

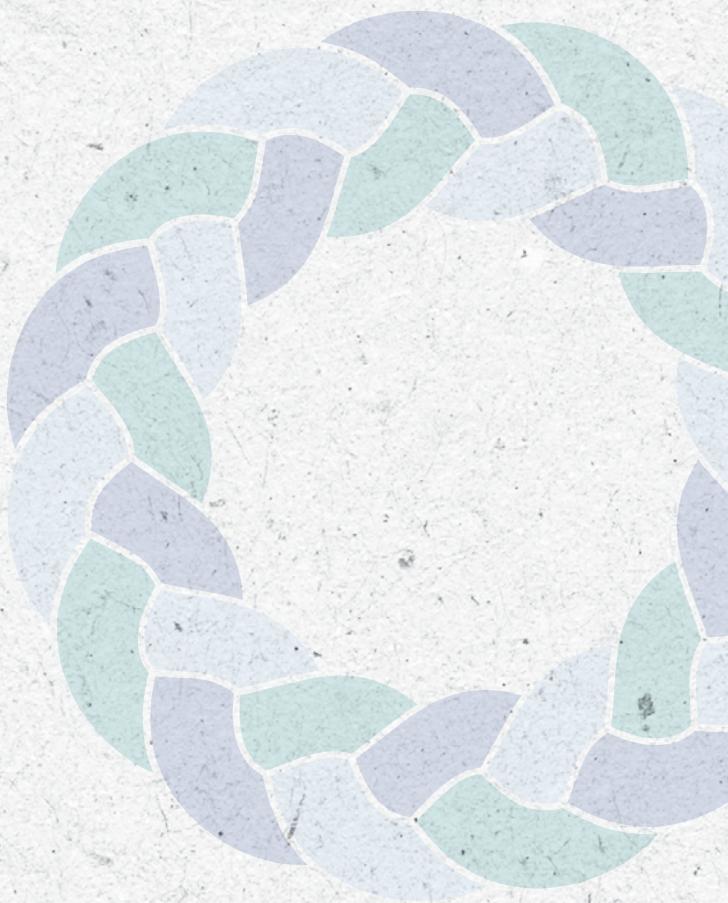
Rapid Evidence Assessment (REA)



# ATTRIBUTES OF EFFECTIVE TEAMS AND INTERVENTIONS INCREASING TEAM EFFECTIVENESS

a summary of scientific literature

December 2019



Culture Review Implementation  
our journey of positive change



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## Acknowledgement of Country

ACT Health Directorate acknowledges the Traditional Custodians of the land, the Ngunnawal people. The Directorate respects their continuing culture and connections to the land and the unique contributions they make to the life of this area. It also acknowledges and welcomes Aboriginal and Torres Strait Islander peoples who are part of the community we serve.

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## Background

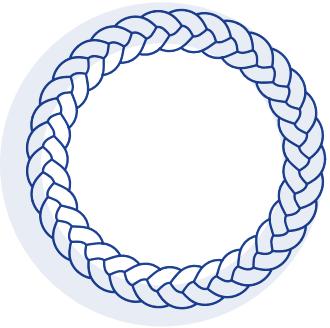
Novartis, one of the largest pharmaceutical companies, with more than 125,000 employees, is involved in several projects to enhance organisational effectiveness and performance. The effectiveness of teams and workgroups is assumed to be one of the most significant factors affecting a company's performance. For this reason, Novartis approached the Center for Evidence Based Management (CEBMa) to undertake a Rapid Evidence Assessment (REA) to understand what is known in the scientific literature about the attributes of effective teams and workgroups and the effectiveness of interventions aimed at increasing team effectiveness. This review presents an overview of the findings.



# What is a Rapid Evidence Assessment (REA)?

Evidence reviews come in many forms. One of the best-known types is the conventional literature review, which provides an overview of the relevant scientific literature published on a topic. However, a conventional literature review's trustworthiness is often low: Clear criteria for inclusion is often lacking and studies are selected based on the researcher's personal preferences.

As a result, conventional literature reviews are prone to severe bias. This is why 'rapid evidence assessments' (REAs) are used. REAs use a specific research methodology to identify the most relevant studies on a given topic as comprehensively as possible, and to select appropriate studies based on explicit criteria. In addition, the methodological quality of the studies included is assessed by two independent reviewers on the basis of explicit criteria. In contrast to a conventional literature review, REAs are transparent, verifiable, and reproducible, and, as a result, the likelihood of bias is considerably smaller.

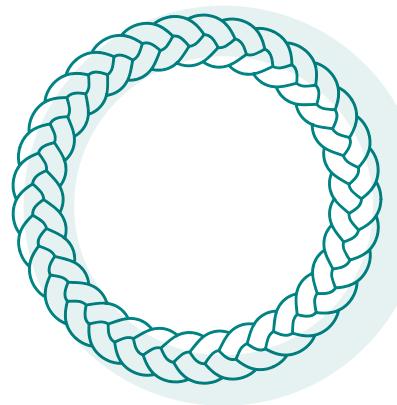


## Main question: What does the REA answer?

What is known in the scientific literature about the attributes of effective teams?

Other issues raised, which will form the basis of our conclusion regarding the main question above, are:

1. **What constitutes a team?**
2. **What is team effectiveness?**
3. **How can the effectiveness of teams be measured?**
4. **What are the attributes (e.g. characteristics, conditions, composition) of effective teams?**
5. **What interventions influence team effectiveness?**
6. **What is known about the reliability and validity of team effectiveness models?**

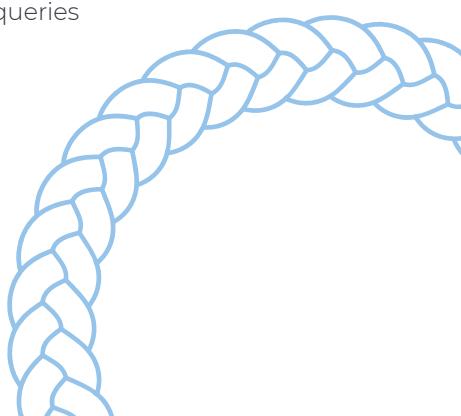


## Search strategy: How was the research evidence sought?

Three databases were used to identify studies: ABI/INFORM Global, Business Source Premier and PsycINFO. The following generic search filters were applied during the search:

1. **Scholarly journals, peer-reviewed.**
2. **Published in the period 2000 to 2019.**
3. **Articles in English.**

A search was conducted using combinations of various search terms, including 'performance', 'effectiveness', 'team', and 'group'. We conducted 10 different search queries and screened the titles and abstracts of 992 studies. An overview of all search terms and queries is provided in Appendix I.



## Selection process: How were the studies selected?

Study selection took place in two phases. First, titles and abstracts of the 993 studies identified were screened for relevance. In case of doubt or lack of information, the study was included. Duplicate publications were removed. This first phase yielded 141 studies. Second, studies were selected based on the full text of the article using these inclusion criteria:

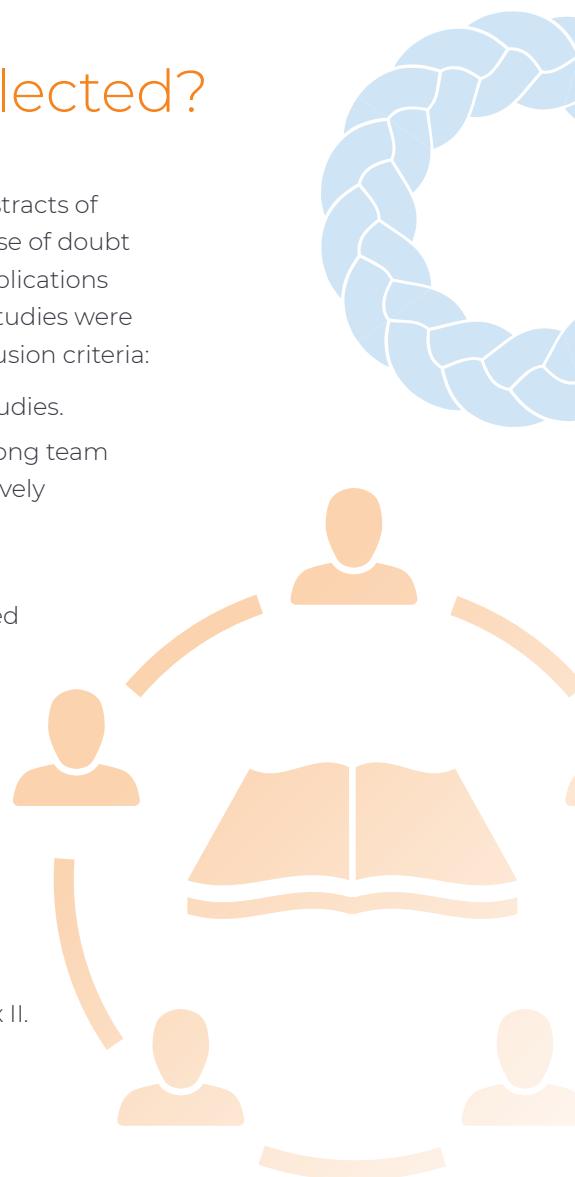
1. **Type of studies:** Focusing on quantitative, empirical studies.
2. **Measurement:** Only studies in which relationships among team attributes, interventions and outcomes were quantitatively measured.
3. **Context:** Only studies related to workplace settings
4. **Level of trustworthiness:** Only studies that were graded level C or above (see below).

In addition, the following exclusion criteria were applied:

- Studies of ad hoc teams formed for immediate task performance, such as emergency teams.
- Studies of dyadic teams.
- Studies measuring the effect of leader attributes on team effectiveness.

This second phase yielded a total number of 70 studies.

An overview of the selection process is provided in Appendix II.



## Critical appraisal: How were the quality of the included studies judged?

The overall quality of the included studies were moderate to high. Of the 70 studies included, 31 studies concerned controlled studies and were therefore graded level B or higher. The remaining studies concerned uncontrolled, longitudinal studies, and were therefore classified as level C or lower. An overview of all studies included and their year of publication, research design, sample size, population, main findings, effect sizes and limitations is provided in Appendix III.

# Main findings

## 1. What constitutes a team?

In daily life, a team is simply a group of people working together to achieve a goal. In the domain of social sciences, however, teams have specific characteristics that differentiate them from groups generally. For example, a widely used definition states: "A team is a collection of individuals who are interdependent in their tasks, share responsibility for outcomes, see themselves (and who are seen by others) as a social entity embedded in one or more larger social system (for example, business unit or the corporation), and, who manage their relationships across organisational boundaries." (Cohen, 1997). Most researchers, however, summarise the minimal defining characteristics of a team as: A group of employees who are 1) formally established; 2) assigned (some) autonomy; and 3) interdependent.

## 2. What is team effectiveness?

Teams are not automatically more effective than individual employees. Working in teams may impede performance because of the potential conflict between individual and group interests. In addition, a team's performance may decline due to a phenomenon known as social loafing: The tendency of team members to get by with less effort than what they would have put when working alone (also referred to as the free-rider effect). Although the term 'team effectiveness' is widely used in the research literature, it is rarely specified. In fact, even some of the meta-analyses and high quality studies included in this review fail to provide a clear definition of team effectiveness. Most studies included in this review consider team effectiveness synonymous to team performance. As such, team effectiveness is broadly defined as task performance, contextual performance, and/or adaptive performance (e.g. learning, creativity, decision making). Some scholars differentiate between performance behaviours and performance outcomes (Beal, 2003). Behaviours are actions that are relevant to achieving goals, whereas outcomes are the consequences or results of performance behaviours (Mathieu, 2008). Examples of performance behaviours include feedback seeking, reflectivity, information sharing, and learning behaviours.

Finally, several authors point out that an effective team is not necessarily an efficient team (Beal, 2003). Whereas team effectiveness concerns merely an evaluation of a team's results, team efficiency also takes into account the 'costs' of achieving those results. For this reason, intra-team processes such as communication, information sharing, conflicts, etc. are often considered an essential element of team effectiveness (Mathieu, 2008).

### 3. How can team effectiveness be measured?

Whether or not a team is effective depends on the applied criteria. In most of the studies included, the criterium is team (task) performance, that is, the degree to which a team accomplishes its goals, as reflected by performance indicators such as number of units produced, number of items sold, number of clients served, number of innovations, number of errors, number of complaints, etc. In addition, some studies also measure intra-team processes such as team-member exchange, internal communication, level of information sharing, etc., as these are considered relevant indicators for team effectiveness.

As a result, there is no generally accepted instrument that measures team effectiveness - organisations, researchers, and consulting firms often create their own. Instruments developed by consulting firms typically ask members to assess their teams on those dimensions that the consulting firm assumes to be most consequential for team effectiveness (Wageman, 2005). By contrast, scholar-developed instruments that measure team effectiveness tend to focus on variables that are of (research) interest to the scholars who devised them.

### 4. What are the attributes of effective teams?

This review has yielded a large number of studies examining myriad attributes. To facilitate a better understanding, we have grouped the findings into three main categories: team composition, emergent socio-affective states, and emergent cognitive states. Team composition refers to team member characteristics such as age, gender, level of education and functional background. Team composition variables and their impact on team outcomes have been incorporated into studies of team effectiveness for nearly 60 years (e.g., Mann, 1959).

Emergent states are team attitudes that arise from individual team members' experiences. As such, they are different from team processes such as membership changes, internal communication or conflicts. Whereas team process describes the nature of team member interaction, emergent states describe conditions that dynamically enable and underlie effective teamwork (DeChurch, 2010). Research on teams has identified a range of emergent states assumed to affect a team's performance such as confidence, efficacy, cohesion, trust, and shared mental models. In the scientific literature, two main categories of emergent states are distinguished: socio-affective states and cognitive states. While conceptually distinct, socio-affective and cognitive states are correlated and are assumed to in tandem.

It should be noted, however, that team performance is, to a large extent, a compositional construct - it is a direct result of its members' individual performance. As such, drivers of individual performance - such as goal clarity, supervisory support, employee recognition - should first be taken into account before considering attributes and interventions at the team level (see CEBMa's *REA - Factors Associated with Knowledge Worker Performance, a summary of research literature*, July 2019).

## Team composition

**Finding 1: The link between team effectiveness and team diversity dimensions such as age, gender, ethnicity, religion, functional background, educational background, organisational tenure, and experience is small and sometimes negative (Level AA)**

It is often assumed that differences between individual members of a team on dimensions such as age, functional background, organisational tenure, gender, race, ethnicity, and experience enhance team effectiveness. As such, team diversity is one of the most researched attributes of effective teams.

This review identified eight meta-analyses representing a combined sample size of more than 2,000 teams that measured the correlations between these attributes and team effectiveness or team efficiency (Bell, 2011; Bui, 2019; Guillaume, 2012; Haas, 2010; Horwitz, 2007; Wang, 2019; Webber, 2001; Zhou, 2015). Surprisingly, all meta-analyses demonstrated only small ( $< .1$ ), zero, or even negative associations, regardless of team size, team type, or task type. As such, it is important to also consider – and compensate for – potential negative consequences of team diversity on communication, cohesiveness, and consequently performance (see also Finding 9).

**Finding 2: Of the Big Five personality traits, only agreeableness and conscientiousness are (somewhat) positively related to team performance (Level B)**

Several meta-analyses with a combined sample size of more than 100 studies found that the higher the level of agreeableness and conscientiousness within teams, the better their performance (Bell, 2007; Hopp, 2012; Peeters, 2006; Prewett, 2009). The effect sizes found, however, were small. Other personality traits such as emotional stability, extraversion, and openness to experience were not related with team performance.

Socio-affective states describe team members' collective reactions to interpersonal aspects of team functioning. Examples of emergent socio-affective states that have received considerable attention during the past decades include team confidence, social cohesion, collective efficacy, shared feelings, psychological safety, and intra-team trust (Mathieu, 2008). Below an overview is provided of the socio-affective states that were found to have the highest impact on team effectiveness.

## Socio-affective states

**Finding 3: Intrateam trust is positively related to performance (Level A)**

**Finding 4: Team trust is most critical when team virtually, task interdependency, authority differentiation, and/or team temporality is high (Level A).**

Several meta-analyses and high quality studies have demonstrated that a high level of intra-team trust is an important attribute of effective teams (Breuer, 2016; De Jong, 2016; Webber, 2008). Scholars often distinguish two types of trust: cognition-based trust (a member's cognitive evaluation of the reliability, integrity, and competence of other members) and affect-based trust (a member's emotional feelings/evaluation of the reliability, integrity, and competence of other members), which are regarded as functionally distinct, in that they affect a team performance through different causal mechanisms (De Jong, 2016). It was also found that team trust is even more important under conditions that create challenges for teamwork. These include: a high level of task interdependence (i.e. the degree to which team members must rely on each other's input and resources to perform their tasks effectively); a high level of virtuality (i.e. the degree to which team members do not work in either the same place and/or at the same time, and therefore cannot collaborate face-to-face all of the time); low temporal stability (i.e. the degree to which team members have a history of working together in the past and an expectation of working together in the future); high authority differentiation (decision-making responsibility is distributed across the team); and a high level of skill differentiation (the degree to which teams consist of members with specialised knowledge or skills that make them uniquely qualified and therefore difficult to substitute).



In addition, it was found that in virtual teams, team familiarity has a positive effect on the development of team trust (Webber, 2008), whereas negative performance feedback has a substantial negative impact on team trust (Jaakson, 2019). Finally, a meta-analysis of controlled studies indicate that team-building has a moderate to large positive effect on a team's affect-based trust (Klein, 2009).

**Finding 5: Group-level psychological safety has a moderate to large positive impact on team performance (Level B)**

Psychological safety at the group-level refers to the shared belief held by members of a group that the group is safe for 'interpersonal risk taking' - a sense of confidence that others will not embarrass, reject or punish someone for speaking up (Edmondson, 1999). Psychological safety is related to 'intra-team trust', but the primary difference is that psychological safety concerns a belief about a group norm, whereas trust concerns a belief that one person has about another (Edmondson, 2003). A large, recent meta-analyses including 136 studies with a combined sample size of 5,000 teams indicates that psychological safety has a moderate to large impact on team performance (Frazier, 2017).

**Finding 6: Team cohesion has a moderate to large impact on team performance (Level B)**

**Finding 7: The cohesion – performance relationship is moderated by team size, type of team, and task interdependence (Level B)**

Several meta-analyses have demonstrated that cohesion, in particular social cohesion, has a moderate to large impact on a team's (behavioural) performance (Chiocchio, 2009; Evans, 2012; Mathieu, 2015). Social cohesion refers to a shared liking or attraction to the group, emotional bonds of friendship, caring and closeness among group members, and enjoyment of each other's company (Chiocchio, 2009). Other constructs that are related to social cohesion, such as relationship building, team familiarity, friendship, social network density, have shown a similar impact on team performance (Chung, 2018; De Jong, 2017). For example, a meta-analysis involving more than 3000 teams found that for newly acquainted team members, informal (social) ties are critical to performance (Balkundi, 2006).

In addition, it was found that the positive effect of social cohesion is stronger within large teams, virtual teams, project teams, and teams with high task interdependency (Lin, 2008; Gully, 2012; Chiocchio, 2009). Finally, social cohesion is not a stable trait; it can (and most likely does) change over time. More specifically, several studies suggest that it takes time for team cohesion to develop and solidify before it positively affects performance. As such, it may be beneficial to try and accelerate the process by engaging in team building and other activities aimed at enhance team familiarity, morale and cohesion (Mathieu, 2015).



## **Finding 8: The emergence of intra-team trust and social cohesion are critical for virtual teams (Level A)**

As mentioned above, the positive effect of intra-team trust and social cohesion is stronger within virtual teams. In fact, a meta-analysis of high quality studies shows that these two attributes are critical for the performance of teams with a high level of virtuality (Lin, 2008). This finding was confirmed by several randomised controlled studies that demonstrate that virtual teams with a high level of social cohesion and intra-team trust outperform teams in which trust and social cohesion is low (Capiola, 2019; Fang, 2014; Kennedy, 2010). As pointed out by Kennedy (2010), this finding suggests that managers, when setting up a computer-supported team, may want to require an initial face-to-face session (i.e., more than just a “meet and greet”) to prepare members to work together in the future.

## **Finding 9: Team cohesion is strongly associated with team inclusion (Level B)**

According to the social inclusion model developed by Shore et al (2011), inclusive teams are expected to be more effective than non-inclusive ones, because inclusion stimulates social cohesion, improves intra-team trust, and reduces chances of conflict in the team. Findings from a recent longitudinal study confirmed the central tenet of the social inclusion model and demonstrated that, indeed, at the team level, perceptions of inclusiveness strongly correlate with team cohesion. In addition, the study's findings suggest that when a team contains members who all feel included (i.e. accepted and feel that their unique characteristics are valued), the team becomes vastly more cohesive, which in turn has a positive effect on a team's effectiveness (De Cooman, 2016).

## **Finding 10: Team identification has a positive effect on social cohesion and consequently team performance (Level B)**

## **Finding 11: Turnover has a negative effect on social cohesion and consequently team performance (Level C)**

Team identification refers to the extent to which people acknowledge and value being part of a team, share norms and behaviours, and experience a sense of social cohesion and interdependency (Solansky, 2011). Randomised experimental interventions have demonstrated, that team identification leads to increased emotional convergence (the process in which people are affectively influenced by others and become more similar with regard to their socio-affective states), social cohesion, and consequently team performance (Tanghe, 2010). Conversely, turnover of members in a team negatively affects social integration and cohesion and thus negatively impacts team performance (Van der Vegt, 2010).

Team cognition is an emergent state that refers to the way in which knowledge important to team functioning is cognitively organised, represented, and distributed within the team (Kozlowski, 2006). Team cognition is a bottom-up emergent construct, originating from the cognition of individual team members (DeChurch, 2010).

## Cognitive states

**Finding 12: Team cognition – in particular information sharing, transactive memory systems, and cognitive consensus – has a large, positive impact on team performance (Level AA).**

In the past decade, a large number of high quality studies have consistently demonstrated that team cognition is one of the most important drivers of team effectiveness (DeChurch, 2010; Mesmer-Magnus, 2009; Turner, 2014). The research literature distinguishes several constructs of team cognition, such as shared mental models, team mental models, information sharing, transactive memory systems, cognitive consensus and group learning. Of these constructs, information sharing, transactive memory systems, and cognitive consensus have the largest impact on team performance.

Information sharing (IS) refers to the extent to which a team utilises its individual members' knowledge or expertise for the team's benefit. Especially if complex problems have to be addressed, IS is indispensable in that it allows team members to share their knowledge and past experiences and exchange and discuss ideas, which is particularly important for the generation of new ideas (Hülsheger et al., 2009). In addition, sharing information with teammates promotes team trust and social cohesion, which in turn increases team performance. Finally, it was found that IS strongly predicts team performance across all kinds of moderators (team size, team type, etc.).

An important concept related to IS is that of the Transactive Memory System (TMS). TMS within a team refers to a form of knowledge that is embedded in a team's collective memory. This collective memory works like an indexing system that tells members who knows what. Results from meta-analyses consistently show that TMS has a large, positive effect on team performance (Bachrach, 2019; Mesmer Magnus, 2017, Turner, 2014). Surprisingly, a cross-sectional study suggests that trust in team mates is a strong predictor for the emergence of a TMS, whereas trust in management is not (Robertson, 2013).

Cognitive consensus (CC) refers to similarity among group members regarding how key issues are defined and conceptualised (Mohammed, 2001). CC is not so much about consensus regarding final decisions or solutions, but rather about consensus regarding the interpretation of issues. Put differently, CC is about whether team members attend to, interpret, and communicate about issues in a similar way (Mumford, 2008).





**Finding 13: Team learning does not automatically lead to team performance improvement (Level AA)**

**Finding 14: Team reflexivity moderates the effect of team cognition on team performance (Level C)**

Team learning involves behaviours such as asking questions, challenging assumptions, and discussing errors or unexpected outcomes. Surprisingly, team learning seems to have a rather small impact on team performance (Turner, 2014; Santos, 2015). However, this does not seem to be the case for team reflexivity, which is often considered an important element of (team) learning.

In fact, team reflexivity – the extent to which team members overtly reflect upon the team's goals, collaboration, decision making processes, internal communication, etc. – seems to moderate the effect of team cognition (Schippers, 2013; Konradt, 2015; Wildman, 2018). Put differently, if teams don't periodically reflect on how the team is doing, the positive effects of information sharing, a shared memory system, and cognitive consensus on team performance will decrease (see also Finding 16).

## 5. What interventions influence team effectiveness?

In the past decades, numerous studies on the effectiveness of team interventions have been published. Below an overview is provided of interventions that have shown to have moderate to large effects.

**Finding 15: Team building has a moderate positive effect on team performance (Level A)**

Originally designed as a group process intervention (e.g., Schein, 1969, 1999) for improving interpersonal relations and social interactions, team-building interventions are common and popular (Klein, 2009). Although team building interventions encompass a wide range of activities, the term refers to a class of formal and informal team-level interventions that focus on improving social relations and clarifying roles. As such, team building typically does not target skill-based competencies and is often done in settings outside the actual workplace.

A meta-analyses of longitudinal studies shows that, in general, team-building interventions have a moderate, positive indirect effect on team performance, and a moderate to large positive direct effect on trust, social cohesion, and internal communication (Klein, 2009). This meta-analysis confirmed the findings of a previous meta-analyses that included controlled studies and examined the effect of moderating factors (Svyantec, 1999). Results indicate that the effect of team building is larger when:

- » the initiator is external (rather than internal to the team).
- » the rationale is corrective (rather than preventive).
- » when team members are not involved in the planning.
- » when the focus is on both the team's goals and interpersonal relations.
- » when the team building is planned together with other interventions.
- » when the team building is led by both an internal staff member and external consultant.
- » when the focus is on the group (rather than the individuals).
- » when the team building is supported by (higher) management.



## **Finding 16: Teamwork training has a large positive effect on team performance (Level A)**

In the scientific literature a distinction is made between 'taskwork' and 'teamwork'. In short, taskwork represents what teams are doing, whereas teamwork describes how they are doing it. Teamwork training involves education of team members about the importance of providing social support within the team or promoting ways to manage interpersonal conflict among teammates.

In some types of training team members take part in a group activity in which they discuss the team's purposes, goals, and performance, or a simulation wherein they experientially enact various teamwork skills, such as interpersonal communication and coordination. A recent meta-analysis that included 51 controlled studies shows that teamwork training, in general, tend to have a large, positive effect on team performance (McEwan, 2017). This study confirmed the findings of previous meta-analyses, that demonstrated that teamwork training not only has a large, positive effect on team performance, but also on a team's affective, social, and cognitive state (Delise, 2010; Salas, 2008).

## **Finding 17: Debriefing sessions and guided team reflexivity have a moderate to large positive effect on team performance (Level A)**

Debriefing sessions lead teams through a series of questions that allow its members to reflect on a recent experience, construct their own meaning from their actions, and uncover lessons learned in a non-punitive environment (Tannenbaum, 2013).

Debriefing sessions are also referred to as 'guided team reflexivity' (see also finding 13). Meta-analyses and randomised controlled studies have found that, when appropriately conducted, debriefing sessions can lead to substantial improvement of a team's performance (Tannenbaum, 2013; Konradt, 2015). In addition, it was found that debriefs are most effective when the following requirements are met:

- » The focus of the debrief should be on learning and improvement, rather than evaluation or judgment. A developmental, non-punitive focus not only yields more honest and accurate feedback, but also enhances experiential learning.
- » The debrief should focus on specific activities, episodes or events, rather than performance or results in general.
- » The debrief should be informed by a variety of perspectives and evidence sources. For example, the review should include input from multiple participants and at least one additional source of evidence (e.g. organisational data).

Finally, it was found that facilitated and highly structured debriefs have a greater effect on team performance than non-facilitated or loosely structured debriefs.



## **Finding 18: Setting group goals has a moderate to large positive effect on team performance (Level AA)**

Over the past decades, high-quality meta-analyses in a wide range of disciplines (management, medicine, sports, rehabilitation, prevention, etc.) and populations (patients, athletes, managers, senior adults, children, etc.) have demonstrated the positive effects of goal-setting interventions on performance outcomes.

Overall, challenging and specific goals (rather than non-specific 'do your best' goals) have a positive effect on performance. Several studies, however, demonstrate that setting goals at the group level may yield even higher performance than individual goals (Kleingeld, 2011). In addition, it is assumed that group goals enhance both social and cognitive group processes such as planning, cooperation, morale-building, communication, and collective efficacy. Finally, a recent cross-sectional study indicates that the effect of group goals is mediated by team reflexivity (Acikgoz, 2018; see also Findings 14 and 17).

### **6. What is known about the reliability and validity of team effectiveness models?**

In an attempt to understand how effective teams work, a number of authors have developed models for determining a team's performance. Typically, these models contain several variables believed to influence team effectiveness. Some of these models have been proposed decades ago, whereas some have been developed in recent years. By 2008, it was found that there were over 130 different models of team effectiveness available (Salas, 2008). As such, a full review of the evidence supporting these models is beyond the scope of this REA. However, based on the studies included in this review, the following general finding emerged:

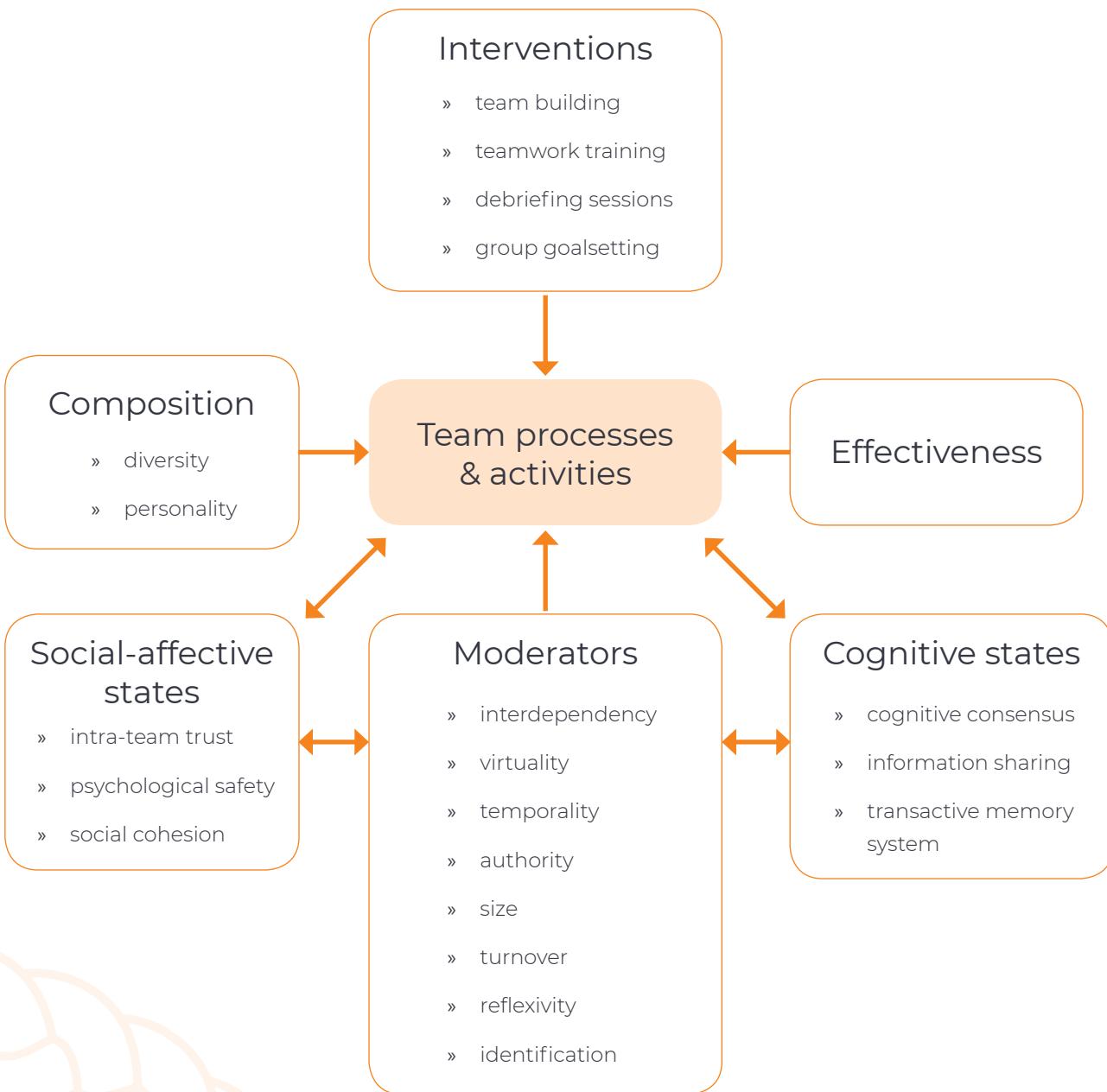
## **Finding 19: For most models of team effectiveness the underlying research is inadequate to establish reliability and validity.**

In the popular management literature, there are many team effectiveness models available that claim to help teams work together more efficiently. Examples of popular models are Lombardo and Eichinger's T7 Model, Hackman & Wageman's 6 Conditions model, the Lencioni Model, the Katzenbach & Smith model, and the Drexler/Sibbet Team Performance Model. Some of these models focus on team composition and structure, while others emphasise intra-team processes such as communication and interaction.

Although some models contain factors that have been shown to be strong predictors of team performance (e.g. social cohesion, goal clarity, trust), the underlying psychometric research is often inadequate to establish the reliability and validity of the model as a whole (Eisele, 2015).

# Conclusion

Attributes of effective teams are one of the most widely researched topics in industrial/organisational (I/O) psychology. This review identified a large number of high quality studies that indicate that effective teams are not so much determined by their composition, but rather through the emergence of socio-affective (in particular trust, psychological safety and social cohesion) and cognitive states (in particular cognitive consensus, information sharing and TMS). An overview of the minimal and maximal effect sizes is provided below.



### Average minimal and maximal effect sizes

Team diversity	$\rho = -.05/.10$	Soc. cohesion	$\rho = .20/.60$	Team building	$\rho = .25/.45$
Personality	$\rho = -.20/.25$	Cognitive consensus	$\rho = .40$	Teamwork training	$\rho = .35/.55$
Team trust	$\rho = .30/.40$	Information sharing	$\rho = .30/.50$	Debriefing/reflection	$d = .30/.70$
Psychological safety	$\rho = .40/.50$	Transactive Memory system	$\rho = .30/.50$	Group goalsetting	$d = .55/1.2$

In addition, findings suggest that level of interdependency, virtuality, team size, team reflexivity, identification, authority, turnover, and temporality are important moderators. Finally, team interventions such as team building, team training, debriefing and goal setting have shown to positively affect both the emergence of socio-affective and cognitive states and consequently team performance. This suggests that team leaders not only have an important role in promoting and stimulating the emergence of socio-affective and cognitive states - they can also (proactively) initiate interventions to enhance team effectiveness.

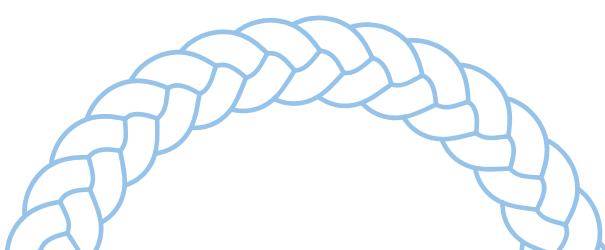
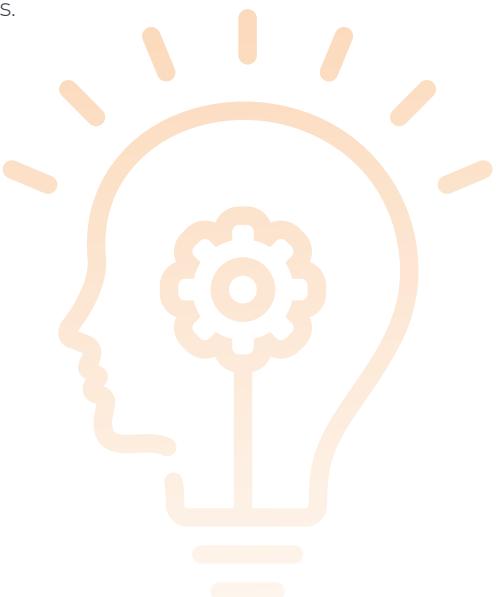
## Limitations

This REA aims to provide a balanced assessment of what is known in the scientific literature about the attributes of effective teams and interventions increasing team effectiveness by using the systematic review method to search and critically appraise empirical studies. However, in order to be 'rapid', concessions were made in relation to the breadth and depth of the search process, such as the exclusion of unpublished studies, the use of a limited number of databases and a focus on empirical research published in the period 2000 to 2019. As a consequence, some relevant studies may have been missed.

A second limitation concerns the critical appraisal of the studies included, which did not incorporate a comprehensive review of the psychometric properties of their tests, scales and questionnaires.

Finally, this REA focused only on high-quality studies, i.e. studies with a control group and/or longitudinal studies. For this reason, cross-sectional studies were excluded. As a consequence, new, promising findings that are relevant for practice may have been missed.

Given these limitations, care must be taken not to present the findings presented in this REA as conclusive.



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# Appendix I

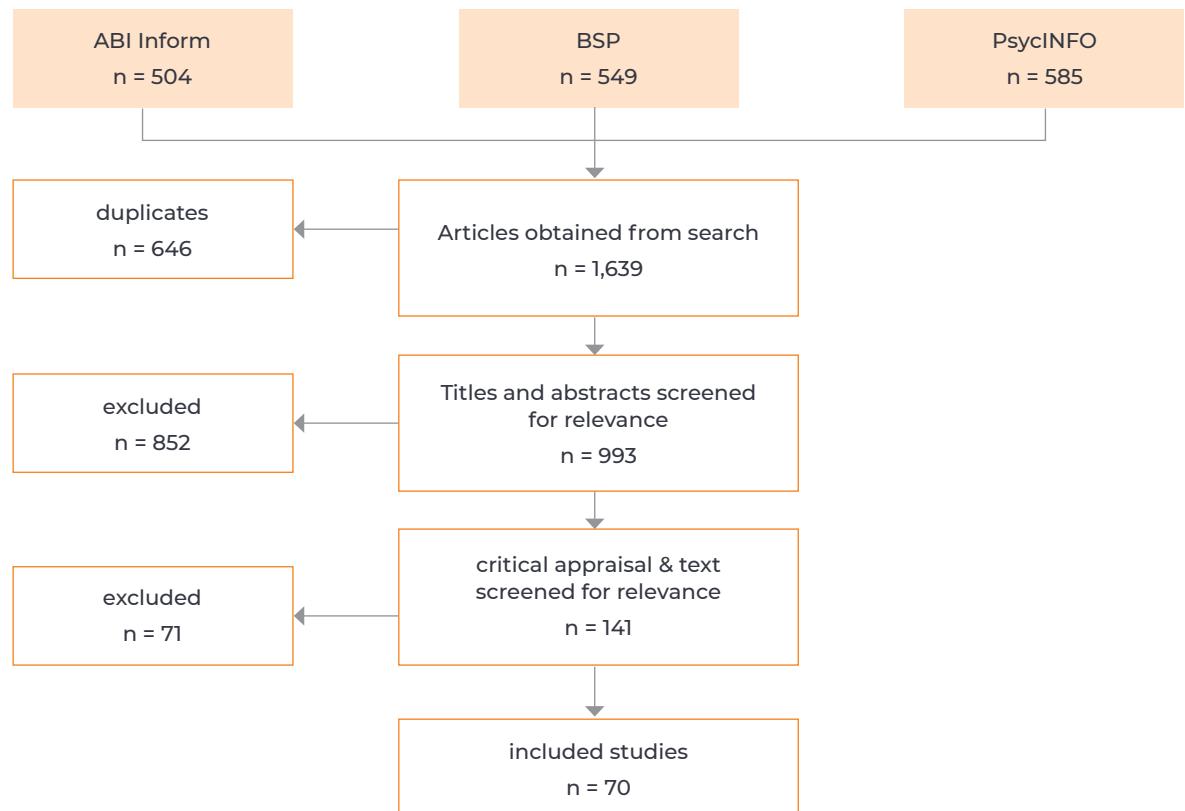
## Search terms & hits

### **ABI/Inform Global, Business Source Elite, PsycINFO peer reviewed, scholarly journals, November 2019**

Search terms	ABI	BSP	PSY
S1: ti(team* OR workgroup* OR group*)	27,086	32,959	69,490
S2: ti(effectiv* OR effic* OR perform* OR innovati* OR learn* OR success* OR collaborati* OR cooperati*)	191,527	237,841	252,785
S3: S1 AND S2	4,960	5,031	8,659
S4: filter meta-analyses	62	69	140
S5: ti(antecedents OR attributes OR characteristics OR predictor*)	37,217	30,080	77,497
S6: S3 AND S5 limit > 2010	138	77	71
S7: S3 AND filter high quality studies, limit > 2010	371	384	284
S8: S6 OR S7	431	465	344
S9: ti(team*) AND ti(build* OR interven* OR train* OR develop*)	1,288	1,156	1,147
S10: S9 AND (filter meta-analyses* OR high quality studies**)	11*	15*	101**

## Appendix II

### Selection of studies



# Appendix III

## Critical Appraisal Studies Team Effectiveness

Author & year	Design & sample size	Sector / Population	Main findings	Effect sizes	Limitations	Level
Acikgoz, 2018	cross- sectional study  n = 194 (78 teams)	product development teams of 43 high tech firms in the Istanbul region	The results showed that setting a specific, challenging learning goal is associated with team performance (new product success), but that this relationship is mediated by collective team reflection.	R2 = .64	no serious limitations	D
Bachrach, 2019	Meta-analysis  k = 76 N = 6,869	various	Research on moderators of TMS to performance relationship. It was found that environmental volatility (market turbulence, technology turbulence, or environmental dynamism), leadership effectiveness, and team human capital (team level knowledge, skills, abilities) are positively associated with TMS, and informational diversity (heterogeneity of work experience - e.g., organisational tenure, job experience- education level, education major, functional background) and gender diversity are negatively associated with TMS development.	All-over team performance $p = .45$  Task performance $p = .44$  Affective performance $p = .58$  Creative performance $p = .42$	Design of included studies not specified	C


Team mean conscientiousness (H1), team minimum agreeableness (H2), extraversion (H3), team average emotional stability (H4), openness to experience (H5), collectivism (H6), and preference for teamwork (H7) were found to be related to team performance in field studies.	Teams (context is not clear)	H1: $\rho = .30$ H2: $\rho = .31$ H3: $\rho = .15$ H4: $\rho = .21$ H5: $\rho = .20$ H6: $\rho = .40$ H7: $\rho = .22$ H8: $\rho = .33; \rho = .26$ (lab) H9: $\rho = .20$ (lab)	B	
Only negligible effects were observed in lab settings for the relationship between these factors and team performance. However, in lab settings, team minimum and maximum general mental ability (H8) and team mean emotional intelligence (H9) were related to team performance. Also in the field setting GMA was related to team performance (H8).	The relationships between the personality factors and team performance was not related to the team tenure (H12 not supported).	1. There is a small positive relationship between functional background diversity in terms of variety and team performance.  2. There is NO relationship between educational background diversity in terms of variety and team performance.  3. The positive relationship between functional background diversity in terms of variety and team performance is (somewhat) stronger when the team performance criterion is creativity or innovation rather than efficiency.  4. The positive relationship between functional background diversity in terms of variety and team performance is (somewhat) stronger when the team is a design team or top management teams (TMT) as compared to another team type.  5. The positive relationship between educational background diversity in terms of variety and team performance is stronger when the team performance criterion is creativity or innovation rather than efficiency.  6. The positive relationship between educational background diversity in terms of variety and team performance is (somewhat) stronger when the team is a design team or TMT as compared to another team type.  7. There is NO relationship between team mean educational level and team performance, regardless of team type.  8. There is a small positive relationship between team mean organisational tenure and team performance when efficiency is the criterion.  9. There is NO relationship between organisational tenure diversity and team performance when innovation is the criterion.  10. Team mean tenure is NOT related to team performance when efficiency is the criterion.  11. There is NO relationship between sex or age diversity in terms of separation and team performance.		

meta-analysis of cross- sectional and longitudinal studies	various	Team effectiveness overall $P = .33$  Team attitudes $\rho = .64$  Team trust facilitates coordination and cooperation in teams, and is therefore positively related with team effectiveness (attitudes, information processing and team performance). The relationship between team trust and team task performance was stronger in virtual teams than in face-to-face teams.	Team inf. proc $P = .54$  Team perf $P = .27$ (task $P = .27$ , contx $P = .27$ )  Team performance: virt teams $P = .33$ ftf teams $P = .22$	no serious limitations	B
Breuer, 2016	$k = 54$ $N = 12,615$ (1,850 teams)				
meta-analysis, various		1. Team diversity measured with SC attributes have a positive impact on a) openness and b) frequency of communication.  2. Team diversity measured with KSA attributes have a negative impact on a) openness and b) frequency of communication.  3. Frequency (a) and high openness (b) of communication have a positive relationship with team performance.  Note 1: social-category (SC) differences = race, ethnicity, gender, age, religion, sexual orientation, and physical abilities; differences in knowledge, skills, and abilities (KSA) = education, functional knowledge, information or expertise, training, experience, and abilities).	1a: $P = .13$ 1b: $P = .00$ ns  2a: $P = .14$ ns 2b: $P = .11$ ns  3a: $P = .20$ 3b: $P = .35$	design of included studies not specified	
Bui, 2019	$k = 35$	Note 2: Openness of communication is defined in several studies as 'knowledge sharing'.			
Capiola, 2019	RCT $n = 320$ (64 teams)	undergraduate students and general public in the US	1. Individual-level trustworthiness perceptions is positively related to team performance in a computer-mediated task.  2. Individual-level trustworthiness perceptions has indirect effects on team performance in a computer-mediated task through group-level collective efficacy across time.	A  artificial setting and tasks (airport simulation)	

meta-analysis k = 29 (9,416 participants distributed in 1,598 teams)	Chiocchio, 2009	various	<p>The cohesion–performance relationship is moderated by type of team and setting. Project teams in organisational settings show large effect sizes than other types of teams and teams in different settings.</p> <p>In addition, the cohesion–performance relationship is strongest for social cohesion – behavioural performance.</p> <p>Note: Outcome performance relates to the end results of tasks and includes measures such as profits, sales, ranks, grades as well as schedule and cost variance. Behavioural performance includes two types of performances: task and contextual.</p>
meta-analysis k = 26 (1,016 groups)	Chung, 2018	various	<p>Results show that friendship has a significant positive effect on group task performance.</p> <p>Furthermore, this relationship was moderated by group size (i.e., the positive effect of friendship on performance increased with group size) and task focus (i.e., friendship groups performed better than acquaintance groups on tasks requiring a high quantity of output, whereas there was no performance benefit on tasks requiring a single or high-quality output).</p> <p>Task interdependence did not moderate the effect.</p>
Interrupted time series N = 17 teams	Cordery, 2010	wastewater treatment teams	<ol style="list-style-type: none"> <li>1. Redesigning work to provide teams with increased autonomy results in improved team performance.</li> <li>2. Increasing levels of task uncertainty is associated with declining levels of team performance.</li> <li>3. Task uncertainty and team autonomy interact, such that the higher the level of task uncertainty, the stronger the positive impact of team autonomy on team performance.</li> </ol>
longitudinal study n = 121 (30 teams)	De Cooman, 2016	college students participating in a course on strategic management in a large Dutch university	<p>Design of included studies not specified (includes some longitudinal studies)</p> <p>Design of the included studies not specified</p> <ol style="list-style-type: none"> <li>1. Individual-level supplementary fit positively correlated with team cohesion.</li> <li>2. At the team level, the aggregate of supplementary fit positively correlated with the team average of team cohesion.</li> <li>3. The aggregate of complementary fit positively correlated with the team average of team cohesion (<math>r = .41</math>).</li> </ol>

meta-analysis of cross- sectional studies (30 studies measured outcomes immediately after training, ↑ had a time- lag)  $K = 41$  (143 teams)	Intervention: Team training is defined as a planned effort designed to improve team performance by assisting individuals in the acquisition of new information, skills, and attitudes essential to effective performance in a team environment. It is administered to an entire team, aimed at enhancing the performance of the team as a unit. It is a planned effort to develop a team's task-specific competencies, thereby improving its ability to perform its tasks effectively.  1. Team training is positively associated with affective, cognitive, subjective task-based skill, objective task-based skill, and teamwork skill. 2. There are no differences in effects of team training in military vs. civilian samples, laboratory vs. field setting, ad-hoc vs. intact (existing) teams, team-oriented vs. task-oriented training, short vs. long training.  Team training is associated more strongly with improved cognitive outcomes after a period of time passed from the training than immediately after the training.  $K = 41$  (143 teams)	1. Affective outcomes: $d=80$ ; cognitive: $d=1.37$ ; subjective task-based skill: $d=88$ ; objective task-based skill: $d=76$ ; teamwork skill: $d=.64$ .  2. Military: $d=1.05$ , civilian: $d=80$ ; Lab: $d=87$ , field: $d=.76$ ; Ad-hoc: $d=.92$ , intact: $d=.62$ ; no effect size estimates given for team-oriented vs. task-oriented training and short vs. long training. Immediately after the training: $d=1.21$ ; time lag after training: $d=2.40$	C  incorrectly analysed (funnel plot only maps positive effect sizes)
meta-analysis of cross- sectional studies (30 studies measured outcomes immediately after training, ↑ had a time- lag)  $K = 41$  (143 teams)	The results indicated a positive relationship with the average cohesive group performing 18 percentile points above the average non-cohesive group.	$r = .42$  note: large 95% CI	limited search, relevant studies may have been missed design of included studies not specified
RCT $n = 285$ (95 teams)  Evans, 2012	1. Compared to teams in which members are familiar with each other, teams in which members are strangers have lower performance.  2. Compared to teams in which task results are visible, teams in which these result are invisible do NOT have lower performance.  3. Compared to teams in which team members are not perceived as engaging in co-worker loafing, teams in which members are perceived as engaging in co-worker loafing do NOT have lower team performance.	no effect sizes reported	A  artificial setting and tasks (brain storming)

Frazier, 2017	Meta-analysis  K = 136 N = > 22,000, (5,000 groups)	Various	Psychological safety impacts important organisational outcomes. It is positively related to information sharing, citizenship behaviours and task performance. There are personality traits that are positively related to psychological safety. The results indicate that psychological safety is impacted by positive leader relations (e.g. transformational leadership), workplace support (e.g. peer support), and work design (e.g. interdependence).	The study examines the performance and behavioral impact of team design on sales performance. The findings demonstrate improved overall performance for the team and the individual members of the team - the gains were particularly pronounced when members have moderate levels of difference in ability, rather than small or large differences in ability.  1. A. Individuals in team tasks perform better than those in individual tasks. B. Weaker individuals in team tasks perform better than those in individual tasks. C. Stronger individuals in team tasks perform better than those in individual tasks.  2. A. Performance gains across individuals in team tasks, relative to those in individual tasks, exhibit an inverted U-shaped relationship with the difference in ability of the team members. B. Performance gains for weaker individuals in group tasks, relative to weaker individuals working alone, exhibit an inverted U-shaped relationship with the difference in ability of the group members. C. Performance gains for stronger individuals in group tasks, relative to stronger individuals working alone, exhibit an inverted U-shaped relationship with the difference in ability of the group members.  3. Instrumentality to the team relates positively to the performance gain exhibited by the sales team member.  4. Self-efficacy for the task does not relate positively to the performance gain of the sales team member.  5. Impression management does not relate positively to the performance gain of the sales team member, but negatively.  6. The perception of receiving coaching from a team member negatively moderates the relationship of self-efficacy to the performance gain of the sales team member.
			Search terms not specified	B

Gino, 2010	Study # 2: RCT  College students  n = 36 teams N = 238 participants	<p>Direct task experience leads to more highly developed transactive memory systems than indirect experience (H4).</p> <p>Transactive memory positively influences the level of creativity of products within teams (H5).</p> <p>Transactive memory mediates the relationship between experience and the level of creativity of products within teams (H6).</p>	<p>H5; <math>\eta^2 = .05</math></p> <p>H6; <math>\beta = 0.33</math></p> <p>No serious limitations</p> <p>A</p>
Greer, 2018	Meta-analysis of 54 cross- sectional studies  Teams, organisational setting  N = 13,914 teams	<p>In general, hierarchy is likely to have a negative impact on team effectiveness (performance and viability); this effect is mediated by increased conflict-enabling states (H2a, H2b).</p> <p>The negative relationship between hierarchy and team performance is exacerbated by aspects of the team structure: membership instability (H4a) and skill differentiation (H4b), and the hierarchy itself: mutability (H5a).</p> <p>The predictions regarding the positive effect of hierarchy on team viability as mediated by coordination-enabling processes (H1b), and of hierarchy on team performance as mediated by coordination-enabling processes (H1a), as well as the moderating roles of several aspects of team tasks: interdependence (H3a) and complexity (H3c), and the hierarchy: form (5b), were not supported, with the exception that task ambiguity enhanced the positive effects of hierarchy (H3b).</p>	<p>Note: all ES low or ns</p> <p>r = -.08 (hierarchy &amp; performance) r = -.11 (hierarchy &amp; viability)</p> <p>H1a: not supported H1b: not supported H2a: unclear H2b: unclear</p> <p>H3a: not supported H3b: not supported H3c: not supported</p> <p>H4a: unclear H4b: unclear</p> <p>H5a: unclear H5b: not supported</p> <p>C</p>

<p>Guillaume, 2012</p> <p>Meta-analysis of cross- sectional studies</p> <p>Work groups from divers industries</p>	<ol style="list-style-type: none"> <li>1. Both, surface-level* (H1a) and deep-level** (H1b) dissimilarity are negatively related to social integration.</li> <li>2. The negative relationship between surface-level dissimilarity and social integration is weaker under high team interdependence than under low team interdependence (H2a). On the other hand, the negative relationship between deep-level dissimilarity and social integration is stronger under high team interdependence than under low team interdependence (H2b).</li> <li>3. There is a positive relationship between social integration and task performance (H3) and between social integration and contextual performance (H4). Moreover, social integration and turnover are negatively related (H5).</li> <li>4. Under low team interdependence, social integration mediates the negative relationship between surface-level dissimilarity and task performance (H6a), and between surface-level dissimilarity and contextual performance (H7a).</li> <li>5. Under high team interdependence, social integration mediates the negative relationship between deep-level dissimilarity and task performance (H6b), and between deep-level dissimilarity and contextual performance (H7b).</li> <li>6. Under low team interdependence, social integration mediates the positive relationship between surface-level dissimilarity and turnover (H8a). Under high team interdependence, social integration mediates the positive relationship between deep-level dissimilarity and turnover (H8b).</li> </ol> <p>* surface-level dissimilarities: i.e., age, race/ethnicity, gender, tenure, ** deep-level dissimilarity: i.e., personality, attitudes, and values.</p>	<p>C</p> <p>No serious limitations</p> <p>Unclear, only gamma's are reported</p>
<p>Gully, 2002</p> <p>Meta-analysis of 67 cross- sectional studies</p> <p>Context is not clear</p>	<p>The positive relationships between team efficacy and performance, and potency* and performance is stronger at the team level of analysis than at the individual level (H3).</p> <p>At the team level, both team-efficacy (H1) and potency (H2) had positive relationships with performance.</p> <p>The relationship between team-efficacy and performance seems to be stronger when interdependence was high than when it was low. Such moderating effect of interdependence was not found for the relationship between potency and performance.</p>	<p>C</p> <p>No serious limitations</p> <p>H1: <math>\rho = .41</math> H2: <math>\rho = .37</math> H3: <math>\rho = .39</math> (team level)</p> <p><math>\rho = .20</math> (individual level)</p> <p>H4 (team-efficacy): <math>\rho = .45</math> (high interdependence) <math>\rho = .34</math> (low interdependence)</p>

		limited search, relevant studies may have been missed design of included studies not specified	C
Gully, 2012  meta-analysis k = 46  (51 effect sizes)	Results suggest that level of analysis and task interdependence moderate the cohesion-performance relationship.  low task interd: r = .21  high task interd: r = .46	<ol style="list-style-type: none"> <li>Twelve out of the 15 relationships of age diversity to team performance that were tested in regression models did not show any significance. The remaining three were negative.</li> <li>For gender diversity, performance links (18) show weak (positive, negative, and non-significant) correlations.</li> <li>For educational level diversity, regressions (4) are negative or not significant. There is no pattern of context factors that might explain the differences.</li> <li>For ethnic diversity (note: combined with national diversity!), four studies showed a negative and three a (weak) positive regression result, leaving 11 non-significant. When considering national diversity alone, there are no significant relationships. An additional finding is that negative effects of ethnic diversity in terms of correlation coefficients occur in teams with more than 12 members.</li> <li>For functional background diversity and organisational tenure diversity, correlations are mixed (size, neg/pos), but mostly non-significant</li> <li>None of the observed relationships between team tenure diversity and team performance is significantly positive or negative.</li> </ol>	<p>Very limited search, mainly studies cited in other reviews.</p> <p>Design of studies included not specified,</p> <p>but the text suggests that exp lab studies were included.</p> <p>Uses vote counting!</p>
Haas, 2010  meta-analysis k = 30  (includes non-work settings)		<ol style="list-style-type: none"> <li>Teams that exhibit a higher variation with respect to conscientiousness (with more people having higher or lower values than other team members) reduces team performance. Having people in the team that deviate on crucial personal characteristics is negative for performance. This effect is supported by the negative coefficient associated with the deviation of aspired points among team members. A wide dispersion is negative for team performance. Having team members who vary in their goals from the rest of the team is detrimental for team performance.</li> </ol>	<p>no serious limitations</p>
Hopp, 2012  Non-randomised longitudinal study 18 teams (97 students)  Computer science students			Unclear

- Horwitz,  
2007
- meta-analysis  
k = 35  
(78 correlations)
1. A. There is a positive relationship between task-related diversity and the quality of team performance. B : There no relationship between bio-demographic diversity and the quality of team performance.
  2. The relationship between team diversity and team performance is stronger for task-related diversity than bio-demographic diversity.
  3. A. There is a positive relationship between task-related diversity and the quantity of team performance. B. There is a positive relationship between bio-demographic diversity and the quantity of team performance.
  4. There is a (very small) negative relationship between team diversity (bio-demographic diversity and task-related diversity) and social integration among team members.
  5. Task complexity, team type, and teams size do NOT moderate the relationship between team diversity and team performance.
- Note: team performance = decision making, creativity & innovation, problem solving.

All ES are very small

Design of studies included not specified, but the text suggests that RCTs were included.

1a:  $\rho = .13$   
1b:  $\rho = .00$

3a:  $\rho = .07$

3b:  $\rho = -.02$

4: bio  $\rho = -.04$   
task  $\rho = -.02$

A



Meta-analysis of 52 cross- sectional studies  Jin, 2017	Organisational setting, teams in the context of new ventures (high-and low- tech industry)  N = 55 independent samples (8,892 observations)	Aggregated entrepreneurial team composition characteristics are positively related to new venture performance, such that the greater the aggregated characteristics, the greater the new venture performance (H1). Moreover, contrary to the expectations, the relationship between aggregated entrepreneurial team characteristics and new venture performance is stronger in low-tech industries than in high-tech industries (H4a).  The heterogeneity of entrepreneurial team composition characteristics is positively related to new venture performance, such that the greater the heterogeneity, the greater the new venture performance (H2). This relationship is similar in the low-tech and high-tech industries (H4b).  Entrepreneurial team size is positively related to new venture performance, such that the greater the team size, the greater the new venture performance (H3).	H1: $r = .14$  H2: $r = .05$  H3: $r = .08$  H4a (not supported): $r = .25$ (low-tech industries)  $r = .11$ (high-tech industries)
Meta-analysis of 52 cross- sectional studies  De Jong, (2016)	various  N = 7,763	Intrateam trust is positively related to team performance. To maximize team performance, trust building initiatives should focus on developing both cognitive and affective bases of trust within the team, and enhance team members' trust both in each other and in the team leader. Team trust will be most critical when team members work in a highly interdependent manner, with other members who possess unique skills and have different levels of authority in the team (see moderators).  Note I: Cognition-based trust: individuals' cognitive evaluations of the reliability, integrity, and competence of others. Affect based trust: individuals' feelings of emotional involvement and others' genuine care and concern for their welfare. Besides being conceptually distinct, cognition- and affect-based trust are regarded as functionally distinct, in that they affect outcomes through distinct causal mechanisms and thus uniquely contribute to predicting performance.  Note II: - Task interdependence: the degree to which team members must rely on each other's input and resources to perform their tasks effectively; - Team virtuality: the degree to which team members do not work in either the same place and/or at the same time, and therefore cannot collaborate face-to-face all of the time; - Temporal stability: the degree to which team members have a history of working together in the past and an expectation of working together in the future; - Authority differentiation: how decision-making responsibility is distributed across the team; - Skill differentiation: the degree to which teams consist of members with specialised knowledge or skills that make them uniquely qualified and therefore difficult to substitute.	C  No serious limitations  Search terms not specified  Moderators (low vs high): virtuality $p = .26$ vs. $.35$  task interdependence $p = .21$ vs. $.33$  temporal stability $p = .23$ vs. $.32$  authority differentiation $p = .25$ vs. $.41$  skill differentiation $p = .23$ vs. $.36$  (ref's suggest some are longitudinal or controlled)  Design included studies not specified  A

1) Quasi experiment N = 35 teams De Jong, 2017	1) Mainly female students, Romania 2) Field study N = 66 teams (255 team members)	<p>1) Above and beyond team familiarity, transactive memory and friendship network density, cross-attuning (CA) have a positive impact on team performance.</p> <p>1) The group level elevation of social sensitivity (team social sensitivity) is positively related to CA.</p> <p>2a The group level elevation of social sensitivity (team social sensitivity) is positively related to CA.</p> <p>2b CA mediates the relationship between the group level elevation of social sensitivity (team social sensitivity) and team performance.</p> <p>2c Team social sensitivity is more positively related to CA in small teams with low longevity and in large teams with high longevity in comparison to large teams with low longevity but not with small teams with high longevity.</p> <p>Note: Cross-attuning = having an accurate understanding of and anticipate on one another's work routines.</p>	<p>1) R<sup>2</sup> = .58 vs .35</p> <p>2a) <math>\beta = .14</math></p> <p>2b) Indirect effect .16</p>
	RCT n = 294 (98 teams) Kennedy, 2010	<p>Results indicate computer-mediated teams reported lower participative decision making than face-to-face teams after the first session and the disparity continued at the second session.</p> <p>undergraduate business students from a large public university in the Northeastern United States</p>	<p>In addition, When setting up a computer-supported team, practitioners need to consider how the duration of the team's existence may impact the team's process development and outputs. Teams that are assembled to complete a specific task in a very short period may not have time to successfully develop processes as would a team working on a project over a much longer duration. In such cases, assigning team members that are well acquainted with each other may be most appropriate.</p>

<p>Intervention: team building (a class of formal and informal team-level interventions that focus on improving social relations and clarifying roles, as well as solving task and interpersonal problems that affect team functioning). Team building does not target skill-based competencies, is not systematic in nature, and is typically done in settings that do not approximate the actual performance environment.</p> <p>meta-analysis of before-and-after studies (some studies are also controlled)</p> <p>Klein, 2009</p>	<p>1. Teambuilding interventions have a moderate positive effect on team outcomes. <math>\rho=.44</math></p> <p>2. Teambuilding have a small positive effect on cognitive team outcomes (e.g. declarative knowledge of teamwork competencies). <math>\rho=.26</math></p> <p>3. Teambuilding have a medium-large positive effect on affective team outcomes (e.g. trust, team potency). <math>\rho=.44</math></p> <p>4. Teambuilding have a medium-large positive effect on process team outcomes (e.g. coordination, communication). <math>\rho=.26</math></p> <p>5. Teambuilding have a small-to-medium positive effect on team performance. <math>\rho=.37</math></p> <p>6. Components of teambuilding (goal setting, interpersonal relations, problem solving, and role clarification): each of them individually has a medium effect on team outcomes. <math>\rho=.28</math>; <math>\rho=.27</math>; <math>\rho=.35</math>; <math>\rho=.66</math></p> <p>Note: Team size moderates the effects of teambuilding on team outcomes: the effect is medium for small and medium-sized teams, and large for large teams.</p>	<p>no serious limitations</p> <p>A</p>	<p>AA</p>
<p>3/4 lab studies, 1/4 field studies; only studies with pre-test and control group</p> <p>Kleingeld, 2011</p> <p>N(individuals) = 739;</p> <p>N(groups) = 2954</p>	<p>Our inventory of multilevel goals in interdependent groups indicated that the effect of individual goals in groups on group performance was contingent upon the focus of the goal: "Egocentric" individual goals, aimed at maximizing individual performance, yielded a particularly negative group-performance effect, whereas "group centric" goals, aimed at maximizing the individual contribution to the group's performance, showed a positive effect.</p> <p>These findings demonstrate that group goals have a robust effect on group performance. Individual goals can also promote group performance but should be used with caution in interdependent groups.</p>	<p>specific &amp; difficult</p> <p><math>d = 0.80</math></p>	<p>No serious limitations</p>

Knight, 2015	Meta-analysis of 39 studies  N = 2,799 groups	Context is not clear	Design of the included studies  C  not reported
			Group positive affect has consistent positive effects on social integration and task performance regardless of contextual characteristics (H1).  The effects of group negative affect depend on the context. Shared negative feelings promote social integration and task performance when stemming from an exogenous source (H2) or experienced in a 1-shot group (H3), but undermine social integration and task performance when stemming from an endogenous source (H2) or experienced in an ongoing group (H3).
Konradt, 2015	RCT n = 294 (98 teams)	university students  (Dutch and German?)	Unclear, only B's instead of $\beta$ 's are reported.  1. Reflection is higher in teams (irrespective of virtual or face-to-face) that receive guided reflexivity combined with feedback, as compared to teams who receive either (a) guided reflexivity without feedback or (b) neither guided reflexivity nor feedback.  2. Virtual teams do NOT show lower team reflection than face-to-face teams.  Note: Guided team reflexivity (sometimes referred to as briefing/debriefing) refers to an intervention to induce reflection in groups.
Lee, 2014	Longitudinal study, n = 528 (132 four member teams)	undergraduate business students at a university in the US	Frequent, dyadic information exchanges among team members both help and hinder members learn about the expertise of other members and thus help and hinder the development of a TMS.  small beta's
Lin, 2008	Meta-analysis (k = 50) and RCT (n = 200)	MA: various  RCT: Australian students	Results show that both social (e.g. relationship building and cohesion) and task (e.g. coordination) factors are crucial for improving the performance and satisfaction of virtual teams.  SEM suggest the following paths: 1. communication > relationship building > coordination > performance. 2. communication > cohesion > coordination > performance.  Coord – Perf: $r = .53$ Comm – Perf: $r = .32$ Coh – Perf: $r = .36$ ReBui – Perf: $r = .21$ Trust – Perf: $r = .29$  AA  no serious limitations


<p>1. Teamwork training has a medium-to-large positive effect on teamwork behaviours.</p> <p>2. Teamwork training has a large positive effect on team performance.</p> <p>Moderators for effect on teamwork behaviours:</p> <p>3. Team context: strongest effect in aviation teams, followed by military teams, followed by healthcare and lab experiments, then industry, and finally academia.</p> <p>4. Team tenure: teamwork training has a larger positive effect on teamwork behaviours in newly-formed teams than in existing (intact) teams.</p> <p>5. Training method: simulation-based trainings has a large positive effect, team reviews a medium-to-large effect, workshop a medium effect, and didactic education a small effect.</p> <p>6. The number of dimensions of teambuilding targeted by the training: targeting 3 dimensions has the strongest effect, followed by two, four, and one.</p> <p>7. The dimensions targeted by the teambuilding: preparation had the strongest effect, followed by interpersonal dynamics, reflection, and execution.</p> <p>Moderators for effect on team performance:</p> <p>8. Team context: strongest effect in teams in industry, followed by healthcare, military, aviation, lab experiment, and academia.</p> <p>9. Team tenure: teamwork training has a larger positive effect on team performance for existing (intact) teams than for newly-formed teams.</p> <p>10. Training method: team reviews have a medium-to-large effect, simulation-based trainings and workshops have a medium effect, and didactic education a small-to-medium effect.</p> <p>11. The number of dimensions of teambuilding targeted by the training: targeting 4 dimensions has the strongest effect, followed by two, one and three.</p> <p>The dimensions targeted by the teambuilding: preparation had the strongest effect, followed by interpersonal dynamics, reflection, and execution.</p>	<p>1. d=.68 (outliers removed: d=.55)</p> <p>2. d=.92 (outliers removed: d=.58)</p> <p>3. ?</p> <p>4. existing teams: d=.33; new teams: d=.67</p> <p>5. simulation-based training: d=.78; team reviews: d=.64; workshops: d=.50; didactic education: d=.19</p> <p>6. three dimensions: d=.98; two dimensions: d=.65; four dimensions: d=.57; one dimension: d=.005</p> <p>7. Preparation: d=.75; interpersonal dynamics: d=.69; reflection: d=.65; execution: d=.64</p> <p>8. ?</p> <p>9. existing teams: d=.99; new teams: d=.54</p> <p>10. team reviews: d=.69; simulation-based training: d=.57; workshops: d=.55; didactic education: d=.41</p> <p>11. d between .46 and .67 d between .52 and .60</p>	<p>A</p>	

McLanahan, 2019	RCT  n = 13,224  (1,839 teams)	Individuals who were participating in the X-Culture consulting competition	artificial setting and tasks  A
Mesmer- Magnus, 2009	Meta-analysis, includes RCTs  k = 72  (4,795 groups, n = 17,279)	Information sharing positively predicted team performance across all levels of moderators. However, IS uniqueness predicts team performance more strongly than IS openness. In addition, it was found that teams share more information wherein (a) task demonstrability is high (solve vs. judge), b) discussion structure is high (freeform vs. highly focused), and (c) members are more cooperative during discussions.	IS > perf: $P = .42$  IS un > perf: $P = .50$ IS op > perf: $P = .32$ task dem > IS: $P = .45$ disc struct > IS: $P = .41$  coop disc > IS: $P = .57$  AA
Mesmer- Magnus, 2017	meta-analysis  k = 28  (results from 4,943 teams /19,575 individuals).	Results show consistent effects for team cognition in team process and performance. However, whereas originally compilational cognition (TMS) was more strongly related to both team process and team performance than was compositional cognition (SMM), in the updated database, compilational cognition (TMS) is more strongly related to team process and compositional cognition (SMM) is more strongly related to team performance.  In essence, this updated finding suggests that knowing who knows what (TMS) is more important to predicting effective and efficient team processes, while having a shared understanding of the problem, task, or team (e.g. SMMs) is more influential in predicting the extent to which a team will be successful.	overall $P = .36$  compositional (SMM) $P = .39$  compilational (TMS) $P = .29$  C design of the included studies not specified


Study examined relations between team personality and team performance considering a.o. the choice of criterion (behavioural vs. outcome) and method of aggregation (mean, minimum, maximum and variance).	1. Conscientiousness acts as a supplementary trait, such that (A) mean and (B) minimum methods of aggregating Conscientiousness positively relates to performance. (C) Variance in Conscientiousness is not negatively related to performance.  2. Extroversion acts as a complementary trait (A) minimum scores did not negatively relate to performance (B) variance in Extroversion positively predicts team performance.  3. Agreeableness acts as a supplementary trait, such that (A) mean and (B) minimum methods of aggregation positively relate to performance, and (C) variance in Agreeableness negatively relates to performance.  4. Emotional Stability did not demonstrate supplementary characteristics, such that (A) mean and (B) minimum methods of aggregation will positively relate to performance, and (C) variance methods will negatively relate to performance.  5. Team Extroversion relates more strongly to (A) team behavior than to (B) team outcome measures.  6. Team Agreeableness relates more strongly to (A) team behavior than to (B) team outcome measures.  7. Team Emotional Stability relates more strongly to (A) team behavior than to (B) team outcome measures.	1a r = .13 1b r = .13 1c r = -.06 (ns)  2a r = .03 (ns) 2b r = .06  3a r = .10 3b r = .10 3c r = -.07  4a r = .08 4b r = .06 (ns) 4c r = -.03 (ns)  5a r = .20 5b r = .06 (ns)  6a r = .20 6b r = .08  7a r = .17 7b r = .05 (ns)	Design of included studies not reported			C  no serious limitations
Meta-analysis	Not reported	k = 70				
Prewett, 2009						

cross-sectional study n = 383	Robertson, 2013	various	Trust in teammates predicted transactive memory. Trust in management did NOT predict transactive memory.	trust teammates > TMS: $\beta = .46$ trust management > TMS: $\beta = .08$
meta-analysis of cross-sectional studies	Salas, 2008	Most subjects either in military domain or students in lab settings  k = 45 (2,650 teams)	Intervention: team training: a set of tools and methods that, in combination with required [team-based] competencies and training objectives, form an instructional strategy. Task focused team training enables team members to become aware of, learn about, and practice requisite team competencies (i.e., KSAs) and performance processes while receiving feedback on their performance.  1. Team training has a moderate positive effect on team outcomes. 2. Team training has a medium-to-large positive effect on cognitive and process outcomes, and a medium positive effect on affective outcomes. 3. Team training has a moderate-to-high positive effect on team performance.  Moderators of the effect of team training on team performance:  4. The content of the training (taskwork, teamwork, both) results in little differences in the effect size estimates. 5. The stability of the team: the effect in intact (existing) teams is higher than in ad-hoc teams.  The size of the team: the effect is greatest in large teams, followed by small teams and then by medium teams.	D  no serious limitations  C  no serious limitations  2. cognitive outcomes: $p=.42$ ; process outcomes: $p=.44$ ; affective outcomes: $p=.35$  3. $p=.39$  4. taskwork: $p=.35$ ; teamwork: $p=.38$ ; both: $p=.40$ .  5. existing teams: $p=.54$ ; ad-hoc teams: $p=.38$ large teams: $p=.50$ ; small teams: $p=.39$ ; medium teams: $p=.34$



<p>Team learning processes do not automatically lead to performance improvement. In order to achieve an increase in team performance over time, teams need to complement their team learning behaviours with shared task and temporal mental models.</p> <p>1) The extent to which the team members engage in team learning processes is not positively related to team performance improvement.</p> <p>2a) The relationship between team learning processes and team performance improvement is moderated by task mental model similarity in such a way that when team members have a similar task mental model, the relationship will be more positive than when they do not have a similar mental model.</p> <p>2b) The relationship between team learning processes and team performance improvement is not moderated by team mental model similarity in such a way that when team members have a similar mental model the relationship will be more positive than when they do not have a similar mental model.</p> <p>2c) The relationship between team learning processes and team performance improvement is moderated by temporal mental model similarity in such a way that when team members have a similar temporal mental model the relationship will be more positive than when they do not have a similar temporal mental model.</p>	<p>Concerns a simulation, partly with students</p>	<p>C</p>	<p>No major weaknesses</p>
<p>Longitudinal study</p> <p>Santos, 2015</p> <p>N = 67 teams, 314 individuals</p> <p>Company managers, university students</p>	<p>Prior team performance moderates the relationship between team reflexivity and final team performance such that team reflexivity will be positively related to final team performance for a) teams with relatively low prior performance and unrelated to final team performance for b) teams with relatively high prior performance.</p>	<p>1a <math>\beta = .25</math></p> <p>1b <math>\beta = -.16</math> (ns)</p> <p>2a <math>\beta = .49</math></p> <p>2b <math>\beta = .09</math> (ns)</p>	<p>No major weaknesses</p>
<p>Longitudinal study</p> <p>Schipper, 2013</p> <p>N = 73 teams (groups of 3 students)</p>	<p>Prior team performance moderates the relationship between team reflexivity and team learning such that a) team reflexivity will be positively related to team learning for teams with relatively low prior performance and b) unrelated to final team performance for teams with relatively high prior performance.</p>	<p>3) Team learning mediates the interaction between team reflexivity and prior team performance on final team performance.</p>	

		H1: $r = .28$ H2: $r = .02$ H3: $r = .29$  Team process variables: Internal (H5) and external (H6) communication, group cohesiveness (H7) goal clarity (H8) were found to be positively associated with NPD outcomes.  Additionally, NPD effectiveness seems to be predicted by team leadership, internal and external communication, and group cohesiveness (H9, H10). NPD efficiency was predicted by all but team size and team tenure (H9).  * NPD = new product development.	Design of the included studies not reported	C
Sivasubram- aniam, 2012	Meta-analysis of 38 studies  Organisational setting, teams from different industries (e.g., high-tech, manufacturing, software, electronics, healthcare)	H4: $r = .44$ H5: $r = .31$  H6: $r = .18$ H7: $r = .20$  H8: $r = .50$  * team leadership = the extent to which the team leader is charismatic and transformational, and utilises a style characterised as being participative, empowering, facilitative, and communicative.	H9, H10: R2 = .45  R2 = .34	D
Solansky, 2011	Study 1 Longitudinal study N1 = 20 teams (86 students)  Study 2 N2a = 126 (10 teams)  N2b = 58 (12 teams)	1) Team identification is positively related to performance.	Study 1 $r = .63$ Study 2 $r = .58$	C no serious weaknesses
Solansky, 2019	Study 1 Quasi exp study N = 86 (20 teams)  Study 2 Cross-sect N = 126 (10 teams)	1. Collective mind scores increase over time. 2. Collective mind scores are positively associated with team performance.  Note: collective mind collective mind refers to a team or an organisation that acts intelligently as a collection of individuals.	Study 1 1) Not reported 2) $\beta = .68$  Study 2 2) $\beta = 0.80$	C Unclear reporting of results

<p>The study examines the relationships between team design features (group composition, task design and leadership) and team performance and reports the following results:</p> <ol style="list-style-type: none"> <li>Aggregated measures of individual ability and disposition correlate positively with team performance.</li> <li>Team member heterogeneity and performance correlate near zero, but the effect varies somewhat by type of team (project, production and management).</li> <li>Project and management teams have slightly higher performance when they include more members.</li> <li>Team-level task meaningfulness exhibits a modest but inconsistent relationship with performance.</li> <li>Increased autonomy and intra-team coordination correspond with higher performance, but the effect varies depending on task type (teams engaged in physical vs knowledge work).</li> <li>Leadership, particularly transformational and empowering leadership, improves team performance.</li> </ol>	<p>1. <math>\rho = .22</math></p> <p>2. <math>\rho = -.04</math> (general)  <math>\rho = .04</math> (project teams)  <math>\rho = -.07</math> (production teams)  <math>\rho = -.03</math> (management teams)</p> <p>3. <math>\rho = .04</math></p> <p>4. <math>\rho = .16</math></p> <p>5. Autonomy:  <math>\rho = .25</math> (general)  <math>\rho = .36</math> (physical work)  <math>\rho = .26</math> (knowledge work)  intra-team coordination:  <math>\rho = .25</math> (general)  <math>\rho = .12</math> (physical work)  <math>\rho = .29</math> (knowledge work)</p> <p>6. <math>\rho = .26</math> (transformational leadership)  <math>\rho = .33</math> (empowering leadership)</p>	<p>C</p> <p>Design of the included studies not reported</p>

	Moderators of team building effect on team productivity:	
	<b>Factors before team building</b>	
1.	The initiator of the teambuilding: when the initiator is external (vs. internal to the team), the positive effect is stronger.	1. Internal initiator: $d=.43$ ; external initiator: $d=.78$
2.	The rationale for the teambuilding: when the action is corrective (vs. preventive), the effect is stronger.	2. Preventive action: $d=.69$ ; corrective action: $d=.86$
3.	The expectations from team building benefits: when the expectation is to change both, the effect is strongest, followed by expectations to improve performance, and lastly by expectations to improve attitudes $d=.23$	3. Expect to change attitudes & performance: $d=.86$ ; expect to change performance: $d=.79$ ; expect to change attitudes: $d=.23$
4.	The involvement of the group in planning the team building: when the group is involved, the effect is weaker than when it isn't involved.	4. Group involved: $d=.50$ ; group not involved: $d=1.07$
	<b>Factors during team building</b>	
5.	Focus of team building: a mixed focus on goal setting and interpersonal relations has the highest effect, followed by only goal setting, followed by only interpersonal relationships. The presence of other interventions together with team building: in the presence of other interventions, the effect of team building is stronger than when it is alone.	5. Interpersonal focus: $d=.58$ ; goal setting focus: $d=.62$ ; mixed focus: $d=.79$
6.	Who managed the intervention(s): for team buildings with an external and an internal consultant the effect is strongest, followed by only external consultant, followed lastly by only internal consultant.	6. Only teambuilding: $d=.82$ ; $d=.53$ ; other interventions: $d=.82$
7.	The focus of the teambuilding: an intragroup focus has a stronger effect than an individual focus.	7. Only internal consultant: $d=.35$ ; only external consultant: $d=.74$ ; both internal and external: $d=1.75$
	<b>Organisational support factors</b>	
8.	Supervisory support for the team building: when support is present, the effect is stronger.	8. Individual focus: $d=.48$ ; intragroup focus: $d=.79$
9.	Support for change efforts: when support from higher levels is present, the effect is strongest, followed by organisations with no evidence for support, and followed lastly by support from different levels.	9. Support present: $d=1.02$ ; support missing: $d=.49$
10.	Organisational characteristics.	10. Support from higher levels: $d=.90$ ; no evidence of support: $d=.64$ ; support from different levels: $d=.50$
11.	Size of organisation: small organisations have the strongest effect, followed by large organisations, followed by medium ones.	11. (Small organisation: $d=.80$ ; medium org: $d=.43$ ; large org: $d=.56$ )
12.	Type of organisation: in industrial/manufacturing organisations, the effect is stronger than in government organisations.	12. (Industrial/man: $d=.89$ ; government: $d=.21$ )
13.	Team's responsibility for own performance: when the team is solely responsible for own performance, the effect is stronger than when the team depends on other elements in the organisation.	13. Responsible for performance: $d=.92$ ; interdependent: $d=.76$
	Management style: In teams with a participative management style, the effect was stronger than in teams with an autocratic management style.	Participative style: $d=.62$ ; autocratic: $d=.18$
	n = 11 studies	A meta analysis of before-after studies and controlled before-after studies
	Svyantec, 1999	

Study 1 Cross-sectional N = 71 teams	Tanghe, 2010  1. Employees, mainly service organisations  2. Students  Study 2 Scenario experiment 2x2 design N = 121	<p>Team identification leads group members to affectively converge to their fellow group members and that this affective convergence, in turn, explains subsequent team-oriented attitudes:</p> <ol style="list-style-type: none"> <li>1. The higher the group identification is, the stronger the affective convergence among team members.</li> <li>2. Positive group affective (PA) tone is positively associated with team effectiveness and this effect will be stronger for higher levels of group identification.</li> <li>3. Negative group affective (NA) tone is not negatively associated with team effectiveness and this effect will be stronger for higher levels of group identification.</li> </ol>	<p>Measure group affect study 2 somewhat unclear unclear</p> <p>1) D 2) B</p> <p>See article</p>
	Tannenbaum, 2013  n = 31 studies, 2,136 participants	<p>Intervention: debriefs. Debriefs lead individuals or teams through a series of questions that allow participants to reflect on a recent experience, construct their own meaning from their actions, and uncover lessons learned in a non-punitive environment. A debrief has four elements: (1) participants reflect on specific events; (2) participants are actively involved in self-discovery; (3) the environment is nonjudgmental and focused on learning; (4) both the participants and at least one other external source give input regarding the events under review.</p> <ol style="list-style-type: none"> <li>1. Debriefs have a medium-to-large positive effect on team performance.</li> <li>2. Debriefs focused on team-level improvement have a larger effect on team performance than on individual performance.</li> </ol> <p>Moderators of the effect of debriefs on team performance:</p> <ol style="list-style-type: none"> <li>3. Facilitation in debriefs: facilitated debriefs have a greater effect on team performance than non-facilitated debriefs.</li> <li>4. The degree of structure of debriefs: highly structured debriefs have a stronger effect than moderately structured debriefs.</li> </ol>	<p>B</p> <p>no serious weaknesses</p> <p>d=.67 team performance: d=1.2; individual performance: d=.4</p> <p>facilitated debriefs: d=.75; non-facilitated debriefs: d=.25</p> <p>highly structured debriefs: d=.69; moderately-structured debriefs: d=.54</p>

Tekleab, 2016  n = 227 (45 teams)	employees pursuing a graduate degree at a large Midwestern university.	<ol style="list-style-type: none"> <li>1. There is NO curve linear relationship between functional diversity and team cohesion.</li> <li>2. Behavioural integration positively influences team cohesion.</li> <li>3. A high level of behavioural integration attenuates the negative impact of functional diversity on team cohesion such that the relationship will be negative only under a low level of behavioural integration.</li> <li>4. The relationship between team cohesion and objective team performance is mediated by team learning. <math>\beta = .66</math></li> </ol> <p>Note: Behavioural integration is a meta-construct, which includes the team's information exchange, collaborative behavior, and joint decision making.</p>	<ol style="list-style-type: none"> <li>1. <math>\beta = -.12</math> ns</li> <li>2. <math>\beta = .73</math></li> <li>3. <math>\beta = -.48</math></li> <li>4. coh &gt; learning <math>\beta = .45</math> learning &gt; performance <math>\beta = .66</math></li> </ol> <p>Concerns a capstone simulation C</p>
Turner, 2014	Meta-analysis, includes RCTs k = 18 (768 teams, n = 13,491)	<p>The primary focus of this meta-analysis is to identify which measure of the six team cognition constructs (shared mental models, SMM; team mental models, TMM; information sharing, IS; transactive memory systems, TMS; cognitive consensus, CC; group learning, GL) produced the best performance outcome results.</p> <p>The one team cognition construct that stood out was that of IS, with statistical findings greater than the constructs of TMM, GL, and TMS. The two shared cognitive constructs that were not statistically different from IS were SMM and CC; neither of these constructs was found to be significantly different from TMM, GL, or TMS.</p> <p>Note: see discussion &amp; conclusion.</p>	<ol style="list-style-type: none"> <li>1. SMM r = .39</li> <li>2. TMM r = .19 ns</li> <li>3. IS r = .51</li> <li>4. TMS r = .30</li> <li>5. CC = .42</li> <li>6. GL = .15 ns</li> </ol> <p>no serious limitations AA</p>
Van der Vegt, 2010	Longitudinal study  N = 47 teams (average team size = 10)	<ol style="list-style-type: none"> <li>1. Turnover is negatively associated with social integration within self-managing work teams.</li> <li>2. Turnover is negatively associated with team learning behavior within self-managing work teams but is not inverse U-shaped.</li> <li>3. Team turnover is negatively associated with task flexibility in self-managing work teams.</li> <li>4. Social integration does not partially mediate a generally negative relationship between team turnover and effectiveness in self-managing work teams.</li> <li>5. Team learning behavior partially mediates a generally negative relationship between team turnover and effectiveness in self-managing work teams.</li> <li>6. Task flexibility partially mediates a generally negative relationship between team turnover and effectiveness in self-managing work teams.</li> <li>7. Team turnover is negatively related to team effectiveness.</li> </ol>	<ol style="list-style-type: none"> <li>1. <math>\beta = -.32</math></li> <li>2. <math>\beta = -.41</math></li> <li>3. <math>\beta = -.37</math></li> <li>4. <math>\beta = -.36</math></li> </ol> <p>No full use of validated scales C</p>

Randomised experiment Wagner, 2012	Students, US N = 206 (82 teams)	<p>1. For work consisting of a combination of individualized and interdependent tasks, team member performance is higher for individuals possessing a mix of individualism and collectivism than for individuals who lack similar heterogeneity.</p> <p>2. The relationship between intrapersonal heterogeneity in individualism-collectivism and performance predicted in H1 is moderated by structural interdependence such that the effect is stronger under conditions of loose structural interdependence than under conditions of tight structural interdependence.</p>	See article  no serious weaknesses  A
	meta-analysis Wang, 2019	<p>1a) Surface-level diversity in culturally diverse teams is not related to team creativity/innovation, (2a) irrespective whether the team is colocated or non-colocated, level of task independency (3a), task complexity (4a), or task intellectiveness (judgmental vs intellective tasks) (5a).</p> <p>1b)... whereas deep-level diversity in culturally diverse teams is somewhat positively related to team creativity/innovation. 2) This relationship is stronger for colocated teams than for non-colocated teams, 3) stronger for interdependent tasks than for independent tasks, 5) stronger for intellective tasks than for judgmental tasks. Tasks complexity and intellectiveness did not moderate the effect.</p>	<p>All ES very small</p> <p>Design of included studies not reported</p> <p>C</p> <p>1. a) ns and mostly close to zero b) <math>p = .16?</math></p> <p>2. col: <math>p = .18</math> non col: <math>p = .02</math> ns</p> <p>3. inter: <math>p = .19</math> indep: <math>p = -.10</math> ns</p>
	meta-analysis Webber, 2001	Results showed that job-related diversity has NO relationship with cohesion or performance.	Design of included studies not reported  C

		Note: direct effect sizes incorporated in De Jong 2016.		
Longitudinal study Webber, 2008 <i>n</i> = 69 (9 teams)	Undergraduate students, Canadian University	<p>1. Early trust emerges as a one-dimensional factor early in the life span of a team.</p> <p>2. Cognitive and affective trust emerge as separate components over time.</p> <p>3. Familiarity with team members is positively related to early trust.</p> <p>4. Interaction frequency is NOT related to (affective or cognitive) trust.</p> <p>5. Monitoring behaviours by team members (eg tracking the work of others, creating backup plans, or working around team members to get tasks done) somewhat negatively affects the development of cognitive and affective trust in teams (even after controlling for familiarity and early trust).</p>	<p>3) <math>R^2 = .06, \beta = .24</math></p> <p>4) Aff: <math>R^2 = .01, \beta = .09</math> Cogn: <math>R^2 = .00, \beta = .03,</math></p> <p>5) small</p>	C artificial setting
longitudinal study with 3 measurement points over 4,5 years Weer, 2016 <i>n</i> = 714 teams	Employees of a large, multinational technology-driven firm.	<p>Intervention: coaching by team leader: facilitative coaching (providing guidance by aligning team member aspirations with organisational goals and facilitate the achievement of both individual and team objectives) and pressure-based coaching (providing direction by applying extensive pressure to get results).</p> <p>These managers communicate expectations by becoming visibly upset and complaining vigorously if goals are not met, and may challenge employees to improve by reprimanding poor performance and/or publicly criticizing mistakes.)</p>	<p>Low effect sizes</p> <p>r=.14 at time 1; r=.0 at time 2; r=.02 and <math>\beta=.02</math> at time 3.</p> <p>r=-.05 at time 1; r =-.11 at time 2; r =-.06 and <math>\beta=-.24</math> at time 3</p>	B no serious weaknesses
Systematic review of 31 cross-sectional (28) and longitudinal (3) studies Wildman, 2016	Work teams, different industries	Team leader's facilitative coaching predicts team effectiveness (as rated by the team leader).	Team leader's pressure-based coaching negatively predicts team effectiveness.	B It seems that the authors pretend to estimate causal inference basing on correlational studies.

			D	
Cross-sectional study	Wildman, 2018 N = 117 teams (593 respondents)	Team learning behaviours (TLBs), especially team reflexivity and boundary spanning, relate positively to innovative work behaviour (IWB). Furthermore, team structure, task interdependence and group potency relate positively to TLBs. TLBs can be fostered by establishing these team learning conditions.	1a ns 1b $\beta = 0.54$ 1c $\beta = 0.61$ 1d ns  2a $\beta = 0.73$ 2b $\beta = 0.44$ 2c $\beta = 0.49$ 2d $\beta = 0.29$  no serious limitations	
meta-analysis	Zhou, 2015 k = 31	1. a) Knowledge sharing is not related to IWB. b) Team reflexivity relates positively to IWB. c) Boundary spanning relates positively to IWB. d) Storage and retrieval is not related to IWB.  2. Team structure relates positively to (a) knowledge sharing, (b) team reflexivity, (c) boundary spanning, (d) storage and retrieval.  3. Task interdependence relates positively to (a) knowledge sharing, (b) team reflexivity, (c) boundary spanning. It does not positively relate to (d) storage and retrieval.  4. Group potency relates positively to (b) team reflexivity, but not to (a) knowledge sharing, (c) boundary spanning, (d) storage and retrieval.	3a $\beta = 0.24$ 3b $\beta = 0.25$ 3c $\beta = 0.26$ 3d ns  4a ns 4b $\beta = .28$ 4c ns 4d ns	Design of included studies not reported  ns

## Excluded studies

Author & year	Reason for exclusion
Barczak, 2010	Cross-sectional study, partly focusses on EI, confirms findings from recent MAs.
Beal, 2003	Included in Chioccio 2009.
Budworth, 2011	Concerns the assessment of a specific training (employee selection methods).
Buljac, 2010	Literature review, narrative summary of findings (including of individual studies included).
Buvik, 2016	Cross-sectional study, small sample, Norwegian construction teams, confirms findings from recent MAs.
Carboni, 2013	Cross-sectional study, sales teams. Results indicated that individuals close to the core of a team outperformed more peripheral individuals, but only to the extent that teams were high-performing or had been together longer as a team.
Chen, 2018	Limited generalizability (undergraduate students in Singapore). Experiment comparing different methods of team formation: (1) random assignment; (2) self-selection; and (3) algorithm assignment designed to maximize skill complementarity. The study found that self-selection creates high-performing teams.
Cheng, 2016	Study with several weaknesses, artificial setting and artificial tasks, findings are inconclusive.
Chi, 2012	Paper cannot be retrieved.
Curseau, 2014	Concerns the effect of individual goals rather than group goals.
DeChurch, 2010	Incorporated in Mesmer-Magnus, 2017.
de Pillis, 2015	Concerns student teams in an educational setting.
Devine, 2001	Focusses only on differences between field and lab studies.
Ehrhardt, 2014	Cross-sectional study, mainly confirms findings from meta-analyses.
Eisele, 2013	Assessment of feedback sessions based on the Team Diagnostic Survey, lacks detailed information regarding the effect.
Eisele, 2015	The study doesn't examine an intervention. It is focused only on the predictive validity of the Team Diagnostic Survey.
Espinosa, 2015	Concerns dyadic teams.
Farh, 2017	Concerns TMX, findings rather hard to apply: strong TMX produces obligations to utilize resources provided by one's teammates, and these obligations enhance performance when (a) teammates provide resources of high quality or (b) the quality of resources available from individuals outside of the TMX relationship (i.e., the leader) are low, purportedly because TMX-based obligations protect individuals from over-utilizing low-quality resources from the leader.
Gaggioli, 2015	Longitudinal study, concerns social network indices and experience of flow.

Gilley, 2010	The study doesn't examine an intervention. It is focused only on the managerial skills that predict the manager's ability to facilitate and build teams.
Hasa, 2019	Limited generalizability (startups in India). The findings highlight how prior social connections, which are often a source of knowledge and influence, can limit new interactions and thus the ability of organisations to leverage peer effects to improve the performance of their members.
Harty, 2016	No estimate of effect sizes is given, only significance levels. Furthermore, data is analysed at individual level, and the groups might not be teams.
Huang, 2013	Cross-sectional study, mainly confirms findings from meta-analyses (Bachrach 2019, Mesmer-Magnus 2017).
Jarrett, 2016	The study is included in the McEwan (2017) meta-analysis, with another reference (Jarrett et al. 2012) – this is a dissertation that the article from 2016 was based on (the same sample & data).
Kaymak, 2011	The effect of positive past experiences working on group cohesion and group performance was only indirectly measured (SEM).
Kuipers, 2009	The study doesn't examine an intervention. It examines whether three team processes predict.
Lee, 2013	Limited generalizability (operational service teams in Hong Kong en Macao. In this study, operational service teams' attribute patterns and their associated performance levels were examined using a configuration approach.
Liu, 2011	Cross-sectional study, Taiwanese companies, confirms findings from recent MA's.
Marques-Quintreiro, 2019	Cross-sectional study, confirms findings from recent MA's.
Matta, 2018	The meta-analysis doesn't focus on an intervention, but on leader-member exchange (team leader's behaviour).
McHaney, 2018	Off topic, study about whether groups with prior history of interaction outperform individuals in deception detection. Results indicated that groups which exhibited higher levels of relational links, that is, established groups, were more accurate in deception detection than ad hoc groups.
McNeese, 2017	Not relevant, laboratory-based study of collocated student teams undertaking information retrieval tasks.
Mell, 2014	Effect sizes are incorporated in Bachrach 2019. In addition, the central hypothesis ('Teams with a centralized TMS structure perform better than teams with a decentralized TMS structure when there is a disconnected distribution of interdependent task information, but not when there is a connected distribution of interdependent task information') is too detailed and too academic for this REA.
Meneghel, 2016	Cross-sectional study.
Mertins, 2015	Simulation game, no hypotheses, methods section rather unclear.
Moser, 2019	Cross-sectional study, confirms findings from recent MAs.
Muhlberger, 2015	The study doesn't measure team effectiveness, but the effectiveness of several types of coaching (including group coaching) interventions for individual goal attainment.
Mullen, 1994	Included in Chioccio 2009.
Naidoo, 2011	(included in Matta, 2018) The study doesn't focus on an intervention, but on leader-member exchange (team leader's behaviour).
Nielsen, 2010	Concerns training of managers rather than teams.

<b>Nielsen, 2012</b>	The study doesn't measure team effectiveness, but individual-level variables such as autonomy, social support, job satisfaction, and affective well-being.
<b>Nielsen, 2017</b>	Only marginally relevant, most of the findings are incorporated in recent MAs (eg McEwan, 2017).
<b>Nisula, 2016</b>	Cross-sectional study, focusses on individual creative self-efficacy and several other constructs measured at the individual level.
<b>Nouri, 2013</b>	Nice study, but unfortunately concerns dyads.
<b>Oertel, 2015</b>	Partly incorporated in Bachrach 2019. In addition, hypotheses tested mostly descriptive and fairly self-evident (eg "During the formation phase of teams, knowledge-based team learning behaviours (storing and retrieving task- and teamwork-relevant knowledge) are positively related to the emergence of transactive memory).
<b>O' Leary, 1994</b>	Included in Kleingeld, 2011.
<b>Pierro, 2015</b>	Cross-sectional study on the relationship between need for cognitive closure and employee performance.
<b>Rapp, 2007</b>	Included in Delise 2010, McEwan 2017, and Salas 2008.
<b>Revilla, 2012</b>	Cross-sectional study, very small sample, confirms findings from recent MAs.
<b>Rico, 2011</b>	Examined the effects of person-focused organisational citizenship behaviours on the performance of teams characterized by different levels of virtuality and task interdependence.
<b>Rodriguez-Sanchez, 2016</b>	Longitudinal study, outcomes are incorporated in recent MAs.
<b>Rousseau, 2013</b>	Cross-sectional study on team coaching by team leaders, uses a self-constructed 5-item questionnaire that takes a very broad approach to coaching (eg: Our team leader points out the areas we need to improve; Our team leader suggests means to improve our performance).
<b>Salanova, 2015</b>	Off topic, study about collective efficacy and collective flow. No performance measure.
<b>Salas, 1999</b>	Rather old MA of cross-sectional studies, outcome is partly refuted by more recent, high quality MAs (eg Klein, 2009).
<b>Shazi, 2015</b>	Cross-sectional study, small sample, confirms findings from recent MAs.
<b>Staats, 2012</b>	Off topic. Study about 'team scaling fallacy'. As team size increases, people increasingly underestimate the number of labor hours required to complete projects.
<b>Sonnentag, 2010</b>	Focusses on individual performance (findings suggest that team members can improve their individual performance when engaging in teamwork processes that are relevant for the team as a whole).
<b>Stevens, 2003</b>	Participants were all female and from sports teams.
<b>Tanghe, 2010</b>	Experimental lab study with students, very artificial. Concerns the effect of team members' affective state on propensity to trust. People who are less trusting will show more cooperative behaviours when confronted with group members displaying high activation affective states than when confronted with group members displaying low activation affective states.
<b>Tindale, 2012</b>	Unclear framework, hypotheses and methods, limited generalizability.
<b>Troster, 2014</b>	Concerns only self-managed teams and the effect of nationality. Outcomes are "potency" (the team's confidence in its ability to perform) and its performance as rated by expert judges.

Unger-Aviram, 2015	Lab setting and artificial task (bridge planning task), focusses mainly on the effect of goal orientation on adaption to change.
van der Haar, 2015	Concerns on-scene-command teams that coordinate the interdisciplinary aid efforts of fire departments, the police, and disaster medicine in case of natural or man-made emergencies, such as floods, fire breakouts, or car accidents.
Van Mierlo, 2010	Lab setting and artificial task (tower building task), very academic, implications for practice somewhat unclear.
Vora, 2012	Longitudinal study, simulation with undergraduate students, effects unclear.
Woehr, 2013	Concerns an RCT with students in an artificial setting and an artificial task (building a replica of a real bridge, using 33 plastic pipes of three different sizes and 20 rubber bands). Note: Results indicated that value diversity among team members had NO significant impact on task performance.
Wu, 2016	Cross-sectional study, student population (undergraduates), confirms findings from recent MAs.
Xu, 2019	Longitudinal study, only marginally relevant to the REA question.
Yee-Young, 2015	Concerns whether social category (gender and age) and informational diversity (education and work experience) in work teams may affect a team's perceived fit, which in turn may influence leader-rated group performance.
Zhang, 2015	Cross-sectional study of Chinese teams. The statistical technique (support vector machine) that is used to build the model is rather unclear.
Zhang, 2016	Population concerns Chinese employees and students. However, in China group members may differ from their American and European counterparts in terms of group diversity effects. In addition, most beta's found were practically irrelevant.
Zhu, 2018	Longitudinal survey, confirms findings from recent MAs (Bachrach 2019, Mesmer-Magnus 2017).



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Calvary

The Calvary logo features a stylized cross or flame shape composed of three interlocking loops.

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