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Threatening relatedness while boosting social interactions: the inconsistent effect of daily task ambiguity on daily relatedness satisfaction among remote workers

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ABSTRACT

Contemporary workplaces are characterized by ambiguity. Next to implications for performance, ambiguity has been negatively associated with employees' satisfaction of the need for relatedness. In this study, we investigate the implications of daily fluctuations of task ambiguity among remote workers and hypothesize that increased daily task ambiguity negatively relates to remote workers' daily relatedness satisfaction. However, drawing on uncertainty management theory and relational coordination theory, we argue that task ambiguity may also encourage the coordination of work activities with colleagues and supervisors, which, in turn, contributes to relatedness satisfaction. Paradoxically, task ambiguity should, thus, have a direct negative and an indirect positive relationship with relatedness satisfaction via increased coordination activities. We found support for our hypotheses in a daily diary study among 795 experienced remote workers, conducted during the COVID-19 pandemic. Our results confirm that daily task ambiguity is a work stressor with negative implications for daily relatedness satisfaction that experienced remote workers manage by seeking clarification from social sources. Moreover, we identify coordination activities as valuable for relatedness satisfaction. We critically discuss organizational policies on task clarity and provide ways to encourage coordination activities in remote work contexts.

KEYWORDS

Remote work;
self-determination theory;
need satisfaction;
coordination; ambiguity

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Introduction

Remote work is a form of flexible work in which employees work detached from conventional workplaces (Felstead & Henseke, 2017). Instead, employees work (at least partly) from locations other than their organization's main premises, for instance, from home. As work becomes disconnected from a specific physical location, information and communication technologies connect employees in a digital sphere (Donnelly & Johns, 2021; Messenger & Gschwind, 2016). The COVID-19 pandemic has accelerated the implementation of remote work practices and flexible working practices are expected to remain an integral part of the contemporary world of work (McPhail et al., 2024). Although remote work affords many opportunities for employees and organizations alike, such as increased flexibility (Gajendran & Harrison, 2007) and is associated with lower stress and higher work engagement and productivity (Delanoeije & Verbruggen, 2020), organizations must be aware of challenges associated with remote work. Remote work changes how employees connect to each other (Donnelly & Johns, 2021) and social and professional isolation, as well as loneliness, have been identified as challenges of remote work (e.g. Charalampous et al., 2019; Wang et al., 2021). Likewise, the satisfaction of the need for relatedness (Ryan & Deci, 2000), a powerful predictor of motivation, well-being, and productivity (Van den Broeck et al., 2016) has been negatively affected by remote work practices during the COVID-19 pandemic (Schade et al., 2021).

In the present study, we shed light on the antecedents of daily relatedness satisfaction among experienced remote workers, enabling us to provide useful guidelines for practitioners. We focus on ambiguity, which has been negatively associated with relatedness satisfaction (Van den Broeck et al., 2016) but is a common element of contemporary office and remote work environments (Gittell, 2006)—particularly of those that are characterized by volatile and dynamic project tasks (Schoellbauer et al., 2022)—and necessitates continuous coordination of tasks, schedules, and work activities (Bolton et al., 2021; Prem et al., 2021). Drawing on self-determination theory (Ryan & Deci, 2000), we extend the proposed effects of ambiguity and coordination, as suggested by uncertainty management theory (Kramer, 2004) and relational coordination theory (Gittell, 2006), by investigating their role in achieving daily relatedness satisfaction. In a daily diary study, we investigate whether remote workers engage in coordination activities when they experience task ambiguity and whether this type of interaction can contribute to daily relatedness satisfaction. Thus, we are able to derive useful insights concerning both the benefits and drawbacks of daily variations in task ambiguity and its management in remote work contexts. While most research focuses on

relatedness satisfaction as a stable construct (see Van den Broeck et al., 2016), we focus on daily experiences because work characteristics, such as task ambiguity, and need satisfaction vary intra-individually and these variations are generally largest on a daily level and significantly impact well-being and performance (Coxen et al., 2021).

Theory and hypotheses

Task ambiguity and relatedness satisfaction

The need for relatedness refers to the desire to love and care, to be loved and cared for, and to feel connected (Baumeister & Leary, 1995; Ryan & Deci, 2000). Maintaining close relationships and engaging in meaningful interactions with people can satisfy this need (Van den Broeck et al., 2008, 2016). Lately, this need to feel connected and to interact with others has been studied as one of the universal psychological needs within the framework of Ryan and Deci's (2000) self-determination theory and, in recent years, increasingly in the context of work and organizations (e.g. Coxen et al., 2023; Deci et al., 2017; Patterer et al., 2024; Van Tuin et al., 2021). Empirical observations support self-determination theory's proposition that satisfying the need for relatedness positively affects employees' motivation, well-being, and performance (for a meta-analysis, see Cerasoli et al., 2016; for reviews, see Deci et al., 2017; Van den Broeck et al., 2016). Self-determination theory, moreover, proposes that various contextual factors, such as job stressors (Deci et al., 2017), and their daily variations affect relatedness satisfaction (Coxen et al., 2021; Deci et al., 2017).

Job stressors, such as ambiguity at work, have been negatively associated with relatedness satisfaction (Fernet et al., 2013; Van den Broeck et al., 2016). Ambiguity is understood as a job stressor (Kauppila, 2014) and is characterized by a lack of certainty regarding the behavioral requirements at work, which are often conveyed in terms of inputs from the environment (Rizzo et al., 1970). It has been associated with low levels of performance (Eatough et al., 2011), engagement (Maden-Eyiusta, 2021), and job satisfaction (Gilboa et al., 2008). Moreover, it has been negatively associated with well-being (Fernet et al., 2013; Lang et al., 2007) and the satisfaction of the need for relatedness (Fernet et al., 2013). Conversely, clarity is crucial in ensuring appropriate work behaviors and adequate performance (Mañas et al., 2018) and has been positively associated with relatedness satisfaction (Karkkola et al., 2019). While need satisfaction is often understood as a stable construct, evidence suggests that daily variations occur and are meaningful for well-being and performance (Coxen et al., 2021). Consequently, we test whether daily fluctuations in task ambiguity

generate meaningful implications for relatedness satisfaction, as Van den Broeck et al. (2016) suggested, and whether the observed relationship between ambiguity and relatedness satisfaction replicates in a remote work context.

Hypothesis 1: Daily task ambiguity negatively relates to daily relatedness satisfaction (direct negative effect).

Managing daily task ambiguity by coordinating work activities with others

Ambiguity negatively affects various job-related outcomes, including relatedness satisfaction (Van den Broeck et al., 2016). In flexible work environments, however, employees are largely responsible for managing their tasks independently and must actively coordinate their work tasks with others to work efficiently (Prem et al., 2021). Coordination can be understood as the management of task dependencies (Faraj & Sproull, 2000; Malone & Crowston, 1994) under conditions of uncertainty (Faraj & Xiao, 2006) and is an essential objective of organizations (Okhuysen & Bechky, 2009). It involves planning, communicating, and anticipating colleagues' actions, their needs, and task requirements (Rico et al., 2011) and allows teams to work efficiently, achieve common goals (Gorman, 2014), and increase performance (Faraj & Sproull, 2000). Likewise, spontaneous or “nonprogrammed” coordination has been shown to facilitate effectiveness in ambiguous situations (Argote, 1982).

Both theory and empirical evidence suggest that coordination is critical in ambiguous situations. According to relational coordination theory (Gittell, 2006), relationships play a crucial role in facilitating the coordination of work within uncertain environments (Bolton et al., 2021; Gittell, 2006). Likewise, Galbraith (1974) argues that ambiguous tasks can be managed by establishing communication channels with other organizational units because this facilitates coordination. Beyond suggesting that coordination is critical in ambiguous situations, uncertainty management theory (Kramer, 2004) poses that uncertainty, which we understand to be an aspect of ambiguity (Rizzo et al., 1970), motivates individuals to seek clarification, for instance, from colleagues and supervisors (Freund, 2015; Gallagher & Sias, 2009). Accordingly, Lee et al. (2017) found that collaboration reduces ambiguity, arguably because employees gain new information in their interactions with their colleagues and supervisors. We propose that remote workers who encounter daily task ambiguity increase their daily coordination efforts because they experience a need for information (cf. Kramer, 2004; Kramer et al., 2019).

Hypothesis 2: Daily task ambiguity positively relates to daily coordination activities.

Informally interacting with others (Jungert et al., 2018) and receiving support from colleagues and supervisors (Men et al., 2022; Van den Broeck et al., 2008) can increase daily relatedness satisfaction. We argue that coordination activities contribute to relatedness feelings as coordination entails interpersonal interaction and offers opportunities for social support and bonding (Bolton et al., 2021; Courtright et al., 2015). Although remote workers connect digitally rather than in person (Donnelly & Johns, 2021), we assume that digitally mediated coordination is still effective in satisfying relatedness needs because research finds that communication *via* digital technologies can be effective in reducing feelings of isolation among remote workers (Golden et al., 2008; Van Zoonen & Sivunen, 2022). This likely extends to relatedness satisfaction. Consequently, we argue that coordination activities positively relate to the satisfaction of the need for relatedness:

Hypothesis 3: Daily coordination activities positively relate to remote workers' daily feelings of relatedness.

Research in the field of self-determination theory (Ryan & Deci, 2000) indicates that ambiguity has detrimental effects on relatedness satisfaction, mainly because employees who lack task-specific information may feel excluded or isolated from their colleagues and supervisors (Fernet et al., 2013; Van den Broeck et al., 2016). Premises of uncertainty management theory (Kramer, 2004) and relational coordination theory (Gittell, 2006), however, suggest that ambiguity encourages employees to increase their coordination activities, which should foster feelings of relatedness (Lee et al., 2017). Paradoxically, ambiguity should, therefore, have both direct negative (hypothesis 1) and indirect positive (hypothesis 4) consequences for relatedness satisfaction:

Hypothesis 4: Daily task ambiguity positively relates to daily relatedness satisfaction via higher levels of daily coordination activities (indirect positive effect).

Method

Procedure and sample

The daily diary data were collected during the first months of the COVID-19 pandemic (between March and May 2020), during which an unprecedented number of people worked from home. This gave us a unique opportunity to study the experience of extensive remote work. Participants were recruited via various Austrian organizations and we distributed the questionnaire as an online survey. As this study is non-interventional, no ethical approval was required. After

agreeing to the terms, participants completed a questionnaire that included questions related to socio-demographics as well as work-related questions. had to provide their phone number or email address so the daily diary questionnaires could be forwarded. This personal information was saved separately from the information provided in the questionnaires. For the diary data collection, participants were instructed to fill out the daily questionnaire shortly after work on 5 consecutive days. We sent reminders at 5:30 PM via email and SMS. Because this study was directed at individuals working remotely during data collection, participants who had not worked remotely on a specific day were screened out.

A total of 1,853 higher education professionals, office workers, professional workers, and technicians signed up for the study. Of those, 220 participants did not respond to the basic questionnaire after registration. Another 66 participants were excluded for not filling out any daily questionnaires. The transition to remote work was particularly difficult for individuals without prior remote work experience (Fana et al., 2020), and even individuals with jobs that were generally unsuited to remote work, such as teachers, were required to work remotely during the COVID-19 pandemic. Experienced remote workers are more likely to have established practices and workflows for remote work communication and coordination. In contrast, employees new to a remote work context may initially struggle with developing successful strategies. Because we aimed to provide insights that generally could be applied to remote workers beyond the COVID-19 pandemic, we only included experienced remote workers for analysis. Consequently, we excluded 772 individuals who worked in organizations that did not offer periodic remote work before the COVID-19 pandemic. We obtained a final sample of 795 participants and 2,961 daily observations. On average, participants completed 3.75 ($SD=1.29$) daily questionnaires. We repeated all analyses for individuals with only limited prior experience, as a robustness check.

Participants were between 18 and 70 years old ($M=42.71$, $SD=11.83$) and, on average, worked 37.74 h per week ($SD=8.79$). Overall, 57.6% of the respondents were women. The sample was highly educated, with 82.6% having at least a high-school diploma equivalent and/or university degree. The mean organizational tenure of participants was 17.80 years ($SD=13.22$), and 22.1% indicated that they had leadership responsibilities. In terms of work roles, 49.8% were higher education professionals (i.e. individuals with jobs that typically require a university degree, such as engineers, economists, lawyers, physicians, researchers, or professionals in the information and communication industry), 31.9% office staff, and 18.2% skilled workers or technicians.

Attrition bias

Of the initial pool of 822 participants who fulfilled the inclusion criteria and provided general information in the first questionnaire, 27 failed to fill out the daily diary questionnaires. To avoid the effects of any unwanted systematic attrition bias in the data, we conducted *t*-tests to examine whether any significant differences existed in terms of gender, age, education, and work hours across participants who only filled out the initial questionnaire and those who filled out at least one diary questionnaire. The results revealed that both groups did not differ significantly. Moreover, the number of diary questionnaires completed by participants was not significantly related to daily ambiguity, daily coordination activities, or daily relatedness satisfaction. Results are presented in the [Appendix A](#).

Measures

Task ambiguity

Task ambiguity was assessed daily with the item “How clear were your work assignments today?” which we reversed before conducting the analyses. Participants indicated their responses on a Likert scale ranging from one (“not at all”) to seven (“completely”). We created this item instead of using existing items measuring role clarity or role ambiguity because we intended to measure perceived ambiguity regarding daily work tasks rather than general role ambiguity. Role ambiguity describes a lack of clarity regarding duties, responsibilities, and expectations from supervisors, team members, or the organization itself (Kauppinen, 2014; Rizzo et al., 1970) and refers to a broader understanding of an employee’s role at the organization. Although role ambiguity is generally assumed to decrease with organizational tenure (e.g. Srikanth & Jomon, 2013), it is arguably not subjected to significant daily variations but remains stable over time (La France et al., 2003). However, individuals with a clear understanding of their role in an organization may still experience daily fluctuations of task clarity, which we aimed to assess. Moreover, using abbreviated scales or single items has become common in diary studies (e.g. Shockley et al., 2022; Xing et al., 2021) to reduce the overall length of questionnaires (Ohly et al., 2010).

Following recommendations by Gabriel et al. (2019) for analyzing single items, we assessed whether our measure of task ambiguity was suitable. To do so, we investigated its correlation with in-role behavior, which is consistently negatively associated with ambiguity (e.g. Gilboa et al., 2008). The analysis revealed that the one-item measure of ambiguity was significantly correlated with in-role behavior (measured with items

adapted from Goodman & Svyantek, 1999) at a medium level of $r = -0.44$, $p < 0.001$, suggesting that it is an adequate measure with adequate content and construct validity.

Coordination activities

To capture coordination, we adapted the three items from the subscale “coordinating with others” of the German version of the cognitive demands of flexible work scale developed by Prem et al. (2021) for the daily diary design (e.g. “Today, I had to coordinate with colleagues and supervisors in terms of content.”). Participants indicated how much each item applied to their working day on a Likert scale ranging from one (“not at all”) to seven (“completely”).

Relatedness satisfaction

To measure relatedness satisfaction, we adapted three items from the German language relatedness subscale of the work-related basic need satisfaction scale developed by Van den Broeck et al. (2010; e.g. “Today, I felt part of a group”). Responses were indicated daily on a Likert scale ranging from one (“not at all”) to seven (“completely”).

Data analysis

Our data are characterized by a hierarchical structure, with repeated measurements of the same individuals. We employed a two-level analysis framework, with individuals at the between-person level ($N = 795$) and daily observations at the within-person level ($N = 2,961$). The focal variables were measured daily at the within-person level. Prior to testing our hypotheses, intra-class correlations (ICC) were calculated. ICCs describe the degree of variability of the focal variables and can be defined as the ratio of between-person variability divided by the sum of between-person variability and within-person variability (cf., Liu et al., 2017).

We followed recommendations for multilevel mediation path analysis outlined by Stride et al. (2015) to examine the relationships between task ambiguity, coordination activities, and relatedness satisfaction. Using Mplus Version 8 (Muthén & Muthén, 2017), we specified a path model for the between- and within-person levels. To account for potential violations of distributional assumptions and non-independence of observations, we utilized the maximum likelihood with robust standard errors (MLR) estimator. This approach enabled us to account for within-person variability in daily experiences and between-person differences in overall levels of task ambiguity, coordination activities, and relatedness satisfaction.

To evaluate model fit, we used the root mean square error of approximation (RMSEA; Steiger, 1990), the χ^2 index, the comparative fit index (CFI), and the Tucker–Lewis index (TLI; Bentler, 1990). These indices provided insight into the adequacy of our multilevel mediation path model in explaining the relationships among our study variables.

Model fit

We conducted multilevel confirmatory factor analyses and used robust maximum likelihood estimation to determine the distinctiveness of our measures. The hypothesized model with three factors on the first level (i.e. task ambiguity, coordination activities, and relatedness satisfaction) yielded a good model fit, $\chi^2(20) = 107.69$, CFI = 0.98, TLI = 0.95, RMSEA = 0.038. The model fitted our data significantly better than the best fitting model with only two factors, $\chi^2(24) = 226.50$, CFI = 0.95, TLI = 0.90, RMSEA = 0.053, Sattora–Bentler scaled $\Delta\chi^2 = 174.93$ (considering a scaling correction factor of 1.23), $\Delta df = 4$, $p < 0.001$ as well as the model with only one factor, $\chi^2(26) = 1036.61$, CFI = 0.72, TLI = 0.55, RMSEA = 0.12, Sattora–Bentler scaled $\Delta\chi^2 = 2072.25$ (considering a scaling correction factor of 1.13), $\Delta df = 6$, $p < 0.001$.

Results

Table 1 displays the means, standard deviations, intraclass correlations, and correlations for all study variables at within- and between-person levels. Consistent with our hypotheses, we found negative correlations between task ambiguity and relatedness satisfaction and positive correlations between task ambiguity and coordination activities as well as between coordination activities and relatedness satisfaction, both on the within- and between-person levels. Intraclass correlations indicate medium daily task ambiguity, daily coordination activities, and daily relatedness satisfaction, which suggests that the

Table 1. Means, standard deviations, reliabilities, intraclass correlations, and zero-order correlations at the day and person levels.

Variables	Person level			Day level			1	2	3
	<i>M</i>	<i>SD</i>	α	<i>SD</i>	α	ICC			
1. Task ambiguity	1.67	0.74				0.51		0.06*	−0.06*
2. Coordination activities	3.14	1.10	0.95	0.56	0.79	0.49	0.18**		0.24**
3. Satisfaction of the need for relatedness	5.25	1.12	0.84	0.85	0.47	0.64	−0.44**	0.21**	

Note. ICC: intraclass correlation coefficient; α : Cronbach's alpha reliability estimate. Correlation coefficients above the diagonal are at the day level ($N = 2,961$), and correlation coefficients below the diagonal are at the person level ($N = 795$). * $p < 0.05$, ** $p < 0.01$.

values of the measured constructs fluctuate moderately from day to day, while some variability can be attributed to personal characteristics (Hedges & Hedberg, 2007).

Main findings

The day-level results from the multilevel path model are illustrated in Figure 1 and Table 2. As expected, a direct negative relationship between daily task ambiguity and daily relatedness satisfaction was observed, $\gamma = -0.069$, $SE = 0.029$, $p < 0.05$, which provides support for hypothesis 1. Moreover, daily task ambiguity was positively associated with the mediating variable, daily coordination activities, $\gamma = 0.058$, $SE = 0.026$, $p < 0.05$. This confirms hypothesis 2. In support of hypothesis 3, daily coordination activities positively related to daily relatedness satisfaction, $\gamma = 0.246$, $SE = 0.025$, $p < 0.001$. In other words, on days when individuals coordinate with others more than usual, their relatedness satisfaction was higher. Contrary to the direct relationship with daily relatedness satisfaction, and in accordance with hypothesis 4, we observed a positive indirect relationship between daily task ambiguity and daily relatedness satisfaction via daily coordination activities, $\gamma = 0.014$, $SE = 0.007$, $p < 0.05$.

Supplemental analyses

Although not hypothesized, we estimated the total effect of daily task ambiguity on daily relatedness satisfaction. The total effect was significant and negative, $\gamma = -0.055$, $SE = 0.028$, $p < 0.05$. This result indicates that the negative direct effect of task ambiguity on relatedness satisfaction weighs somewhat more than the indirect positive effect *via* coordination activities.

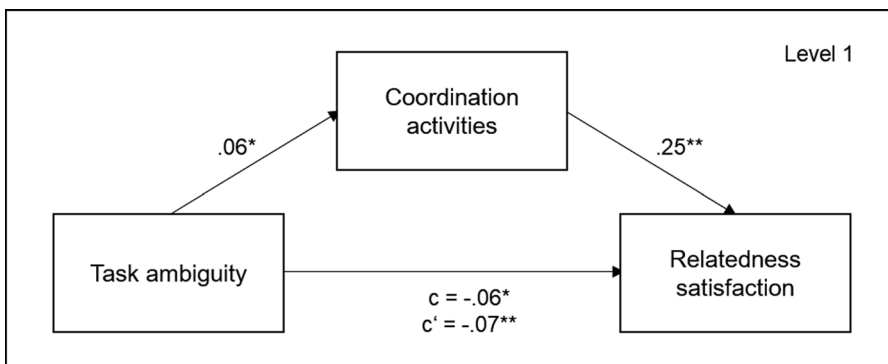


Figure 1. Path diagram with standardized path estimates at the day level. Note. * $p < 0.05$, ** $p < 0.001$.

Table 2. Results from the multilevel path analysis on the within- and between-person level.

Level	Dependent variable	Independent variable	Parameter	Estimate (SE)	95% CI		P
					LL	UL	
Within-person							
	Coordination activities	Task ambiguity	a	0.058 (0.026)	0.006	0.109	0.029
	Relatedness satisfaction	Coordination activities	b	0.246 (0.025)	0.198	0.295	<0.001
Direct effect							
	Relatedness satisfaction	Task ambiguity	c'	−0.069 (0.029)	−0.126	−0.013	0.016
Total effect							
	Relatedness satisfaction	Task ambiguity	c	−0.055 (0.028)	−0.110	0.000	0.049
Indirect effect							
	Relatedness satisfaction	Task ambiguity	ab	0.014 (0.007)	0.001	0.027	0.030
Residual variance							
			θ_M	0.997 (0.003)	0.991	1.003	<0.001
			θ_Y	0.936 (0.012)	0.912	0.962	<0.001
Between-person							
	Coordination activities	Task ambiguity	a	0.181 (0.051)	0.080	0.281	<0.001
	Relatedness satisfaction	Coordination activities	b	0.295 (0.044)	0.209	0.381	<0.001
Direct effect							
	Relatedness satisfaction	Task ambiguity	c'	−0.486 (0.047)	−0.579	−0.394	<0.001
Total effect							
	Relatedness satisfaction	Task ambiguity	c	−0.434 (0.047)	−0.527	−0.341	<0.001
Indirect effect							
	Relatedness satisfaction	Task ambiguity	ab	0.053 (0.019)	0.016	0.091	0.005
Residual variance							
			ψ_M	0.967 (0.018)	0.931	1.004	<0.001
			ψ_Y	0.728 (0.045)	0.641	0.816	<0.001

Note. CI: confident interval; LL: lower limit; UL: upper limit.

The hypothesized relationships were tested on the within-person level. Results are, however, corroborated by between-level results (cf. Table 2). This implies that remote workers who generally experience higher task ambiguity also experience lower relatedness satisfaction but engage in more coordination activities, which, paradoxically, relates to generally higher levels of relatedness satisfaction.

Analyses were repeated for participants who did not have the option to work remotely prior to the COVID-19 pandemic. Findings are presented in Table 3 and largely align with the results for the main sample. On the within-level, however, daily task ambiguity and daily coordination activities were not related, $\gamma = -0.033$, $SE = 0.029$, $p > 0.05$, and daily coordination activities did not mediate the relationship between daily task ambiguity and daily relatedness satisfaction for this sample, $\gamma = -0.008$, $SE = 0.007$, $p > 0.05$.

Table 3. Results from the multilevel path analysis on the within- and between-person level for individuals who did not have the option to work remotely prior to the COVID-19 pandemic ($N=772$ on the between-person level and $N=2,935$ on the within-person level).

Level	Dependent variable	Independent variable	Parameter	Estimate (SE)	95% CI		p
					LL	UL	
Within-person							
	Coordination activities	Task ambiguity	a	−0.033 (0.029)	−0.080	0.023	0.251
	Relatedness satisfaction	Coordination activities	b	0.244 (0.027)	0.190	0.298	<0.001
Direct effect							
	Relatedness satisfaction	Task ambiguity	c′	−0.128 (0.024)	−0.174	−0.082	<0.001
Total effect							
	Relatedness satisfaction	Task ambiguity	c	−0.136 (0.025)	−0.185	−0.87	<0.001
Indirect effect							
	Relatedness satisfaction	Task ambiguity	ab	−0.008 (0.007)	−0.020	0.006	0.254
Residual variance							
			θ _M	0.999 (0.002)	.995	1.002	<0.001
			θ _Y	0.922 (0.014)	0.894	0.950	<0.001
Between-person							
	Coordination activities	Task ambiguity	A	0.292 (.054)	0.186	0.399	<0.001
	Relatedness satisfaction	Coordination activities	B	0.219 (0.043)	0.136	0.303	<0.001
Direct effect							
	Relatedness satisfaction	Task ambiguity	c′	−0.569 (0.037)	−0.642	−0.495	<0.001
Total effect							
	Relatedness satisfaction	Task ambiguity	C	−0.505 (0.036)	−0.575	−0.434	<0.001
Indirect effect							
	Relatedness satisfaction	Task ambiguity	Ab	0.064 (0.019)	0.027	0.101	0.001
Residual variance							
			ψ _M	0.914 (0.032)	0.852	−977	<0.001
			ψ _Y	0.702 (.037)	0.628	0.775	<0.001

Note. CI: confident interval; LL: lower limit; UL: upper limit.

Discussion

The present study investigates the relationship between daily fluctuations of task ambiguity, coordination activities, and their paradoxical relationship with daily relatedness satisfaction among experienced remote workers. We joined different theoretical approaches, namely self-determination theory (Ryan & Deci, 2000), uncertainty management theory (Kramer, 2004), and relational coordination theory (Gittell, 2006) to predict the consequences of daily task ambiguity. We hypothesized an inconsistent relationship between daily task ambiguity and daily feelings of relatedness, expecting a direct negative association and an indirect positive relationship *via* daily coordination activities. Analyses confirmed that task ambiguity negatively relates to daily relatedness satisfaction but that remote workers increase their daily coordination efforts in response to daily task ambiguity, thus paradoxically contributing to daily relatedness satisfaction. However, this only applies to individuals with prior remote

work experience. This may be because inexperienced remote workers may not yet know how to coordinate their work activities remotely and must first acquire appropriate strategies. Likewise, these individuals have been forced to work from home during the COVID-19 pandemic, and their jobs may have been unsuitable for remote work, or they may have been challenged with setting up an adequate workspace at home rather than ensuring optimal work processes. The total effect of ambiguity on daily relatedness satisfaction was negative for both groups.

Theoretical implications

Our findings align with existing studies concerning the role of relational coordination (Gittell, 2006) and contribute to our understanding of the antecedents of satisfying the universal psychological need for relatedness (Ryan & Deci, 2000). In particular, the present study specifies prior empirical findings that link social interactions to satisfying the need for relatedness (e.g. Jungert et al., 2018; Lee et al., 2017; Men et al., 2022) and shows that coordination, as a specific form of interaction, contributes to relatedness satisfaction. Coordination likely contributes to relatedness satisfaction as it entails opportunities for interaction, bonding, and social support (Bolton et al., 2021; Courtright et al., 2015). Moreover, most research conceptualizes relatedness satisfaction as stable and neglects daily variations (Van den Broeck et al., 2016). In line with Coxen et al. (2021), who stressed the relevance of studying need satisfaction, as well as their antecedents and consequences, our findings indicate that need satisfaction varies on a daily basis and that daily variations of task ambiguity and coordination activities explain these fluctuations. Consequently, SDT theorizing should incorporate daily variations of need satisfaction and its antecedents to capture their relevance for motivation and well-being.

The present observations support prior empirical findings that positively link clarity to increased and ambiguity to decreased relatedness satisfaction (Fernet et al., 2013; Karkkola et al., 2019). Our findings corroborate the understanding of ambiguity as a work stressor (Kauppila, 2014) with negative implications for various job-related outcomes (Van den Broeck et al., 2016; Van Steenbergen et al., 2018) and highlight that ambiguity may have been a threat to the well-being, motivation, and productivity of remote workers during the pandemic. Notably, the findings indicate that even daily fluctuations impact remote worker's experiences considerably. Previous research, however, has failed to address why and how ambiguity negatively impacts relatedness satisfaction. Individuals who lack task-specific information may feel anxious, excluded, or inadequate (Kramer et al., 2019; Morrison, 2002), which might diminish

their sense of belonging to the team or organization at large, which constitutes an important facet of relatedness satisfaction (Deci et al., 2017).

Beyond replicating and extending previously observed effects, we demonstrated that the previously assumed negative relationship between ambiguity and relatedness satisfaction requires a more nuanced perspective. Uncertainty management theory (Kramer, 2004) asserts that a lack of information leads to an information need, which, in turn, motivates individuals to seek clarification from others (Freund, 2015). Likewise, relational coordination theory stresses the role of coordination in uncertain environments (Bolton et al., 2021; Galbraith, 1974; Gittell, 2006). Our findings corroborate this theoretical assumption, showing that remote workers increase their coordination efforts when they experience unusually high ambiguity regarding their tasks. However, only experienced remote workers increased their coordination activities when facing ambiguity, and both inexperienced and experienced remote workers felt less connected to their colleagues when facing ambiguity. Previous research, likewise, has shown that ambiguity does not always lead to information seeking but that individuals may choose not to decrease uncertainty (Brashers, 2001) or attempt to increase clarity via other means, such as through cognitive processes (Kramer, 2004), likely to maintain the impression that they are capable and well-functioning employees (Kramer et al., 2019). While UMT has already incorporated these findings in part (see Kramer, 2004; Kramer et al., 2019), it should further develop to incorporate consequences for relational processes. Likewise, relational coordination theory (Gittell, 2006) ought to be further developed to incorporate these insights.

Practical implications

Although we found evidence for the hypothesized inconsistency of a positive indirect relationship between daily task ambiguity and daily relatedness satisfaction via daily coordination activities, the direct and total effects of task ambiguity on relatedness satisfaction are negative. Additionally, behaviors initiated to overcome ambiguity, such as coordination, may be demanding and deplete employee resources (Prem et al., 2021). Consequently, organizations should not rely on employees to overcome ambiguity but instead focus on providing employees with clear instructions. This is particularly relevant during crises, such as the COVID-19 pandemic, as individuals experience high levels of stress and exhaustion during such times (Suresh et al., 2021; Wu et al., 2021).

Task ambiguity, however, may not always be preventable in contemporary workplaces (Gittell, 2006; Schoellbauer et al., 2022). Thus, Human Resource Management (HRM) should foster opportunities for

coordination activities to enable employees to sidestep the negative effects of task ambiguity on relatedness satisfaction. Beyond providing suitable hard- and software, organizations may foster coordination, particularly for remote workers, by creating virtual spaces for communication and coordination and establishing dedicated communication channels. Likewise, organizations may encourage teams to schedule regular meetings, such as stand-ups or planning and review meetings, to discuss tasks and processes. A thorough assessment of remote workers' specific needs and requirements allows the identification of useful avenues and the development of tailored measures. To enable their employees to collaborate effectively in remote work contexts, HRM should focus on strengthening employees' digital competencies, for instance, by offering training and assistance and establishing a comprehensive onboarding process tailored to the specific challenges of remote work, which may include instructions on communication protocols, digital solutions, and management tools. This seems particularly important as our findings suggest that only experienced remote workers were able to increase their daily coordination efforts when facing ambiguity.

As leaders have been identified as vital in facilitating coordination and the achievement of organizational goals (Bolton et al., 2013), adequate training opportunities for leaders should be provided. In particular, leaders ought to be instructed to encourage interdependence, create opportunities for social interaction, and, in turn, increase relatedness satisfaction. While task interdependence is likely to promote interaction and coordination, outcome interdependence may increase prosocial motivation and bonding between team members (Courtright et al., 2015). Thus, leaders may help establish relatedness satisfaction among their team members by redesigning work processes to encourage collaboration, defining clear goals and highlighting the contributions of employees to achieve these goals (Bolton et al., 2021).

Limitations and future directions for research

Although our study yields insights concerning the daily influences of relatedness satisfaction among remote workers, it is not without limitations. The first limitation regards the generalizability and transferability of the findings. Data were collected during the first months of the COVID-19 pandemic, which can be characterized as a time of crisis marked by rapid change and economic uncertainty (Altig et al., 2020). During the first months of the COVID-19 pandemic, employees were required to shift to full-time remote work, often suddenly and unexpectedly, likely without adequate preparation or training. The context in which data for this study was collected was thus distinct from the remote

work context both prior to and after the pandemic. This context may have affected remote workers' behavior. Because experienced remote workers may have been affected less by the context of working from home, we only investigated remote workers who had the option to work remotely prior to the pandemic to provide insights into the experiences of remote workers that can be transferred to a remote work context beyond the pandemic. Nevertheless, findings should be replicated after the COVID-19 pandemic and in different contexts, such as hybrid work contexts.

Another limitation regards participants' low levels of ambiguity. Chen et al. (2021) have argued that employees require basic knowledge of their general responsibilities to identify which information they lack for specific tasks and where they can find this information. Our findings, thus, may only apply to remote workers with a basic level of clarity, whereas individuals with very low levels of clarity may behave differently in response to fluctuations of clarity. Accordingly, investigating the observed relationships among individuals who experience high ambiguity, such as newcomers, may broaden our understanding of the hypothesized psychological model.

A number of avenues for future research became apparent during the study. First, we call to differentiate between the effects of informal and formal interactions on relatedness satisfaction. This might not only extend self-determination theory but also enhance our knowledge about the relevance of professional interactions for developing close connections and relatedness feelings at work. Moreover, our results suggest that the observed effects of coordination on performance and well-being (Bolton et al., 2021) may be explained by need satisfaction. Future studies may integrate relational coordination theory (Gittell, 2006) and self-determination theory and investigate the mediating effect of need satisfaction.

Next, the literature will benefit from investigating personal dispositions and contextual characteristics that can facilitate coordination in ambiguous situations. Although uncertainty management theory (Kramer, 2004) generally argues that individuals may be motivated to decrease uncertainty, it suggests that ambiguity does not always lead to interaction. Kramer et al. (2019) note that individuals may refrain from approaching others when they face uncertainty because they are motivated to maintain the impression that they are capable and well-functioning employees. Drawing on others to clarify tasks may reveal a lack of information or competence, and, therefore, individuals may be hesitant to approach others. However, personal characteristics, such as proactive personality (Fuller & Marler, 2009) or autonomous causality orientation (Deci et al., 2017), may facilitate daily coordination. Likewise, situational factors, such

as communication norms (e.g. Ajzen, 2020) or leadership behavior (e.g. autonomy support; Slemp et al., 2018), should be further investigated.

Conclusion

In this daily diary study, we observed an inconsistent relationship between daily task ambiguity and daily relatedness satisfaction among remote workers. We shed light on factors that impede and enhance remote workers' daily feelings of relatedness, which has recently gained importance due to the widespread introduction of remote work and ensuing concerns regarding loneliness at work. In particular, we showed that, paradoxically, daily task ambiguity negatively relates to daily relatedness satisfaction while indirectly contributing to relatedness satisfaction by increasing social interaction in the form of coordination of work activities. Importantly, the present study shows that the negative effects of daily task ambiguity may be partially circumvented by facilitating daily coordination activities. We advise organizations to increase task clarity when possible and facilitate interdependence and coordination among colleagues in order to foster employees' relatedness satisfaction.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

The data of this study are available from the corresponding author upon reasonable request.

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Appendix A
A. Attrition bias

T-test results for sociodemographic variables for individuals who did (N=795) and who did not (N=27) provide diary data.

Variable	Diary data available			No diary data available			T	df	Cohen's d
	M	SD	N	M	SD	N			
Age	42.64	11.48	821	40.46	11.83	27	-0.83	818	-0.17
Gender	1.43	0.50	821	1.42	0.50	27	-0.02	819	-0.40
Education	4.19	1.01	822	3.96	1.13	27	-1.14	820	-0.61
Work hours	40.46	8.65	821	39.37	6.90	27	-0.65	811	-0.13

Note. *p < .05., **p < .01.

Mann-Whitney U test results for non-continuous sociodemographic variables for individuals who did (N=795) and who did not (N=27) provide diary data.

Variable	N	Mann-Whitney U test	Standard error	Z
Gender	821	10356.50	1018.87	0.02
Education	822	12198.00	1116.95	1.31

Note. *p < .05, **p < .01.

Means, standard deviations, and zero-order correlations for the focal variables and the number of diary questionnaires filled out by participants.

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Number of diary questionnaires	3.75																	
2. Task ambiguity t1	1.68	1.03	-0.05															
3. Task ambiguity t2	1.64	0.97	-0.01	0.51**														
4. Task ambiguity t3	1.64	1.03	-0.03	0.50**	0.49**													
5. Task ambiguity t4	1.72	1.12	-0.03	0.49**	0.49**	0.50**												
6. Task ambiguity t5	1.64	1.02	0.08	0.39**	0.42**	0.52**	0.50**											
7. Coordination activities t1	2.25	1.52	-0.05	0.09*	0.12**	-0.002	0.04	0.07										
8. Coordination activities t2	3.14	1.56	.001	0.02	0.09*	0.03	-0.02	0.07	0.50**									
9. Coordination activities t3	3.24	1.59	0.06	0.09	0.09*	0.12**	0.16**	0.09	0.38**	0.52**								

(Continued)

Appendix A. Continued.

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
10. Coordination activities t4	3.16	1.55	0.01	0.16**	0.15**	0.11*	0.13**	0.15**	0.39**	0.41**	0.51**							
11. Coordination activities t5	3.13	1.66	0.03	0.08	0.11**	0.10*	0.04	0.17**	0.45**	0.51**	0.51**	0.56**						
12. Relatedness satisfaction t1	5.23	1.30	0.03	-0.29**	-0.22**	-0.30**	-0.30**	-0.21**	0.19**	0.07	0.01	0.07	0.11					
13. Relatedness satisfaction t2	5.16	1.31	0.04	-0.26**	-0.23**	-0.24**	-0.33**	-0.21**	0.10*	0.18**	0.02	-0.01	0.08	0.64**				
14. Relatedness satisfaction t3	5.11	1.25	0.10*	-0.24**	-0.18**	-0.26**	-0.25**	-0.21**	0.11*	0.10*	0.13**	0.09	0.09	0.60**	0.61**			
15. Relatedness satisfaction t4	5.09	1.25	0.08	-0.28**	-0.28**	-0.25**	-0.33**	-0.24**	0.02	0.05	0.04	0.09	0.12*	0.59**	0.60**	0.66**		
16. Relatedness satisfaction t5	5.08	1.23	0.01	-0.29**	-0.23**	-0.28**	-0.27**	-0.25**	0.17**	0.15**	0.10	0.16**	0.20**	0.56**	0.56**	0.59**	0.65**	

Note. * $p < 0.05$, ** $p < 0.01$.