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Work Engagement in Agile Teams: Extending Multilevel JD-R Theory

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ABSTRACT

Teams often fail to mobilize their resources effectively, which can undermine team engagement. Prominent work engagement theories, including Job Demands-Resources (JD-R) theory, have not accounted for this conceptually. By taking a closer look at how teams can mobilize resources through their use of agile work practices (AWPs), we develop a multilevel extension of JD-R theory. First, we propose that agile taskwork (i.e., use of sprint planning and iterative development practices) contributes to team engagement, especially in teams working on complex tasks. Second, we argue that agile teamwork (i.e., frequency of stand-up and retrospective meetings) promotes team engagement only when team role conflict low. We test our hypotheses in a field study involving 110 teams ($N = 694$ employees) with multisource ratings of job demands and two different operationalizations of team engagement. Our findings demonstrate which AWPs contribute more (vs. less) strongly to team engagement. Moreover, results evidence the boosting principle of JD-R theory at the team-level by showing that resource mobilization through agile taskwork is most engaging in challenging contexts (i.e., high work complexity). We discuss the implications of these findings for JD-R theory and research on collective work engagement.

When teams are engaged at work, their members feel enthusiastic about their tasks and can channel their energy toward shared goals (Bakker 2022; Costa, Passos, and Bakker 2014; Costa et al. 2017; Metiu and Rothbard 2013; Schaufeli and Bakker 2004, 2023; Van Mierlo and Bakker 2018). Several studies have demonstrated that collective levels of work engagement are positively associated with organizationally relevant outcomes such as financial returns (Barrick et al. 2015; Eldor 2020; Schneider et al. 2018) or ratings of service quality (García-Buades et al. 2016; Gracia et al. 2013; Salanova, Agut, and Peiró 2005). At the same time, it is still unclear precisely *how* groups can enter a state of collective engagement. This leaves a gap in our understanding of how high levels of collective work engagement can be realized in teams.

One of the few studies that explored how shared work engagement emerges within teams concluded that team members become collectively engaged when they interact frequently in an energizing manner and when tasks, goals, or activities are pulling them in a "compelling direction" (Metiu and Rothbard 2013). Quantitative research that followed after the ethnographic study of Metiu and Rothbard (2013) confirmed that team engagement is predicted by *socio-emotional resources* such as psychosocial safety (Hu, Dollard, and Taris 2022; Laulié, Tekleab, and Rousseau 2023; Peeters, Van De Voorde, and Paauwe 2022) or team cohesion (Fortuin et al. 2021; Klasmeier and Rowold 2022; Rodríguez-Sánchez et al. 2017). In addition to these socio-emotional resources, team engagement requires *cognitive-attentional resources*. This has been indicated by studies

showing that collective engagement is higher when groups have a shared vision (Eldor 2020), collective ownership (Martinaityte, Unsworth, and Sacramento 2020), and when team members are not fatigued (Boermans et al. 2014). Hence, the literature to date has identified various resources as the proximal predictors of team engagement.

The importance of resources for work engagement is central to Job Demands-Resources (JD-R) theory (Bakker and Demerouti 2018, 2024; Bakker, Demerouti, and Sanz-Vergel 2023)—one of the main theories of work engagement (Wittenberg et al. 2024). This theory suggests that work engagement occurs when sufficient resources are available to meet job demands (Demerouti et al. 2001). However, the question remains whether resources alone are enough to fully explain team engagement (Costa, Passos, and Bakker 2014). To develop a more comprehensive understanding of the factors driving team engagement, it is essential not only to identify resources as key components but also to explore the "tools" that enable teams to effectively mobilize these resources (see also Hobfoll et al. 2018, 109).

Despite a number of studies on resources as antecedents of collective engagement, our understanding of practical tools that help teams to mobilize resources is still limited (Bakker, Demerouti, and Sanz-Vergel 2023; Hobfoll et al. 2018; Wittenberg et al. 2024). Prior research on how teams can mobilize resources has focused on relatively abstract concepts such as collective intelligence (Mayo and Woolley 2021). Instead of explaining the ability to mobilize resources with a latent collective intelligence factor, we introduce the concept of agile work practices, which may serve the purpose of resource mobilization in teams. It has been argued that what characterizes agile teams is their ability to swiftly mobilize and allocate resources to where they are needed most (Baham and Hirschheim 2022; Cunha et al. 2020; Junker, Bakker, and Derks 2025; Kremser and Blagoev 2021; Steegh, Van De Voorde, and Paauwe 2025). Therefore, taking a closer look at the practices that agile teams use to facilitate resource mobilization helps to advance our understanding of *how* teams can enter a state of collective work engagement.

Agile work practices (AWPs) have gained popularity in recent years, which may be partly due to the increasing projectification of organizations (Jensen, Thuesen, and Geraldi 2016), the rise of globally distributed teamwork (Santistevan and Josserand 2019), and certification bodies such as the Project Management Institute (PMI and AgileAlliance 2017). On a more abstract level, we can conceptualize AWPs as planning routines that facilitate iterative (vs. sequential) approaches to *taskwork* and *teamwork* (Junker et al. 2023). Taskwork refers to how teams structure their work assignments and approach goals (Crawford, LePine, and Rich 2010; Fisher 2014). Agile taskwork, specifically, entails working in short iterative cycles or so-called "sprints," which enables teams to make use of time (Lieberum, Schiffels, and Kolisch 2022) and knowledge resources (Jarvenpaa and Välikangas 2022). The domain of teamwork entails how teams structure their interactions (Marks, Mathieu, and Zaccaro 2001) and attend to members' socio-emotional needs (McGrath, Arrow, and Berdahl 2000). Agile teamwork is structured around meetings that facilitate rapid

goal prioritization (Ghosh and Wu 2023) and reflection (Hennel and Rosenkranz 2021).

Instead of seeing AWPs as resources in themselves (e.g., Rietze and Zacher 2022), we prefer to conceptualize them as tools that help to mobilize resources (see also Junker, Bakker, and Derks 2025). This is consistent with previous research showing that AWPs can help to stimulate proactivity (Junker et al. 2022; Twemlow, Tims, and Khapova 2023), which is a process through which resources can be mobilized in teams (Tims et al. 2013; Vough, Bindl, and Parker 2017; Williams, Parker, and Turner 2010). For instance, Junker et al. (2022) observed that AWPs establish a context that encourages team proactivity by creating a norm where proactivity is both expected and supported. While it may seem intuitive that these practices foster team engagement by pulling the team in a compelling direction and promoting frequent interactions (cf. Metiu and Rothbard 2013), we currently lack empirical evidence supporting this intuition. Indeed, a recent meta-analysis by Koch, Drazic, and Schermuly (2023) shows that agile ways of managing projects have ambiguous relationships with affective well-being outcomes.

Some studies provide evidence for the benefits of AWPs for well-being (e.g., Tuomivaara, Lindholm, and Känsälä 2017; Venkatesh et al. 2020), whereas others highlight their downsides in terms of promoting exhaustion rather than engagement (e.g., Benlian 2022; Mueller and Benlian 2022). This suggests that context matters. However, to our knowledge, no study has tested moderators in the relationship between AWPs and team engagement to this date. Guided by JD-R theory (Bakker, Demerouti, and Sanz-Vergel 2023), we investigate work complexity and role conflict as potential moderators in the relationship between AWPs and team engagement. Hence, we examine whether challenge demands (i.e., work complexity) and hindrance demands (i.e., role conflict) have a differential impact on the resource mobilization processes that AWPs may stimulate. We test the main predictions of the model shown in Figure 1 in a study among 110 teams undergoing an agile transformation at a large German organization.

In sum, we aim to make the following contributions. First, we advance research on agile teams, by outlining which of their practices are most likely to foster collective work engagement. Moreover, we investigate in what contexts these practices may be more (vs. less) beneficial for team engagement. These findings offer important practical insights on how work engagement in agile teams can be enhanced (Baham and Hirschheim 2022; Junker, Bakker, and Derks 2025; Steegh, Van De Voorde, and Paauwe 2025). Second, we empirically validate the "boosting principle" of JD-R theory at the team-level. This principle refers to the idea that resource mobilization is most needed for work engagement when challenge demands are high (Bakker and Demerouti 2024). Despite its prominent role in JD-R theory, the boosting principle has not received much support at the team-level (e.g., Costa, Passos, and Bakker 2015; Liu et al. 2024). Finally, we aim to shift the conversation in work engagement research from identifying abstract ingredients (resources) to understanding concrete practices that could help to nurture these ingredients.
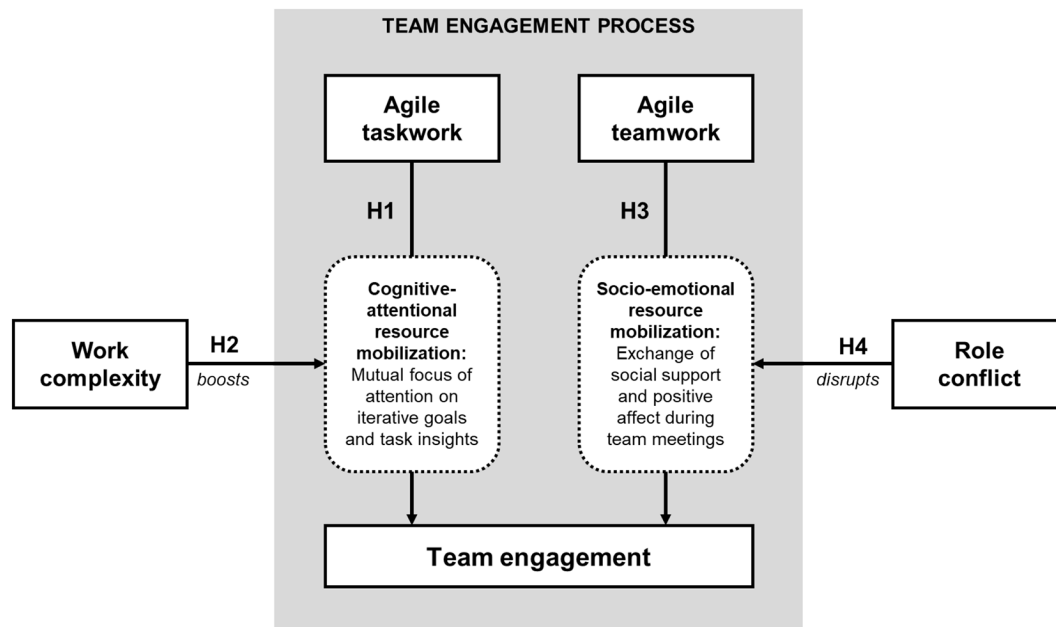
FIGURE 1 | A model of work engagement in teams using agile work practices.

1 | Theoretical Background

1.1 | Work Engagement in Teams

Work engagement has mostly been studied as an individual psychological state characterized by the presence of high levels of energy (*vigor*), a positive attitude toward work (*dedication*), and full immersion in work (*absorption*; Schaufeli and Bakker 2004, 2023). While some of these experiences are internal and hidden from other people, it has been shown that work engagement is highly visible to external observers such as colleagues (e.g., Bakker and Xanthopoulou 2009; Van Mierlo and Bakker 2018). This is because engaged employees display high levels of enthusiasm and personal initiative. These positive attitudes and expressions can "spread" from one person to another through both conscious and subconscious social influence (Barsade, Coutifaris, and Pillemer 2018; Cheshin, Rafaeli, and Bos 2011). Another reason teammates experience similar levels of work engagement is their collective experience of shared work situations (Bakker, Emmerik, and Euwema 2006; Totterdell et al. 1998). When work engagement is experienced collectively by the team as a whole, we can speak of *team engagement* (Costa, Passos, and Bakker 2014; Menges and Kilduff 2015; Metiu and Rothbard 2013).

According to Costa, Passos, and Bakker (2014), team engagement is best measured using the team-level referent (e.g., "My team …" or "We …"). This makes explicit that raters evaluate a collective experience rather than how they individually feel. Most existing studies on team engagement and other forms of collective work engagement (e.g., workforce engagement; Schneider et al. 2018) did not make use of the referent-shift consensus measures that Costa, Passos, and Bakker (2014) recommended. Yet, virtually all studies did find substantial between-team variance in work engagement (see Appendix A). When using the referent-shift approach, even studies with smaller samples were able to demonstrate theoretically-driven antecedents and boundary conditions of team engagement (e.g., Boermans et al. 2014; Costa, Passos, and Bakker 2015; Klasmeier and Rowold 2022; Martinaityte, Unsworth, and Sacramento 2020; Tims et al. 2013). The present study focuses on AWPs as potential antecedents of team engagement and examines whether shared job demands form a boundary condition to the work engagement of agile teams.

1.2 | A Model of Work Engagement in Agile Teams

In refining our theoretical arguments on how collective work engagement emerges in agile teams, we were inspired by the work of Metiu and Rothbard (2013). Based on an in-depth ethnographic study of software development projects, they concluded that team engagement emerges in situations characterized by two conditions. First, team engagement requires that members develop a mutual focus of attention on shared goals, situations, or problems. This allows team members to invest their *cognitive-attentional resources* in their tasks. Second, team engagement occurs when members exchange positive emotions. This may happen via unconscious emotional contagion processes (e.g., mimicking facial expressions; Hatfield, Cacioppo, and Rapson 1994; Bakker and Xanthopoulou 2009) and positive communication patterns (e.g., Lehmann-Willenbrock et al. 2017). These interactions can help to build *socio-emotional resources* (e.g., shared enthusiasm and social support). Extending the work of Metiu and Rothbard (2013), we theorize that AWPs can help in mobilizing the cognitive-attentional and socio-emotional resources needed for shared experiences of work engagement.

Prior research indicates that AWPs can be distinguished on a taskwork-teamwork continuum, operating via different mechanisms (Junker et al. 2022, 2023; Tripp, Riemenschneider, and Thatcher 2016). We refine this line of thinking by proposing

that agile taskwork primarily helps to mobilize cognitive-attentional resources, whereas agile teamwork helps to mobilize socio-emotional resources. Moreover, we predict that these team-internal resource mobilization processes are influenced by team-external job demands. When teams receive complex assignments, planning tasks in sprints and adopting an iterative approach may be more important for team engagement because this is when cognitive-attentional resources are most needed (Graf-Drasch et al. 2022; Junker, Bakker, and Derks 2025). Thus, work complexity may strengthen the link between agile *taskwork* and team engagement. In contrast, we propose that team role conflict may weaken the relationship between agile *teamwork* and team engagement. Teams that receive conflicting requests (e.g., from clients) may experience more negative interaction patterns during team meetings (Stray, Sjøberg, and Dybå 2016; Twemlow, Tims, and Khapova 2023), which disrupts the mobilization of socio-emotional resources. We elaborate on our predictions in the following.

1.3 | Agile Taskwork, Work Complexity, and Team Engagement

Agile taskwork entails a specific way of planning and coordinating members' tasks. One of the main features of agile teams is that they plan their tasks in "sprints," which are short performance episodes of about four weeks (Junker et al. 2023). During a sprint, members are encouraged to experiment with different approaches and adapt their strategies based on iterative task insights. This allows teams to learn and make adjustments as they progress from one sprint to the next (Ghosh and Wu 2023). Thus, agile taskwork creates learning routines that may help to mobilize members' cognitive-attentional resources (Annosi et al. 2020). Experimental research shows that planning tasks in sprints can help to overcome the "progression fallacy"—the tendency to spend too much time on early performance episodes at the expense of later ones (Lieberum, Schiffels, and Kolisch 2022). By working in sprints, agile teams establish temporal schemas that allow team members to cognitively invest themselves in their tasks and coordinate more effectively (Labianca, Moon, and Watt 2005). Finally, the routinized nature of agile taskwork may help to free cognitive resources (Chae and Choi 2019), which can be used for more engaging work activities (e.g., personal initiatives; Junker et al. 2022). Thus, by establishing learning routines and temporal schemas, agile taskwork may help to mobilize cognitive-attentional resources. In consequence, teams that make use of agile taskwork will experience situations characterized by a mutual focus of attention on team goals and shared positive emotions more frequently:

Hypothesis 1. *Agile taskwork relates positively to team engagement. The more a team utilizes agile taskwork practices, the higher the levels of team engagement.*

One of the more recent propositions of JD-R theory is that resources are most useful when work is challenging (Bakker, Demerouti, and Sanz-Vergel 2023; Bakker and Demerouti 2024). In line with this proposition, it has been found that challenging job demands "boost" the benefits of job resources for work engagement (e.g., Breevaart and Bakker 2018; Tadić, Bakker, and

Oerlemans 2015). One important challenge job demand is work complexity (Crawford, LePine, and Rich 2010; LePine 2022). In the presence of complex work, it may be especially beneficial to approach tasks in an agile way. This is because long-term and linear goal-setting approaches are less effective when tasks are complex (e.g., Wood, Mento, and Locke 1987). Working on complex assignments may require teams to break down the development process in short iterative cycles and to frequently revisit whether the initial goal is still valid. In other words, complex work requires constant reprioritization of activities, which is facilitated by agile taskwork (Goh and Pentland 2019; Kremser and Blagoev 2021). The agile approach can help transform ill-structured problems into more well-structured tasks (Lieberum, Schiffels, and Kolisch 2022). Once tasks are well-structured, teams are more likely to display collective intelligence (Graf-Drasch et al. 2022) and collectively use member's strengths (Meyers, Van Woerkom, and Bauwens 2023; van Woerkom, Meyers, and Bakker 2020). This should allow team members to become fully immersed in their work, even if they are confronted with a highly complex assignment (Backmann et al. 2024; Metiu and Rothbard 2013). Moreover, it has been found that approaching tasks in an agile way can reduce cognitive depletion processes that happen during complex work (Benlian 2022; Mueller and Benlian 2022). Thus, the benefits of agile taskwork for team engagement will be more visible when work is complex because this is when the mobilization of cognitive resources is most needed:

Hypothesis 2. *Work complexity strengthens the benefits of agile taskwork for team engagement. When work complexity is high, the relationship between agile taskwork and team engagement will be stronger than when work complexity is low.*

1.4 | Agile Teamwork, Role Conflict, and Team Engagement

Agile teamwork is characterized by frequent goal-oriented interactions among team members (Grass, Backmann, and Hoegl 2020; Junker et al. 2022; Twemlow, Tims, and Khapova 2023), which are thought to facilitate rapid consensus on work issues (Ghosh and Wu 2023; Schmidt, Dunlop, and O'Neill 2023). The two most important interaction moments of agile teams are "stand-up meetings" at the start of a workday (Stray, Sjøberg, and Dybå 2016), and "retrospective meetings" at the end of a sprint (Twemlow, Tims, and Khapova 2023). We assume that these agile meetings fulfill similar functions in the team engagement process (see Figure 1). Specifically, we argue that agile teamwork practices help to mobilize socio-emotional resources by (a) creating opportunities for exchanging social support, and (b) fostering the contagion of positive affect (Bakker 2022; Metiu and Rothbard 2013). Teams may use agile meetings to exchange information from customers, clients, or other stakeholders in members' social networks (Hoda, Noble, and Marshall 2011; Stray, Sjøberg, and Dybå 2016). These meetings may also represent an opportunity to engage in chit-chat (Methot et al. 2021) and humorous conversations (Lehmann-Willenbrock and Allen 2014). This may contribute to the emotional contagion of work engagement (Bakker 2022; Bakker and Xanthopoulou 2009). There already exists some evidence for the idea that agile teamwork

contributes to team engagement. For instance, it has been observed that agile teamwork contributes to psychological safety (Hennel and Rosenkranz 2021) and positive communication patterns (Redlbacher, Lehmann-Willenbrock, and Frost 2022; Twemlow, Tims, and Khapova 2023). This suggests that agile teamwork practices (e.g., stand-up or retrospective meetings) can foster team engagement by helping to mobilize socioemotional resources. Thus, we predict

Hypothesis 3. *Agile teamwork relates positively to team engagement. The more a team utilizes agile teamwork practices, the higher the levels of team engagement.*

Hindrance job demands stand in the way of goal accomplishment and undermine work engagement (Crawford, LePine, and Rich 2010; LePine 2022). A common hindrance job demand is role conflict. This stressor can also be experienced collectively by teams (Savelsbergh et al. 2012). In agile teams, this commonly happens when conflicting requests are made by clients, other teams, or leaders (Hoda, Noble, and Marshall 2011; Strode et al. 2022). Role conflict may disrupt the goal-oriented interactions that make agile meetings effective (Redlbacher, Lehmann-Willenbrock, and Frost 2022; Twemlow, Tims, and Khapova 2023). This is because role conflict may induce a "double-bind" situation. Double-bind situations make it impossible to fulfill conflicting requirements, leaving individuals to feel trapped, confused, and frustrated (Watzlawick 1963). When team members experience role conflicts and discuss them in agile meetings, the double bind situation becomes more salient. Thus, the combination of agile teamwork (i.e., frequent meetings) and role conflict may drain emotional resources. In contrast, when objectives are aligned and roles clearly defined, it may be easier to engage in goal-oriented interaction during agile meetings (Twemlow, Tims, and Khapova 2023). Moreover, concordant goals and role clarity may instigate team engagement processes by strengthening members' social identity (Tyler and

Blader 2003). In this scenario, frequent agile meetings may promote team engagement. Thus, we predict that role conflict moderates the relationship between agile teamwork and team engagement as follows:

Hypothesis 4. *Role conflict weakens the benefits of agile teamwork for team engagement. When role conflict is high, the relationship between agile teamwork and team engagement will be less positive than when role conflict is low.*

2 | Methods

2.1 | Organizational Context

We collected our data among teams of the digital service provider of a large German railway organization, which was undergoing an "agile transformation" program at the time of the study. The agile transformation entailed that larger departments were reorganized into systems of self-managing agile teams. Each team underwent a team-building program resembling classic models of group development (cf. Tuckman 1965). Approximately half of the teams were in the early phases of this program ("forming-storming"), while the rest were in more mature phases of agile team development ("norming-performing"). Teams were allowed to complete the program at their own pace, tailor AWPs to their needs, and utilize their preferred agile methods (e.g., Scrum or Kanban). In consequence, the teams in our study differed substantially in their use of AWPs.

In their implementation of AWPs, teams were supported by a designated agile coach. Other responsibilities of the coach were supporting the team in HR-related matters such as professional development, team building, and collaboration with other stakeholders. Thus, the agile coaches in the present

TABLE 1 | Sample characteristics.

	Main sample (*N* = 110 teams)	Sub sample (*N* = 54 teams)	
	Team members (*n* = 694)	Team members (*n* = 353)	Agile coaches (*n* = 54)
Age	<35 years (33%), 35–55 years (54%), >55 years (13%)	<35 years (39%), 35–55 years (52%), >55 years (9%)	<35 years (21%), 35–55 years (62%), >55 years (17%)
Gender	74% men	77% men	61% men
Education	61% Bachelor degree or higher	60% Bachelor degree or higher	76% Bachelor degree or higher
Team tenure	<1 year (28%), 1–2 years (29%), >2 years (43%)	<1 year (31%), 1–2 years (34%), >2 years (35%)	<1 year (30%), 1–2 years (20%), >2 years (49%)
Team types	79% delivery teams	80% delivery teams	
Agile transformation program	59% in advanced phase	66% in advanced phase	
Team size	*M* = 10.49 (*SD* = 2.47)	*M* = 10.78 (*SD* = 2.43)	
Within-team response rate	*M* = 62% (*SD* = 14%)	*M* = 62% (*SD* = 12%)	

organization took on a servant leader role, similar to what has been observed in other studies of agile teams (Shastri, Hoda, and Amor 2021). The organization provided access to the shared email accounts of the teams and corresponding data in the HR system including the number of team members, the progress of the team in the agile transformation program, and the main function of the team. The organization distinguished between two types of teams, namely, (1) delivery teams (digital services, maintenance, and consulting) and (2) support teams (HR, finance, and customer relations).

2.2 | Procedure and Participants

After receiving approval from the company's work council and data privacy officers, we sent an invitation to the shared email accounts of all 577 teams registered in the company's HR system. In the survey, we asked participants to indicate whether they were a "regular" team member or an agile team coach. We separated the team member ($n = 1271$) and team coach data ($n = 163$). A challenge in empirical team research is to decide whether or not to include teams with relatively low within-group response rates. On the one hand, excluding groups with low response rates can increase statistical power by improving the reliability of group means (ICC2). On the other hand, excluding groups implies a lower number of Level 2 units, which can decrease statistical power. In addition, team researchers need to consider whether their data aggregation model is *formative* (member responses are not interchangeable) or *reflective* (members act as informants on behalf of the team).

According to Biemann and Heidemeier (2012), for reflective aggregation models, it is appropriate to include groups with sub-optimal response rates. Their simulations suggest that for reflective aggregation models, excluding groups with very few responses has little effect on statistical power. Excluding groups with six or more responses can influence statistical power *negatively* (see Biemann and Heidemeier, p. 395). Hence, to balance group mean reliability and the Level 2 sample size, we performed the analyses on a sample of 110 teams for which we obtained at least five responses per team ($n = 694$). The average team size according to HR system data was 10.49 ($SD = 2.47$) and the average within-team response rate was 62% ($min. = 33\%$, $max. = 100\%$). For a sub-sample of 54 teams, we also obtained ratings of their agile coach. Sample characteristics are displayed in Table 1.

2.3 | Measures

All measures were administered in German and, if necessary, translated from English using the forward-back translation method by the first author with the help of a research assistant (both are German native speakers and fluent in English). Psychometrics and data aggregation statistics are provided below in Table 2.

Agile work practices. We used the recently validated Agile Work Practices Instrument (AWPI; see Junker et al. 2022, 2023). The AWPI captures *agile taskwork* with a four-item iterative development subscale (e.g., "We experiment with different ideas before settling on an approach") and a four-item sprints subscale (e.g., "We plan our work in short cycles"). The agile taskwork items are rated on a Likert scale (1 = *fully disagree*, 7 = *fully agree*). The AWPI captures *agile teamwork* with a four-item retrospective meetings subscale (e.g., "We take our time to discuss about our work processes") and a four-item standup meetings subscale (e.g., "We have a short meeting to monitor the progress of our work"). The agile teamwork items are rated on a frequency scale (1 = *never*, 7 = *daily*).

Job demands. We used measures validated by Savelsbergh et al. (2012) for assessing *team role conflict* with three items (e.g., "The team receives conflicting requests from two or more people."). We also build on their measures to capture *team work complexity* with three items: (1) "The team's tasks are complex and difficult," (2) "The team's tasks seem to be getting more and more complex," and (3) "The team's tasks require a large variety of different skills and abilities." Team members rated the extent to which the statements applied to their team (1 = *fully disagree*, 7 = *fully agree*).

Team engagement. As recommended by Costa, Passos, and Bakker (2014), we used the referent "my team" to measure *team vigor* ("My team is bursting with energy at work"), *team dedication* ("My team is enthusiastic about the work"), and *team absorption* ("My team is immersed in its work"). In addition, we included the short version of the Utrecht Work Engagement Scale (UWES3; Schaufeli et al. 2002, 2019), which allowed us to control for the average team member work engagement. Items were rated from (1 = *never*, 7 = *always*).

2.4 | Data Aggregation and Psychometrics

As shown in Table 2, there existed considerable team-level variance (ICC1), ranging from 10% for individual work

TABLE 2 | Psychometrics and data aggregation statistics.

Variable	ICC1	ICC2	Median r_{wgj}	Mean r_{wgj}	α	ω_h
Agile taskwork	0.40	0.81	0.93	0.90	0.89	0.89
Agile teamwork	0.30	0.73	0.96	0.90	0.89	0.82
Team role conflict	0.23	0.65	0.86	0.82	0.77	0.78
Team work complexity	0.11	0.45	0.89	0.86	0.68	0.70
Team engagement	0.21	0.63	0.92	0.89	0.92	0.93
Member work engagement	0.10	0.42	0.90	0.86	0.92	0.92

Note: Within group agreement (r_{wgj}) was calculated based on a uniform distribution.

engagement to 40% for agile taskwork. The ICC2 and rwg(j) statistics indicate that aggregation to the team-level is appropriate (Bliese, Maltarich, and Hendricks 2018; Van Mierlo, Vermunt, and Rutte 2009). Moreover, our scales were internally consistent, as shown by sufficiently large Cronbach's alpha (α) and McDonald's omega values (ω_h).

2.5 | Analysis Strategy

We test our hypotheses using the "multilevel" package in R (Bliese 2013) to account for the nested data structure. Given that we are primarily interested in the Level 2 relationships, we aggregate the predictors to the team-level. Hence, we use the study variables to predict the random intercept of team engagement using the aggregated scores of AWPs and job demands. The advantage of multilevel modeling over conventional regression analysis with aggregated data is that this approach can better account for unequal cluster sizes (Bliese, Maltarich, and Hendricks 2018; Hox, Moerbeek, and van de Schoot 2017). In the sub-sample of 54 teams, we conduct robustness analyses by using the agile coach ratings of job demands. In all analyses, we control for team type and whether teams were at the beginning or end phases of the agile transformation. Hence, we examine whether relationships are not otherwise explained by these context factors. We also test

models where we control for the respondents' work engagement to establish whether AWPs are predictive of team engagement, beyond individual work engagement. Finally, we replicate the analyses using formative aggregation models to measure team engagement as the average individual work engagement (direct-consensus).

3 | Results

3.1 | Measurement Model and Descriptive Statistics

Before testing the hypotheses, we examined our measurement model using confirmatory factor analyses of the aggregated team data ($N = 110$ teams). The proposed five-factor model (agile taskwork, agile teamwork, role conflict, work complexity, and team engagement) fit the data well: $\Delta\chi^2 = 87.28$, $df = 78$, $p = 0.004$, CFI $= 0.95$, TLI $= 0.92$, RMSEA $= 0.07$, SRMR $= 0.07$. As shown in Table 3, agile taskwork and agile teamwork were significantly associated with team engagement ($r = 0.41$ and $r = 0.29$). To a smaller extent, agile taskwork and agile teamwork also related to the average individual work engagement ($r = 0.24$ and $r = 0.24$). Moreover, teams in the advanced phase of the agile transformation scored higher on agile taskwork ($r = 0.22$) and team engagement ($r = 0.23$).

TABLE 3 | Means, standard deviations, and correlations.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1. Team size	10.49	2.47										
2. Team type (0 = delivery team)	0.21	0.41	−0.05									
3. Agile transformation (0 = beginning)	0.59	0.49	0.11	0.20*								
4. Agile taskwork	4.63	0.78	−0.02	−0.15	0.22*							
5. Agile teamwork	4.64	0.59	−0.08	−0.08	0.14	0.63**						
6. Team engagement	5.06	0.56	0.00	0.00	0.23*	0.41**	0.29**					
7. Work engagement	5.06	0.52	0.04	0.13	0.13	0.24*	0.24*	0.73**				
8. Team role conflict	3.37	0.64	−0.13	0.21*	0.02	−0.33**	−0.27**	−0.35**	−0.38**			
9. Work complexity	5.33	0.46	0.26**	0.04	0.07	−0.02	−0.05	0.24*	0.15	0.21*		
10. Coach-rated role conflict	3.29	1.08	−0.27*	0.01	0.04	−0.17	−0.16	−0.17	−0.30*	0.38**	0.23	
11. Coach-rated work complexity	5.64	0.86	−0.05	−0.07	0.10	0.06	0.24	−0.02	−0.04	−0.11	0.25	0.34*

Note: Sample size for correlations with coach ratings is $N = 54$ teams, for all other variables $N = 110$ teams.
**$p < 0.01$.
*$p < 0.05$.

3.2 | Hypotheses Testing

Hypothesis 1 states that agile taskwork relates positively to team engagement. As shown in Table 4, agile taskwork explained variance in team engagement over and above job demands (see M1, $\gamma = 0.17$, $p < 0.001$) and was uniquely associated with team engagement when controlling for agile teamwork (M3, $\gamma = 0.16$, $p = 0.012$), and the average individual work engagement (M5, $\gamma = 0.13$, $p = 0.007$). Thus, Hypothesis 1 was supported. Hypothesis 2 states that work complexity strengthens the relationship between agile taskwork and team engagement. Results indicated a significant interaction effect of agile taskwork and work complexity (M4, $\gamma = 0.14$, $p = 0.007$), which was also significant when controlling for the average individual work engagement (M5, $\gamma = 0.09$, $p = 0.025$). Results with the coach ratings of work complexity shown in Table 5 indicate a similar interaction of agile taskwork and work complexity, although this effect is only significant at $p < 0.10$ (M4, $\gamma = 0.15$, $p = 0.059$).

We plotted the interactions (Figure 2), which revealed a pattern that aligned with Hypothesis 2: Agile taskwork related more strongly to team engagement when work complexity was high (+1SD) compared to when it was low (-1SD). Simple slope analyses indicated that agile taskwork related more strongly to team engagement at *high* levels (+1SD) of work complexity ($b = 0.29$, 95% CI [0.136 to 0.438]) than at *low* levels (-1SD) of work complexity ($b = 0.01$, 95% CI [−0.148 to 0.167]). Similar results emerged when simple slopes analyses were conducted based on models with agile coach ratings of work complexity (Table 5): agile taskwork related significantly to team engagement at *high* levels (+1SD) of work complexity ($b = 0.39$, 95% CI [0.142 to 0.633]) but not at *low* levels (–1SD) of work complexity ($b = 0.09$, 95% CI [−0.170 to 0.340]). These findings support Hypothesis 2.

Hypothesis 3 states that agile teamwork relates positively to team engagement. Although agile teamwork explained significant variance in team engagement over and above job demands (see M2 of Table 4, $\gamma = 0.11$, $p = 0.020$), this effect vanished when controlling for agile taskwork (see M3 to M5). In addition, the interaction effect of agile teamwork and role conflict as predicted by Hypothesis 4 was not significant, neither in models with team member ratings of role conflict (Table 4) nor in models with agile coach ratings of role conflict (Table 5). In sum, these findings indicate that Hypotheses 3 and 4 are rejected.

3.3 | Supplementary Analyses

As supplementary analyses, we tested the hypotheses again by measuring team engagement as the average individual work engagement. This corresponds to a formative aggregation model, where it is recommended to maximize the within-team response

TABLE 4 | Multilevel regressions with team member ratings of job demands.

Model	M0	M1	M2	M3	M4	M5
(Intercept)	4.91 (0.08)***	4.95 (0.07)***	4.93 (0.07)***	4.95 (0.07)***	4.94 (0.07)***	5.01 (0.06)***
Team type	0.05 (0.12)	0.11 (0.12)	0.07 (0.12)	0.11 (0.12)	0.11 (0.11)	−0.05 (0.09)
Agile transformation	0.25 (0.10)*	0.16 (0.10)+	0.21 (0.10)*	0.16 (0.10)+	0.16 (0.09)	0.12 (0.08)
Team role conflict	−0.23 (0.05)***	−0.18 (0.05)***	−0.20 (0.05)***	−0.18 (0.05)***	−0.18 (0.05)***	−0.03 (0.04)
Team work complexity	0.17 (0.05)***	0.17 (0.05)***	0.17 (0.05)***	0.17 (0.05)***	0.19 (0.05)***	0.09 (0.04)*
Agile taskwork		0.17 (0.05)***		0.16 (0.06)*	0.15 (0.06)*	0.13 (0.05)**
Agile teamwork			0.11 (0.05)*	0.03 (0.06)	0.04 (0.06)	0.00 (0.05)
Agile taskwork×work complexity					0.14 (0.05)**	0.09 (0.04)*
Agile teamwork×role conflict					−0.04 (0.04)	0.00 (0.03)
Average member work engagement						0.33 (0.04)***
SD (intercept team)	0.36	0.32	0.34	0.32	0.30	0.14
SD (observations)	0.85	0.86	0.85	0.86	0.86	0.85
R^2 Marg.	0.084	0.110	0.097	0.111	0.127	0.208

Note: All predictors were modeled at Level 2 as fixed effects (intercept-as-outcome model). Standard errors are shown in brackets. R^2 Marg. refers to variance explained by the fixed effects and is comparable to conventional R^2 statistics. $N = 641$ observations, nested in 110 teams,
***$p < 0.001$.
**$p < 0.01$.
*$p < 0.05$.
+$p < 0.10$.

TABLE 5 | Multilevel regressions with team coach ratings of job demands.

| Model	M0	M1	M2	M3	M4
(Intercept)	5.10 (0.15)***	5.13 (0.13)***	5.11 (0.14)***	5.13 (0.13)***	5.14 (0.14)***
Team type	−0.05 (0.21)	0.06 (0.19)	−0.02 (0.20)	0.05 (0.19)	0.04 (0.19)
Agile transformation	0.08 (0.18)	−0.01 (0.16)	0.04 (0.17)	−0.01 (0.16)	−0.04 (0.17)
Team role conflict	−0.11 (0.09)	−0.05 (0.08)	−0.05 (0.09)	−0.04 (0.08)	−0.03 (0.09)
Team work complexity	0.01 (0.09)	−0.02 (0.08)	−0.06 (0.09)	−0.03 (0.08)	0.00 (0.08)
Agile taskwork		0.28 (0.08)***		0.24 (0.10)*	0.24 (0.10)*
Agile teamwork			0.22 (0.08)*	0.07 (0.10)	0.10 (0.10)
Agile taskwork×work complexity					0.15 (0.08)+
Agile teamwork×role conflict					−0.03 (0.09)
SD (intercept team)	0.49	0.40	0.45	0.41	0.39
SD (observations)	0.89	0.90	0.90	0.90	0.90
R^2 Marg.	0.012	0.082	0.053	0.085	0.104

Note: All predictors were modeled at Level 2 as fixed effects (intercept-as-outcome model). Standard errors are shown in brackets. R^2 Marg. refers to variance explained by the fixed effects and is comparable to conventional R^2 statistics. $N = 353$ observations, nested in 54 teams,

***$p < 0.001$.

**$p < 0.01$.

*$p < 0.05$.

+$p < 0.10$.
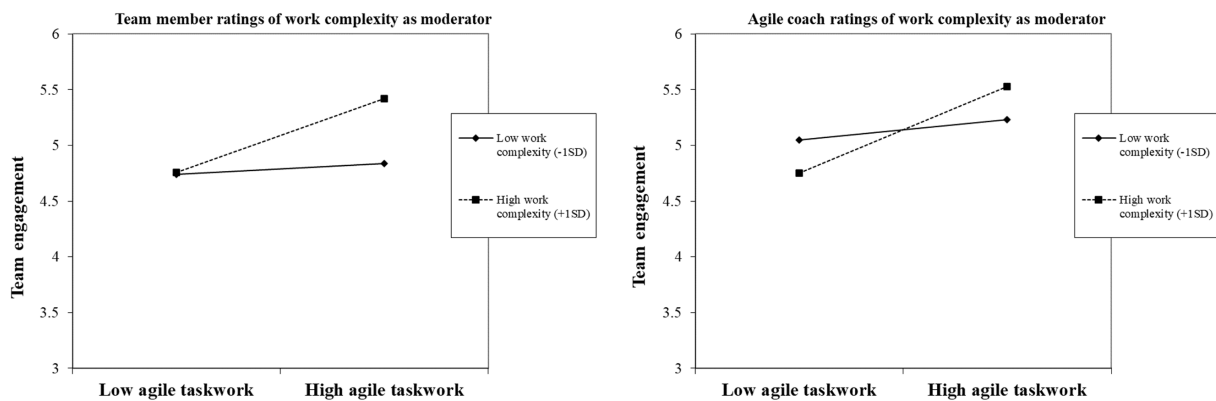
FIGURE 2 | Interaction of agile taskwork and work complexity on team engagement (referent-shift operationalization).

rate (Biemann and Heidemeier 2012). Hence, we conducted the analyses on a sub-sample of 31 teams from which we had surveyed at least 70% of all team members ($N = 214$ observations). As shown in Model 4 of Table 6, the analyses again replicate the hypothesized interaction effect of agile taskwork and work complexity ($\gamma = 0.31$, $p = 0.008$, see Figure 3). This supports Hypothesis 2. In addition, models with average work engagement as the outcome indicate a significant interaction of agile teamwork and role conflict ($\gamma = −0.31$, $p = 0.014$). According to simple slopes analyses (see right panel of Figure 3), agile teamwork related to work engagement only at *low* levels (-1SD) of role conflict ($b = 0.38$, 95% CI [0.060 to 0.702]), but not at *high* (+1SD) levels of role conflict ($b = −0.25$, 95% CI [−0.551 to 0.061]). Therefore, in analyses with team engagement measured as the average individual work engagement, Hypothesis 4 is supported. Finally, we tested whether the effects are robust to (a) exclusion of control variables, (b) inclusion of additional two-way interaction, and (c) inclusion of additional three-way interactions

with the team type and agile transformation variable. These supplementary analyses indicate that our findings hold in different sub-groups (i.e., team types, agile transformation phases). Detailed results of these robustness tests are available online (see Table S1, OSF|Work Engagement in Agile Teams).

4 | Discussion

The findings of the present study contribute to research on agile teams and theories of work engagement in three ways. First, we identify which agile practices are most effective in fostering team engagement (Baham and Hirschheim 2022; Junker, Bakker, and Derks 2025; Steegh, Van De Voorde, and Paauwe 2025). Specifically, the results reveal that *agile taskwork*—characterized by working in short, iterative cycles—is more closely linked to collective work engagement compared to *agile teamwork*, which includes practices like frequent stand-up

TABLE 6 | Multilevel regressions with average individual work engagement as outcome.

| Model	M0	M1	M2	M3	M4
(Intercept)	4.94 (0.12)***	4.95 (0.12)***	4.93 (0.12)***	4.93 (0.12)***	4.85 (0.11)***
Team type	0.51 (0.23)*	0.55 (0.23)*	0.52 (0.23)*	0.53 (0.23)*	0.34 (0.22)
Agile transformation	0.07 (0.20)	0.04 (0.20)	0.09 (0.19)	0.08 (0.20)	0.33 (0.21)
Team role conflict	−0.28 (0.10)*	−0.26 (0.10)*	−0.29 (0.10)**	−0.28 (0.10)*	−0.24 (0.09)*
Team work complexity	0.17 (0.10)	0.17 (0.10)	0.20 (0.10)+	0.20 (0.10)+	0.27 (0.09)**
Agile taskwork		0.09 (0.09)		0.03 (0.11)	0.09 (0.10)
Agile teamwork			0.13 (0.09)	0.11 (0.11)	0.07 (0.10)
Agile taskwork×work complexity					0.31 (0.11)**
Agile teamwork×role conflict					−0.31 (0.12)*
SD (intercept team)	0.30	0.29	0.28	0.29	0.17
SD (observations)	0.96	0.96	0.96	0.96	0.96
R^2 Marg.	0.079	0.085	0.093	0.093	0.146

Note: All predictors were modeled at Level 2 as fixed effects (intercept-as-outcome model). Standard errors are shown in brackets. R^2 Marg. refers to variance explained by the fixed effects and is comparable to conventional R^2 statistics. $N = 214$ observations, nested in 31 teams,
***$p < 0.001$.
**$p < 0.01$.
*$p < 0.05$.
+$p < 0.10$.
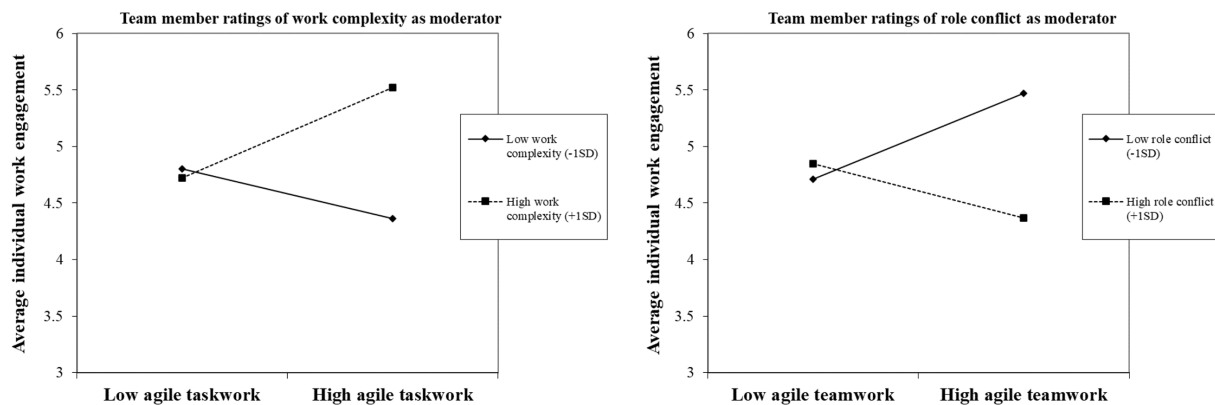
FIGURE 3 | Interactions with average individual work engagement as outcome (direct-consensus operationalization).

and retrospective meetings. Second, this study is among the first to validate the boosting principle of JD-R theory at the team-level (cf. Costa, Passos, and Bakker 2015; Liu et al. 2024). We demonstrate that agile taskwork has a stronger association with team engagement in environments where work complexity is high (vs. low). These findings provide a multilevel extension of JD-R theory by showing that team resource mobilization (e.g., through agile taskwork) is most engaging in the context of challenging work (Bakker, Demerouti, and Sanz-Vergel 2023; Tadić, Bakker, and Oerlemans 2015). Finally, our findings shift the focus of team engagement research from viewing resources as abstract ingredients to recognizing actionable, concrete practices that enable teams to mobilize resources effectively (Hobfoll et al. 2018; Wittenberg et al. 2024). Next, we discuss the theoretical mechanisms that illustrate how agile work practices (AWPs) facilitate resource mobilization and help teams achieve a state of collective work engagement.

4.1 | How Do Agile Work Practices Contribute to Team Engagement?

Our model (Figure 1) proposes that agile taskwork contributes to team engagement by mobilizing members' cognitive-attentional resources. Approaching tasks in iterative sprint cycles may help to channel members' attention toward shared goals and promote evolving task insights (i.e., learning; Annosi et al. 2020). Our results showed that the more a team practiced agile taskwork, the higher the level of team engagement. The correlations between agile taskwork and work engagement ($r = 0.24$ to 0.41) are comparable to commonly studied job resources (e.g., Hakanen, Bakker, and Turunen 2021). Thus, teams that utilize agile taskwork practices, such as sprints and iterative development, seem to create a task environment that is conducive to team engagement. In this agile task environment, employees may experience higher levels of work engagement because they have the

cognitive resources to fully immerse themselves in their tasks (Metiu and Rothbard 2013). Now the question arises whether the pathway from agile taskwork to team engagement is indeed based on the proposed cognitive-attentional mechanism (see gray box of Figure 1).

While we were not able to directly test the mediating mechanisms, the results of moderation analyses support the underlying logic that agile taskwork facilitates cognitive-attentional resource mobilization. Specifically, we found that work complexity strengthens the relationship between agile taskwork and team engagement. This suggests that agile taskwork is particularly useful for cognitively demanding work. Linear and long-term goal setting is less effective for complex tasks (Wood, Mento, and Locke 1987). Instead, complex work requires more frequent re-prioritizing (Kremser and Blagoev 2021), changes in performance strategies (Goh and Pentland 2019), and flexible time management (Lifshitz-Assaf, Lebovitz, and Zalmanson 2021). This can be enabled through agile taskwork practices, such as sprints (Junker et al. 2022, 2023; Junker, Bakker, and Derks 2025; Lieberum, Schiffels, and Kolisch 2022). Agile taskwork allows teams to transform complex assignments into more well-structured tasks, which has been shown to foster collective intelligence (Graf-Drasch et al. 2022; Janssens, Meslec, and Leenders 2022). As a consequence, members of agile teams collectively experience work engagement despite facing highly complex work.

While the results regarding agile taskwork were robust, relationships between agile teamwork and work engagement were less consistent. Our findings did not support the assumption that agile teamwork translates automatically into higher levels of team engagement. There may be several explanations for this. First, we measured agile teamwork in terms of the frequency of agile meetings (i.e., stand-up and retrospective meetings; Junker et al. 2022). Although meetings are important contextual determinants of teamwork, the frequency of meetings does not necessarily say something about the quality of social interaction (Blanchard and Allen 2022). In addition, most teams were conducting their meetings remotely at the time of the study due to the COVID-19 pandemic. Given that remote meetings can be exhausting ("Zoom fatigue"; Nesher Shoshan and Wehrt 2021), the context of the study may have worked against our predictions. While frequent meetings can help remote teams maintain a sense of cohesion, this practice may also drain energetic resources (Bennett et al. 2021; Zhang, Spreitzer, and Qiu 2023)—undermining team engagement.

Another explanation for the lack of main effects of agile teamwork could be that moderators determine whether this practice translates into team engagement (Aguinis, Edwards, and Bradley 2017). In the present study, we focused on team role conflict—a hindrance stressor that may arise from the external context of agile teams. For example, team role conflict may occur when agile teams lack important information from customers (Hoda, Noble, and Marshall 2011) or when they must collaborate with other stakeholders that oppose an agile approach to work (Strode et al. 2022). Our analyses partially supported the idea that team role conflict weakens the relationship between agile teamwork and team engagement. This pattern was mainly present when we measured team engagement as the average individual

work engagement (see Figure 3). Role conflict potentially inhibits team members from overtly expressing their disengagement by creating a double-bind situation (Watzlawick 1963). In such situations, team members may *internally* experience lower levels of work engagement, yet do not express or display this to one another during team meetings. This may explain why we find the moderating effect of role conflict only for the average individual work engagement but not for shared team engagement scores.

We theorized that hindrance demands weaken the benefits of AWPs for team engagement (i.e., negative sign of the interaction coefficient). However, it is still possible these practices buffer the negative effects of hindrance demands in some situations (i.e., positive sign of the interaction coefficient). This may be the case for hindrance demands that team members experience *individually* (e.g., lack of information to complete a task) rather than *shared* hindrance demands (e.g., team role conflict). Having the opportunity to interact with colleagues in daily agile meetings may allow team members to address their task-related hindrance demands (Stray, Sjøberg, and Dybå 2016). When a team member experiences problems with a task, they may seek advice from colleagues during agile meetings to address the problem. Although such interactions may not contribute to *shared* team engagement, they may help the team member in question to maintain their *individual* work engagement—despite experiencing a hindrance stressor. In contrast, shared hindrance demands such as team role conflict may undermine the motivational benefits of agile teamwork by disrupting the mobilization of socio-emotional resources by the whole team (e.g., less positive interactions during agile meetings; Twemlow, Tims, and Khapova 2023). This underscores the importance of distinguishing between shared and individual job demands (cf. Razinskas and Hoegl 2020).

4.2 | Practical Implications

The results of this study offer empirical evidence for the suitability of AWPs as practical tools that could help to nurture the "ingredients" for team engagement. Planning tasks in sprints and approaching goals iteratively seems to pull team members in a compelling direction (cf. Metiu and Rothbard 2013), allowing them to channel their cognitive-attentional resources on mutual activities. As our results suggest, these elements of popular agile management frameworks (e.g., Scrum) have the potential to benefit team engagement. In contrast, the same benefits are less likely to occur from increasing the frequency of agile meetings. Although earlier work by Metiu and Rothbard (2013) suggested that team engagement requires frequent interactions, it appears that social interactions alone may not be sufficient. These interactions also need to be energizing, which is unlikely when teams are confronted with stressful job demands such as role conflict—as our results show.

By bringing attention to the moderating role of job demands, our insights could also be useful for teams that already use AWPs. Our results imply that by regulating job demands, organizations may be able to enhance or sustain the work engagement of agile teams (i.e., those who already use AWPs

extensively). We focused on job demands that arise from the external context of teams: The difficulty of work assignments a team receives (*work complexity*) and the degree to which teams receive conflicting requests (*role conflict*). The latter represents a hindrance stressor that may require external intervention. To address such hindrance demands, team leaders may try clarify a team's role and address conflicting customer requests (Hoda, Noble, and Marshall 2011). For example, leaders could help in developing team charters (Mathieu and Rapp 2009) that make explicit how teams should collaborate with external parties, such as customers in terms of deadlines and work processes.

Our findings also have implications for organizations or leaders who contemplate whether an agile approach is suitable for their teams. To this end, the results show that teams working on complex assignments may benefit the most from approaching tasks in an agile way by working toward short-term goals (i.e., sprints) and experimenting with different ideas (i.e., iterative development). Hence, team members and external leaders may reflect on the complexity of their tasks before deciding to proceed in an agile way. These findings also indicate that leaders of agile teams may stimulate team engagement by ensuring that members can work on complex tasks that allow for sufficient mastery experiences. Taken together, the present study developed a contingency perspective on AWPs and urges agile practitioners to establish favorable work design conditions (for a review of work re-design interventions, see Knight and Parker 2021).

Team coaches may also pay attention to communicative dynamics during meetings and initiate interaction patterns that promote work engagement, even when teams experience hindrance stressors (e.g., by using humor; Lehmann-Willenbrock and Allen 2014; Scharp, Breevaart, and Bakker 2021). Doing so may help to unlock the engaging potential of agile teamwork practices (Twemlow, Tims, and Khapova 2023). In addition, we believe that team coaches should go beyond standard agile management guidelines (e.g., Schwaber and Sutherland 2017) in setting up practices such as stand-up and retrospective meetings. The general literature on work teams offers extensive guidance on how to conduct effective after-action-reviews or debriefs (Keiser and Arthur 2022). Although the present study did not find a lot of evidence for the added benefits of these review meetings, prior research suggested that well-designed team reflexivity interventions can improve team well-being (Chen et al. 2018).

4.3 | Limitations and Future Research

The results of the present study need to be interpreted in light of their limitations, which provide important directions for future research. First, causal conclusions cannot be derived from the results because this would require experimental manipulation. This may be especially important for improving our understanding of agile teamwork, given the possibility of reversed causation. For instance, highly engaged team members may be more attracted to meet and interact with each other (Schneider 1987). Experimental research can rule out this possibility by using the manipulation of agile teamwork introduced by Ghosh and Wu (2023). Experimental methods can also show whether agile taskwork *causes* work engagement

by helping employees mobilize cognitive-attentional resources (e.g., Lieberum, Schiffels, and Kolisch 2022).

Second, although we focused on job demands that originate from sources outside the team, it is possible that AWPs also have a direct effect on job demands (Rietze and Zacher 2022; Venkatesh et al. 2020). Here, this may have been the case for role conflict because AWPs correlated negatively with this hindrance stressor. For work complexity, this possibility seems less likely because the correlations with AWPs were weak and non-significant (see Table 3). Although agile practices were originally developed for complex task domains (e.g., software development projects), our results show that these practices are also used by teams that experience their work as less complex. Crucially, in these low-complexity contexts, agile taskwork practices do not promote experiences of team engagement (see Figure 2). It could be worthwhile for future research to examine whether the cause of work complexity matters. Does it matter whether a team experiences work complexity due to technological demands, difficult customer requests, or convoluted organizational processes? We encourage future research to address this question by developing more elaborate measures of work complexity and by going beyond survey-based methods.

Third, some of the results may have been affected by common method variance (CMV). We tried to limit the impact of CMV by including multisource ratings of job demands and by testing interaction effects (Siemsen, Roth, and Oliveira 2010). Nevertheless, future research may temporally separate the study variables to limit the impact of CMV further. Future research may go beyond survey-based methods to validate the proposed resource mobilization mechanisms (gray box of Figure 1). Experimental studies can test whether an agile approach to tasks helps in mobilizing cognitive-attentional resources (Lieberum, Schiffels, and Kolisch 2022). Moreover, interaction process analyses (Bales 1950) could be suitable for investigating the mobilization of socio-emotional resources across different timeframes. Indeed, a recent study of Klonek et al. (2024) demonstrated how interaction processes can be studied within agile teams, both at a micro-scale (i.e., during meetings) and macro-scale (i.e., entire duration of a sprint cycle). Although Klonek et al. (2024) focused on performance outcomes, the same approach could also be used to study team engagement.

The approach of Klonek et al. (2024) could also be useful for studying daily fluctuations in team engagement and its development over the course of a project. Our review of prior research on team engagement suggests that daily fluctuations in team engagement have been examined by only one study (Klasmeier and Rowold 2022), to the best of our knowledge (see Appendix A). Within-team analyses with multiple measurement moments per team may also help to improve statistical power, given that most prior studies sampled a relatively small number of Level 2 units (median of 93 groups; see Appendix A). Whether this is necessary is a matter of the research question. The present study primarily concerned *between-team* differences. These stable differences can co-exist next to *within-team* fluctuations in collective work engagement, and make up a different part of the variance in this emergent state (Klasmeier and Rowold 2022). Future research may attempt to disentangle these variance components in team engagement.

5 | Conclusion

While aggregated levels of work engagement have been linked to objective measures of team performance (Costa, Passos, and Bakker 2015) and firm profitability (Eldor 2020; Schneider et al. 2018), antecedents of team engagement remain understudied by the broader engagement literature (Wittenberg et al. 2024). The present study extends current theorizing on team engagement (Metiu and Rothbard 2013) and job demands-resources (JD-R) theory (Bakker, Demerouti, and Sanz-Vergel 2023), by explaining how teams can mobilize their collective resources using agile work practices (AWPs). This study also contributes to closing the research-practice gap on agile teams by investigating in which situations the use of AWPs translates into work engagement. Our findings indicate that *agile taskwork* (sprints and iterative development) may facilitate the mobilization of cognitive-attentional resources, helping team members to become immersed in their work when mastering complex tasks. In contrast, *agile teamwork* (stand-up and retrospective meetings) seems to benefit work engagement only when team role conflict is absent. The findings refute the universal best practice perspective on AWPs and indicate that collective job demands can form an important boundary to team engagement.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data access can be requested from the corresponding author. Analysis files are available online: OSF|Work Engagement in Agile Teams.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.

Appendix A

TABLE A1 | Review of prior quantitative studies on collective work engagement.

Authors	Study context	Level	L2 Units	L1 Units	Measurement	ICC1	Method
Barrick et al. (2015)	Credit unions, US	Firm	83	903	Referent-shift	0.08	Multisource and time-separated
Boermans et al. (2014)	Peacekeeping teams, Netherlands	Team	93	971	Referent-shift	0.20	Time separated
Chen et al. (2020)	Manufacturing and service teams, China	Team	149[a]	562[a]	Direct consensus	0.43	Multisource and time-separated
Costa, Passos, and Bakker (2014)	Student project teams, Portugal	Team	115[a]	513[a]	Referent-shift	0.17	Cross-sectional and single-source
Costa, Passos, and Bakker (2015)	Research teams, Portugal	Team	82	217	Referent-shift	0.05	Multisource
Costa, Passos, and Bakker (2016)	Student project teams, Portugal	Team	167	764	Referent-shift	0.12	Multisource and time-separated
Eldor (2020)	Retail service firms, Israel	Firm	198	4290	Direct consensus	0.03	Multisource and time-separated
Fan, Huang, and Timming (2021)	Manufacturing and service teams, China	Team	77	631	Direct consensus	0.34	Multisource
Fortuin et al. (2021)	Teams from various sectors, Netherlands	Team	111	612	Referent-shift	0.33	Multisource
García-Buades et al. (2016)	Hotel teams, Spain	Team	86	344	Direct consensus	0.18	Multisource
Gracia et al. (2013)	Tourist firms, Spain	Firm	107	615	Direct consensus	Unclear	Multisource
Hu, Dollard, and Taris (2022)	Healthcare teams, China	Team	66	963	Direct consensus	0.18	Cross-sectional and single-source
Huettermann and Bruch (2019)	SMEs, Germany	Firm	88	15952	Referent-shift	0.08	Multisource
Klasmeier and Rowold (2022)	Teams from various sectors, Germany	Team/ Day	53	187	Referent-shift	0.26	Daily diary, no time separation
Laulié, Tekleab, and Rousseau (2023)	Manufacturing and service teams, Chile	Team	69	504	Direct consensus	0.15	Cross-sectional and single-source
Mäkikangas et al. (2016)	Education teams, Finland	Team	102	1074	Referent-shift	0.13	Cross-sectional and single-source
Martinaityte, Unsworth, and Sacramento (2020)	Project teams, multiple countries	Team	39	186	Referent-shift	Unclear	Multisource and time-separated
Peeters, Van De Voorde, and Paauwe (2022)	Multinational bank, Netherlands	Team	97	623	Referent-shift	0.14	Cross-sectional and single-source
Rodríguez-Sánchez et al. (2017)	Student project teams, Spain	Team	118	605	Referent-shift	Unclear	Multisource and time-separated
Schneider et al. (2018)	Publicly traded firms, US	Firm	102	4199	Direct consensus	0.06	Multisource and time-separated
Tims et al. (2013)	Occupational health teams, Netherlands	Team	54	525	Referent-shift	0.14	Cross-sectional and single-source

[a]When multiple studies were reported, we recorded the weighted mean sample size and statistics. L2 Units refers to the number of teams/organizations, L1 Units refers to the number of individuals. ICC1 refers to the average between-team variance. We coded the between-team variance as "unclear" in cases where the specific ICC1 could not be extracted from the method section of the respective article. Records were extracted from Web of Science (April 2024) using the following keyword search: "Team Work Engagement" OR "Team Engagement" OR "Collective Work Engagement" OR "Collective Engagement" (249 records). Studies included in this table were published in prominent organizational behavior outlets and provided sufficient information on quantitative measures of collective work engagement.