrelevant or when discrepancies between team members are too large (Festinger, 1954; see also Messé et al., 2002).[10]

Conversely, when social comparisons are not possible during teamwork, people cannot obtain relevant self-knowledge or validate themselves (see Festinger, 1954) by expending much effort during teamwork (Hertel & Hüffmeier, 2020; Karau & Wilhau, 2020). In such situations, the behavior–outcome relation can also be less pronounced than during individual work, so that we expect effort losses to emerge (Lount & Wilk, 2014). Altogether:

> *Hypothesis 2a:* Team members expend more effort when social comparison during teamwork is possible as compared with not possible.
>
> *Hypothesis 2b:* Specifically, team members exhibit effort gains when social comparison is possible.
>
> *Hypothesis 2c:* Team members exhibit effort losses when social comparison is not possible.

Social comparison is an *intraindividual* process whereby individuals compare their performance to that of others (e.g., Harkins et al., 2000; Parker, 2001). Yet, there are also other sources of an evaluation, like the experimenter or a teammate. Contrary to social comparison, being evaluated by others is an *interindividual* process. Unfortunately, extant studies typically did not distinguish

[9] We preregistered our hypotheses and research questions on the Open Science Framework (OSF; https://osf.io/c6djr/?view_only=fbb8cf9ad0994cd3a1e0dbece31d80b0). We have a first set of main hypotheses, which we believed we could test because we were aware that enough pertinent primary studies existed that allowed for such tests. These main hypotheses are presented in this article. We preregistered two additional sets of hypotheses. The first of these sets specifies effects that are more complex than simple moderator effects (i.e., three-way interaction effects). Following the preregistration, we report the related analyses only in the online supplemental material available on the OSF. Hypotheses of the second of these sets are reported in the article if there were enough studies available to conduct robust analyses, which was only the case for task meaningfulness. Otherwise, the related analyses are reported in the online supplemental material available on the OSF.

[10] Because of a lack of studies varying the discrepancy in ability, we could not examine this variable as a moderator.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

between the potentials for social comparison and evaluation (for exceptions, see Szymanski & Harkins, 1987, 1993), although they are theoretically distinct. Thus, we elaborate on evaluation potential below.

Evaluation Potential

Evaluation potential is given when the own individual input is identifiable to the self, the experimenter, or a teammate, and a comparison standard is given (Harkins & Jackson, 1985; Harkins, & Szymanski, 1989). When working in a team, individual contributions are often not identifiable (Williams et al., 1981). Thus, people can receive neither credit nor blame for their performance, and they may not perceive the need to work hard (Williams et al., 1981). Thus, when evaluation is not possible, team members can "hide in the crowd" (Davis, 1969) and they cannot be held accountable for poor performance (see value component, Table 1). Thus, withholding effort is less costly during teamwork as compared with individual work, so that we expect effort losses to emerge in these situations (Harkins & Jackson, 1985). Conversely, when evaluation is possible, others can sanction a bad performance (Williams et al., 1981), which implies costs, so that people should be hesitant to lower their efforts. Thus, avoiding sanctions by maintaining one's efforts can make the costs of contributing to teamwork comparable to individual work. Yet, unless team members can realistically expect to receive additional benefits (e.g., credit or praise), we do not assume evaluation potential to yield effort gains. This assumption is consistent with results showing that punishment does not increase effort beyond a control condition and decreases intrinsic motivation (Schnake, 1991). Altogether:

> *Hypothesis 3a:* Team members expend more effort when there is evaluation potential during teamwork as compared with when there is no evaluation potential during teamwork.

> *Hypothesis 3b:* Specifically, team members exhibit effort losses when there is no evaluation potential.

Team Formation

Working with familiar team members may increase effort. As noted by Karau and Williams (1993; p. 685), when "working with highly respected coworkers, exerting high levels of effort may lead to self-satisfaction, approval from the team, or other important outcomes." Yet, both Shepperd (1993) and Karau and Williams (1993) do not explain in detail why such outcomes matter. Thus, we draw from Self-Determination Theory (SDT; Deci & Ryan, 2011) and Social Identity Theory (SIT; Hogg & Abrams, 2003; Tajfel & Turner, 1979) to provide such explanations. SDT (Deci & Ryan, 2011) proposes that people are especially motivated in situations that fulfill their need for relatedness, and SIT (Hogg & Abrams, 2003) suggests that performing well as a group can provide group members with a positive (social) identity. Thus, when working with friends or other highly respected coworkers (Karau & Williams, 1993), people can satisfy their need for relatedness, as performing well can help foster valued relationships (see value component, Table 1). Similarly, higher levels of social identification accompany a "desire to obtain, maintain, or enhance a positive self-identity through the achievements of groups, teams, or social categories that one belongs to or identifies strongly with" (Karau & Wilhau, 2020; p. 17).

Conversely, in ad hoc teams, people do not expect future interactions and thus are less able to satisfy their need for relatedness. Additionally, in ad hoc teams, a good team outcome does not enhance a positive self-identity, because the individual does not (strongly) identify with a group of strangers (Hogg & Abrams, 2003; Shepperd, 1993). Thus, people's efforts should be lower in ad hoc teams than in teams not formed ad hoc (e.g., for supporting findings, see Karau & Hart, 1998; Karau & Williams, 1997). We therefore predict:

> *Hypothesis 4:* Team members expend more effort when they work in teams that have not been formed ad hoc (e.g., sports teams; when working with friends or coworkers) as compared with when they work in ad hoc teams (e.g., groups of strangers).[11]

Task Meaningfulness

Task meaningfulness "concerns the value of the task goal or purpose, judged in relation to the individual's own ideals or standards. In other words, it involves the individual's intrinsic caring about a given task" (Thomas & Velthouse, 1990; p. 672; see also Shepperd, 1993; p. 71). The more meaningful a task is to a team member, the higher should the valence of the task be (see value component, Table 1). Because task valence moderates the impact of teamwork versus individual work on effort (Karau & Williams, 1993; Shepperd, 1993), people should expend more effort when they perform a meaningful as compared with a less meaningful task. More specifically, if a team task is more meaningful than an analogous individual task—for instance, because it affects more than the focal team member (Hackman & Oldham, 1975; Hertel et al., 2018) or because team members can make a positive impression on others by performing well (see Schleu et al., 2019)—effort gains in teams should result. This finding is likely because people working on a personally meaningful task can fulfill, obtain, or maintain a positive social identity (Hogg & Abrams, 2003) or satisfy their need for relatedness (Deci & Ryan, 1980; Ryan & Deci, 2000) by performing well.

Although we expect task meaningfulness to increase people's effort, working on less meaningful tasks may not necessarily lead to effort losses. Whereas being able to satisfy a psychological need can, quite obviously, be a motivating experience, working on a less meaningful task may simply have limited implications for people's needs, and, thus, may not decrease their effort below the effort expended during individual work. Altogether:

> *Hypothesis 5a:* Team members expend more effort during teamwork when they perform a meaningful as compared with a less meaningful task.

> *Hypothesis 5b:* Specifically, team members exhibit effort gains when the task is meaningful.

Comparison Baseline

To assess the magnitude of effort gains in teams, individual and coactive baselines need to be distinguished. During individual work, people typically work alone or in the presence only of an

[11] An anonymous reviewer noted that our preregistered hypothesis was mistakenly formulated as a main effect of team type. Thanks to this helpful comment, we changed the formulation of this hypothesis in this article.

experimenter (Karau & Williams, 1993), which makes social comparisons impossible. Yet, others are present and work on the same task during coactive work (Karau & Williams, 1993). When coactive tasks serve as the baseline, effort gains might be less pronounced or even absent as social comparisons (i.e., a benefit) are possible in both collective and coactive tasks (effort gains, then, can only be driven by other processes, e.g., indispensability; Weber & Hertel, 2007). Thus, we predict:

Hypothesis 6: When social comparison during teamwork is possible, effort gains will be higher in studies comparing individual work with teamwork as compared with studies comparing coactive work with teamwork.

Measurement of Effort Losses

Prior research (e.g., Karau & Williams, 1993; Williams et al., 1981) suggested that people may not provide accurate self-reports of their objectively assessed effort losses. This dissociation between subjective and objective effort measures may be due to social desirability concerns, for instance (Crowne & Marlowe, 1964; Edwards, 1957). Interestingly, the dissociation may also provide insights into the processes through which a certain level of effort emerges: Karau and Williams (1993; p. 685) mention that, depending on the situation, people either intentionally choose a certain level of effort or "respond automatically to a preexisting effort script." If people automatically respond to a script, they may be unaware of their actual effort expenditure and, thus, unable to report it accurately. A dissociation between objectively measured effort losses and people's self-reports, thus, might also suggest that effort losses result from automatic processes. In line with this idea, studies found that educating people about social loafing and asking them to avoid it did not help to prevent social loafing (Huddleston et al., 1985; Nilsen et al., 2014). Altogether, we predict:

Hypothesis 7: In studies finding effort losses on objective measures, subjective measures (i.e., team members' self-reported effort) either do not indicate effort losses (i.e., an effect size that does not differ from zero) or at least less pronounced effort losses as compared with the effort losses observed with objective measures.

Measurement of Effort Gains

When team members show effort gains, they need to regulate and monitor their effort expenditure (e.g., Carver & Scheier, 2001) as they actively increase their effort beyond their typical level (i.e., effort spent during individual work; see Sackett et al., 1988). This change in effort could, for example, take the form of going beyond the own pain threshold when performing a physical task (e.g., Cohen et al., 2010; Hertel et al., 2000). As such bodily reactions (e.g., muscular tension, fatigue, or pain) provide feedback, people likely are aware of their increased effort (via interoception; Craig, 2002), so that they should be able to accurately report their effort.

Hypothesis 8: In studies finding effort gains on objective measures, subjective reports about effort also indicate effort gains (i.e., an effect size that positively differs from zero).

Research Questions

We preregistered open research questions (RQs) when we could not derive clear hypotheses (e.g., when alternative hypotheses were equally plausible). The first RQ concerns a *main effect* of working in a team as compared with working individually or coactively. Given the many determinants of effort (see our hypotheses above), it is unclear whether teamwork—on average and *across* different contexts—increases or decreases effort. Thus, we ask:

RQ 1: Does teamwork on average result in effort gains or effort losses in teams?

Prior research used both physical and cognitive tasks. On the one hand, *effort gains* may be stronger in physical versus cognitive tasks, as the relationship between behavior and the outcome may be clearer (i.e., holding a weight above a trip rod vs. generating ideas in a brainstorming task). Additionally, performance on cognitive tasks is bounded by general cognitive abilities, which may limit the emergence of effort gains (e.g., Mangos & Steele-Johnson, 2001; Maynard & Hakel, 1997). On the other hand, physical tasks (e.g., holding a bar; Hertel et al., 2000) are often simple so that people may become less motivated (Jackson & Harkins, 1985; Karau & Williams, 1993). Similarly, *effort losses* may be stronger either for cognitive tasks as people's cognitive limitations may be demotivating or for physical tasks as people are less motivated to perform a boring task (Jackson & Harkins, 1985; Karau & Williams, 1993). Thus, it is unclear whether and how the task type affects people's effort.

RQ 2: Are effort gains stronger in studies employing physical as compared with cognitive tasks?

RQ 3: Are effort losses stronger in studies employing cognitive as compared with physical tasks?

Pertinent research used both between- (e.g., Cymek, 2018; Ying et al., 2014) and within-subjects designs (e.g., Hüffmeier et al., 2017; Wittchen et al., 2007). On the one hand, within-subjects designs entail the risk that, in laboratory studies, people may change their behavior "due to cues about what constitutes appropriate behavior" (i.e., demand effects; Zizzo, 2010; p. 75). There may also be unwanted carry-over effects from one condition to another (e.g., order effects; Krosnick & Alwin, 1987; see also Charness et al., 2012). Thus, within-subjects designs may be less suited to detect existing effects of teamwork on effort. Yet, within-subjects designs tend to have higher statistical power than between-subjects designs (Charness et al., 2012; Mullet & Chasseigne, 2018), potentially rendering within-subjects designs more suitable to detect existing effects of teamwork on effort. Thus, we ask:

RQ 4: Which effect does the study design (between- vs. within-subjects design) have on effort in teams?

Field studies have recently been increasingly conducted (e.g., Hüffmeier et al., 2017; Lount & Wilk, 2014). Thus, we compare laboratory studies with field studies and ask:

RQ 5: Which effect does the study setting (field vs. laboratory) have on effort in teams?

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

We also examine gender differences. Women may show particularly strong effort gains when their individual contribution to the team performance is indispensable (Weber & Hertel, 2007; Weber et al., 2009) because being other-oriented is part of the female gender role (Eagly, 1987; Eagly & Karau, 2002). The possibility of comparing one's own performance with the performance of a teammate allows for competition (Hertel et al., 2008; Moede, 1914). Thus, following their agentic gender role, men might be more prone to social comparison processes than women (Schwartz & Rubel, 2005; Weber et al., 2009). Altogether, men and women might differ in their propensity to show these two processes (see also Hypotheses 10a, 10b, 11a, and 11b in the online supplementary materials available on the OSF), but we do not have a clear a priori hypothesis about the *overall* effect of gender on effort in teams.

RQ 6: Which effect does gender have on effort in teams?

We further examine gender differences when people's own contributions are dispensable. On the one hand, when the own contribution to the team performance is dispensable, it is not necessary and may be costly to expend high levels of effort (Karau & Williams, 1993). Thus, people should generally show effort losses, so that women and men might not differ from each other. On the other hand, "women's behavior seems to be more motivated by group-oriented interests such as building or maintaining harmonious and stable relationships" (Weber et al., 2009; p. 733). Thus, women might be less likely to show effort losses than men, even if their own contribution is dispensable. The gender-related findings by Karau and Williams (1993) support this latter assumption. Altogether, we ask:

RQ 7: Do men exhibit stronger effort losses than women when their own contribution to the team performance is dispensable?

Finally, the presence of teammates is another relevant factor. When teammates are physically present as compared with absent, there may be a higher potential for evaluation and for social comparisons. Thus, team members might expend more effort when teammates are present (cf. Hypotheses 2a and 3a above). Still, a converse prediction could also be derived. For instance, Postmes et al. (1998; p. 697) argue that anonymity "can actually reinforce group salience and conformity to group norms." Thus, a possible group norm to exhibit high effort could become more influential when teammates are absent, resulting in more effort as compared with when teammates are physically present.

RQ 8: Do team members expend more effort when their teammates are physically present as compared with when they are absent?

Method

We preregistered this project on the OSF. Online supplemental materials, including additional analyses and the full dataset, are publicly available under https://osf.io/c6djr/?view_only=fbb8cf9ad0994cd3a1e0dbece31d80b0.

Literature Search

We searched relevant literature on effort gains and losses in teams by using multiple strategies. First, we reviewed studies included in previous meta-analyses on this topic (Herbst & Mas, 2015; Karau & Williams, 1993; Weber & Hertel, 2007). Second, we conducted electronic literature searches with Version 8.7.3 of the Web Content Extractor (http://www.newprosoft.com, Copyright (C) 2004 – 2018 Newprosoft) in the following databases: Academic Search Premier, Business Source Premier, EconLit, ERIC, PsycARTICLES, PsycINFO, PSYNDEX, and SocINDEX via EBSCOhost; ABI/INFORM, Dissertations & Theses Global, and SOCA via ProQuest. For our search string, we used search terms used in previous pertinent meta-analyses (Herbst & Mas, 2015; Karau & Williams, 1993; Weber & Hertel, 2007) and keywords from other relevant articles (e.g., studies that are included in these meta-analyses; e.g., Lount, Park, et al., 2008). The following search string was used: Motivation AND ("social loafing" OR "köhler effect" OR "kohler effect" OR "social comparison" OR "free rider" OR "sucker effect" OR "social laboring" OR "social compensation" OR "social dispensability" OR "social indispensability" OR "instrumentality" OR "collective effort model" OR "social competition" OR "exergame*" OR "active video game*" OR shirking OR "peer effect*") NOT (health OR "social facilitation").

Third, we searched the literature via Google Scholar. In this additional search, owing to the immanent technical restrictions, the following shorter string had to be used: motivation OR effort OR performance + gain OR loss + group OR team - health - "social facilitation." Because of the extremely large number of records in Google Scholar, we adjusted the search strategy: Following Reed and Baxter (2009), we stopped our search via Google Scholar when the rate of newly included literature was less than 1% (i.e., when we did not find any new relevant literature in 100 records). We included all citations up to a cutoff date of January 16, 2019; which yielded an initial search result of 3,560 citations.

Fourth, we conducted a "forward search" via Google Scholar with all included studies, and, fifth, we searched the reference lists of included studies for additional research. Sixth, we hand-searched articles published since October 1993 (when Karau & Williams's, 1993, meta-analysis appeared) in the following journals: *Academy of Management Journal*, *European Journal of Social Psychology*, *Group Dynamics: Theory, Research, and Practice*, *Group Processes & Intergroup Relations*, *Journal of Applied Social Psychology*, *Journal of Experimental Social Psychology*, *Journal of Personality and Social Psychology*, *Personality and Social Psychology Bulletin*, and *Small Group Research*. Seventh, we hand-searched the reference lists of a recent handbook on effort gains and losses in teams (Karau, 2020).

Eighth, to search for unpublished or "gray" literature on the topic, we sent requests for unpublished data via mailing lists to the German Psychological Society (DGPs) and the European Association of Social Psychology (EASP). Furthermore, we posted requests on the Web sites of the European Association of Work and Organizational Psychology (EAWOP), the Human Resources Division of the Academy of Management (AOM), the Society for Industrial and Organizational Psychology (SIOP), and the Society for Personality and Social Psychology (SPSP). We also shared the request on social media accounts (i.e., Facebook, LinkedIn groups, and Twitter) of the Interdisciplinary Network for Group Research (INGRoup), the EAWOP, and the EASP. Moreover, we contacted 12 experts in small group research personally to request

unpublished studies. We included unpublished studies from the aforementioned sources until January 24, 2020.

Altogether, these combined efforts yielded 3,689 potentially eligible studies. The first author and one of two different judges independently checked half of these studies' titles and abstracts for inclusion. The other half of the abstracts was solely checked by the first author. Judges were individually trained by the first author in the manner described by Wilson (2009). Interrater reliability was high (95% agreement rate). Disagreements were resolved through discussion. Figure 1 shows the search strategies in a PRISMA flowchart (Moher et al., 2009).

Criteria for Inclusion and Exclusion

Studies were included in the meta-analysis if they met the following criteria. First, they had to be written in English or German. Second, they had to allow for a comparison between individuals' expended effort under individual work and under teamwork conditions (i.e., individual effort on a team task), assessed either objectively or via self-report. We excluded studies that only examined effort *intentions* (e.g., Hüffmeier et al., 2013), social facilitation (e.g., Zajonc, 1965), or other group processes that are not relevant for our research question (e.g., coordination, information sharing, or decision making).[12] As noted earlier, we define a team as consisting of two or more individuals who work in the real or imagined presence of others, share a common goal, and are interdependent in their outcomes (e.g., Kozlowski & Bell, 2003; Larson, 2010). We used coactive and nominal group tasks as well as individual work as comparison standards for effort spent during teamwork. In *nominal groups* (Taylor, 1954), people work without the real or imagined presence of others. Their individual inputs are unknowingly combined to form a single team product.

Third, studies were included if they analyzed data that were not reported in any other study—thus, some studies had to be excluded if their data were analyzed more than once (e.g., Neugart & Richiardi, 2013). Fourth, studies were included if they provided an effect size or sufficient information to calculate an effect size. If an article provided insufficient data to calculate an effect size (e.g., Cymek, 2018), two attempts were made to contact the study author(s). In total, we contacted 29 authors by email, yielding 16 responses (55%).

Many studies provided more than one effect size (on average three effect sizes per study) because the difference between effort spent on collective versus individual tasks was reported, for instance, in different experimental conditions (e.g., Everett et al., 1992) or for independent samples (e.g., Cooley, 1991).

Coding of Study Characteristics and Moderators

The first author and a second rater who was blind to the hypotheses coded 10 randomly selected studies independently. All discrepancies were discussed until consensus was reached, and the coding scheme was subsequently adjusted. After this initial set of articles, the first author coded all remaining studies. A second coder (who holds a bachelor's degree in psychology) additionally coded 25% of the studies (for an analogous approach, see, e.g., Asperholm et al., 2019; Fernandes & Garcia-Marques, 2020). The resulting average interrater reliability was $\kappa = .89$. Remaining discrepancies were resolved through discussions.

For each study, the following characteristics were coded: (a) date of publication, (b) publication type (e.g., journal article or unpublished paper), and (c) subject of the study (i.e., effort gains in teams, effort losses in teams, or both). At the level of the individual effect size, the following characteristics were coded: (d) setting (i.e., laboratory or field), (e) study design (i.e., within-subjects or between-subjects), (f) reward (i.e., no reward, credits, or monetary reward; if monetary reward were provided: performance-related pay or not), (g) number of participants, (h) age of participants, (i) type of sample (i.e., children, undergraduates, employees, or sports teams), and (j) team size.

To test our hypotheses and address our research questions, we coded the following key variables (for details, see below): (a) (in-) dispensability, (b) social comparison potential, (c) evaluation potential, (d) team formation (i.e., ad hoc vs. not ad hoc), (e) task meaningfulness, (f) comparison baseline (coactive vs. individual), (g) sex composition of team (i.e., same sex, mixed-sex, or both), (h) gender of participants, (i) second instrumentality component (i.e., the relationship between team performance and team outcomes; see Karau & Williams, 1993), (j) third instrumentality component (i.e., the relationship between team outcomes and individual outcomes), (k) group cohesion, (l) social identification with team, (m) social support from teammates, (n) social comparison orientation, (o) Protestant work ethic, (p) culture, (q) physical presence of the teammate(s), and (r) task type (i.e., physical, cognitive, perceptual, or evaluative).

The coding of *(in-)dispensability* was based on information on (a) the team task structure, (b) the uniqueness of individual inputs, and (c) the expectation of coworker ability and effort. The team task structure concerns Steiner's (1972) typology of group tasks (i.e., additive, conjunctive, or disjunctive). The uniqueness of inputs indicates whether inputs of individual members are redundant (i.e., they can be compensated by other team members; e.g., in rope pulling or shouting tasks; see, e.g., Czyż et al., 2016; Thompson et al., 1980) or unique (i.e., they cannot be compensated; e.g., in some brainstorming tasks; see Harkins, 1987). Expectations of coworker ability and effort refer to researchers' manipulations of coworker ability and effort (e.g., participants often received bogus feedback about their partner's ability; e.g., Kerr, 1983).

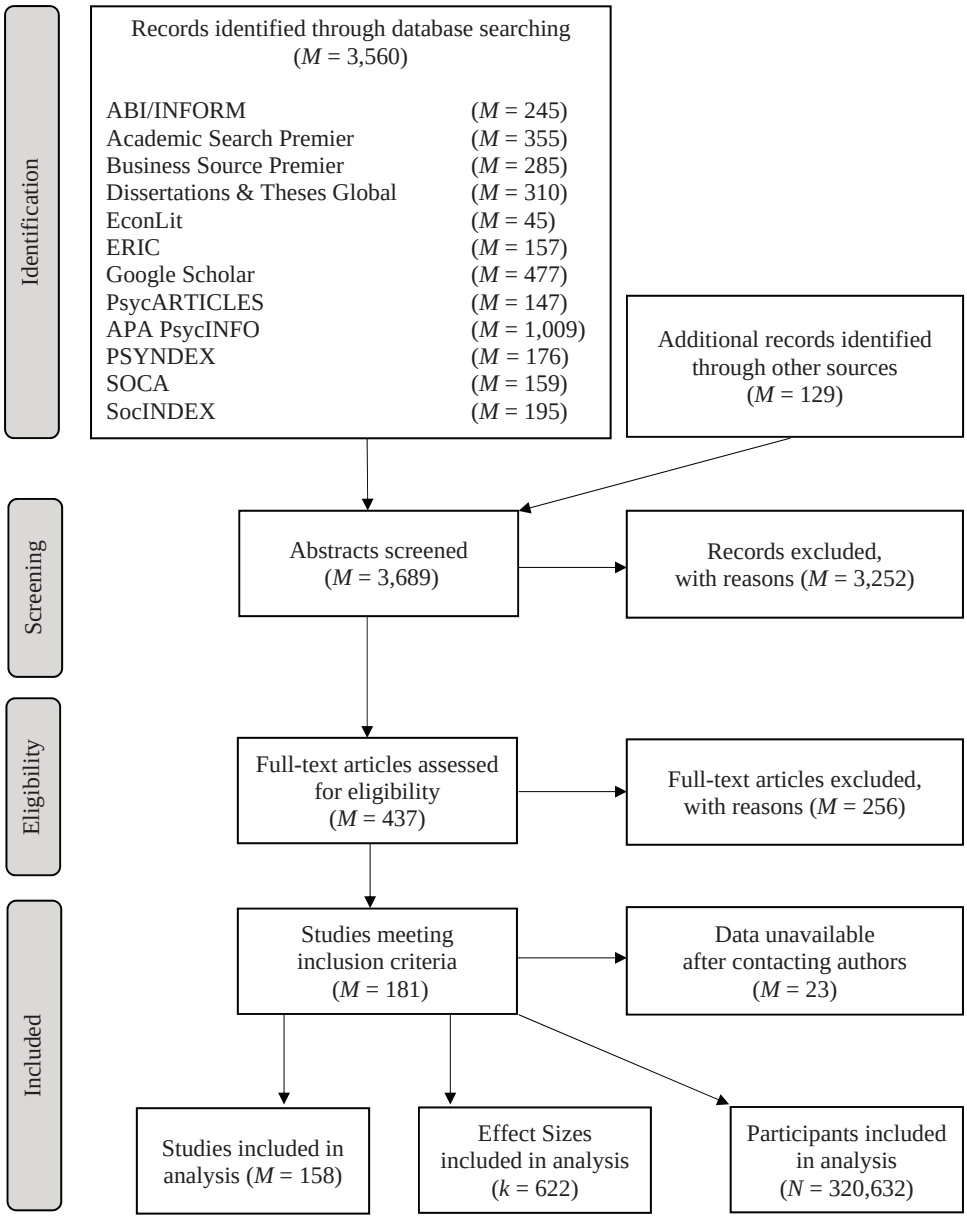
(In-)dispensability was, for example, coded as "indispensable" when people were inferior members in a conjunctive task (e.g., Hertel et al., 2000), superior members in a disjunctive task (e.g., Kerr, 1983), or a member performing late or last in a sequential task (e.g., Hüffmeier & Hertel, 2011b); when members had a unique input to the team performance (e.g., Harkins & Petty, 1982); or when they worked on an additive task with a low-ability/low effort coworker (Williams & Karau, 1991). (In-)dispensability was, for example, coded as "dispensable" when people were

[12] In many of our included primary studies, effort under teamwork conditions was examined by studying individuals working in dyads on easy tasks that did not require coordination of individual inputs and that did not offer the possibility of cognitive stimulation ($k = 288$). Moreover, even if teams were larger and if there were minimal coordination requirements in other studies (e.g., in swimming relays, see, for instance, Hüffmeier et al., 2017), it is rather unlikely that coordination losses or coordination gains affected the observed results. Thus, the observed effects on performance are most likely attributable to individuals' effort in teams and not to other team processes like coordination or cognitive stimulation.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

Figure 1

Flowchart of Studies Through Each Stage of the Meta-Analysis



Note. *M* = number of studies; *k* = number of effect sizes; *N* = number of participants.

inferior members in a disjunctive task (e.g., Kerr, 1983), when a member performed first or early in a sequential task (e.g., Hüffmeier & Hertel, 2011b), when members had a redundant input to the team performance (e.g., Harkins & Petty, 1982), or when working on an additive task with a high-ability coworker (e.g., Hart et al., 2004).

We coded (in-)dispensability in two different ways, reflecting an increasing resolution. First, we coded it dichotomously as "indispensable" versus "dispensable" (see above), which corresponds to the operationalization in many primary studies. This dichotomous variable is included as one of the key moderators in all our main analyses (see the Results section). Second, we coded (in-) dispensability as a variable with three levels (i.e., highly indispensable, moderately indispensable, and dispensable). This coding reflects the fact that many studies (e.g., Hüffmeier et al., 2017; Osborn et al., 2012) had more than two (in-)dispensability levels. Moreover, this coding allows us to examine tipping points in effort (that is, the tipping point where effort gains in teams change to comparable effort levels in teamwork and individual work and the tipping point where comparable effort levels in teamwork and individual work change to effort losses in teams). The complete coding strategy for the two ways of coding (in-) dispensability can be found in the online supplementary materials available on the OSF (see Tables S1 and S2).

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

Regarding s*ocial comparison potential,* we coded it as "given" when participants' own individual contribution and the individual contribution of a teammate were both identifiable. In all other cases, we coded social comparison potential as "not given." We also coded social comparison potential in two different ways, again reflecting an increasing resolution. First, we coded it dichotomously as "given" versus "not given" (see above), which corresponds to the operationalization in many primary studies. This dichotomous variable is again included as one of the key moderators in all our main analyses (see the Results section). Second, we coded social comparison potential as a variable with three levels (i.e., no social comparison potential, low salience of social comparison potential, and high salience of social comparison potential). This coding may again allow us to examine tipping points in effort. The complete coding strategy can again be found in the online supplementary materials available on the OSF (see Tables S3 and S4).

Similarly, we coded *evaluation potential* as "given" when participants' outputs were identifiable to either the self, the experimenter, or a teammate, and when there was also a reference standard given that allowed for comparisons. In all other cases, we coded evaluation potential as "not given." It is reasonable to theoretically distinguish between the potential to be evaluated by others (i.e., one of the main facets of evaluation potential) and the potential for self-evaluation (i.e., social comparison; for this conceptual distinction, see, e.g., Szymanski & Harkins, 1993, 1987). Unfortunately, however, most included studies typically did not distinguish between the potential for evaluation and the potential for social comparison. Thus, it was not possible to fully empirically distinguish evaluation potential from social comparison potential (see also the Results section).

Furthermore, regarding *team formation*, we coded teams as "ad hoc teams" when participants were strangers and as "not ad hoc teams" when they were friends (e.g., Van Dick et al., 2009) or teammates on previously existing teams (e.g., Schleu et al., 2019). We further coded task meaningfulness based on the definition by Thomas and Velthouse (1990). Thus, we coded task meaningfulness as high if there was a reason to assume that an individual intrinsically cared about the task, which was given in three types of situations. In the first type of situation, people choose to perform the task regularly (e.g., athletes performing their chosen sport; e.g., Hüffmeier et al., 2017). If people regularly choose to perform a task in their everyday lives, then it can be assumed that the task has meaning to them (i.e., they like doing it). In the second type of situation, researchers provided the subjects with a rationale for viewing the task as especially important (e.g., Brickner et al., 1986; Williams & Karau, 1991). In some cases, researchers directly manipulated the subjects' personal involvement. A rationale given was, for instance, that the task would directly influence their school-life (e.g., Brickner et al., 1986) or that performance on the task was related to intelligence (e.g., Williams & Karau, 1991). In the third type of situation, subjects were selected based on their likely intrinsic interest in the task (e.g., Petty et al., 1985), which was derived from participants' characteristics (i.e., from personality variables). An example for this situation is people high in need for cognition working on a brainstorming task (e.g., Petty et al., 1985). In all other cases, we coded task meaningfulness as "low."

Finally, we coded whether studies compared teamwork with *individual work* or with *coactive work*. We assigned the code "coactive comparison" when performance-related social comparisons with another participant were possible during individual work. We assigned the code "individual comparison" when such social comparisons were not possible during individual work.

Because not all primary studies reported sufficient information for each moderator, we had some missing values. Thus, we coded each moderator as a variable with three categories (e.g., for [in-] dispensability: dispensable, indispensable, and missing information). To perform our metaregression analyses, we dummy-coded all moderator variables (Field, 2013). For all dummy variables, the reference category denoted that the moderator was not given (e.g., dispensable). The first dummy variable (called, for instance, [in-] dispensability) denoted whether the moderator was given (e.g., "indispensable" was coded with 1), and the second dummy variable (called, for instance, [in-]dispensability missing) denoted whether there were missing values for the moderator (e.g., missing information was coded with 1).

Computation of Effect Sizes

If reported, team members' individual performance—assessed either objectively (i.e., via objective performance in a task) or subjectively (i.e., self-reported effort)—was used as an indicator of individuals' effort. If individual outcomes were not reported (e.g., Diehl & Stroebe, 1991; Experiment 4; Williams et al., 1981), we used joint performance outcomes achieved by teams as compared with a coactive baseline to compute effect sizes. Some articles directly reported a Cohen's *d* or Hedges' *g* ($k = 15$). For the other effect sizes, we first computed the standardized mean difference (Cohen's *d*) representing the difference between effort spent on a collective task and an individual task for between-subjects and within-subjects study designs. We then converted the obtained standardized differences to Hedges' *g* to correct for a potential bias in small samples (Borenstein, 2009; Borenstein et al., 2009). The variance of each effect size was computed according to the formulas given by Borenstein (2009). If means and standard deviations were not available, Hedges' *g* was computed from *t* statistics ($k = 37$) or *F* statistics ($k = 2$) via the respective formulas given by Borenstein (2009). In studies with difference scores from individual and team trials (e.g., Griffith et al., 1989; Hallmark & Downs, 1987), we assessed changes in effort using Cohen's *dz* (Cohen, 1988; Lakens, 2013), which represents the standardized difference between a mean and a specified value. Here, *dz* is operationalized as the standardized difference between team trials and individual trials: $dz = M_{\text{difference}}/SD_{\text{difference}}$, or assessed via *t* statistics, $dz = t/\sqrt{(N)}$. Using the correction factor *J*, we then transformed these *dz* values to Hedges' *g*. When studies provided separate effect sizes for different conditions (e.g., men and women; high and low indispensability), we extracted these effects separately.

We computed our dependent variable by subtracting the effort spent on an individual task from the effort spent on a collective task. A positive sign of Hedges' *g* in the current meta-analysis thus denotes more effort spent on a collective task than on an individual task (i.e., effort gains in teams). Conversely, a negative sign of Hedges' *g* denotes less effort spent on the collective task than on the individual task (i.e., effort losses in teams).

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

Multilevel Modeling for Meta-Analysis

As mentioned before, many included studies provided more than one effect size. To maximize statistical power and to keep all information about potential moderators, we included—if possible and available—more than one effect size per study. For this reason, however, there may be dependencies among the effect sizes contained in the dataset. To account for these dependencies, we used a multilevel approach in all our meta-analytical procedures, which addresses the nested structure of our data (e.g., Raudenbush & Bryk, 2002; Van Den Noortgate & Onghena, 2003). Level 1 specifies the individual effect sizes and their variances. Level 2 specifies moderators at the measurement level (e.g., [in]dispensability or social comparison potential). On this level, the effect sizes are regressed on our included moderators. Finally, Level 3 specifies moderators (i.e., study characteristics such as the subject of the study or year of publication) at the study level (for a similar approach, see Bijmolt & Pieters, 2001; Freund & Kasten, 2012).

In the current multilevel meta-analysis, variance on the level of both effect sizes and studies, is estimated. In the conditional model, we thus have two variance components: the variance component within a study (i.e., τ^2) at the effect size level (i.e., Level 1) and the variance component between studies (i.e., ς^2) at the study level (i.e., Level 3). We performed our analyses with the software HLM 6.08 (Raudenbush et al., 2004).

Results

Our analyses included $M = 158$ studies with $k = 622$ effect sizes ($N = 320{,}632$ participants), of which 121 (76.58%) were published and 37 (23.42%) were not published. Characteristics of the included studies are summarized in Table 2. These studies were published between 1974 and 2019 ($M = 2000.60$, $SD = 12.00$). They include various types of samples, mostly undergraduates ($k = 438$), but also members of sports teams ($k = 66$), regular employees ($k = 30$), and children ($k = 9$). Thus, the age of our included participants ranged from children of 3.5 years to elderly people of 70.3 years, $M = 21.75$, $SD = 7.39$. Further, although our sample stems primarily from the United States ($k = 341$), it also includes effect sizes from Africa (i.e., South Africa), Asia (i.e., China, Japan, Israel, and Taiwan), Australia, Canada, and Europe (i.e., France, Germany, Norway, Spain, Poland, and the United Kingdom).

It is noteworthy that the distribution of effect sizes by study characteristics and moderators in Table 2 suggests that all moderator categories were generally represented in journal articles as well as dissertations, in laboratory as well as field settings, and in studies focusing on effort gains as well as on effort losses. Not surprisingly, the moderators often cluster with the subject of the respective studies. That is, if a study investigates effort losses, it is consequential to create the appropriate conditions that cause effort losses. Thus, some moderators were likely confounded with the subject of the study (e.g., individual contributions were often dispensable in studies focusing on effort losses, or social comparison potential was mostly given in studies focusing on effort gains).

Table 2 also suggests a pattern between field studies and not ad hoc groups as well as between field studies and meaningful tasks. This is no surprise either because it reflects the situation of teams in field settings: Deviating from laboratory teams, they are typically not formed ad hoc and not assigned artificial tasks, but they already exist before a study and work on longstanding tasks that are often meaningful. This is also mirrored in our coding of these moderators. For example, by definition, field studies with teammates on previously existing (sports) teams were coded as "not ad hoc" and as working on meaningful tasks (e.g., working in a relay in their sport, cf. Hüffmeier & Hertel, 2011b). Thus, as expected, some moderators were confounded with study characteristics. However, there were no unexpected confounds of important moderators with descriptive variables. To test for possible confounds between moderators *with each other*, we offer an assessment of multicollinearity in our analyses (see below), where we report correlations between our moderators. A summary of all included studies, including all effect sizes and corresponding coding information, is provided in the online supplementary materials available on the OSF (see Tables S8).

Distribution of Effect Sizes

Whereas 573 effect sizes (92.12%) were based on objective measures, 49 (7.87%) were based on subjective measures (i.e., self-reports). Of the 622 effect sizes, 319 effect sizes (51.29%) were positive, that is, descriptively indicating effort gains (284 and 35 were based on objective and subjective measures, respectively), and 299 (48.07%) were negative, that is, descriptively indicating effort losses (285 and 14 were based on objective and subjective measures, respectively). Four effect sizes were exactly 0, that is, indicating comparable effort levels in the individual and the team task (all of these were based on objective measures). Altogether, the effect sizes ranged from $g = -3.98$ to $g = 2.95$. These descriptive statistics indicate substantial variability in effect sizes, suggesting that people's expended effort in teamwork as compared with individual work strongly varied across situations. Figure 2 shows a caterpillar plot (Viechtbauer, 2010), which also revealed substantial variability in effect sizes. Regarding the size of the effects, 138 (22.19%) of the 622 effect sizes were smaller than an absolute value of $g = 0.20$ (small effects; Cohen, 1988); 291 effect sizes (46.78%) ranged from absolute values of $g = 0.20$ to $g = 0.80$ (medium effects), and 193 effect sizes (31.03%) exceeded an absolute value of $g = 0.80$ (large effects).

Bias Tests

To illustrate the distribution of effect sizes and to investigate a potential publication bias, we inspected the symmetry of a funnel plot (see Figure 3; Borenstein et al., 2009). When publication bias is present, the distribution of effect sizes would be asymmetrical (Borenstein et al., 2009), suggesting that studies reporting either positive (i.e., effort gains) or negative effect sizes (i.e., effort losses) were published more frequently. Visual inspection of Figure 3 did not suggest an asymmetry. Furthermore, the Egger's test (Egger et al., 1997) was not significant, $z = 0.18$, $p = .856$. Thus, we did not observe indications of publication bias.

Overall Difference in Effort and Assessment of Variability

We estimated the unconditional three-level model including all 573 effects sizes based on objective measures, without any

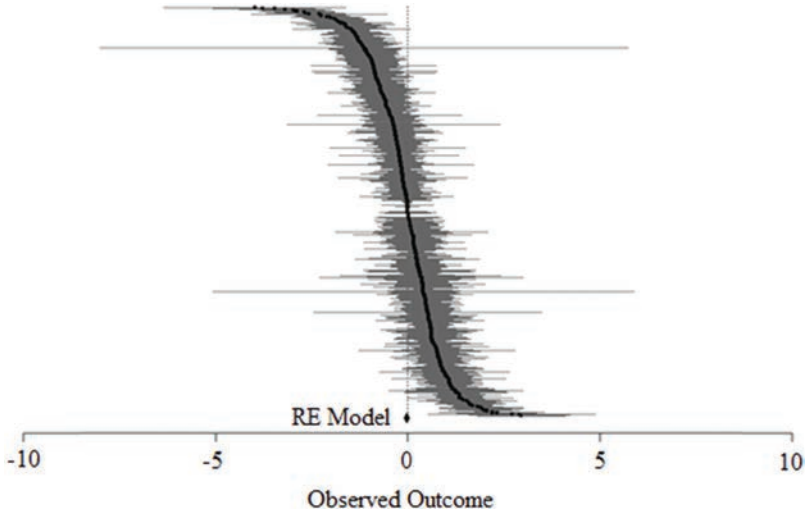
This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

Table 2
Study Characteristics and Moderator Breakdown for the Effect Sizes (k = 573) Based on Objective Measures

	Study characteristics																
			Publication type			Subject of the study			Setting		Type of sample				Team size		
Sample	Mean year of publication	Mean age	Journal article	Dissertation	Unpublished documents	Effort gains	Effort losses	Both	Laboratory	Field	Children	Undergraduates	Employees	Sports teams	Two people	Three or more people	Mixed
Overall sample	*M* = 2000.60 *SD* = 12.00 Min = 1974 Max = 2019	*M* = 21.75 *SD* = 7.39 Min = 3.5 Max = 70.3	466	62	45	189	247	94	471	85	9	438	30	66	283	239	25
Moderators							*k*										Overall Sample
(In-)dispensability of the own contribution																	
Dispensable			298	37	22	31	226	74	295	61	9	287	18	42	123	189	24	357
Indispensable			161	25	11	157	11	20	165	24	0	140	12	24	145	47	0	197
Social comparison potential																	
Not given			209	24	23	13	179	55	237	19	9	219	11	13	114	110	23	256
Given			253	31	15	174	58	37	219	66	0	206	19	53	165	120	2	299
Evaluation potential																	
Not given			181	24	23	11	156	52	212	16	9	196	9	10	109	94	17	228
Given			281	36	17	176	88	40	251	69	0	236	21	56	171	142	8	334
Team formation																	
Ad hoc			380	45	17	161	194	57	413	15	6	387	18	6	263	139	21	442
Not ad hoc			83	5	1	24	25	36	22	67	0	19	10	60	7	80	2	89
Task meaningfulness																	
Less meaningful			376	46	44	156	226	45	432	17	9	401	25	1	256	162	22	466
Meaningful			90	16	1	33	21	49	39	68	0	37	5	65	27	77	3	107
Comparison baseline																	
Coactive			166	15	0	56	75	43	115	66	3	114	8	56	62	118	1	181
Individual			259	36	16	118	123	43	281	16	3	253	20	10	195	87	14	311
Gender of participants																	
All male sample			89	10	14	40	54	8	88	19	0	96	1	6	67	35	9	113
All female sample			69	8	5	42	25	10	72	5	0	69	0	6	60	20	1	82
Mixed sample			278	44	20	105	148	63	280	58	6	242	29	54	142	165	14	342
Country																	
Australia			3	0	0	0	3	0	0	3	0	0	0	3	0	3	0	3
Canada			0	4	0	0	4	0	4	0	0	4	0	0	0	4	0	4
China			4	8	1	2	11	0	13	0	0	5	8	0	5	8	0	13
France			8	0	0	0	8	0	8	0	0	8	0	0	7	1	0	8
Germany			86	7	15	62	18	10	94	0	0	82	2	0	66	40	2	108
Israel			6	0	0	0	6	0	4	2	0	2	4	0	0	6	0	6
Japan			3	0	2	1	2	2	5	0	0	5	0	0	3	2	0	5
Norway			8	0	0	0	4	4	8	0	0	8	0	0	0	8	0	8
Spain			0	2	0	0	0	0	2	0	0	1	1	0	0	2	0	2
Taiwan			6	0	0	0	6	0	2	4	3	3	0	0	6	0	0	6
UK			15	0	0	4	11	0	7	8	0	13	2	0	6	9	0	15
USA			273	41	27	96	162	62	312	26	6	295	13	21	187	105	23	341
Mixed: Poland + South Africa			12	0	0	0	12	0	12	0	0	12	0	0	3	9	0	12

Note. *k* = number of effect sizes. All values are based on cases for which information was available.

Figure 2
Caterpillar Plot of the Effect Sizes on Objective Measures



Note. RE = random effects.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

moderators specified in the multilevel model. The individual effect sizes and their variance are specified at Level 1 (the moderators are later specified at Level 2, and the study characteristics at Level 3). For all following analyses, we used a full maximum likelihood estimator. In the unconditional model, the intercept was estimated at Hedges' $g = -0.04$, $t = -0.70$, $p = .485$. Thus, there was no main effect of teamwork versus individual work, which answers our first research question (RQ 1): Teamwork did not have a motivating or demotivating effect on effort per se.

The variance component τ^2 at the effect size level was estimated at 0.27, and τ was estimated at 0.52, $\chi^2(417) = 7{,}685.38$, $p < .001$. The variance component ς^2 at the study level was estimated at 0.33, and ς was estimated at 0.58, $\chi^2(155) = 587.08$, $p < .001$. The I^2 statistic was estimated at 99.97%, which suggests considerable heterogeneity (Higgins & Thompson, 2002). In line with our theorizing, these results suggest considerable influences of moderators.

Moderation of Effort

Prior to analyzing the influence of our moderators, we tested for potential multicollinearity among them. The correlations are shown in Table 3. Four correlations exceeded an absolute value of .5 (see Table 3), which is seen as a value indicating potential multicollinearity (Bijmolt et al., 2005). Two of the correlations concerned the moderators' evaluation potential and social comparison potential (i.e., the correlation between Evaluation Potential and Social Comparison Potential, and the correlation between Evaluation Potential Missing and Social Comparison Potential Missing). These correlations were not surprising, however, because—although being theoretically distinguishable—social comparison potential was in many primary studies typically operationalized as being one part of evaluation potential (see the Method section). The third correlation that exceeded an absolute value of .5 was the correlation between Team Formation Missing and Social Comparison Potential Missing. Both of these dummy variables denote the comparison between missing values and the reference category (see the Method section). Thus, they do not concern our hypotheses tests. Accordingly, we did not exclude the variable Team Formation Missing. The fourth correlation that exceeded an absolute value of .5 was the correlation between Task Meaningfulness[13] and Team Formation. Because most studies did not manipulate team formation or task meaningfulness, we had to work with proxies for these moderators in our coding. For instance, we coded team formation as "not ad hoc" when they were teammates on previously existing (sports) teams (e.g., Schleu et al., 2019). We also coded task meaningfulness as "meaningful" when members of sports teams performed their regular sport (e.g., Hüffmeier et al., 2017). Thus, this correlation was not surprising.

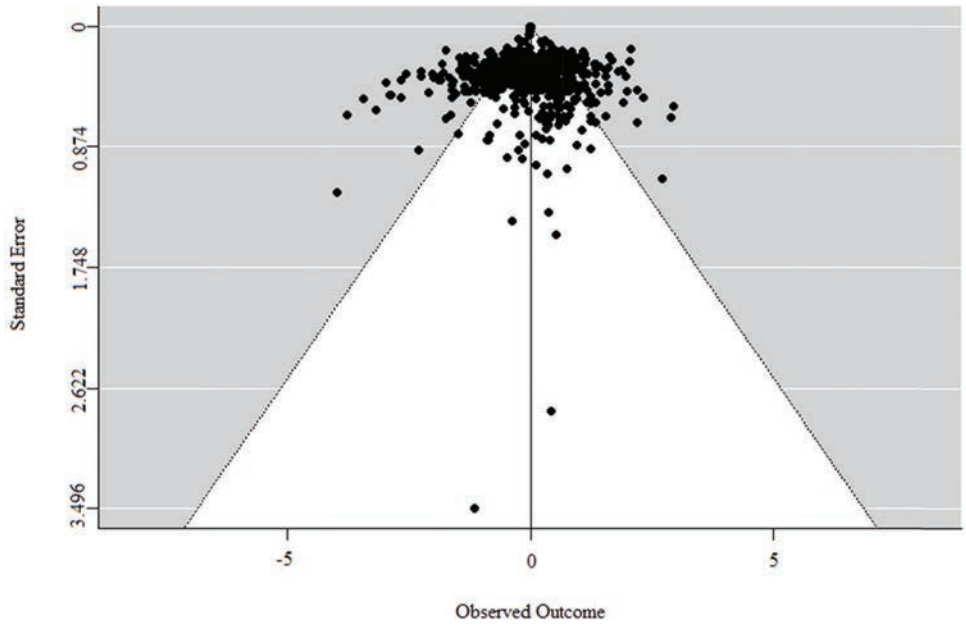
To address the multicollinearity, we excluded social comparison potential in the analyses of evaluation potential, and we excluded evaluation potential in the analyses of social comparison potential. Similarly, we excluded task meaningfulness in the analyses of team formation, and we excluded team formation in the analyses of task meaningfulness. Furthermore, we checked whether the multicollinearity affected the results regarding the remaining moderator in the conditional model (i.e., [in-]dispensability). Therefore, we estimated the conditional model five times: (a) with all moderators included, (b) without evaluation potential, (c) without social comparison potential, (d) without team formation, and (e) without task meaningfulness. The parameter estimates for the remaining moderator of (in-)dispensability were highly similar across the different models. We thus concluded that multicollinearity did not affect the results for (in-)dispensability, and, therefore, we used all moderator variables to prevent a potential omitted variable bias.

Conditional Model and Subgroup Analyses

To test the preregistered moderators and to answer our research questions, we estimated the conditional three-level model

[13] Contrary to the other moderators, there were no missing values for task meaningfulness. Thus, unlike for the other variables, we do not have two different variables for task meaningfulness.

Figure 3
Funnel Plot of the Effect Sizes on Objective Measures



including all effect sizes based on objective measures (k = 573) with the moderators simultaneously specified at Level 2. Table 4 depicts the results of the conditional model that includes the moderators (in-)dispensability, evaluation potential, social comparison potential, team formation, and task meaningfulness. As mentioned in the Method section, we dummy coded the moderators. The second dummy variable (called, for instance, [In-]dispensability Missing) denotes the difference between missing values and the reference category. Thus, in the following, we always report the estimated coefficients for the first variable related to each moderator.

Moreover, to examine our hypotheses and research questions, we report below the results from the conditional model including all moderators along with results from subgroup analyses. The results from the conditional model concern the general "direction" of a moderator effect—that is, whether the difference between effort during teamwork and effort during individual work increases in the direction of effort gains or decreases in the direction of effort losses. Recall that a positive effect size indicates effort gains, and a negative effect size indicates effort losses. A positive sign for the coefficient of a moderator indicates that the difference between effort during teamwork and individual work increases in the direction of effort gains in teams. By contrast, a negative sign for the coefficient of a moderator indicates that the difference between effort during teamwork and individual work decreases in the direction of effort losses in teams.

Because we made nuanced predictions about the moderators based on our extended framework, we additionally performed unconditional models within subgroups to examine the average

Table 3
Assessment of Multicollinearity: Correlations Between Moderators

Variable	1	2	3	4	5	6	7	8	9
1. (In-)dispensability	—								
2. (In-)dispensability missing	−.13	—							
3. Evaluation potential	.43	−.00	—						
4. Evaluation potential missing	.06	−.03	−.17	—					
5. Social comparison potential	.49	.02	.88	−.15	—				
6. Social comparison potential missing	.04	−.03	−.11	.63	−.19	—			
7. Team formation	−.07	−.08	.17	−.06	.20	−.08	—		
8. Team formation missing	−.08	.10	−.24	.35	−.27	.53	−.12	—	
9. Task meaningfulness	−.09	−.09	.06	−.07	.06	−.09	.67	−.08	—

Note. The moderators were dummy coded. The second dummy for each moderator (e.g., [In-]dispensability missing or Evaluation potential missing) always concerns the presence of missing values. The key variables were coded as follows: (In-)dispensability: 0 = dispensable, 1 = indispensable; Evaluation potential: 0 = no evaluation potential given, 1 = evaluation potential given; Social comparison potential: 0 = no social comparison potential given, 1 = social comparison potential given; Team formation: 0 = ad hoc group, 1 = no ad hoc group; task meaningfulness: 0 = less meaningful task, 1 = meaningful task. k = 573 effect sizes (i.e., effect sizes on objective measures) included in this analysis.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

Table 4
Mixed-Effects Moderator Analysis of Effort (Conditional Model)

Measure	*k*	Coefficient	*SE*	*t*	*p*
Fixed effects					
Intercept		−0.53	0.08	−6.50	<.001
(In-)dispensability	197	0.59	0.22	2.74	.007
(In-)dispensability missing	19	0.34	0.15	2.25	.025
Evaluation potential	334	0.21	0.17	1.24	.217
Evaluation potential missing	11	0.55	0.37	1.50	.134
Social comparison potential	299	0.26	0.27	0.96	.337
Social comparison potential missing	18	−0.10	0.28	−0.34	.735
Team formation	89	−0.05	0.36	−0.13	.895
Team formation missing	42	0.16	0.16	1.01	.315
Task meaningfulness	107	0.20	0.24	0.83	.408

	Variance component	χ^2	*df*	*p*
Random effects				
Within study, τ^2	0.27	306,492.19	408	<.001
Between studies, ς^2	0.12	320.05	155	<.001

Note. The coefficients for the moderator variables reflect multilevel regression coefficients. A positive sign for the coefficient of a moderator indicates that the difference between effort during teamwork and effort during individual work increases in the direction of effort gains. *k* indicates the number of effect sizes coded as 1.

level of effort at different levels of a moderator (e.g., effort during teamwork in the indispensability condition). The intercept in these unconditional models shows whether, for a certain level of a moderator, the effect size is positive, indicating effort gains, or negative, indicating effort losses.

Supporting Hypothesis 1a, (in-)dispensability of the own contribution emerged as a significant moderator in the conditional model: As shown in Table 4, team members expended more effort when their individual contribution to the team performance was indispensable versus dispensable, coefficient = 0.59, $p = .007$. For Hypotheses 1b and 1c, we performed two unconditional models within the corresponding subgroups. When the own contribution to the team performance was indispensable ($k = 197$), team members exhibited effort gains, intercept = 0.59, $p < .001$, whereas they exhibited effort losses when their own contribution was dispensable ($k = 357$), intercept = −0.35, $p < .001$. These results support Hypotheses 1b and 1c.

In the following, we offer a more precise yet exploratory analysis with (in-)dispensability coded as a variable with three levels (i.e., high indispensability, moderate indispensability, and dispensability). We performed three unconditional models within the subsets including cases of either (a) high indispensability, (b) moderate indispensability, or (c) dispensability. When the indispensability of the own contribution was high ($k = 204$), team members exhibited effort gains, intercept = 0.59, $p < .001$. When the indispensability of the own contribution was moderate ($k = 26$), team members exhibited neither effort gains nor losses, intercept = −0.08, $p = .519$. In other words, they exhibited comparable effort levels during teamwork and individual work. When the own contribution was dispensable ($k = 336$), team members exhibited effort losses, intercept = −0.37, $p < .001$. Thus, (in-)dispensability as a first central moderator of our study could explain and integrate the full spectrum effort-related findings in teams (i.e., effort gains, comparable effort levels during teamwork and individual work, and effort losses).

When testing the influence of social comparison potential, we omitted evaluation potential from the analysis (see our explanation of our treatment of multicollinearity above). There was a significant moderator effect for social comparison potential: Supporting Hypothesis 2a, in the conditional model without evaluation potential, team members expended more effort when social comparison during teamwork was possible as compared with when it was not possible, coefficient = 0.44, $p = .040$. To test Hypotheses 2b and 2c, we performed two unconditional models within the corresponding subgroups. When social comparison was possible ($k = 299$), team members exhibited effort gains in teams, intercept = 0.33, $p < .001$, whereas they exhibited effort losses in teams when social comparison was not possible ($k = 256$), intercept = −0.40, $p < .001$. These results support Hypotheses 2b and 2c.

In the following, we again offer a more precise yet exploratory analysis with social comparison potential coded as a variable with three levels (i.e., no social comparison potential, low salience of social comparison potential, and high salience of social comparison potential). We again performed three unconditional models within the subsets including cases of either (a) no social comparison potential, (b) low salience of social comparison potential, or (c) high salience of social comparison potential. When the salience of social comparison potential was high ($k = 229$), team members exhibited effort gains, intercept = 0.54, $p < .001$. When the salience of social comparison potential was low ($k = 70$), team members exhibited neither effort gains nor losses, intercept = −0.20, $p = .188$. In other words, they exhibited comparable effort levels during teamwork and individual work. When there was no social comparison potential ($k = 256$), team members exhibited effort losses, intercept = −0.40, $p < .001$. Thus, social comparison potential as a second central moderator of our study could again explain and integrate the full spectrum of effort-related findings in teams.

When testing the influence of evaluation potential, we omitted social comparison from the analysis (see above). The conditional

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

model without social comparison revealed a significant moderator effect for evaluation potential, such that team members expended more effort when there was evaluation potential during teamwork as compared with when there was no evaluation potential during teamwork, coefficient = 0.40, $p = .036$. This result supports Hypothesis 3a. For Hypothesis 3b, we performed an unconditional model with the cases in which evaluation potential was not given ($k = 228$). Supporting Hypothesis 3b, team members exhibited effort losses when there was no evaluation potential, intercept = −0.42, $p < .001$.

When testing the influence of team formation (ad hoc vs. not), we omitted task meaningfulness from the analysis (see our explanation of our treatment of multicollinearity above). In the conditional model without task meaningfulness, contrary to Hypothesis 4, team formation was not found to influence effort during teamwork, coefficient = 0.07, $p = .876$. We follow up on this unexpected result with an exploratory analysis further below.

In our analysis of the influence of task meaningfulness, we omitted team formation from the analysis (see above). In the conditional model without team formation, contrary to Hypothesis 5a, task meaningfulness was not found to influence effort during teamwork, coefficient = 0.17, $p = .632$. To test Hypothesis 5b, we restricted our analysis to cases with meaningful tasks ($k = 107$) and performed an unconditional model. Contrary to Hypothesis 5b, team members did not exhibit effort gains when the task was meaningful, intercept = 0.02, $p = .618$. We also follow up on this unexpected result with an exploratory analysis below.

Hypotheses 6 through 8 did not concern the overall conditional model shown in Table 4. Thus, to examine these hypotheses, we analyzed specific subsets of the full dataset. Hypothesis 6 stated that, when social comparison during teamwork is possible, effort gains should be higher in studies comparing individual work with teamwork as compared with studies comparing coactive work with teamwork. Thus, to test Hypothesis 6, we restricted the analysis to situations in which social comparison during teamwork was possible ($k = 299$). In this restricted conditional model, there was no moderator effect for comparison baseline (individual vs. coactive), coefficient = 0.25, $p = .110$, which does not support Hypothesis 6.

Hypothesis 7 stated that, in studies demonstrating effort losses on objective measures, subjective measures either do not indicate effort losses (i.e., an effect size that does not differ from zero) or at least less pronounced effort losses as compared with the effort losses observed with objective measures. Thus, to test Hypothesis 7, we restricted our analysis to cases that reported effort losses on objective measures and that also included subjective measures ($k = 13$), and we performed an unconditional model with the effect sizes on subjective measures as the dependent variable. In this model, the intercept was not different from zero, intercept = 0.21, $p = .322$. Thus, the subjective measures did not indicate effort losses, which is in line with Hypothesis 7. Descriptively, the intercept even indicated effort gains.

Although this analysis is in line with Hypothesis 7, null results are inherently difficult to interpret. Therefore, we tested the same hypothesis from a different angle. For this analysis, we restricted our analysis to cases that reported effort losses on objective measures and that also reported subjective measures. We then included both, all subjectively and all objectively measured effect sizes ($k = 26$). With this subset, we performed a conditional model with the effect sizes (i.e., the difference between an individual's effort under individual work and under teamwork conditions) as dependent variable and measurement (i.e., objective vs. subjective) as moderator. The effect size was more in the direction of effort gains when measured subjectively than when assessed objectively, coefficient = 0.58, $p = .019$. Thus, subjective measures did indicate less pronounced effort losses as compared with the effort losses observed with objective measures. This finding is again in line with Hypothesis 7.

Hypothesis 8 stated that, in studies finding effort gains on objective measures, subjective reports about effort also indicate effort gains (i.e., an effect size that positively differs from zero). To test this hypothesis, we restricted our analysis to cases that reported effort gains on objective measures and that also included subjective measures ($k = 30$) and performed an unconditional model with the effect sizes on subjective measures as the dependent variable. The results revealed that, in studies finding effort gains on objective measures, subjective reports also indicated effort gains (i.e., an effect size that positively differed from zero), intercept = 0.48, $p = .001$.

Overall Conditional Model

We compared the fit of the unconditional model to the fit of the main conditional model including all moderators (i.e., [in-]dispensability, evaluation potential, social comparison potential, team formation, and task meaningfulness; Table 4) by examining the difference in deviances of the two nested models. The results indicated that the model with moderators fitted the data significantly better than the unconditional model, $\chi^2(9) = 98.67$, $p < .001$. This result suggests that the inclusion of moderators significantly helped to explain variability in effect sizes. Nevertheless, including the moderators did not decrease τ, which was estimated at 0.52 in the conditional model, and the variance component τ^2 remained significant even after including moderators in the conditional model ($p < .001$). Thus, a significant portion of heterogeneity remained unexplained (for similar results, see, for instance, Kugler et al., 2018; Mazei et al., 2015).

Research Questions

We already answered the first research question when we estimated the unconditional three-level model (see above)—overall, working in a team did not increase or decrease people's effort when compared with working individually or coactively (RQ 1). Concerning the task, we first asked whether *effort gains* are stronger in studies employing physical as compared with cognitive tasks (RQ 2). To answer this question, we restricted our analysis to cases finding (at least descriptively) effort gains on objective measures ($k = 288$). Within this subgroup, we performed a conditional model with task type as moderator. The model revealed a moderating effect of task type, coefficient = −0.23, $p = .002$. As post hoc analyses, we performed two unconditional models with only physical ($k = 165$) or cognitive tasks ($k = 123$), respectively. We found significant and more pronounced effort gains in studies employing physical (intercept = 0.71, $p < .001$; a medium-sized to large effect; Cohen, 1988) as compared with cognitive tasks (intercept = 0.44, $p < .001$; a small to medium-sized effect).

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

RQ 3 asked whether *effort losses* are stronger in studies employing cognitive as compared with physical tasks. Thus, we restricted our analysis to cases that reported (at least descriptively) effort losses on objective measures ($k = 285$). Within this subgroup, we performed a conditional model with task type as moderator. The model revealed a moderating effect of task type, coefficient = −0.20, $p = .029$. As post hoc analyses, we performed two unconditional models with only physical ($k = 142$) or cognitive tasks ($k = 143$), respectively. We found significant and more pronounced effort losses in studies employing cognitive (intercept = −0.78, $p < .001$; a medium-sized to large effect; Cohen, 1988) as compared with physical tasks (intercept = −0.51, $p < .001$; a medium-sized effect).

Furthermore, we were interested in the potential effects of study design (RQ 4) and study setting (RQ 5). To answer RQ 4, we performed a conditional model with study design as a moderator ($k = 568$, given that we had some missing values for the moderator). The analysis revealed that effort in teams did not differ between studies employing a within- versus a between-subjects design, coefficient = 0.06, $p = .568$. To answer RQ 5, we performed a conditional model with the study setting as a moderator ($k = 556$, given that we had some missing values for the moderator). The analysis revealed that effort in teams did not differ between field and laboratory settings, coefficient = 0.02, $p = .873$. For a more nuanced analysis, we split the data into two subsets with cases that reported either effort gains ($k = 284$) or effort losses ($k = 285$) and estimated two conditional models on these subsets using study setting (field vs. laboratory) as a moderator. The first conditional model revealed that the study setting had no effect on the extent of reported effort gains, coefficient = −0.00, $p = .333$ (i.e., effort gains in field and laboratory studies were comparable in size). In the second conditional model, the effect size was more in the direction of effort gains in field versus laboratory studies, coefficient = 0.29, $p = .027$. Thus, in field studies, effort losses were less pronounced than in laboratory studies.

We were also interested in the potential effects of gender (RQ 6 and RQ 7). RQ 6 asked which overall effect gender has on effort in teams. To answer this question, we restricted the analysis to cases with all-male samples or all-female samples ($k = 195$; i.e., excluding mixed samples consisting of both women and men) and performed a conditional model with gender as a moderator. We found that men and women differed in their effort during teamwork, such that women showed a higher increase in the difference between effort spent during teamwork and effort spent during individual work than men, coefficient = 0.31, $p = .017$. As post hoc analyses, we performed two unconditional models with all-male samples ($k = 113$) or all-female samples ($k = 82$), respectively. These analyses revealed that men overall showed comparable effort during teamwork as compared with individual work (intercept = −0.00, $p = .989$), whereas women overall showed effort gains during teamwork (intercept = 0.38, $p = .003$).

These results may, however, be attributable to an uneven distribution of effect sizes: In our dataset, 40 of the 113 (35%) all-male samples, but 42 of the 82 (51%) all-female samples stemmed from studies with a focus on effort gains. To examine whether the gender effect is due to this uneven distribution of gender among studies, we conducted some follow-up analyses.[14] We restricted the analyses to cases with all-male samples or all-female samples and with a focus on either effort gains or losses. We then split the data into two subsets with studies with a focus on effort gains ($k = 78$) or with a focus on effort losses ($k = 77$), respectively, and estimated two conditional models on these subsets using gender as a moderator. The first conditional model revealed a gender effect in the subset on effort losses, coefficient = 0.33, $p = .035$. As post hoc analyses, we performed two unconditional models with all-male samples ($k = 54$) or all-female samples ($k = 23$), respectively. These analyses revealed that in studies with a focus on effort losses, men showed stronger effort losses (intercept = −0.59, $p < .001$) than women (intercept = −0.26, $p = .034$). The second conditional model also revealed a gender effect in the subset on effort gains, coefficient = 0.29, $p = .031$. The two unconditional models with all-male samples ($k = 36$) and all-female samples ($k = 42$) revealed that in studies with a focus on effort gains, men showed weaker effort gains (intercept = 0.46, $p = .004$) than women (intercept = 0.84, $p < .001$).

RQ 7 asked whether men exhibit stronger effort losses than women when their own contribution to the team performance is dispensable. To answer this question, we restricted our analysis to cases with dispensability that included only men or only women ($k = 66$). The conditional model with gender as a moderator revealed that men did not exhibit stronger effort losses than women when the own contribution to the team performance was dispensable, coefficient = 0.02, $p = .921$.

Our last research question (RQ 8) asked whether team members expend more effort when their teammates are physically present as compared with when they are absent. To answer this question, we performed a conditional model with the presence of teammates as a moderator ($k = 573$). We did not find that the presence of teammates had a statistically significant effect on effort during teamwork, coefficient = −0.16, $p = .162$.

Exploratory Analyses

We ran exploratory analyses to (a) further clarify the relationship between effort gains and losses in teams, (b) to follow up on unexpected results (e.g., concerning Hypotheses 4 and 5b), and (c) to conduct tests of relevant theoretical assumptions that we had not planned a priori.

The TEEM allows the prediction that effort gains and losses can be attributable to both, different levels of the same moderators *and* due to different moderators. We reasoned and found that some moderators yield, depending on their specific level, *both* higher and lower benefits of contributing effort than during individual work (e.g., the [in-]dispensability of the own contribution to the team performance; Hertel et al., 2000; Kerr & Bruun, 1983). On the other hand, there may be other moderators that result only in *either* higher *or* lower benefits of contributing effort than during individual work. For instance, social support by fellow members during teamwork is known to result in effort gains (Hüffmeier et al., 2014; see also the related analysis of Hypothesis 18b in the online supplementary materials available on the OSF), yet the absence of social support may not result in effort losses. To explore whether social support is, in fact, related to effort gains but not to effort losses in teams, we ran an exploratory analysis on the subset

[14] A reviewer kindly suggested conducting additional and more differentiated analyses on this gender effect. We thank the reviewer for this helpful suggestion.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

that contained no social support ($k = 516$). To do so, we estimated an unconditional model on this subset. In line with our conjecture, we did not find significant effort losses in this subset, intercept = −0.04, $p = .552$. Yet, these results should be interpreted with caution due to the uneven distribution of effect sizes across the levels of this moderator.

Similarly, to explore whether evaluation potential is related to effort losses but not to effort gains (i.e., given evaluation potential does not result in effort gains; see Harkins & Jackson, 1985), we ran an exploratory analysis on the subset in which evaluation potential was given (while disentangling it from social comparison potential, $k = 31$). We again estimated an unconditional model on this subset. In line with our conjecture, we did not find significant effort gains in this subset, intercept = −0.36, $p = .070$. Descriptively, the intercept even indicated effort losses. Yet, it should be noted that the number of effect sizes was relatively small in this analysis. Both analyses, nevertheless, provide first hints that effort gains and effort losses in teams may not always be two sides of the same coin.

To follow up on the unexpected null effects for team formation and task meaningfulness (see above), we conducted additional exploratory analyses. The absence of the expected effects may be attributable to higher-order interaction effects (e.g., a team formation by [in-]dispensability interaction). To examine this possibility, we investigated a possible team formation by (in-)dispensability interaction effect. We estimated a conditional model ($k = 516$) with team formation and (in-)dispensability as moderators and also included the interaction term of these two factors. The analysis revealed a significant interaction effect, coefficient = −0.78, $p < .001$ (see also Figure 4). A follow-up analyses, we split the data into two subsets with only ad hoc teams ($k = 427$) or only not ad hoc teams ($k = 89$), respectively. We then estimated two conditional models on these subsets using (in-)dispensability as a moderator. These analyses revealed that, when working in ad hoc teams, people expended more effort when the own contribution to the team performance was indispensable versus dispensable, coefficient = 0.91, $p < .001$. In ad hoc teams, we found effort gains when the own contribution was indispensable, intercept = 0.59, $p < .001$ (in the unconditional model with $k = 164$), and effort losses when the own contribution was dispensable, intercept = −0.41, $p < .001$ (in the unconditional model with $k = 263$). Yet, in not ad hoc teams, (in-)dispensability had no significant effect on effort, coefficient = 0.15, $p = .082$. Thus, the interaction involving team formation and (in-)dispensability may be responsible for the absence of the simple moderator effect of team formation. Note, however, that the distribution of effect sizes across the subsets in these analyses is highly uneven.

As reported above, team members did not expend more effort in meaningful tasks than in less meaningful tasks. We again investigated a possible task meaningfulness by (in-)dispensability interaction effect that might help explain the absence of the hypothesized effect. We estimated a conditional model ($k = 554$) with task meaningfulness and (in-)dispensability as moderators and also included the interaction term of these two factors. The analysis revealed a significant interaction effect, coefficient = −0.92, $p < .001$ (see also Figure 5). As follow-up analyses, we split the data into two subsets with less meaningful ($k = 447$) or meaningful tasks ($k = 107$), respectively. We then estimated two conditional models on these subsets using (in-)dispensability as a moderator. These analyses revealed that, when working on less meaningful tasks, people expended more effort when the own contribution to the team performance was indispensable versus dispensable, coefficient = 1.00, $p < .001$. When team members worked on less meaningful tasks, we found effort gains when the own contribution was indispensable, intercept = 0.65, $p < .001$ (in the unconditional model with $k = 277$), and effort losses when the own contribution was dispensable, intercept = −0.44, $p < .001$ (in the unconditional model with $k = 170$). Yet, when team members worked on meaningful tasks, (in-)dispensability had no significant effect on effort, coefficient = 0.09, $p = .243$. Thus, the interaction involving task meaningfulness and (in-)dispensability may be responsible for the absence of the simple moderator effect of task meaningfulness. Again, however, the distribution of effect sizes across the subsets in these analyses is rather uneven.

Finally, we explore relevant social comparison processes.[15] Following the assumption of the SCT (Festinger, 1954; p. 123) that "a person will be less attracted to situations where others are very divergent from him than to situations where others are close to him for both abilities and opinions," we assume that people show stronger effort gains due to social comparison processes when the partner is similar as opposed to dissimilar to the individual. To test this assumption, we restricted our analysis to cases in which social comparison was possible and that featured either low or high partner similarity ($k = 20$). With this subset, we performed a conditional model and included partner similarity as moderator. Contrary to the above assumption, the analysis revealed no significant effect of partners' similarity on effort, coefficient = 0.09, $p = .781$.

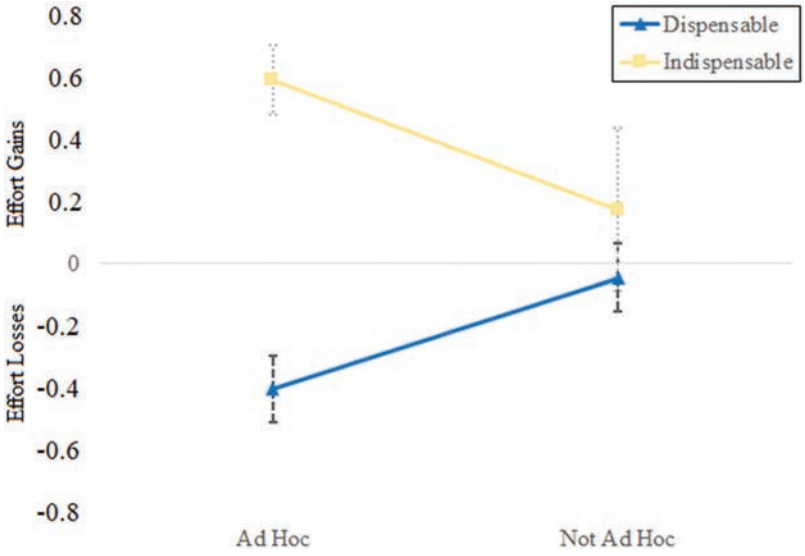
Similarly, it could be expected that team members show higher effort gains owing to social comparison processes when performing with familiar others (i.e., in a not ad hoc group). To test this assumption, we restricted our analysis to cases in which social comparison potential was given and that reported sufficient information for team formation ($k = 297$). With this subset, we performed a conditional model with team formation (i.e., ad hoc teams vs. not ad hoc teams) as a moderator because members of ad hoc teams are not familiar with each other while members of extant teams are. The model did not reveal a moderating effect of member familiarity, coefficient = −0.27, $p = .086$. Yet, we performed two follow-up analyses to better understand the pattern of results. Specifically, first, we performed an unconditional model on the subset in which social comparison was possible and teams were formed ad hoc (i.e., no member familiarity; $k = 230$). For this subset, we found effort gains, intercept = 0.36, $p < .001$. Second, we performed an unconditional model on the subset in which social comparison was possible and teams were not formed ad hoc (i.e., member familiarity; $k = 67$). For this subset, we found no effort gains, intercept = −0.01, $p = .844$, which is against the assumption that can be derived from SCT (Festinger, 1954).

Discussion

The current research is the largest meta-analysis on effort gains and effort losses in teams so far. We were able to include about as

[15] A reviewer kindly suggested conducting additional and more differentiated analyses on social comparison processes. We are grateful for this suggestion.

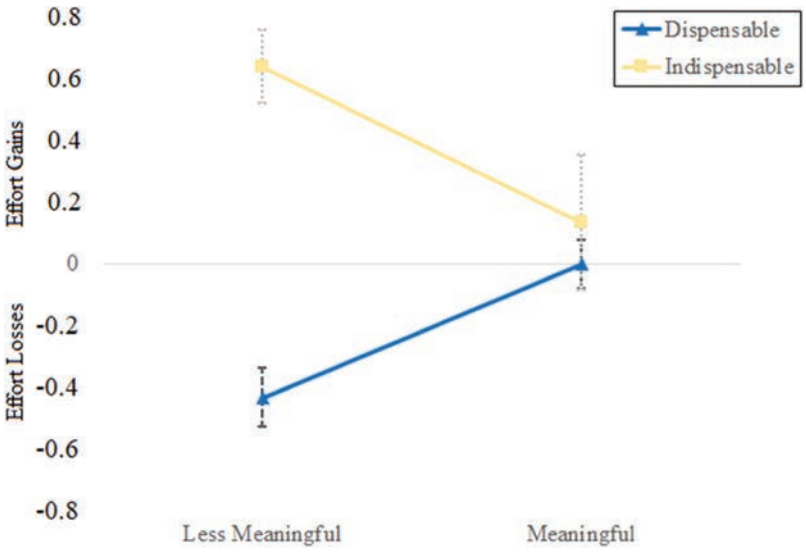
Figure 4
Team Formation × (In-)Dispensability Interaction



Note. The effect size represents the difference in effort (i.e., expended effort during teamwork minus expended effort during individual work). Error bars show 95% confidence intervals. See the online article for the color version of this figure.

much research on effort gains as on effort losses. The first important finding of our research is that teamwork did not have a motivating or demotivating effect on effort per se. Yet, in line with our theorizing, the impact of teamwork versus individual work on expended effort varied systematically across moderating conditions. Consistent with the notion that effort gains and losses are *often* two sides of the same coin (i.e., the two phenomena result from different levels of the same moderators), we found that the (in-)dispensability of the own contribution to the team performance moderated effort during teamwork. In accordance with our hypotheses, people showed effort gains when their individual contribution was indispensable but effort losses when their individual contribution was dispensable. In a more fine-grained exploratory analysis, we further found that the (in-)dispensability of the own

Figure 5
Task Meaningfulness × (In-)Dispensability Interaction



Note. The effect size represents the difference in effort (i.e., expended effort during teamwork minus expended effort during individual work). Error bars show 95% confidence intervals. See the online article for the color version of this figure.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

contribution explained the full spectrum of effort-related findings: We found effort gains in teams under high indispensability conditions, comparable effort levels in teamwork and individual work under moderate indispensability conditions, and effort losses under dispensability conditions. This pattern has not been shown before and represents an important novel insight.

Furthermore, in accordance with our hypotheses, we found effort losses when people's performance could not be evaluated by others and also when they could not compare their performance to someone else's. In addition, as with (in-)dispensability, a fine-grained analysis of social comparison potential showed that this moderator also explained the full spectrum of effort-related findings (i.e., from effort gains in teams via comparable effort levels in teamwork and individual work to effort losses in teams). Again, this finding represents a novel insight. Altogether, our meta-analysis illuminated the tipping points in people's effort and revealed that effort gains as compared with effort losses can be attributable to different levels of the *same* moderators, which provides an answer to a key question that had been hitherto unanswered (i.e., whether effort gains and losses in teams can be two sides of the same coin).

We further obtained two novel and important findings that speak to the question of whether effort gains and effort losses are *always* two sides of the same coin—that is, whether these two phenomena can also be due to *different* moderators. First, in our exploratory analyses of the studies that disentangled evaluation and social comparison potential (Szymanski & Harkins, 1987, 1993), we observed the following pattern: The absence of evaluation potential yielded effort losses, but the presence of evaluation potential did not yield effort gains. Second, we observed an inverse pattern for social support provided by fellow members (Hüffmeier & Hertel, 2011a; Hüffmeier et al., 2014) in our exploratory analyses: Given social support by fellow team members yielded effort gains (see the online supplementary materials available on the OSF for the related analysis), yet the absence of social support did not yield effort losses in teams. The analyses on social support should, however, be interpreted with caution because of the uneven distribution of effect sizes across the two levels of this moderator. Nevertheless, when taken together, there appear to be moderators that are tied to only one part of the motivational spectrum during teamwork—effort gains and effort losses are not always two sides of the same coin. All told, effort gains and effort losses appear to be multiply determined phenomena that have—yet only in part—shared causes.

Contrary to our hypothesis, team members did not expend more effort in teams that had not been formed ad hoc (e.g., when working with friends) than in teams of strangers. Yet, an exploratory analysis suggested that a higher-order interaction between team formation and (in-)dispensability may explain the absence of the expected effect: When working in ad hoc teams, people expended more effort when the own contribution to the team performance was indispensable versus dispensable. By contrast, when working in teams that were not formed ad hoc, (in-)dispensability had no significant effect on effort.

Also contrary to our hypothesis, team members did not expend more effort in meaningful tasks than in less meaningful tasks. Again, a higher-order interaction between task meaningfulness and (in-)dispensability may explain this finding: When working on tasks that were low in meaningfulness, people expended more effort when the own contribution to the team performance was indispensable versus dispensable. By contrast, when working on tasks that were high in meaningfulness, (in-)dispensability had no significant effect on effort. Thus, this interaction and the team formation by (in-)dispensability interaction again illustrate that teamwork can have a motivating and a demotivating effect, depending on how it is designed.

Our research also provided novel insights concerning another aspect of the question of whether effort gains and losses are two sides of the same coin: Do team members subjectively report (and/or potentially experience) effort gains and losses differently? To address this question, we analyzed the dissociation between subjective and objective measures of people's effort. In line with our predictions and going beyond the inconsistent (Karau & Williams, 1993) or lacking (Weber & Hertel, 2007) prior findings, we found that people's self-reports did not indicate effort losses when they had clearly shown such effort losses. By contrast, people's self-reports indicated effort gains when they had shown such gains. Altogether, a dissociation between subjective and objective measures was observed only for effort losses but not for effort gains, which again suggests differences between the two phenomena.

The analyses of our research questions also provided insights regarding issues that have not been examined in prior meta-analyses or insights that contradict prior meta-analytical findings. Notably, we found no overall differences between field and laboratory settings, which points to the generalizability of findings obtained in the laboratory to field settings. Yet, we observed that effort losses in teams were less pronounced in field studies as compared with laboratory studies, whereas there was no related difference for effort gains in teams. Effort losses in teams may thus pose less of a problem in field settings than it has been previously assumed (see also Erez & Somech, 1996). In addition, we found systematic gender differences indicating a higher willingness to expend effort on behalf of teams among women: In studies focusing on effort losses, women's losses were less pronounced than men's, whereas in studies focusing on effort gains women's effort gains were also more pronounced than those exhibited by men. These findings underscore the notion that "women's behavior seems to be more motivated by group-oriented interests" (Weber et al., 2009; p. 733; see also Eagly, 1987; Eagly & Karau, 2002). But, contrary to prior research, men did not exhibit stronger effort losses than women when their contribution to the team performance was dispensable. These latter findings are inconsistent with rather general assumptions (e.g., Kugihara, 1999; Williams & Sommer, 1997) and also prior meta-analytical results that were based on fewer studies (Karau & Williams, 1993) and that suggested that men are more prone to social loafing than women.

Finally, our analyses did not replicate some of the classic findings on effort expenditure during teamwork. For example, we found no evidence for an overall sucker effect (Kerr, 1983; Schnake, 1991; see p. 12 of the online supplementary materials available on the OSF). Additionally, inconsistent with the findings by Weber and Hertel (2007), we did not observe women exhibiting stronger effort gains than men when they perceived their contribution as indispensable. We also did not observe men exhibiting stronger effort gains than women when they could compare their performance to a moderately stronger fellow team member (see p. 8 of the online supplementary materials available on the OSF). These interesting insights suggest that future research is needed that

investigates under which specific conditions those classic effects can be found.

Theoretical Implications and Future Research

At least four aspects of our meta-analysis have important theoretical implications: (a) the absence of a teamwork main effect on expended effort, (b) (in-)dispensability and social comparison potential as key moderators, (c) the confounding of several moderators in the extant primary studies, and (d) the dissociation between objective and subjective effort indicators for effort losses in teams.

First, our research, which was based on an extensive literature search, included just as much research on effort gains as on effort losses. Our exploratory analysis revealed that teamwork did not have a motivating or demotivating effect per se. This finding is noteworthy because, in the past, a general notion was that effort losses prevail during teamwork (e.g., Karau & Williams, 1993; Latané et al., 1979). As summarized by Karau and Wilhau (2020), for instance, effort losses are a long-standing phenomenon in prior research, whereas effort gains have only received more research attention in recent years. The perception that effort losses generally prevail during teamwork is also reflected in the content covered in widely used psychology textbooks, as most textbooks primarily cover effort losses. In fact, many prominent social psychology textbooks cover *only* social loafing (and social facilitation; e.g., Aronson et al., 2010; Crisp & Turner, 2020). Even when textbooks cover effort gains, (much) more space is devoted to effort losses, along with the notion that there is supposedly much less evidence of effort gains than of effort losses (e.g., Hewstone et al., 2012; Smith et al., 2014). Our meta-analysis revealed that the representation of the actual evidence for both effort gains and losses in textbooks and beyond is skewed, thereby creating a false impression of effort expenditure during teamwork. Based on the results of our meta-analysis, providing an update is urgent because "textbooks influence the knowledge base of . . . future practitioners and researchers" (Aguinis et al., 2017; p. 509). Thus, as effort during teamwork appears to fully depend on situational conditions, the basic tenor of psychological theory and research should change.

Second, we found that both the (in-)dispensability of the own contribution to the team performance and social comparison potential explained the full spectrum of effort-related findings. These insights clearly extend the knowledge on effort expenditure in teams and show that effort gains and effort losses in teams can be "two sides of the same coin." Yet, this finding does not mean that other moderating conditions—such as social support by teammates leading to effort gains (Hüffmeier et al., 2014) or the absence of evaluation potential leading to effort losses (Harkins & Jackson, 1985)—cannot yield only one effect (i.e., effort gains or effort losses in teams). Thus, future research is needed to examine the (in-)dispensability of the own contribution and social comparison potential as moderators with (at least) three levels; it should even more precisely delineate the tipping points from effort gains in teams to comparable effort levels in teamwork and individual work and from comparable effort levels in teamwork and individual work to effort losses in teams.

Third, we observed that different moderators were strongly correlated (especially evaluation potential and social comparison potential). Thus, past research did not sufficiently distinguish between the potentials for evaluation and social comparison (see Szymanski & Harkins, 1987, 1993). Our exploratory analysis, however, provided first evidence suggesting that different levels of evaluation potential lead to effort losses but not to effort gains (see above). Thus, future studies need to further examine whether evaluation potential and social comparison potential differ in their nature (i.e., evaluation potential as a "mere" control mechanism versus social comparison potential as allowing for self-enhancement) and their consequences (i.e., "only" comparable effort levels in teamwork and individual work for evaluation potential vs. effort gains in teams for social comparison potential). Generally, following the novel insights regarding the (de)motivating effects of the (lacking) potential for social comparisons, research on processes underlying social comparison is needed.

Team formation and task meaningfulness were also strongly correlated, as only a few primary studies focused on these moderators (see also Table S7 in the online supplementary materials available on the OSF). In fact, most studies did not manipulate team formation (ad hoc vs. not ad hoc teams) or task meaningfulness (meaningful vs. less meaningful tasks). Thus, to study these moderators, we had to use proxies in our coding. For instance, we coded team formation as "not ad hoc" when people were teammates on previously existing (sports) teams (e.g., Schleu et al., 2019). We also coded task meaningfulness as "meaningful" when subjects came from sports teams performing their regular sport (e.g., Hüffmeier et al., 2017). Thus, although the two moderators clearly differ theoretically, it was not possible to fully distinguish them empirically given the characteristics of the included primary studies. Thus, future studies are desirable that disentangle team formation and task meaningfulness by independently manipulating them. Doing so would also help to further probe the observed three-way interactions that we found in our exploratory analyses.

Fourth, concerning the dissociation between objective and subjective effort indicators, we found that when people showed effort losses in teams, they did not report them. This finding might have been attributable to social desirability (i.e., team members do not want to report their effort losses). In fact, in many studies, people were asked to "give their best" on a task (e.g., Anshel, 1995; Williams et al., 1981). Thus, withholding effort can be regarded as socially undesirable behavior. Withholding effort during teamwork may also violate general norms stipulating adequate behavior in a team (Feldman, 1984) so that people might not want to admit that they socially loafed. Alternatively, the dissociation may be attributable to concerns about responding consistently to different measures: In various studies (e.g., Hardy & Crace, 1991; Williams, 1981), people were asked about their effort expenditure during teamwork and individual with similar items. People are often motivated to respond consistently to similar measures (Podsakoff & Organ, 1986).

Notably, Karau and Williams (1993; p. 685) suggested a third explanation: People might, depending on the situation, intentionally choose a level of effort or "respond automatically to a preexisting effort script." Thus, it is also possible that people are unable rather than unwilling to accurately report their effort losses. Responding automatically to effort scripts might be more common in situations in which the own contribution is not needed, so that team members show effort losses. In contrast, it seems less likely that effort gains in teams emerge automatically (cf. Hüffmeier et al., 2013; Schleu et al., 2019) because team members go beyond their typical effort level (i.e., effort spent during individual work),

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

which requires active self-regulation (e.g., Carver & Scheier, 2001) and may result in bodily reactions (e.g., muscular tension, fatigue, or pain). These bodily reactions create awareness of the increased effort (Craig, 2002). Altogether, an important avenue for future research is to test which processes explain the dissociation between objective and subjective measures concerning effort losses in teams and to further examine the novel insight that people more accurately report their effort gains than their effort losses. Generally, future theories are needed that better explain when exactly deliberative or automatic processes underlie effort expenditure during teamwork.

Practical Implications

Our results can guide the design of teamwork to prevent effort losses or even elicit effort gains. As teamwork is not motivating or demotivating per se, our results on moderators are particularly instructive: First, we found the indispensability of people's individual contribution to the team performance to be consequential—thus, related perceptions could be invoked or strengthened. Indispensability could, for example, be realized by assigning team members unique tasks (Hertel et al., 2003; Mace et al., 2017). To do so, managers could break down the main task into necessary subtasks for the individual team members. Another possibility is to organize work as a temporal sequence of individual contributions. Later and especially last members of sequentially working teams show especially pronounced effort gains in teams (e.g., Hüffmeier et al., 2017; Osborn et al., 2012).

Second, according to our findings, it is advisable for the emergence of effort gains that teamwork allows people to engage in social comparisons. Note that simply having relevant others (e.g., teammates or managers) evaluate individual performances during teamwork may not be enough, as evaluation potential may help to prevent social loafing but does not seem to trigger effort gains (see our exploratory analyses). Thus, practitioners could carefully design teamwork to meet the two preconditions for social comparison to emerge: Both the own individual contribution and the individual contribution of a relevant teammate (preferably a moderately superior fellow member; Festinger, 1954) must be identifiable. For example, this goal could be achieved by making individual inputs visible (Lount & Wilk, 2014). Yet, people are unlikely to exhibit effort gains when the target for comparison is a clearly inferior or a much more capable fellow member (e.g., Messé et al., 2002). People who form a team should therefore be roughly equal in their abilities.

Third, it could be helpful to consider the interaction involving team formation and (in-)dispensability when designing teamwork. When working in ad hoc teams, it is especially important that people's contributions to the team performance are indispensable. Thus, especially managers of newly formed teams should design teamwork such that indispensability perceptions are high (e.g., Hertel et al., 2003). In longstanding teams, such perceptions may well be less relevant.

Fourth and finally, the interaction involving task meaningfulness and (in-)dispensability is also instructive for teamwork design. When performing a less meaningful task, indispensability perceptions can compensate for the low motivating potential of the task (e.g., Jackson & Harkins, 1985). Thus, when teammates have to perform a task that is low in meaningfulness, managers could carefully design the team task such that people's individual contribution to the team performance becomes indispensable. Yet, even under such circumstances, effort losses in teams may be less drastic than has often been assumed because our analysis showed that effort losses are generally less pronounced in field settings versus laboratory settings.

Limitations

Owing to the characteristics of the included primary studies, our research has limitations. First, when setting out to conduct this meta-analysis, we generally hypothesized that effort during teamwork should be moderated by characteristics of the task, the team, and the involved persons (see our preregistration). Yet, many preregistered hypotheses on team-related and person-related facets had to be tested with analyses that were not particularly robust because there were not enough available data (see also Table S7 in the online supplementary materials available on the OSF). Thus, there is a need for more research especially on moderating characteristics of the team and the involved persons. For example, past research found that culture influences effort during teamwork (Earley, 1989; Hertel et al., 2008). Yet, most available studies were conducted in the United States or Europe. Thus, further primary studies are needed to examine whether the findings obtained in Western or individualistic cultures generalize to more Eastern or collectivistic cultures (e.g., China, Korea, or Japan).

Second, because of the lack of primary studies, it was not possible to test relevant preregistered higher-order interactions, for instance, between task meaningfulness and perceived coworker effort (see Hypothesis 8b in the online supplementary materials available on the OSF). Team members working on a meaningful task with a teammate whom they expect or experience to expend little effort may show effort gains during teamwork in an attempt to compensate for their low-performing teammate (social compensation; Karau & Williams, 1997; Williams & Karau, 1991).

Third, there is a general lack of studies looking into the basic processes that underlie effort gains and losses in teams. As an important avenue for future research, studies are especially desirable that examine team members' motives as drivers of effort expenditure during teamwork. The motives following SDT (Deci & Ryan, 2011) are one possible explanation for the emergence of effort gains. Research investigating the need for relatedness or the need for competence as drivers of effort gains does, however, not yet exist. As another example, SIT (Hogg & Abrams, 2003; Tajfel & Turner, 1979) also offers a possible motive that may drive effort gains in teams. And despite the plausibility of related theoretical accounts (e.g., Van Dick et al., 2009), which focus on the achievement or maintenance of a positive social identity as a motive for contributing effort during teamwork, the limited empirical research on social identification provides a less clear message: In the laboratory, the effects were either relatively weak and inconsistent (e.g., Worchel et al., 1998) or even showed that group identification had no direct or moderating effects on effort (e.g., Gockel et al., 2008). These findings are consistent with Shepperd's (1993) claim that small group research examines teams in a minimal sense, as they barely share a history or future interactions (see also McGrath, 1984). Thus, to learn more about team members' striving for a positive social identity that could underlie effort gains in teams, it may be necessary to move beyond the laboratory and study teamwork in field settings.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

Fourth, following prior meta-analyses (e.g., Karau & Williams, 1993; Weber & Hertel, 2007), we interpreted performance as indicative of expended effort. Yet, one might speculate that, in certain instances, increases in effort may not automatically translate to equivalent increases in performance (e.g., in brainstorming tasks). One might also speculate about curvilinear relationships between effort and performance for some tasks. For example, an increase in effort may, at some point, even decrease performance in swimming or running relays (e.g., Hüffmeier et al., 2017; Schleu et al., 2019). Thus, future research should pretest the tasks used for assessing effort to ensure a monotonous positive relation between effort and performance (see Hertel et al., 2000). Complementing behavioral data with additional effort indicators (e.g., physiological data) is another promising strategy in this respect.

Finally, in line with prior meta-analyses on effort during teamwork (Herbst & Mas, 2015; Karau & Williams, 1993; Weber & Hertel, 2007), our research focuses on individual motivation within teams. Other models offer another perspective on team member effort: For instance, Chen and Kanfer (2006) provided a multilevel model of motivated behavior in teams that includes individual-level processes, team-level processes, and cross-level processes. Thus, future research should delve deeper into additional team-level processes and cross-level influences between individual and team motivation.

Conclusions

The current meta-analysis of more than 600 effect sizes comprising data from more than 300,000 team members theoretically and empirically integrated the two research strands on effort gains and effort losses in teams. By doing so, we could demonstrate that teamwork is neither motivating nor demotivating per se. Our meta-analysis is also the first to suggest that both effort gains and effort losses in teams are caused by multiple factors, and whereas some factors can explain both effort gains and effort losses in teams (i.e., [in-]dispensability and social comparison potential), other factors appear to uniquely trigger either effort gains (i.e., social support) or effort losses (i.e., evaluation potential) in teams. In other words, effort gains and effort losses appear to be multiply determined phenomena that have—in part—shared causes and that may also have—in part—unique causes. By presenting this nuanced pattern of results, we advanced the understanding of one of the oldest research questions in modern psychology—individual motivation within teams. Our hope is that our findings are helpful for future researchers and practitioners so that it becomes possible that together, everyone achieves more—and not less.

References

References marked with an asterisk were included in the meta-analysis.

*Abele, S., & Diehl, M. (2008). Finding teammates who are not prone to sucker and free-rider effects: The protestant work ethic as a moderator of motivation losses in group performance. *Group Processes & Intergroup Relations*, *11*(1), 39–54. https://doi.org/10.1177/136843020 7084845

Aguinis, H., Ramani, R. S., Campbell, P. K., Bernal-Turnes, P., Drewry, J. M., & Edgerton, B. T. (2017). Most frequently cited sources, articles, and authors in industrial-organizational psychology textbooks: Implications for the science–practice divide, scholarly impact, and the future of the field. *Industrial and Organizational Psychology: Perspectives on Science and Practice*, *10*(4), 507–557. https://doi.org/10.1017/iop.2017.69

*Anshel, M. H. (1995). Examining social loafing among elite female rowers as a function of task duration and mood. *Journal of Sport Behavior*, *18*(1), 39–49.

Asperholm, M., Högman, N., Rafi, J., & Herlitz, A. (2019). What did you do yesterday? A meta-analysis of sex differences in episodic memory. *Psychological Bulletin*, *145*(8), 785–821. https://doi.org/10.1037/bul0000197

Aronson, E., Wilson, T. D., Akert, R. M., & Sommers, S. (2010). *Social psychology* (Global ed.). Pearson.

*Bartis, S., Szymanski, K., & Harkins, S. G. (1988). Evaluation and performance: A two-edged knife. *Personality and Social Psychology Bulletin*, *14*(2), 242–251. https://doi.org/10.1177/0146167288142003

*Beckles, J. A. (2017). *Enhancing motivation to exercise for obese participants in exergames: Testing partner characteristics as a moderator of the köhler effect* (Publication No. 10616891) [Master's thesis, Michigan State University]. ProQuest Dissertations Publishing.

*Bijmolt, T. H., & Pieters, R. G. (2001). Meta-analysis in marketing when studies contain multiple measurements. *Marketing Letters*, *12*(2), 157–169. https://doi.org/10.1023/A:1011117103381

Bijmolt, T. H. A., Van Heerde, H. J., & Pieters, R. G. M. (2005). New empirical generalizations on the determinants of price elasticity. *JMR, Journal of Marketing Research*, *42*(2), 141–156. https://doi.org/10.1509/jmkr.42.2.141.62296

*Bonaccio, S. (2002). *The effect of intrinsic and extrinsic motivation on social loafing* (Publication No. HM, 1201 B66 2002) [Master's thesis, Concordia University]. Concordia University Library.

Borenstein, M. (2009). Effect sizes for continuous data. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.), *Handbook of research synthesis and meta-analysis* (2nd ed., pp. 221–235). Russell Sage Foundation.

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). *Introduction to meta-analysis*. Wiley. https://doi.org/10.1002/9780470743386

*Brickner, M. A., & Wingard, K. (1988). *Social identity and self-motivation: Improvements in productivity* [Unpublished manuscript]. University of Akron.

*Brickner, M. A., Harkins, S. G., & Ostrom, T. M. (1986). Effects of personal involvement: Thought-provoking implications for social loafing. *Journal of Personality and Social Psychology*, *51*(4), 763–769. https://doi.org/10.1037/0022-3514.51.4.763

Carver, C. S., & Scheier, M. F. (2001). *On the self-regulation of behavior*. Cambridge University Press.

*Cates, K. H. (1986). *The effects of evaluation, identifiability, and task uniqueness on task performance* [Doctoral dissertation]. Dissertation Abstracts International.

*Charbonnier, E., Huguet, P., Brauer, M., & Monteil, J. M. (1998). Social loafing and self-beliefs: People's collective effort depends on the extent to which they distinguish themselves as better than others. *Social Behavior and Personality*, *26*(4), 329–340. https://doi.org/10.2224/sbp.1998.26.4.329

Charness, G., Gneezy, U., & Kuhn, M. A. (2012). Experimental methods: Between-subject and within-subject design. *Journal of Economic Behavior & Organization*, *81*(1), 1–8. https://doi.org/10.1016/j.jebo.2011.08.009

Chen, G., & Kanfer, R. (2006). Toward a systems theory of motivated behavior in work teams. *Research in Organizational Behavior*, *27*, 223–267. https://doi.org/10.1016/S0191-3085(06)27006-0

*Cohen, C. J. (1988). *Social loafing and personality: The effects of individual differences on collective performance* (Publication No. 8809486) [Doctoral dissertation, Fordham University]. ProQuest Dissertations Publishing.

Cohen, E. E., Ejsmond-Frey, R., Knight, N., & Dunbar, R. I. (2010). Rowers' high: Behavioural synchrony is correlated with elevated pain

thresholds. *Biology Letters*, *6*(1), 106–108. https://doi.org/10.1098/rsbl.2009.0670

*Cooke, A., Kavussanu, M., McIntyre, D., & Ring, C. (2013). The effects of individual and team competitions on performance, emotions, and effort. *Journal of Sport & Exercise Psychology*, *35*(2), 132–143. https://doi.org/10.1123/jsep.35.2.132

*Cooley, R. J. (1991). *Adult children of alcoholics: Interpersonal trust and social compensation* [Unpublished master's thesis]. University of Toledo.

Craig, A. D. (2002). How do you feel? Interoception: The sense of the physiological condition of the body. *Nature Reviews Neuroscience*, *3*(8), 655–666. https://doi.org/10.1038/nrn894

Crisp, R. J., & Turner, R. N. (2020). *Essential social psychology* (4th ed.). SAGE Publications Limited.

Crowne, D. P., & Marlowe, D. (1964). *The approval motive: Studies in evaluative dependence*. Wiley.

*Cymek, D. H. (2018). Redundant automation monitoring: Four eyes don't see more than two, if everyone turns a blind eye. *Human Factors*, *60*(7), 902–921. https://doi.org/10.1177/0018720818781192

*Czyż, S. H., Szmajke, A., Kruger, A., & Kübler, M. (2016). Participation in team sports can eliminate the effect of social loafing. *Perceptual and Motor Skills*, *123*(3), 754–768. https://doi.org/10.1177/0031512516664938

Davis, J. H. (1969). *Group performance*. Addison Wesley.

Deci, E. L., & Ryan, R. M. (1980). Self-determination theory: When mind mediates behavior. *Journal of Mind and Behavior*, *1*(1), 33–43.

Deci, E. L., & Ryan, R. M. (2011). Levels of analysis, regnant causes of behavior and well-being: The role of psychological needs. *Psychological Inquiry*, *22*(1), 17–22. https://doi.org/10.1080/1047840X.2011.545978

Devine, D. J., & Philips, J. L. (2001). Do smarter teams do better: A meta-analysis of cognitive ability and team performance. *Small Group Research*, *32*(5), 507–532. https://doi.org/10.1177/104649640103200501

*Diehl, M., & Stroebe, W. (1991). Productivity loss in idea-generating groups: Tracking down the blocking effect. *Journal of Personality and Social Psychology*, *61*(3), 392–403. https://doi.org/10.1037/0022-3514.61.3.392

Eagly, A. H. (1987). *Sex differences in social behavior: A social-role interpretation*. Erlbaum.

Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review*, *109*(3), 573–598. https://doi.org/10.1037/0033-295X.109.3.573

*Earley, P. C. (1989). Social loafing and collectivism: A comparison of the United States and the People's Republic of China. *Administrative Science Quarterly*, *34*(4), 565–581. https://doi.org/10.2307/2393567

Edwards, A. L. (1957). *The social desirability variable in personality assessment and research*. Dryden Press.

Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal*, *315*(7109), 629–634. https://doi.org/10.1136/bmj.315.7109.629

*Elsaid, A. M. M. (2005). *The effects of group beliefs and task meaningfulness on social loafing* (Publication No. 3204644) [Doctoral dissertation, Southern Illinois University at Carbondale]. ProQuest Dissertations Publishing.

*Erev, I., Bornstein, G., & Galili, R. (1993). Constructive intergroup competition as a solution to the free rider problem: A field experiment. *Journal of Experimental Social Psychology*, *29*(6), 463–478. https://doi.org/10.1006/jesp.1993.1021

*Erez, M., & Somech, A. (1996). Is group productivity loss the rule or the exception? Effects of culture and group-based motivation. *Academy of Management Journal*, *39*(6), 1513–1537. https://doi.org/10.2307/257067

*Everett, J. J., Smith, R. E., & Williams, K. D. (1992). Effects of team cohesion and identifiability on social loafing in relay swimming performance. *International Journal of Sport Psychology*, *23*(4), 311–324.

Feldman, D. C. (1984). The development and enforcement of group norms. *Academy of Management Review*, *9*(1), 47–53. https://doi.org/10.5465/amr.1984.4277934

*Feltz, D. L., Forlenza, S. T., Winn, B., & Kerr, N. L. (2014). Cyber buddy is better than no buddy: A test of the Köhler motivation effect in exergames. *Games for Health Journal*, *3*(2), 98–105. https://doi.org/10.1089/g4h.2013.0088

*Feltz, D. L., Irwin, B., & Kerr, N. (2012). Two-player partnered exergame for obesity prevention: Using discrepancy in players' abilities as a strategy to motivate physical activity. *Journal of Diabetes Science and Technology*, *6*(4), 820–827. https://doi.org/10.1177/193229681200600413

*Feltz, D. L., Kerr, N. L., & Irwin, B. C. (2011). Buddy up: The Köhler effect applied to health games. *Journal of Sport & Exercise Psychology*, *33*(4), 506–526. https://doi.org/10.1123/jsep.33.4.506

Fernandes, A. C., & Garcia-Marques, T. (2020). A meta-analytical review of the familiarity temporal effect: Testing assumptions of the attentional and the fluency-attributional accounts. *Psychological Bulletin*, *146*(3), 187–217. https://doi.org/10.1037/bul0000222

Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, *7*(2), 117–140. https://doi.org/10.1177/001872675400700202

*Feuchter, A., & Funke, J. (2004). Positive Effekte sozialen Faulenzens beim Lösen komplexer Probleme [Positive effects of social loafing in solving complex problems]. *Kölner Zeitschrift Für Soziologie Und Sozialpsychologie*, *56*(2), 304–325. https://doi.org/10.1007/s11577-004-0036-x

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). SAGE Publications Limited.

*Forlenza, S. T., Kerr, N. L., Irwin, B. C., & Feltz, D. L. (2012). Is my exercise partner similar enough? Partner characteristics as a moderator of the Köhler Effect in exergames. *Games for Health Journal*, *1*(6), 436–441. https://doi.org/10.1089/g4h.2012.0047

Freund, P. A., & Kasten, N. (2012). How smart do you think you are? A meta-analysis on the validity of self-estimates of cognitive ability. *Psychological Bulletin*, *138*(2), 296–321. https://doi.org/10.1037/a0026556

*Gabrenya, W. K., Jr., Latané, B., & Wang, Y. E. (1981). Social loafing among Chinese overseas and U.S. students. *Proceedings of the Second Asian Conference of the International Association for Cross-Cultural Psychology*, Taipei, Taiwan, ROC.

*Gabrenya, W. K., Jr., Latané, B., & Wang, Y. E. (1983). Social loafing in cross-cultural perspective: Chinese on Taiwan. *Journal of Cross-Cultural Psychology*, *14*(3), 368–384. https://doi.org/10.1177/0022002183014003009

*Gabrenya, W. K., Jr., Wang, Y. E., & Latané, B. (1985). Social loafing on an optimizing task. *Cross-Cultural Differences among Chinese and Americans. Journal of Cross-Cultural Psychology*, *16*(2), 223–242. https://doi.org/10.1177/0022002185016002006

*Gagne, M., & Zuckerman, M. (1999). Performance and learning goal orientations as moderators of social loafing and social facilitation. *Small Group Research*, *30*(5), 524–541. https://doi.org/10.1177/104649649903000502

*Gallupe, R. B., Bastianutti, L. M., & Cooper, W. H. (1991). Unblocking brainstorms. *Journal of Applied Psychology*, *76*(1), 137–142. https://doi.org/10.1037/0021-9010.76.1.137

Geen, R. G. (1995). *Human motivation: A social psychological approach*. Thomson Brooks/Cole Publishing Co.

*Gockel, C., Kerr, N. L., Seok, D. H., & Harris, D. W. (2008). Indispensability and group identification as sources of task motivation. *Journal of Experimental Social Psychology*, *44*(5), 1316–1321. https://doi.org/10.1016/j.jesp.2008.03.011

Goethals, G. R., & Darley, J. M. (1987). Social comparison theory: Self-evaluation and group life. In B. Mullen & G. R. Goethals (Eds.), *Theories of group behavior* (pp. 21–47). Springer. https://doi.org/10.1007/978-1-4612-4634-3_2

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

Grant, A. M. (2007). Relational job design and the motivation to make a prosocial difference. *Academy of Management Review*, *32*(2), 393–417. https://doi.org/10.5465/amr.2007.24351328

Grant, A. M., & Berry, J. W. (2011). The necessity of others is the mother of invention: Intrinsic and prosocial motivations, perspective taking, and creativity. *Academy of Management Journal*, *54*(1), 73–96. https://doi.org/10.5465/amj.2011.59215085

Gregg, A. P., & Sedikides, C. (2018). Essential self-evaluation motives: Caring about who we are. In M. van Zomeren, J. F. Dovidio, M. van Zomeren, & J. F. Dovidio (Eds.), *The Oxford handbook of the human essence* (pp. 59–70). Oxford University Press.

*Griffith, T. L., Fichman, M., & Moreland, R. L. (1989). Social loafing and social facilitation: An empirical test of the cognitive-motivational model of performance. *Basic and Applied Social Psychology*, *10*(3), 253–271. https://doi.org/10.1207/s15324834basp1003_4

Hackman, J. R., & Oldham, G. R. (1975). Development of the job diagnostic survey. *Journal of Applied Psychology*, *60*(2), 159–170. https://doi.org/10.1037/h0076546

*Hallmark, J. R., & Downs, T. M. (1987). *Group participation in the organization: Social loafing as a limitation of group effectiveness (ED293173)*. ERIC. http://files.eric.ed.gov/fulltext/ED293173.pdf

*Harcum, E. R., & Badura, L. L. (1990). Social loafing as response to an appraisal of appropriate effort. *The Journal of Psychology*, *124*(6), 629–637. https://doi.org/10.1080/00223980.1990.10543256

*Hardy, C. J., & Crace, R. K. (1991). The effects of task structure and teammate competence on social loafing. *Journal of Sport & Exercise Psychology*, *13*(4), 372–381. https://doi.org/10.1123/jsep.13.4.372

*Hardy, C. J., & Latane, B. (1988). Social loafing in cheerleaders: Effects of team membership and competition. *Journal of Sport & Exercise Psychology*, *10*(1), 109–114. https://doi.org/10.1123/jsep.10.1.109

*Hardy, C., & Latané, B. (1986). Social loafing on a cheering task. *Social Science*, *71*(2-3), 165–172.

*Harkins, S. G. (1987). Social loafing and social facilitation. *Journal of Experimental Social Psychology*, *23*(1), 1–18. https://doi.org/10.1016/0022-1031(87)90022-9

*Harkins, S. G., Latane, B., & Williams, K. (1980). Social loafing: Allocating effort or taking it easy? *Journal of Experimental Social Psychology*, *16*(5), 457–465. https://doi.org/10.1016/0022-1031(80)90051-7

*Harkins, S. G., White, P. H., & Utman, C. H. (2000). The role of internal and external sources of evaluation in motivating task performance. *Personality and Social Psychology Bulletin*, *26*(1), 100–117. https://doi.org/10.1177/0146167200261010

*Harkins, S. G., & Jackson, J. M. (1985). The role of evaluation in eliminating social loafing. *Personality and Social Psychology Bulletin*, *11*(4), 457–465. https://doi.org/10.1177/0146167285114011

*Harkins, S. G., & Petty, R. E. (1982). Effects of task difficulty and task uniqueness on social loafing. *Journal of Personality and Social Psychology*, *43*(6), 1214–1229. https://doi.org/10.1037/0022-3514.43.6.1214

*Harkins, S. G., & Szymanski, K. (1988). Social loafing and self-evaluation with an objective standard. *Journal of Experimental Social Psychology*, *24*(4), 354–365. https://doi.org/10.1016/0022-1031(88)90025-X

*Harkins, S. G., & Szymanski, K. (1989). Social loafing and group evaluation. *Journal of Personality and Social Psychology*, *56*(6), 934–941. https://doi.org/10.1037/0022-3514.56.6.934

*Harmon, V. M. (2008). *Performance discrepancy between team members and motivation gain* (Publication No. 3345181) [Doctoral dissertation, University of Illinois at Chicago]. ProQuest Dissertations Publishing.

*Hart, J. W., Bridgett, D. J., & Karau, S. J. (2001). Coworker ability and effort as determinants of individual effort on a collective task. *Group Dynamics*, *5*(3), 181–190. https://doi.org/10.1037/1089-2699.5.3.181

*Hart, J. W., Karau, S. J., Stasson, M. F., & Kerr, N. A. (2004). Achievement motivation, expected coworker performance, and collective task motivation: Working hard or hardly working? *Journal of Applied Social Psychology*, *34*(5), 9841000. https://doi.org/10.1111/j.1559-1816.2004.tb02580.x

*Haugen, T., Reinboth, M., Hetlelid, K. J., Peters, D. M., & Høigaard, R. (2016). Mental toughness moderates social loafing in cycle time-trial performance. *Research Quarterly for Exercise and Sport*, *87*(3), 305–310. https://doi.org/10.1080/02701367.2016.1149144

*Henningsen, D. D., Cruz, M. G., & Miller, M. L. (2000). Role of social loafing in predeliberation decision making. *Group Dynamics*, *4*(2), 168–175. https://doi.org/10.1037/1089-2699.4.2.168

Herbst, D., & Mas, A. (2015). Peer effects on worker output in the laboratory generalize to the field. *Science*, *350*(6260), 545–549. https://doi.org/10.1126/science.aac9555

Hertel, G., & Hüffmeier, J. (2020). Temporal stability of effort gains in teams. In S. Karau (Ed.), *Individual motivation within groups* (pp. 223–257). Academic Press. https://doi.org/10.1016/B978-0-12-849867-5.00007-0

*Hertel, G., Deter, C., & Konradt, U. (2003). Motivation gains in computer-supported groups. *Journal of Applied Social Psychology*, *33*(10), 2080–2105. https://doi.org/10.1111/j.1559-1816.2003.tb01876.x

*Hertel, G., Kerr, N. L., Scheffler, M., Geister, S., & Messé, L. A. (2000). Exploring the Köhler motivation gain effect: Impression management and spontaneous goal setting. *Zeitschrift Für Sozialpsychologie*, *31*(4), 204–220. https://doi.org/10.1024//0044-3514.31.4.204

*Hertel, G., Kerr, N. L., & Messé, L. A. (2000). Motivation gains in performance groups: Paradigmatic and theoretical developments on the Köhler effect. *Journal of Personality and Social Psychology*, *79*(4), 580–601. https://doi.org/10.1037/0022-3514.79.4.580

*Hertel, G., Niemeyer, G., & Clauss, A. (2008). Social indispensability or social comparison: The why and when of motivation gains of inferior group members. *Journal of Applied Social Psychology*, *38*(5), 1329–1363. https://doi.org/10.1111/j.1559-1816.2008.00350.x

*Hertel, G., Nohe, C., Wessolowski, K., Meltz, O., Pape, J. C., Fink, J., & Hüffmeier, J. (2018). Effort gains in occupational teams—The effects of social competition and social indispensability. *Frontiers in Psychology*, *9*, Article 769. https://doi.org/10.3389/fpsyg.2018.00769

*Hertel, G., Weber, B., & Yang, Y. (2008). [Unpublished raw data on the influence of culture on effort gains in teams].

*Heuzé, J. P., & Brunel, P. C. (2003). Social loafing in a competitive context. *International Journal of Sport and Exercise Psychology*, *1*(3), 246–263. https://doi.org/10.1080/1612197X.2003.9671717

Hewstone, M., Stroebe, W., & Jonas, K. (Eds.). (2012). *An introduction to social psychology* (Vol. 17). Wiley.

Higgins, J. P., & Thompson, S. G. (2002). Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine*, *21*(11), 1539–1558. https://doi.org/10.1002/sim.1186

*Hilkenmeier, F., & Wakefield, J. (2018). The impact of motive disposition on group performance. *Cogent Psychology*, *5*(1), 1507123. https://doi.org/10.1080/23311908.2018.1507123

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*(3), 513–524. https://doi.org/10.1037/0003-066X.44.3.513

Hogg, M. A., & Abrams, D. (2003). Intergroup behavior and social identity. In M. A. Hogg & J. Cooper (Eds.), *The Sage handbook of social psychology* (pp. 335–360). SAGE Publications Limited.

*Høigaard, R., Boen, F., De Cuyper, B., & Peters, D. M. (2013). Team identification reduces social loafing and promotes social laboring in cycling. *International Journal of Applied Sports Science*, *25*(1), 33–40. https://doi.org/10.24985/ijass.2013.25.1.33

Hollenbeck, J. R., Beersma, B., & Schouten, M. E. (2012). Beyond team types and taxonomies: A dimensional scaling conceptualization for team description. *Academy of Management Review*, *37*(1), 82–106. https://doi.org/10.5465/amr.2010.0181

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

*Huddleston, S., Doody, S. G., & Ruder, M. K. (1985). The effect of prior knowledge of the social loafing phenomenon on performance in a group. *International Journal of Sport Psychology*, *16*(3), 176–182.

Hüffmeier, J., Dietrich, H., & Hertel, G. (2013). Effort intentions in teams: Effects of task type and teammate performance. *Small Group Research*, *44*(1), 62–88. https://doi.org/10.1177/1046496412472242

*Hüffmeier, J., Filusch, M., Mazei, J., Hertel, G., Mojzisch, A., & Krumm, S. (2017). On the boundary conditions of effort losses and effort gains in action teams. *Journal of Applied Psychology*, *102*(12), 1673–1685. https://doi.org/10.1037/apl0000245

*Hüffmeier, J., Kanthak, J., & Hertel, G. (2013). Specificity of partner feedback as moderator of group motivation gains in Olympic swimmers. *Group Processes & Intergroup Relations*, *16*(4), 516–525. https://doi.org/10.1177/1368430212460894

*Hüffmeier, J., Krumm, S., Kanthak, J., & Hertel, G. (2012). Don't let the group down": Facets of instrumentality moderate the motivating effects of groups in a field experiment. *European Journal of Social Psychology*, *42*(5), 533–538. https://doi.org/10.1002/ejsp.1875

Hüffmeier, J., Schleu, J. E., & Nohe, C. (2020). The strength of the situation: Disentangling the situational explanation for effort gains in swimming relays from person-related accounts. *Journal of Sport & Exercise Psychology*, *42*(5), 394–406. https://doi.org/10.1123/jsep.2020-0036

*Hüffmeier, J., Wessolowski, K., Van Randenborgh, A., Bothin, J., Schmid-Loertzer, N., & Hertel, G. (2014). Social support from fellow group members triggers additional effort in groups. *European Journal of Social Psychology*, *44*(4), 287–296. https://doi.org/10.1002/ejsp.2021

Hüffmeier, J., & Hertel, G. (2011a). Many cheers make light the work: How social support triggers process gains in teams. *Journal of Managerial Psychology*, *26*(3), 185–204. https://doi.org/10.1108/02683941111112631

*Hüffmeier, J., & Hertel, G. (2011b). When the whole is more than the sum of its parts: Group motivation gains in the wild. *Journal of Experimental Social Psychology*, *47*(2), 455–459. https://doi.org/10.1016/j.jesp.2010.12.004

Hüffmeier, J., & Hertel, G. (2020). Effort losses and effort gains in sports teams. In S. Karau (Ed.), *Individual motivation within groups* (pp. 109–149). Academic Press. https://doi.org/10.1016/B978-0-12-849867-5.00004-5

*Huguet, P., Charbonnier, E., & Monteil, J. M. (1999). Productivity loss in performance groups: People who see themselves as average do not engage in social loafing. *Group Dynamics*, *3*(2), 118–131. https://doi.org/10.1037/1089-2699.3.2.118

*Hütter, M., & Diehl, M. (2011). Motivation losses in teamwork: The effects of team diversity and equity sensitivity on reactions to free-riding. *Group Processes & Intergroup Relations*, *14*(6), 845–856. https://doi.org/10.1177/1368430211402405

*Ingham, A. G., Levinger, G., Graves, J., & Peckham, V. (1974). The Ringelmann effect: Studies of group size and group performance. *Journal of Experimental Social Psychology*, *10*(4), 371–384. https://doi.org/10.1016/0022-1031(74)90033-X

*Irwin, B. C., Scorniaenchi, J., Kerr, N. L., Eisenmann, J. C., & Feltz, D. L. (2012). Aerobic exercise is promoted when individual performance affects the group: A test of the Kohler motivation gain effect. *Annals of Behavioral Medicine*, *44*(2), 151–159. https://doi.org/10.1007/s12160-012-9367-4

*Irwin, B. C., & Thompson, N. S. (2016). The impact of social category diversity on motivation gains in exercise groups. *American Journal of Health Behavior*, *40*(3), 332–340. https://doi.org/10.5993/AJHB.40.3.5

*Jackson, J. M., Williams, K. D., & Latané, B. (1978, May). *The effects of sexual composition and group size on individual effort* [Paper presentation]. Midwestern Psychological Association Chicago, United States.

*Jackson, J. M., & Harkins, S. G. (1985). Equity in effort: An explanation of the social loafing effect. *Journal of Personality and Social Psychology*, *49*(5), 1199–1206. https://doi.org/10.1037/0022-3514.49.5.1199

*Jackson, J. M., & Latané, B. (1982a, May). *Experimenter immediacy and social loafing* [Paper presentation]. Midwestern Psychological Association, Minneapolis, MN, United States.

*Jackson, J. M., & Latané, B. (1982b, May). *Obedience: Strength and immediacy of authority and social loafing* [Paper presentation]. Midwestern Psychological Association, Minneapolis, MN, United States.

*Jackson, J. M., & Williams, K. D. (1985). Social loafing on difficult tasks: Working collectively can improve performance. *Journal of Personality and Social Psychology*, *49*(4), 937–942. https://doi.org/10.1037/0022-3514.49.4.937

*Janicik, G. A. (2007). *Group motivational gains in a cognitive task domain: Revisiting the Köhler effect* [Unpublished manuscript]. Stern School of Business, New York University, NY.

*Jellison, W. A. (2003). *Concerns about implied negative evaluation of friends versus social comparison: Possible explanations for matching effects in cohesive dyads* [Unpublished master's thesis]. Michigan State University.

Karau, S. (Ed.). (2020). *Individual motivation within groups: Social loafing and motivation gains in work, academic, and sports teams*. Academic Press. https://doi.org/10.1016/B978-0-12-849867-5.00001-X

Karau, S. J., Markus, M. J., & Williams, K. D. (2000). On the elusive search for motivation gains in groups: Insights from the Collective Effort Model. *Zeitschrift Für Sozialpsychologie*, *31*(4), 179–190. https://doi.org/10.1024/0044-3514.31.4.179

*Karau, S. J., & Hart, J. W. (1998). Group cohesiveness and social loafing: Effects of a social interaction manipulation on individual motivation within groups. *Group Dynamics*, *2*(3), 185–191. https://doi.org/10.1037/1089-2699.2.3.185

Karau, S. J., & Wilhau, A. J. (2020). Social loafing and motivation gains in groups: An integrative review. In S. Karau (Ed.), *Individual Motivation within Groups* (pp. 3–51). Academic Press. https://doi.org/10.1016/B978-0-12-849867-5.00001-X

*Karau, S. J., & Williams, K. D. (1997). The effects of group cohesiveness on social loafing and social compensation. *Group Dynamics*, *1*(2), 156–168. https://doi.org/10.1037/1089-2699.1.2.156

Karau, S. J., & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology*, *65*(4), 681–706. https://doi.org/10.1037/0022-3514.65.4.681

*Kerr, N. L. (1983). Motivation losses in small groups: A social dilemma analysis. *Journal of Personality and Social Psychology*, *45*(4), 819–828. https://doi.org/10.1037/0022-3514.45.4.819

*Kerr, N. L., Feltz, D. L., & Irwin, B. C. (2013). To pay or not to pay? Do extrinsic incentives alter the Köhler group motivation gain? *Group Processes & Intergroup Relations*, *16*(2), 257–268. https://doi.org/10.1177/1368430212453632

*Kerr, N. L., Forlenza, S. T., Irwin, B. C., & Feltz, D. L. (2013). . . . been down so long . . .": Perpetual vs. intermittent inferiority and the Köhler group motivation gain in exercise groups. *Group Dynamics*, *17*(2), 67–80. https://doi.org/10.1037/a0031588

*Kerr, N. L., Messé, L. A., Park, E. S., & Sambolec, E. J. (2005). Identifiability, performance feedback and the Köhler effect. *Group Processes & Intergroup Relations*, *8*(4), 375–390. https://doi.org/10.1177/1368430205056466

*Kerr, N. L., Messé, L. A., Seok, D. H., Sambolec, E. J., Lount, R. B., Jr., & Park, E. S. (2007). Psychological mechanisms underlying the Köhler motivation gain. *Personality and Social Psychology Bulletin*, *33*(6), 828–841. https://doi.org/10.1177/0146167207301020

*Kerr, N. L., Seok, D. H., Poulsen, J. R., Harris, D. W., & Messe, L. A. (2008). Social ostracism and group motivation gain. *European Journal of Social Psychology*, *38*(4), 736–746. https://doi.org/10.1002/ejsp.499

*Kerr, N. L., & Bruun, S. E. (1981). Ringelmann revisited: Alternative explanations for the social loafing effect. *Personality and Social Psychology Bulletin*, *7*(2), 224–231. https://doi.org/10.1177/0146167281720007

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

*Kerr, N. L., & Bruun, S. E. (1983). Dispensability of member effort and group motivation losses: Free-rider effects. *Journal of Personality and Social Psychology*, *44*(1), 78–94. https://doi.org/10.1037/0022-3514.44.1.78

Kerr, N. L., & Hertel, G. (2011). The Köhler group motivation gain: How to motivate the 'weak links' in a group. *Social and Personality Psychology Compass*, *5*(1), 43–55. https://doi.org/10.1111/j.1751-9004.2010.00333.x

*Kerr, N. L., & Seok, D. H. (2011). ". . . with a little help from my friends": Friendship, effort norms, and group motivation gain. *Journal of Managerial Psychology*, *26*(3), 205–218. https://doi.org/10.1108/02683941111112640

*Kerr, N. L., & Sullaway, M. E. (1983). Group sex composition and member task motivation. *Sex Roles*, *9*(3), 403–417. https://doi.org/10.1007/BF00289676

Kerr, N. L., & Tindale, R. S. (2004). Group performance and decision making. *Annual Review of Psychology*, *55*, 623–655. https://doi.org/10.1146/annurev.psych.55.090902.142009

Köhler, O. (1926). Kraftleistungen bei Einzel-und Gruppenarbeit [Physical performance in individual and group work]. *Industrielle Psychotechnik*, *3*(9), 274–282.

Kozlowski, S. W., & Bell, B. S. (2003). Work groups and teams in organizations. In S. W. Kozlowski & B. S. Bell (Eds.), *Handbook of psychology* (pp. 333–375). Wiley. https://doi.org/10.1002/0471264385.wei1214

Krosnick, J. A., & Alwin, D. F. (1987). An evaluation of a cognitive theory of response-order effects in survey measurement. *Public Opinion Quarterly*, *51*(2), 201–219. https://doi.org/10.1086/269029

*Kugihara, N. (1999). Gender and social loafing in Japan. *The Journal of Social Psychology*, *139*(4), 516–526. https://doi.org/10.1080/00224549909598410

Kugler, K. G., Reif, J. A. M., Kaschner, T., & Brodbeck, F. C. (2018). Gender differences in the initiation of negotiations: A meta-analysis. *Psychological Bulletin*, *144*(2), 198–222. https://doi.org/10.1037/bul0000135

Lakens, D. (2013). Calculating and reporting effect sizes to facilitate cumulative science: A practical primer for t-tests and ANOVAs. *Frontiers in Psychology*, *4*, Article 863. https://doi.org/10.3389/fpsyg.2013.00863

Larson, J. R. (2010). *In search of synergy in small group performance*. Psychology Press.

*Larson, J. R., Jr., Bihary, J. G., & Egan, A. C. (2018). Motivation gains on divisible conjunctive group tasks. *Group Processes & Intergroup Relations*, *21*(8), 1125–1143. https://doi.org/10.1177/1368430217702724

*Latané, B., Williams, K., & Harkins, S. (1979). Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology*, *37*(6), 822–832. https://doi.org/10.1037/0022-3514.37.6.822

*Lount, R. B., Jr., Kerr, N. L., Messé, L. A., Seok, D. H., & Park, E. S. (2008). An examination of the stability and persistence of the Köhler motivation gain effect. *Group Dynamics*, *12*(4), 279–289. https://doi.org/10.1037/1089-2699.12.4.279

*Lount, R. B., Jr., Messé, L. A., & Kerr, N. L. (2000). Trying harder for different reasons: Conjunctivity and sex composition as bases for motivation gains in performing groups. *Zeitschrift Für Sozialpsychologie*, *31*(4), 221–230. https://doi.org/10.1024//0044-3514.31.4.221

*Lount, R. B., Jr., Park, E. S., Kerr, N. L., Messé, L. A., & Seok, D. H. (2008). Evaluation concerns and the Köhler effect: The impact of physical presence on motivation gains. *Small Group Research*, *39*(6), 795–812. https://doi.org/10.1177/1046496408323215

*Lount, R. B., Jr., & Phillips, K. W. (2007). Working harder with the outgroup: The impact of social category diversity on motivation gains. *Organizational Behavior and Human Decision Processes*, *103*(2), 214–224. https://doi.org/10.1016/j.obhdp.2007.03.002

Lount, R. B., Jr., & Wilk, S. L. (2014). Working harder or hardly working? Posting performance eliminates social loafing and promotes social laboring in workgroups. *Management Science*, *60*(5), 1098–1106. https://doi.org/10.1287/mnsc.2013.1820

*Mace, M., Kinany, N., Rinne, P., Rayner, A., Bentley, P., & Burdet, E. (2017). Balancing the playing field: Collaborative gaming for physical training. *Journal of Neuroengineering and Rehabilitation*, *14*(1), 116–134. https://doi.org/10.1186/s12984-017-0319-x

Mangos, P. M., & Steele-Johnson, D. (2001). The role of subjective task complexity in goal orientation, self-efficacy, and performance relations. *Human Performance*, *14*(2), 169–185. https://doi.org/10.1207/S15327043HUP1402_03

Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, *26*(3), 356–376. https://doi.org/10.5465/amr.2001.4845785

*Matsui, T., Kakuyama, T., & Onglatco, M. U. (1987). Effects of goals and feedback on performance in groups. *Journal of Applied Psychology*, *72*(3), 407–415. https://doi.org/10.1037/0021-9010.72.3.407

*Max, E. J., Feltz, D. L., Kerr, N. L., & Wittenbaum, G. M. (2018). Is silence really golden? Effect of encouragement from a partner or trainer on active video game play. *International Journal of Sport and Exercise Psychology*, *16*(3), 261–275. https://doi.org/10.1080/1612197X.2016.1199580

*Max, E. J., Samendinger, S., Winn, B., Kerr, N. L., Pfeiffer, K. A., & Feltz, D. L. (2016). Enhancing aerobic exercise with a novel virtual exercise buddy based on the Köhler effect. *Games for Health Journal*, *5*(4), 252–257. https://doi.org/10.1089/g4h.2016.0018

Maynard, D. C., & Hakel, M. D. (1997). Effects of objective and subjective task complexity on performance. *Human Performance*, *10*(4), 303–330. https://doi.org/10.1207/s15327043hup1004_1

Mazei, J., Hüffmeier, J., Freund, P. A., Stuhlmacher, A. F., Bilke, L., & Hertel, G. (2015). A meta-analysis on gender differences in negotiation outcomes and their moderators. *Psychological Bulletin*, *141*(1), 85–104. https://doi.org/10.1037/a0038184

*McGovern, J. M. (1986). *The role of insight in the reduction of social loafing* [Unpublished doctoral dissertation]. Florida Institute of Technology.

McGrath, J. E. (1984). *Groups: Interaction and performance*. Prentice Hall.

Meijman, T. F., & Mulder, G. (1998). Psychological aspects of workload. In P. J. D. Drenth, H. Thierry, & C. J. de Wolff (Eds.), *Handbook of work and organizational psychology* (2nd ed., pp. 5–33). Psychology Press.

*Messé, L. A., Hertel, G., Kerr, N. L., Lount, R. B., Jr., & Park, E. S. (2002). Knowledge of partner's ability as a moderator of group motivation gains: An exploration of the Köhler discrepancy effect. *Journal of Personality and Social Psychology*, *82*(6), 935–946. https://doi.org/10.1037/0022-3514.82.6.935

*Miles, J. A., & Greenberg, J. (1993). Using punishment threats to attenuate social loafing effects among swimmers. *Organizational Behavior and Human Decision Processes*, *56*(2), 246–265. https://doi.org/10.1006/obhd.1993.1054

Moede, W. (1914). Der Wetteifer, seine Struktur und sein Ausmaß [Structure and extent of rivalry]. *Zeitschrift fur Padagogische Psychologie*, *23*, 353–368.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & PRISMA Group. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *Annals of Internal Medicine*, *151*(4), 264–269. https://doi.org/10.7326/0003-4819-151-4-200908180-00135

*Moss, O. M. (2018). *Racial diversity in group exercise settings: An extension of the Köhler Effect* [Doctoral dissertation, Michigan State University]. ProQuest Dissertations Publishing.

*Moss, T., Feltz, D. L., Kerr, N. L., Smith, A. L., Winn, B., & Spencer, B. D. (2018). Intergroup competition in exergames: Further tests of the Köhler effect. *Games for Health Journal*, *7*(4), 240–245. https://doi.org/10.1089/g4h.2017.0122

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

Mullet, E., & Chasseigne, G. (2018). Assessing information integration processes: A comparison of findings obtained with between-subjects designs versus within-subjects designs. Quality & Quantity. *International Journal of Methodology*, *52*(4), 1977–1988. https://doi.org/10.1007/s11135-017-0592-6

Neugart, M., & Richiardi, M. G. (2013). Sequential teamwork in competitive environments: Theory and evidence from swimming data. *European Economic Review*, *63*, 186–205. https://doi.org/10.1016/j.euroecorev.2013.07.006

*Nilsen, T., Haugen, T., Reinboth, M., Peters, D. M., & Høigaard, R. (2014). Explicit prior knowledge of social loafing does not reduce social loafing in subsequent team cycle trial performance. *Kinesiologia Slovenica*, *20*(2), 17–25.

*Ohlert, J., & Kleinert, J. (2013). Social loafing during preparation for performance situations. *Social Psychology*, *44*(3), 231–237. https://doi.org/10.1027/1864-9335/a000107

Osborn, K. A., Irwin, B. C., Skogsberg, N. J., & Feltz, D. L. (2012). The Köhler effect: Motivation gains and losses in real sports groups. *Sport, Exercise, and Performance Psychology*, *1*(4), 242–253. https://doi.org/10.1037/a0026887

*Park, E. S., Lount, R. B., Jr., Kerr, N. L., & Messé, L. A. (2006). *"Stand by your man": The influence of traditional sex-role attitudes on motivation in groups* [Unpublished manuscript]. Department of Psychology, Michigan State University, East Lansing, MI.

Parker, R. J. (2001). The effects of evaluative context on performance: The roles of self-and social-evaluations. *Social Behavior and Personality*, *29*(8), 807–822. https://doi.org/10.2224/sbp.2001.29.8.807

*Pearsall, M. J., Christian, M. S., & Ellis, A. P. (2010). Motivating interdependent teams: Individual rewards, shared rewards, or something in between? *Journal of Applied Psychology*, *95*(1), 183–191. https://doi.org/10.1037/a0017593

*Peng, W., & Crouse, J. (2013). Playing in parallel: The effects of multiplayer modes in active video game on motivation and physical exertion. *Cyberpsychology, Behavior, and Social Networking*, *16*(6), 423–427. https://doi.org/10.1089/cyber.2012.0384

*Peterson, C., Zaccaro, S. J., & Daly, D. C. (1986). Learned helplessness and the generality of social loafing. *Cognitive Therapy and Research*, *10*(5), 563–569. https://doi.org/10.1007/BF01177819

*Petty, R. E., Cacioppo, J. T., & Kasmer, J. A. (1985, May). *Individual differences in social loafing on cognitive tasks* [Paper presentation]. Midwestern Psychological Association, Chicago, United States.

*Petty, R. E., Harkins, S. G., & Williams, K. D. (1980). The effects of group diffusion of cognitive effort on attitudes: An information-processing view. *Journal of Personality and Social Psychology*, *38*(1), 81–92. https://doi.org/10.1037/0022-3514.38.1.81

*Plaks, J. E., & Higgins, E. T. (2000). Pragmatic use of stereotyping in teamwork: Social loafing and compensation as a function of inferred partner–situation fit. *Journal of Personality and Social Psychology*, *79*(6), 962–974. https://doi.org/10.1037/0022-3514.79.6.962

Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, *12*(4), 531–544. https://doi.org/10.1177/014920638601200408

Postmes, T., Spears, R., & Lea, M. (1998). Breaching or building social boundaries? SIDE-effects of computer-mediated communication. *Communication Research*, *25*(6), 689–715. https://doi.org/10.1177/009365098025006006

*Price, K. H. (1987). Decision responsibility, task responsibility, identifiability, and social loafing. *Organizational Behavior and Human Decision Processes*, *40*(3), 330–345. https://doi.org/10.1016/0749-5978(87)90020-3

*Quintanar, L. R., & Pryor, J. B. (1982). *Group diffusion of cognitive effort as a determinant of attribution* (ED226290). ERIC.

Raudenbush, S. W., Bryk, A. S., & Congdon, R. (2004). HLM 6 for Windows [Computer software]. Scientific Software International.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Sage.

Reed, J. G., & Baxter, P. M. (2009). Using reference databases. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.), *The handbook of research synthesis and meta-analysis* (pp. 73–101). Russell Sage Foundation.

Reinboth, M., & Duda, J. L. (2006). Perceived motivational climate, need satisfaction and indices of well-being in team sports: A longitudinal perspective. *Psychology of Sport and Exercise*, *7*(3), 269–286. https://doi.org/10.1016/j.psychsport.2005.06.002

Ringelmann, M. (1913). Recherches sur les moteurs animés: Travail de l'homme [Research on animated engines: Man's work]. *Annales de L'Insitut National Agronomique*, *12*, 1–40.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Sackett, P. R., Zedeck, S., & Fogli, L. (1988). Relations between measures of typical and maximum job performance. *Journal of Applied Psychology*, *73*(3), 482–486. https://doi.org/10.1037/0021-9010.73.3.482

*Sambolec, E. J., Kerr, N. L., & Messé, L. A. (2007). The role of competitiveness at social tasks: Can indirect cues enhance performance? *Journal of Applied Sport Psychology*, *19*(2), 160–172. https://doi.org/10.1080/10413200601185164

*Samendinger, S., Forlenza, S. T., Winn, B., Max, E. J., Kerr, N. L., Pfeiffer, K. A., & Feltz, D. L. (2017). Introductory dialogue and the Köhler Effect in software-generated workout partners. *Psychology of Sport and Exercise*, *32*, 131–137. https://doi.org/10.1016/j.psychsport.2017.07.001

*Samendinger, S., Hill, C. R., Kerr, N. L., Winn, B., Ede, A., Pivarnik, J. M., Ploutz-Snyder, L., & Feltz, D. L. (2019). Group dynamics motivation to increase exercise intensity with a virtual partner. *Journal of Sport and Health Science*, *8*(3), 289–297. https://doi.org/10.1016/j.jshs.2018.08.003

*Samendinger, S., Pfeiffer, K. A., & Feltz, D. L. (2018). Testing group dynamics with a virtual partner to increase physical activity motivation. *Computers in Human Behavior*, *88*, 168–175. https://doi.org/10.1016/j.chb.2018.07.004

*Schleu, J. E., Mojzisch, A., & Hüffmeier, J. (2019). Run for the team: An analysis of effort gains in track and field relays. *Psychology of Sport and Exercise*, *45*, 101567. https://doi.org/10.1016/j.psychsport.2019.101567

Schnake, M. E. (1991). Equity in effort: The "Sucker Effect" in co-acting groups. *Journal of Management*, *17*(1), 41–55. https://doi.org/10.1177/014920639101700104

*Schneider, S., & Kummert, F. (2016). Exercising with a humanoid companion is more effective than exercising alone. *Proceedings of the IEEE-RAS 16th International Conference on Humanoid Robots (Humanoids)*, 495–501. https://doi.org/10.1109/HUMANOIDS.2016.7803321

Schwartz, S. H., & Rubel, T. (2005). Sex differences in value priorities: Cross-cultural and multimethod studies. *Journal of Personality and Social Psychology*, *89*(6), 1010–1028. https://doi.org/10.1037/0022-3514.89.6.1010

*Scorniaenchi, J. A.. (2011). *Picking up the pace: Testing the effects of the Kohler motivation gain on an aerobic video task* [Master's thesis, Michigan State University]. MSU Digital Repository. https://d.lib.msu.edu/islandora/object/etd:1998/datastream/OBJ/download/Picking_up_the_pace__testing_the_effects_of_the_Kohler_motivation_gain_on_an_aerobic_video_task.pdf

*Sedabres, K. (2013). *The moderating effects of self and other efficacy on motivation gains in swimming relays* (Publication No. 3566030) [Doctoral dissertation, Michigan State University]. ProQuest Dissertations Publishing. https://doi.org/10.1037/e572522014-001

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

Shepperd, J. A. (1993). Productivity loss in performance groups: A motivation analysis. *Psychological Bulletin*, *113*(1), 67–81. https://doi.org/10.1037/0033-2909.113.1.67

Shepperd, J. A., & Taylor, K. M. (1999). Ascribing advantages to social comparison targets. *Basic and Applied Social Psychology*, *21*(2), 103–117.

*Shepperd, J. A., & Wright, R. A. (1989). Individual contributions to a collective effort: An incentive analysis. *Personality and Social Psychology Bulletin*, *15*(2), 141–149. https://doi.org/10.1177/0146167289152001

*Shirakashi, S. (1984). Social loafing of Japanese students. *Hiroshima Forum for Psychology*, *10*, 35–40.

*Sin, K. H. P. (2010). *Social loafing in virtual collaborative decision making: Relationship among media richness, media synchronicity, group performance, and individual effort* (Publication No. 3412083) [Doctoral dissertation, Walden University]. ProQuest Dissertations Publishing.

*Skorski, S., Etxebarria, N., & Thompson, K. G. (2016). Breaking the myth that relay swimming is faster than individual swimming. *International Journal of Sports Physiology and Performance*, *11*(3), 410–413. https://doi.org/10.1123/ijspp.2014-0577

Slavin, R. E. (2011). Cooperative learning. In V. G. Aukrust (Ed.), *Learning and cognition in education* (pp. 160–166). Academic Press.

*Smith, B. N., Kerr, N. A., Markus, M. J., & Stasson, M. F. (2001). Individual differences in social loafing: Need for cognition as a motivator in collective performance. *Group Dynamics*, *5*(2), 150–158. https://doi.org/10.1037/1089-2699.5.2.150

Smith, E. R., Mackie, D. M., & Claypool, H. M. (2014). *Social psychology*. Psychology Press.

*Sorrentino, R. M., & Sheppard, B. H. (1978). Effects of affiliation-related motives on swimmers in individual versus group competition: A field experiment. *Journal of Personality and Social Psychology*, *36*(7), 704–714. https://doi.org/10.1037/0022-3514.36.7.704

Steiner, I. D. (1972). *Group process and productivity*. Academic Press.

*Stevenson, C. (1990). *Motivating effort under social loafing conditions: The effects of private self-awareness on task effort* [Unpublished doctoral dissertation]. University of Illinois at Chicago.

Stroebe, W., & Frey, B. S. (1982). Self-interest and collective action: The economics and psychology of public goods. *British Journal of Social Psychology*, *21*(2), 121–137. https://doi.org/10.1111/j.2044-8309.1982.tb00521.x

*Swain, A. (1996). Social loafing and identifiability: The mediating role of achievement goal orientations. *Research Quarterly for Exercise and Sport*, *67*(3), 337–344. https://doi.org/10.1080/02701367.1996.10607961

Szymanski, K., & Harkins, S. G. (1993). The effect of experimenter evaluation on self-evaluation within the social loafing paradigm. *Journal of Experimental Social Psychology*, *29*(3), 268–286. https://doi.org/10.1006/jesp.1993.1012

*Szymanski, K., & Harkins, S. G. (1987). Social loafing and self-evaluation with a social standard. *Journal of Personality and Social Psychology*, *53*(5), 891–897. https://doi.org/10.1037/0022-3514.53.5.891

Tajfel, H., & Turner, J. (1979). An integrative theory of intergroup conflict. In M. J. Hatch & M. Schultz (Eds.), *Organizational identity: A reader* (pp. 56–65). Oxford University Press.

*Tauer, J. M., & Harackiewicz, J. M. (2004). The effects of cooperation and competition on intrinsic motivation and performance. *Journal of Personality and Social Psychology*, *86*(6), 849–861. https://doi.org/10.1037/0022-3514.86.6.849

Taylor, D. W. (1954). Problem solving by groups. *Proceedings of the XIV International Congress of Psychology*, 218–219. North-Holland Publishing.

Thomas, K. W., & Velthouse, B. A. (1990). Cognitive elements of empowerment: An "interpretive" model of intrinsic task motivation. *Academy of Management Review*, *15*(4), 666–681. https://doi.org/10.5465/amr.1990.4310926

*Thompson, J., Jackson, J., Williams, K., & Latane, B. (1980, April). *The effects of coactor ability on social loafing* [Paper presentation]. Columbus, Graduate Student Conference in Personality and Social Psychology.

*Thompson, B., & Thornton, B. (2007). Exploring mental-state reasoning as a social—Cognitive mechanism for social loafing in children. *The Journal of Social Psychology*, *147*(2), 159–174. https://doi.org/10.3200/SOCP.147.2.159-174

Tindale, R. S., Smith, C. M., Dykema-Engblade, A., & Kluwe, K. (2012). Good and bad group performance: Same process—different outcomes. *Group Processes & Intergroup Relations*, *15*(5), 603–618. https://doi.org/10.1177/1368430212454928

*Todd, A. R., Seok, D. H., Kerr, N. L., & Messé, L. A. (2006). Social compensation: Fact or social-comparison artifact? *Group Processes & Intergroup Relations*, *9*(3), 431–442. https://doi.org/10.1177/13684302060 64643

Tolman, E. C. (1932). *Purposive behavior in animals and men*. University of California Press.

Van den Noortgate, W., & Onghena, P. (2003). Multilevel meta-analysis: A comparison with traditional metaanalytical procedures. *Educational and Psychological Measurement*, *63*(5), 765–790. https://doi.org/10.1177/001316440 3251027

*Van Dick, R., Stellmacher, J., Wagner, U., Lemmer, G., & Tissington, P. A. (2009). Group membership salience and task performance. *Journal of Managerial Psychology*, *24*(7), 609–626. https://doi.org/10.1108/026839409109 89011

Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of Statistical Software*, *36*(3), 1–48. https://doi.org/10.18637/jss.v036.i03

Vroom, V. H. (1964). *Work and motivation*. Wiley.

*Waller, J. E. (1989). *Developmental aspects of self-evaluation and social loafing in children* [Unpublished doctoral dissertation]. University of Kentucky.

*Waller, J. E. (1996). Social loafing and the group-evaluation effect: Effect of dissimilarity in a social comparison standard. *Psychological Reports*, *78*(1), 177–178. https://doi.org/10.2466/pr0.1996.78.1.177

*Waszak, A., & Hertel, G. (2003, March). *Affektive Einflüsse auf den "Köhler Motivation Gain Effect"* [Affective influences on the "Köhler motivation gain effect"] [Paper presentation]. Tagung experimentell arbeitender Psychologen, Kiel, Germany.

*Weber, B., Wittchen, M., Grosch-Kumbier, S., Hoch, J., Haider, J., & Hertel, G. (2006, July). *Motivation gains of stronger team members: Showing off or slowing down?* [Poster presentation]. European Association of Experimental Social Psychology, Würzburg, Germany.

*Weber, B., Wittchen, M., & Hertel, G. (2009). Gendered ways to motivation gains in groups. *Sex Roles*, *60*(9–10), 731–744. https://doi.org/10.1007/s11199-008-9574-4

Weber, B., & Hertel, G. (2007). Motivation gains of inferior group members: A meta-analytical review. *Journal of Personality and Social Psychology*, *93*(6), 973–993. https://doi.org/10.1037/0022-3514.93.6.973

*Weldon, E., & Gargano, G. M. (1985). Cognitive effort in additive task groups: The effects of shared responsibility on the quality of multiattribute judgments. *Organizational Behavior and Human Decision Processes*, *36*(3), 348–361. https://doi.org/10.1016/0749-5978(85)90004-4

*Weldon, E., & Gargano, G. M. (1988). Cognitive loafing: The effects of accountability and shared responsibility on cognitive effort. *Personality and Social Psychology Bulletin*, *14*(1), 159–171. https://doi.org/10.1177/01461672 88141016

*Weldon, E., & Mustari, E. L. (1988). Felt dispensability in groups of coactors: The effects of shared responsibility and explicit anonymity on cognitive effort. *Organizational Behavior and Human Decision Processes*, *41*(3), 330–351. https://doi.org/10.1177/0146167288141016

*Weldon, M. S., Blair, C., & Huebsch, P. D. (2000). Group remembering: Does social loafing underlie collaborative inhibition? *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *26*(6), 1568–1577. https://doi.org/10.1037/0278-7393.26.6.1568

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

*Wessolowski, K. (2016). *Effort gains in teams through fellow team members' affective social support* [Doctoral dissertation, Universität Münster]. Semantic Scholar. https://pdfs.semanticscholar.org/2a34/7004a4ed166a23b86783004f80d25ee17dfe.pdf

*Wessolowski, K., Meltz, O., Hüffmeier, J., & Hertel, G. (2014). *Cross-lagged panel analyses of effort gains in occupational teams* [Unpublished raw data]. Universität Münster.

*Williams, K. D. (1981). *The effects of group cohesiveness on social loafing in simulated word-processing pools* [Doctoral dissertation, The Ohio State University]. Ohio Link. https://etd.ohiolink.edu/!etd.send_file?accession=osu1487156696792293&disposition=inline

*Williams, K. D., & Williams, K. B. (1981, August). *The development of social loafing in America* [Paper presentation]. International Association for Cross-Cultural Psychology, Taipei, Taiwan.

*Williams, K. D., Williams, K. B., Kawana, Y., & Latane, B. (1984, May). *Collective effort in small groups in the United States and Japan* [Paper presentation]. Midwestern Psychological Association, Chicago, United States.

*Williams, K. D., Nida, S. A., Baca, L. D., & Latané, B. (1989). Social loafing and swimming: Effects of identifiability on individual and relay performance of intercollegiate swimmers. *Basic and Applied Social Psychology*, *10*(1), 73–81. https://doi.org/10.1207/s15324834basp1001_7

*Williams, K. D., & Burmont, S. C. (1981, June). *A look at social loafing in a cognitive task: Individual effort in advertising evaluations* [Paper presentation]. Nags Head Conference, Kill Devil Hills, United States.

*Williams, K. D., & Karau, S. J. (1991). Social loafing and social compensation: The effects of expectations of co-worker performance. *Journal of Personality and Social Psychology*, *61*(4), 570–581. https://doi.org/10.1037/0022-3514.61.4.570

*Williams, K. D., & Sommer, K. L. (1997). Social ostracism by co-workers: Does rejection lead to loafing or compensation? *Personality and Social Psychology Bulletin*, *23*(7), 693–706. https://doi.org/10.1177/0146167297237003

*Williams, K., Harkins, S. G., & Latané, B. (1981). Identifiability as a deterrant to social loafing: Two cheering experiments. *Journal of Personality and Social Psychology*, *40*(2), 303–311. https://doi.org/10.1037/0022-3514.40.2.303

Wilson, D. B. (2009). Systematic coding. In H. Cooper, L. V. Hedges, & J. C. Valentine (Eds.), *The handbook of research synthesis and meta-analysis* (2nd ed., pp. 159–176). Russell Sage Foundation.

*Wittchen, M., Schlereth, D., & Hertel, G. (2007). Social indispensability in spite of temporal and spatial separation: Motivation gains in a sequential task during anonymous cooperation on the internet. *International Journal of Internet Science*, *2*(1), 12–27. https://doi.org/10.1037/e586582007-001

Worchel, S., Rothgerber, H., Day, E. A., Hart, D., & Butemeyer, J. (1998). Social identity and individual productivity within groups. *British Journal of Social Psychology*, *37*(4), 389–413. https://doi.org/10.1111/j.2044-8309.1998.tb01181.x

*Ying, X., Li, H., Jiang, S., Peng, F., & Lin, Z. (2014). Group laziness: The effect of social loafing on group performance. *Social Behavior and Personality*, *42*(3), 465–471. https://doi.org/10.2224/sbp.2014.42.3.465

Zajonc, R. B. (1965). Social facilitation. *Science*, *149*(3681), 269–274. https://doi.org/10.1126/science.149.3681.269

Zizzo, D. J. (2010). Experimenter demand effects in economic experiments. *Experimental Economics*, *13*(1), 75–98. https://doi.org/10.1007/s10683-009-9230-z

Received April 24, 2020
Revision received February 5, 2021
Accepted February 12, 2021 ■

This document is copyrighted by the American Psychological Association or one of its allied publishers.
This article is intended solely for the personal use of the individual user and is not to be disseminated broadly.

E-Mail Notification of Your Latest Issue Online!

Would you like to know when the next issue of your favorite APA journal will be available online? This service is now available to you. Sign up at https://my.apa.org/portal/alerts/ and you will be notified by e-mail when issues of interest to you become available!