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Operationalizing a more comprehensive conceptualization of polychronicity: A consideration of single-tasking, task-switching, and dual-tasking

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ABSTRACT

Polychronicity, the preference for multitasking, is becoming increasingly important in modern workplaces, but extant research is limited by an incomplete view of the construct. Existing measures of polychronicity assess preferences for task-switching alone, despite multitasking consisting of both dual-tasking and task-switching. To resolve this tension, we undergo a three-study scale development process to create and validate two comprehensive measures of polychronicity capturing preferences for task-switching and dual-tasking. We also consider whether monochronicity (preferences for single-tasking) and no preference are antipolar dimensions, and we investigate the effectiveness of two different assessments: a Likert scale and a novel vignette format. Results support the distinctiveness of task-switching and dual-tasking preferences, confirm monochronicity as an antipolar dimension of polychronicity, and identify no preference as a related but distinct construct. Both assessment formats effectively measured polychronicity and demonstrate incremental validity in predicting peer-rated multitasking behaviors and work performance beyond existing scales. These findings expand our understanding of individual differences in multitasking preferences and offer new tools for assessing this important construct in work settings.

1. Introduction

The modern workplace increasingly expects employees to multitask, requiring them to shift between responsibilities and simultaneously complete multiple duties (Asghar, Gull, Tayyab, Zhijie, & Tao, 2020; Chen, 2020; Conte, Aasen, Jacobson, O'Loughlin, & Toroslu, 2019). For instance, office workers often monitor communication platforms while completing tasks and service employees often interact with customers while fulfilling other obligations (Asghar et al., 2021; Mullins, Agnihotri, & Hall, 2020). These expectations have drawn scholarly attention to polychronicity, the preference for multitasking (Conte & Gintoft, 2005; Gupta & Irwin, 2016; Poposki & Oswald, 2010).

Polychronicity strongly relates to multitasking behavior when employees are given autonomy (König & Waller, 2010; Zhang, Goonetilleke, Plocher, & Liang, 2005). Due to multitasking requirements that characterize many modern occupations and organizations, polychronicity has also been found to positively predict work performance, with this relationship strengthening in recent studies (Howard & Cogswell, 2023). As polychronicity is anticipated to become even more important in future work contexts, attention from researchers and practitioners is likely to continue growing.

Although extant studies have provided critical insights on polychronicity, Howard and Cogswell (2023), in their review and meta-analytic investigation of the polychronicity literature, showed that researchers have only adopted a partial view of the construct by overlooking developments in multitasking research. Specifically, recent work differentiates between two types of multitasking, task-switching (i.e., completing parts of multiple tasks before fully completing any) and dual-tasking (i.e., completing multiple tasks simultaneously) (Janczyk & Kunde, 2020; Koch, Poljac, Müller, & Kiesel, 2018; Ward et al., 2019; Worringer et al., 2019). Both contrast with single-tasking, which involves focusing solely on one task.

Neurological investigations have demonstrated that while task-switching and dual-tasking share common neural correlates, each also

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involves unique neural processes, providing evidence of their distinctiveness (Koch et al., 2018; Ward et al., 2019; Worringer et al., 2019). Research suggests that various cognitive and task-related factors can influence performance in dual-tasking and task-switching differently, which may lead to individual variations in performance across these two types of multitasking (Koch et al., 2018). This indicates that preferences for task-switching and dual-tasking should be differentiated in polychronicity research, as individuals may have varying inclinations towards each type of multitasking. However, both represent aspects of multitasking and must be considered to fully capture polychronicity. Relatedly, Howard and Cogswell (2023) showed that the four most used measures of polychronicity only gauge preferences for task-switching, neglecting dual-tasking altogether. This oversight has left the polychronicity literature incomplete, as researchers have yet to accumulate knowledge about preferences for dual-tasking and consequently, multitasking as a whole.

Because scholars are constrained by available measures, we create two polychronicity scales that incorporate preferences for both facets of multitasking: task-switching and dual-tasking. We develop these two comprehensive measures of polychronicity by following recommended scale construction practices (Brown, 2015; Clark & Watson, 2016; DeVellis & Thorpe, 2021; Hinkin, 1995, 1998; Howard, 2018), and assess whether two potential antipolar dimensions should be included: monochronicity and no preference. Existing research has considered preferences for single-tasking (i.e., monochronicity) to be the sole antipolar dimension of polychronicity, as it is often included in measures via reverse-coded items (Bluedorn, Kalliath, Strube, & Martin, 1999; Poposki & Oswald, 2010). However, overlooking the lack of preference as an antipolar dimension may leave the study of polychronicity incomplete.

Further, it is unclear whether people can differentiate between their task-switching and dual-tasking preferences when asked in general terms. For instance, it may be difficult to distinguish between the items, “I prefer to switch between tasks” and “I prefer to perform tasks at the exact same time.” For this reason, we develop two types of measures: a concise Likert scale and a vignette scale. In the vignette measure, a scenario is described and participants rate the extent to which they would prefer to use each of four possible task completion strategies (i.e., task-switching, dual-tasking, single-tasking, no preference). While longer, this format may allow for better preference distinction, enabling independent study of dual-tasking and task-switching preferences. Taken together, we answer the call for polychronicity measures to incorporate a modern conceptualization of multitasking (i.e., consisting of both dual-tasking and task-switching) (Howard & Cogswell, 2023; Koch et al., 2018).

To create these two distinct measures of polychronicity, we underwent a three-study scale development process culminating in an investigation of predictive and incremental validity for our instruments. These efforts have several implications for research and practice. First, identifying separate dimensions for task-switching and dual-tasking preferences suggests the need to reconduct prior polychronicity research, as these studies only provide a partial view of the construct. Second, incorporating dual-tasking into polychronicity research encourages additionally relevant theoretical perspectives to be considered in future studies on multitasking preferences (e.g., Hommel, 2020; Koch et al., 2018; Pashler, 1994; Ravizza & Carter, 2008; Wickens, 2002). Notably, considering diverse theoretical perspectives may help expand existing knowledge of the construct and further elucidate its predictive utility. Third, identifying these dimensions would indicate that the differences in task-switching and dual-tasking outweigh the similarities when developing multitasking preferences, providing further insights into why people develop their preferences. Fourth, if it is found that individuals cannot distinguish between preferences for task-switching and dual-tasking, these results would be valuable in that they would imply similarities outweigh differences in these preferences. Fifth, comparing the psychometric and validity evidence of the standard-format and vignette-format scales tests people's abilities to differentiate between task-switching and dual-tasking, offering insights into methods for parsing associated schemas (i.e., organized patterns of thought or behavior pertaining to task-switching and dual-tasking, including how they are conceptualized and distinguished).

1.1. Background

1.1.1. Polychronicity

Multitasking is difficult and demands greater cognitive resources than single-tasking, which refers to the completion of one task without allocating focus to others (Hyong, 2015; Micó-Amigo et al., 2019). Research on task switching and dual-task interference has demonstrated that attempting to perform multiple tasks simultaneously or in a back-and-forth manner often results in performance costs. Pashler (2000) illustrated this through the psychological refractory period effect, where individuals typically respond more slowly to a second stimulus when it closely follows a first stimulus requiring a response (e.g., Welford, 1952). In workplace contexts, this suggests that employees may take longer to complete tasks when multitasking compared to performing tasks sequentially. These findings highlight the cognitive limitations and potential performance drawbacks associated with multitasking. Yet, individuals higher on polychronicity prefer multitasking despite its challenges, which makes polychronicity a counterintuitive phenomenon. Researchers have, therefore, put great effort into identifying the causes and consequences of this preference.

Polychronicity is a relatively stable individual difference (Mullins et al., 2020; Slocombe & Bluedorn, 1999). Polychrons, who favor multitasking, prefer this approach across various contexts (Howard & Cogswell, 2023), and tend to multitask when possible (Bluedorn, Kalliath, Strube, & Martin, 1999; Poposki & Oswald, 2010; Slocombe & Bluedorn, 1999). Polychrons' cognitive structures are believed to differ from those of monochrons, who prefer single-tasking (König & Waller, 2010; Magen, 2017). Polychronicity is positively associated with multitasking performance, although the causal order of this relation is uncertain (Gupta & Irwin, 2016; Haase, Lee, & Banks, 1979; Magen, 2017; Zhang et al., 2005).

Additionally, polychronicity has been linked to several aspects of workplace performance. Creativity, recognized as a nonlinear, multiphase process, requires switching between tasks in each phase, and individuals adept at task-switching produce more creative outcomes (Madjar & Oldham, 2006; McKay & Gutworth, 2021). Employees who can better switch between tasks to provide assistance should also be more likely to perform organizational citizenship behaviors (OCBs), which may explain the established positive relationship between polychronicity and OCBs (Kayaalp, 2016; Vizcaíno, Martin, Cardenas, & Cardenas, 2021). Polychronicity has also been positively linked to general work performance (Howard & Cogswell, 2023), possibly due to the modern workplace's expectation for employees to multitask and juggle multiple commitments.

Despite these promising findings, we argue that these results may be biased due to an incomplete view of multitasking in research on polychronicity, potentially underestimating the relations of polychronicity with beneficial outcomes. To make this argument, we discuss the two unique ways that individuals can multitask: task-switching and dual-tasking (Koch et al., 2018).

1.1.2. Multitasking: two unique behaviors

Task-switching involves alternating between two or more tasks before completing any (Koch, Gade, Schuch, & Philipp, 2010), while dual-tasking is performing two activities at the exact same time (Janczyk & Kunde, 2020; Strobach, Wendt, & Janczyk, 2018). Although dual-tasking is largely recognized in the cognitive sciences (Janczyk & Kunde, 2020; Strobach et al., 2018), research in organizational contexts has primarily focused on task-switching. Pertinently, even O*Net, a tool created by psychologists and used for career exploration and job

analyses, describes multitasking as "time sharing – the ability to switch back and forth between two or more activities or sources of information" (ONetOnline.Org, 2024), overlooking occupations that require dual-tasking. For example, pilots are likely to demonstrate dual-tasking, as they must monitor multiple systems while steering an aircraft, communicating over radio, and scanning the skies. Table 1 includes additional examples of dual-tasking and task-switching in work contexts.

Neural and behavioral similarities between task-switching and dual-tasking suggest that they are appropriate to study together under the scope of multitasking (Howard & Cogswell, 2023; Koch et al., 2018; Ward et al., 2019; Worringer et al., 2019). However, cognitive differences between dual-tasking and task-switching suggest a theoretical distinction (Worringer et al., 2019). Moreover, evidence indicates that individuals may excel at one component of multitasking but not the other, highlighting a practical distinction between these two task-completion strategies (e.g., Alzahabi & Becker, 2013; Medeiros-Ward, Watson, & Strayer, 2015; Sanbonmatsu, Strayer, Medeiros-Ward, & Watson, 2013; Strobach et al., 2012). For instance, Alzahabi and Becker (2013) found that heavy media multitaskers showed better task-switching ability compared to light multitaskers, but did not demonstrate an advantage in dual-task performance. Similarly, Medeiros-Ward et al. (2015) identified "supertaskers" who excelled at dual-tasking in a driving simulation but did not necessarily show superior performance on other executive control tasks. Strobach et al. (2018) observed that task-switching practice led to improved performance on switch trials, but not necessarily on mixing costs, indicating that different components of executive control in multitasking situations can be selectively improved. These findings underscore the importance of distinguishing between dual-tasking and task-switching abilities when studying multitasking effectiveness. Understanding these differences may be crucial in shaping efforts to optimize performance in multitasking environments.

1.1.3. Measurement of polychronicity

As previously noted, the incomplete view of polychronicity in extant literature is partially due to existing measures solely gauging preferences for task-switching (Bluedorn, Kalliath, Strube, & Martin, 1999; Howard & Cogswell, 2023; Lindquist & Kaufman-Scarborough, 2007; Poposki & Oswald, 2010; Slocombe & Bluedorn, 1999). This one-sidedness causes these measures to relate more strongly to task-switching performance than dual-tasking performance, potentially skewing our understanding of polychronicity. To address this, researchers have called for integrating a more modern conceptualization of multitasking into polychronicity measurement (Howard & Cogswell, 2023; Koch et al., 2018; Spink, Cole, & Waller, 2008).

A more comprehensive measure of polychronicity has benefits for both research and practice. For instance, research on polychronicity and person-environment (P-E) fit (e.g., Asghar et al., 2020, 2021; Howard & Cogswell, 2023) has hinged on the idea that polychrons perform better and are more satisfied when they are in environments that require multitasking, but the exclusive focus of extant measures on task-switching does not account for the potential of fit in contexts that require dual-tasking. A specific type of P-E fit, person-job (P-J) fit, can further illuminate these dynamics.

P-J fit is the compatibility that an individual has with their job (Edwards, 1991; Kristof, 1996). Focusing on the multitasking behaviors that dominate a certain job (i.e., dual-tasking vs. task-switching) and the (mis) alignment between those behaviors and an individual's preference can clarify past findings and provide insight into how preferences and contexts interact to impact important work-related outcomes. For example, polychronicity has been shown to moderate the relation between job multitasking requirements and well-being (Kirchberg, Roe, & Van Eerde, 2015), but Hecht and Allen (2005) found mixed results for the effect of P-J fit on the relation between polychronicity and well-being. These inconsistent findings may result from not distinguishing between the types of multitasking in both the context and preference. As extant measures of polychronicity only include preferences for task-switching, Kirchberg et al. (2015) may have found supportive results because their measure of multitasking requirements solely included indicators of task-switching requirements, whereas Hecht and Allen (2005) may not have found supportive results because their context may have included requirements for dual-tasking. These unclear findings can only be addressed by recognizing the differences between dual-tasking and task-switching, including in the measurement of polychronicity.

Distinguishing between dual-tasking and task-switching would also benefit organizations. Job listings regularly describe the need for multitasking, and some believe that almost every job in the modern workplace requires at least some degree of multitasking (Bühner, König, Pick, & Krumm, 2006; Kirchberg et al., 2015); however, multitasking is more cognitively taxing (Moisala et al., 2016; Worringer et al., 2019) and can lead to employees taking longer to finish tasks (Pashler, 2000), developing mood and anxiety problems (Becker, Alzahabi, & Hopwood, 2013), and experiencing higher stress (Robinson & Smallman, 2006). Higher polychronicity can ameliorate some of these negative effects, and organizations could select for those with a preference for multitasking. In doing so, they could place employees in contexts to benefit their P-J fit, resulting in improved outcomes for both the organization and employee. However, these benefits cannot be realized without a polychronicity measure that captures preferences for dual-tasking and task-switching.

1.1.4. Creating new measures of polychronicity

To align modern research on polychronicity with modern research on multitasking, we develop polychronicity measures that assess preferences for both task-switching and dual-tasking. We also test whether monochronicity (the preference for single tasking) and having no preference serve as antipodes of polychronicity. Extant polychronicity measures often include reverse-coded monochronicity items (Bluedorn, Kalliath, Strube, & Martin, 1999; Poposki & Oswald, 2010), with some scales featuring more monochronicity items than polychronicity ones (Kaufman, Lane, & Lindquist, 1991). We aim to test whether this approach is suitable for gauging multitasking preferences.

No preference refers to not having a penchant for the temporal ordering of tasks. Very little – if any – empirical research on polychronicity has considered participants who do not prefer a task-completion strategy, but some may prefer to complete their tasks with the best strategy for the context. Notably, extant scales solely include items that ask about preferences for multitasking and single-tasking

Table 1
Examples of task-switching and dual-tasking at work.

Examples of Task-Switching at Work	
Occupation	Example
Office Worker	Switching between sending an email and joining video calls
Waiter/Waitress	Switching between taking customer orders and bringing orders to the kitchen
Hospitality Worker	Switching between checking in guests and answering phone calls
Lawyer	Switching between legal research and writing a legal document

Examples of Dual-Tasking at Work	
Occupation	Example
Pilot	Monitoring various gauges while steering the plane
Nurse	Taking a reading while talking to the patient and/or visitors
Surgeon	Operating a surgical tool while looking for tumors
Chef	Cutting ingredients while watching a pot on the stove
Teacher	Lecturing while monitoring students' faces
Comedian	Performing stand up while gauging audience reaction
Physical Therapist	Bracing patients while observing their gait
Delivery Driver	Driving a car while monitoring GPS systems
Performer	Singing while dancing or dancing while playing an instrument
Referee	Running while watching the players' actions

(reverse coded) (Bluedorn, Kalliath, Strube, & Martin, 1999; Poposki & Oswald, 2010). If a person likes to single-task, they would score low on these measures, as they would respond low for the multitasking items and high for the reverse-coded single-tasking items. If a person does not have a preference, they would strongly disagree with both, making it seem that they hold a moderate preference once the single-tasking items are reverse coded. By separating "no preference" into its own dimension, we allow for these nuances to be identified. Relatedly, because research has more often considered monochronicity to be an antipode of polychronicity, we have stronger expectations that preferences for single-tasking will be supported as a reverse-coded dimension of polychronicity than no preference.

Further, while preferences for task-switching and dual-tasking are conceptually distinct, people may have difficulty in distinguishing between their preferences for the two, which could cause the two preferences to demonstrate a lack of empirical distinctness. To investigate this potential issue, we create two new scales with different formats. The first uses a traditional Likert scale format, which asks participants about their (dis)agreement with various statements reflecting preferences for task-switching, dual-tasking, single-tasking, and none. While the brevity and simplicity of this measure are benefits, it does little to parse cognitive schemas for task completion strategies. For this reason, we create a second scale with a vignette format. This scale describes a brief scenario and asks participants about their preference for each task completion strategy in the described scenario. While this format is longer and more complex, it enables participants to more deeply consider their preferred task completion strategy. Respondents may provide more accurate assessments of their preferences via this approach, but it also provides insights into whether novel measurement approaches are necessary to facilitate distinguishable self-reporting of respondents' preferred task completion strategies.

1.2. Overview of studies

To create and validate our new measures of polychronicity, we followed modern recommendations in a three-study scale development process (Brown, 2015; Clark & Watson, 2016; DeVellis & Thorpe, 2021; Hinkin, 1995, 1998; Howard, 2018; Loewenthal & Lewis, 2018). Our process began with item development for the previously discussed dimensions, with subsequent studies progressively bolstering support for our measures. Study 1 investigated the psychometric properties and factor structure of our measures via CFA. Study 2 examined convergent, discriminant, predictive, and incremental validity. Study 3 addressed some notable limitations of Study 2, in addition to assessing predictive and incremental validity in a different field sample. Through these efforts, we provide robust support for our measures' capability to assess polychronicity and its dimensions. For all studies, we referenced prominent guides (e.g., Hair, Black, Babin, & Anderson, 2019; Rouquette & Falissard, 2011) or calculated power analyses to determine our sample sizes, ensuring that we obtained appropriate statistical power (>0.80). Further details about these analyses and datasets associated with all studies can be provided upon request.

1.3. Creation of item lists

We developed two item lists – one with a standard scale format and the other with a vignette scale format. Both use a 1 (Strongly Disagree) to 7 (Strongly Agree) response format. The standard-format scale provides short statements akin to most Likert scales, such as the item, "I like to switch between multiple tasks before finishing any of them." The vignette-format scale first describes a scenario, and it then asks people their preference for using each task-completion strategy. For instance, one set of items begins with, "Imagine that you are a car mechanic. You need to repair the engine of a car, but you also need to give lengthy instructions to a coworker on how to fix a different car. Please rate the extent to which you disagree to agree that you would prefer to complete these two tasks in the following manners." One of the following items reads, "I would prefer to complete one task in its entirety before starting the other." The vignette scale is not an ipsative measure, as participants respond independently for each task-completion strategy.

To develop our items, a team of researchers reviewed prior polychronicity scales, prior multitasking scales, and the intended dimensions of the measures. The group then created items intended to fully gauge the entire construct domain of the dimensions without being repetitive. For creating the vignette items, the group also ensured that the described scenarios represented a relatively broad range of situations that could be completed by single-tasking, task-switching, dual-tasking, or no preference. This resulted in an initial list of 24 standard-format items (6 for each of 4 dimensions) and 20 vignette-format items (5 vignettes, each with 1 item for each of 4 dimensions), with the expectation that these item lists may be reduced into more concise scales.

2. Study 1

The two primary goals of Study 1 were to (a) potentially reduce the item lists and (b) provide support for the factor structure of the item lists via CFA. Due to word count constraints, the complete reporting of Study 1 is provided in Supplemental Material A, and we presently report the abbreviated results of this study.

For Study 1, we administered the standard items to two independent samples of 495 (Sample 1a) and 504 participants (Sample 1b) and the vignette items to another sample of 493 participants (Sample 1c). All three samples were recruited from Prolific, an online platform connecting those needing tasks completed with those willing to complete tasks. Prolific is believed to provide higher quality data than MTurk, and results obtained via Prolific have been shown to be valid when taking the current precautions (Palan & Schitter, 2018; Stanton, Carpenter, Nance, Sturgeon, & Villalongo Andino, 2022). We restricted participation to those fluent in English and located in the United States, and we removed participants who failed any attention checks ("Mark agree to show that you are paying attention"). This resulted in the removal of 8 to 17 participants from each sample, and the sample sizes reported above reflects the sample after removing these participants.

Using Sample 1a (n = 495), our initial CFA on the standard format items indicated that single-tasking, task-switching, and dual-tasking load onto a common latent factor, whereas no preferences did not. For this reason, we tested a CFA model with these three dimensions loading onto a common construct and no preferences serving as an independent construct. Because concise scales are desirable, we removed two items from each dimension based on their initial factor loadings, resulting in a total of 16 items (see Table 2). The revised set of items produced superb model fit (*CFI* = 0.98, *TLI* = 0.98, *SRMR* = 0.04, *AIC* = 355, *BIC* = 506); the first-order factors strongly loaded onto the second-order factor (|.86|-|.98|); and all items loaded strongly onto their respective factors (≥0.69). The Cronbach's alphas for the subscales ranged from 0.88 to 0.97.

Using Sample 1b (n = 504), we retested the standard format items, as some items were removed during the analyses (see Table 3) The final model tested in Study 1 produced appropriate fit (*CFI* = 0.95, *TLI* = 0.94, *SRMR* = 0.07, *AIC* = 653, *BIC* = 805). The three first-order factors strongly loaded onto their second-order factor (|.85|-|.94|), and each item strongly loaded onto their respective first-order factors (≥0.61). Cronbach's alphas for the subscales ranged from 0.88 to 0.97.

Using Sample 1c (n = 493), an initial CFA on the vignette format items again suggested that the single-tasking, task-switching, and dual-tasking load onto a common latent factor, whereas no preferences did not. We then tested a CFA model with these three dimensions loading onto a common construct and no preferences serving as an independent construct (see Table 4). The first-order factors loaded strongly onto the second-order factor (|.69|-|.94|). The item factor loadings met or closely approached cutoffs (≥0.36). The two items with factor loadings below 0.40 corresponded to different vignettes, and removing any vignettes

Table 2
CFA loadings, correlations, and Cronbach's alphas of Study 1 (sample 1a).

	Factor 1	Factor 2	Factor 3	Factor 4
Single-Tasking Preference 1	0.95			
Single-Tasking Preference 2	0.96			
Single-Tasking Preference 3	0.94			
Single-Tasking Preference 4	0.95			
Task-Switching Preference 1		0.77		
Task-Switching Preference 2		0.96		
Task-Switching Preference 3		0.95		
Task-Switching Preference 4		0.96		
Dual-Tasking Preference 1			0.93	
Dual-Tasking Preference 2			0.94	
Dual-Tasking Preference 3			0.89	
Dual-Tasking Preference 4			0.94	
No Preference 1				0.69
No Preference 2				0.82
No Preference 3				0.77
No Preference 4				0.94
Second-Order Loading	−0.91	0.98	0.86	–

Scale Correlations and Cronbach's Alphas					
Single-Tasking Preference	0.97				
Task-Switching Preference	−0.86**	0.95			
Dual-Tasking Preference	−0.75**	0.80**	0.96		
Multitasking Preference	−0.94**	0.95**	0.91**	0.97	
No Preference	−0.27**	0.29**	0.28**	0.30**	0.88

Note: Provided correlations were calculated with scale averages. Multitasking Preferences was calculated via the items of Single-Tasking Preferences (reverse coded), Task-Switching Preferences, and Dual-Tasking Preferences. * $p < .05$, ** $p < .01$.

Table 3
CFA loadings, correlations, and Cronbach's alphas of Study 1 (Sample 1b).

	Factor 1	Factor 2	Factor 3	Factor 4
Single-Tasking Preference 1	0.93			
Single-Tasking Preference 2	0.95			
Single-Tasking Preference 3	0.88			
Single-Tasking Preference 4	0.95			
Task-Switching Preference 1		0.78		
Task-Switching Preference 2		0.96		
Task-Switching Preference 3		0.97		
Task-Switching Preference 4		0.97		
Dual-Tasking Preference 1			0.91	
Dual-Tasking Preference 2			0.91	
Dual-Tasking Preference 3			0.85	
Dual-Tasking Preference 4			0.91	
No Preference 1				0.92
No Preference 2				0.92
No Preference 3				0.61
No Preference 4				0.73
Second-Order Factor Loading	−0.90	0.85	0.94	–

Scale Correlations and Cronbach's Alphas					
Single-Tasking Preference	0.96				
Task-Switching Preference	−0.76**	0.96			
Dual-Tasking Preference	−0.80**	0.76**	0.94		
Multitasking Preference	−0.93**	0.91**	0.93**	0.97	
No Preference	−0.37**	0.46**	0.42**	0.45**	0.88

Note: Provided correlations were calculated with scale averages. Multitasking Preferences was calculated via the items of Single-Tasking Preferences (reverse coded), Task-Switching Preferences, and Dual-Tasking Preferences. * $p < .05$, ** $p < .01$.

significantly worsened the psychometric properties and internal consistency of at least one dimension. For this reason, no vignette was removed. The Cronbach's alphas for the subscales ranged from 0.54 to 0.83.

Table 4
CFA loadings, correlations, and Cronbach's alphas of Study 1 (sample 1c).

	Factor 1	Factor 2	Factor 3	Factor 4
Single-Tasking Preference 1	0.36			
Single-Tasking Preference 2	0.37			
Single-Tasking Preference 3	0.45			
Single-Tasking Preference 4	0.45			
Single-Tasking Preference 5	0.51			
Task-Switching Preference 1		0.48		
Task-Switching Preference 2		0.44		
Task-Switching Preference 3		0.59		
Task-Switching Preference 4		0.49		
Task-Switching Preference 5		0.56		
Dual-Tasking Preference 1			0.42	
Dual-Tasking Preference 2			0.42	
Dual-Tasking Preference 3			0.59	
Dual-Tasking Preference 4			0.46	
Dual-Tasking Preference 5			0.51	
No Preference 1				0.62
No Preference 2				0.61
No Preference 3				0.72
No Preference 4				0.63
No Preference 5				0.68
Second-Order Loading	−0.69	0.94	0.91	–

Scale Correlations and Cronbach's Alphas					
Single-Tasking Preference	0.54				
Task-Switching Preference	−0.70**	0.64			
Dual-Tasking Preference	−0.54**	0.70**	0.59		
Multitasking Preference	−0.84**	0.92**	0.86**	0.83	
No Preference	−0.34**	0.44**	0.44**	0.47**	0.79

Note: Provided correlations were calculated with scale averages. Multitasking Preferences was calculated via the items of Single-Tasking Preferences (reverse coded), Task-Switching Preferences, and Dual-Tasking Preferences. * $p < .05$, ** $p < .01$.

2.1. Study 1 discussion

Study 1 supported the factor structure of a 16-item standard-format scale and a 20-item vignette-format scale via CFA. Both scales produced the four expected dimensions. Their second-order factor structure indicated that single-tasking, task-switching, and dual-tasking each loaded onto a common second-order factor representing polychronicity, whereas no preference loaded onto an independent factor that was only moderately related to the second-order factor of polychronicity. This result supports monochronicity as an antipolar dimension of polychronicity, and it does not support that no preference as an antipolar dimension. Instead, no preference should be conceptualized as a conceptually related but distinct construct from polychronicity. The Cronbach's alphas of the standard scale and its dimensions met traditional cutoffs, but the Cronbach's alphas of the vignette scale and its dimensions were lower than anticipated. Nevertheless, most evidence from Study 1 supports further investigation of the measures. We henceforth label the standard scale, Multidimensional Polychronicity Scale – Standard Version (MPS-SV). We label the vignette scale, the Multidimensional Polychronicity Scale – Vignette Version (MPS-VV). When using these scales, polychronicity consists of preferences for single-tasking (reverse coded), task-switching, and dual-tasking. No preference is a related but independent construct that is also represented as a subscale within the MPS-SV and MPS-VV.

3. Study 2

The goal of Study 2 was to test the scales' convergent, discriminant, and predictive validity.

3.1. Study 2 participants

Participants ($n = 216$, Age $\bar{x} = 39.42$, Age SD = 14.30, 49 % female, 78 % white) were recruited from Prolific with the same inclusion criterion as Study 1. We excluded respondents who participated in Study 1 or failed any attached checks. This resulted in the removal of 34 participants, which is reflected in the sample size reported above. This sample size exceeds the requirements of our analysis with the largest sample size demands (Hair et al., 2019).

3.2. Study 2 method

All participants enrolled via the Prolific platform and completed an online survey that included the polychronicity scales. Eight days later, participants completed a second online survey that included measures of task-switching and dual-tasking as behavioral outcomes. Specifically, after initially capturing individuals' preferences to engage in dual-tasking and task-switching (i.e., self-reported preferences), they later self-reported how much they had engaged in dual-tasking and task-switching behaviors.

3.3. Study 2 measures

In the first survey, participants received the MPS-SV, MPS-VV, and the four most popular measures of polychronicity (Howard & Cogswell, 2023). The Polychronic Attitudes Inventory (Kaufman et al., 1991) is a four-item scale (α = 0.85), and an example item is, "I am comfortable doing several things at the same time." The Inventory of Polychronic Values (Bluedorn, Kalliath, Strube, & Martin, 1999) is a 10-item scale (α = 0.92), and an example item is, "I like to juggle several activities at the same time." The Polychronic-Monochronic Tendency Scale (Lindquist & Kaufman-Scarborough, 2007) is a 5-item scale (α = 0.91), and an example item is, "I prefer to do two or more activities at the same time." The Multitasking Preference Inventory (Poposki & Oswald, 2010) is a 14-item scale (α = 0.95), and an example item is, "I prefer to work on several projects in a day, rather than completing one project and then switching to another." In the second survey, participants received three-item measures of task-switching (α = 0.98) and dual-tasking behaviors (α = 0.97). An example item of the task-switching behavior scale is, "When I have a choice at work, I decide to switch between multiple tasks before completing any." An example item of the dual-tasking behavior scale is, "When given the opportunity at work, I typically choose to perform multiple tasks at the exact same time." These scales were created by the current authors, as no scale exists to assess both task-switching and dual-tasking behaviors.

3.4. Study 2 results

Correlations and Cronbach's alphas are provided in Table 5. Each dimension of the MPS-SV (α = 0.90–0.97) and the MPS-VV (α = 0.65–0.88) produced Cronbach's alphas similar to those found in Study 1, but the MPS-VV was notably improved. The MPS-SV's dimensions produced the following average correlations with the four polychronicity scales: single-tasking ($\bar{r} = -0.78$, all $p < .01$), task-switching ($\bar{r} = 0.74$, all $p < .01$), and dual-tasking ($\bar{r} = 0.76$, all $p < .01$). Polychronicity measured by the MPS-SV had an average correlation of 0.82 (all $p < .01$) with the polychronicity scales. The MPS-VV's dimensions produced the following average correlations with the four polychronicity scales: single-tasking ($\bar{r} = -0.69$, all $p < .01$), task-switching ($\bar{r} = 0.68$, all $p < .01$), and dual-tasking ($\bar{r} = 0.56$, all $p < .01$). Polychronicity measured by the MPS-VV had an average correlation of 0.70 (all $p < .01$) with the polychronicity scales. The MPS-SV and the MPS-VV produced strong convergent validity correlations with each other, with the respective dimensional correlations ranging from 0.48 to 0.63 (all $p < .01$). Polychronicity measured by the newly created scales had a convergent validity correlation of 0.63.

Table 5
Correlations and Cronbach's alphas of Study 2.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.) SV ST	0.96															
2.) SV TS	−0.83**	0.93														
3.) SV DT	−0.77**	0.74**	0.95													
4.) SV MT	−0.94**	0.93**	0.91**	0.97												
5.) SV NP	−0.32**	0.37**	0.34**	0.37**	0.90											
6.) VV ST	0.63**	−0.59**	−0.56**	−0.64**	−0.28**	0.68										
7.) VV TS	−0.56**	0.60**	0.60**	0.63**	0.28**	−0.87**	0.70									
8.) VV DT	−0.36**	0.41**	0.48**	0.45**	0.18**	−0.65**	0.76**	0.65								
9.) VV MT	−0.56**	0.58**	0.60**	0.63**	0.27**	−0.91**	0.96**	0.88**	0.88							
10.) VV NP	−0.21**	0.31**	0.34**	0.31**	0.54**	−0.35**	0.42**	0.38**	0.42**	0.82						
11.) PAI	−0.75**	0.66**	0.71**	0.76**	0.25**	−0.65**	0.65**	0.55**	0.67**	0.30**	0.87					
12.) IPV	−0.81**	0.79**	0.79**	0.86**	0.26**	−0.72**	0.70**	0.58**	0.72**	0.30**	0.82**	0.94				
13.) PMTS	−0.70**	0.68**	0.77**	0.77**	0.25**	−0.67**	0.69**	0.59**	0.71**	0.32**	0.83**	0.86**	0.94			
14.) MPI	−0.85**	0.81**	0.76**	0.87**	0.34**	−0.70**	0.68**	0.51**	0.69**	0.32**	0.80**	0.92**	0.83**	0.96		
15.) TSB	−0.33**	0.40**	0.42**	0.42**	0.11	−0.27**	0.40**	0.34**	0.37**	0.14	0.45**	0.42**	0.44**	0.39**	0.98	
16.) DTB	−0.31**	0.34**	0.47**	0.40**	0.10	−0.21*	0.37**	0.38**	0.35**	0.11	0.51**	0.43**	0.47**	0.36**	0.82**	0.97

Note: SV = Multidimensional Polychronicity Scale - Standard Version; VV = Multidimensional Polychronicity Scale - Vignette Version; ST = Preference for Single-Tasking; TS = Preference for Task-Switching; DT = Preference for Dual-Tasking; MT = Preference for Multitasking; NP = No Preference; PAI = Polychronic Attitude Inventory; IPV = Inventory of Polychronic Values; PMTS = Polychronic-Monochronic Tendency Scale; MPI = Multitasking Preference Inventory; TSB = Task-Switching Behaviors; DTB = Dual-Tasking Behaviors. Multitasking Preferences was calculated via the items of Single-Tasking Preferences (reverse coded), Task-Switching Preferences, and Dual-Tasking Preferences. Cronbach's alphas are listed on diagonal.

* $p < .05$.
** $p < .01$.

No preference as measured by the MPS-SV had an average correlation of 0.28 (all $p < .05$) and no preference as measured by the MPS-VV had an average correlation of 0.31 (all $p < .05$) with the prior polychronicity measures. Because these relations with the prior measures of polychronicity are significant but much weaker than those produced by the dimensions of polychronicity as measured by the MPS-SV and MPS-VV, these results further support that no preference is conceptually related to but distinct from polychronicity.

Regression results are provided in Table 6. To perform these analyses, we included a prior polychronicity scale alone in the first step, the three dimensions of polychronicity as measured by either the MPS-SV or MPS-VV in the second step, and no preference as measured by either the MPS-SV or MPS-VV in the third step. We repeated the analysis for each prior polychronicity scale (four), each newly developed scale (two), and each studied outcome (two), resulting in a total of 16 three-step regression analyses. Our primary goal with these analyses was to assess the additional variance explained by the three polychronicity dimensions beyond the prior polychronicity measures, which provides insights into the incremental contribution of the new measures beyond prior scales. Our secondary goal was to assess whether no preference explains significant variance beyond the measures of polychronicity. The VIF statistics for these regression analyses fell below the recommended cutoff of 10 (Hair et al., 2019; Kennedy, 1992; Neter, Wasserman, & Kutner, 1989), with the largest VIF statistic being 6.22 across all the analyses. Nevertheless, we choose to solely interpret the change in R^2 to assess the incremental validity of the newly created measures to partially alleviate concerns with multicollinearity by avoiding the over-interpretation of individual beta coefficients.

The MPS-SV explained an additional 5 % of variance on average in task-switching behaviors beyond the prior polychronicity measures (two of four $p < .05$), and it explained an additional 8 % of variance on average in dual-tasking behaviors beyond the prior measures (three of four $p < .05$). The MPS-VV explained an additional 6 % of variance on average in task-switching behaviors beyond the prior polychronicity measures (all $p < .05$), and it explained an additional 10 % of variance on average in dual-tasking behaviors beyond the prior measures (all $p < .05$). The dimension of no preference from both the MPS-SV and MPS-VV did not explain a significant amount of variance in any outcome beyond

Table 6
Regression results of Study 2.

	Task-Switching Behaviors					Dual-Tasking Behaviors				
	PAI	MPS-SV		MPS-VV		PAI	MPS-SV		MPS-VV	
1.) PAI	0.45**	0.40**	0.41**	0.35**	0.35**	0.51**	0.55**	0.56**	0.49**	0.25*
2.) ST		0.42*	0.45*	0.35*	0.35*		0.48**	0.51**	0.51**	0.48**
3.) TS		0.35*	0.40*	0.43*	0.44*		0.13	0.18	0.35	0.18
4.) DT		0.18	0.20	0.06	0.06		0.35**	0.36**	0.19	0.28*
5.) NP			−0.11		−0.03			−0.11		−0.16
ΔR^2	0.20**	0.06*	0.01	0.05*	0.00	0.26**	0.08**	0.01	0.09**	0.02

	Task-Switching Behaviors					Dual-Tasking Behaviors				
	IPV	MPS-SV		MPS-VV		IPV	MPS-SV		MPS-VV	
1.) IPV	0.42**	0.26	0.26	0.34**	0.34**	0.43**	0.29	0.28	0.45**	0.46**
2.) ST		0.35	0.37*	0.40*	0.40*		0.34	0.37*	0.58**	0.58**
3.) TS		0.31	0.36*	0.43*	0.43*		0.07	0.12	0.36	0.38*
4.) DT		0.24	0.27	0.09	0.09		0.45**	0.48**	0.23	0.23
5.) NP			−0.11		−0.02			−0.11		−0.06
ΔR^2	0.17**	0.05	0.01	0.06*	0.00	0.19**	0.08**	0.01	0.11**	0.00

	Task-Switching Behaviors					Dual-Tasking Behaviors				
	PMTS	MPS-SV		MPS-VV		PMTS	MPS-SV		MPS-VV	
1.) PMTS	0.44**	0.34*	0.35*	0.36**	0.36**	0.47**	0.34*	0.35*	0.44**	0.45**
2.) ST		0.30	0.32	0.38*	0.38*		0.27	0.30	0.55**	0.55**
3.) TS		0.32	0.37*	0.47*	0.48*		0.08	0.13	0.42*	0.44*
4.) DT		0.13	0.14	0.03	0.04		0.35*	0.36*	0.16	0.17
5.) NP			−0.11		−0.03			−0.11		−0.07
ΔR^2	0.20**	0.04	0.01	0.06*	0.00	0.22**	0.05	0.01	0.09**	0.00

	Task-Switching Behaviors					Dual-Tasking Behaviors				
	MPI	MPS-SV		MPS-VV		MPI	MPS-SV		MPS-VV	
1.) MPI	0.39**	0.19	0.22	0.26*	0.27*	0.36**	0.09	0.12	0.29*	0.30*
2.) ST		0.28	0.32	0.36*	0.36*		0.20	0.23	0.51**	0.51**
3.) TS		0.29	0.33	0.44*	0.45*		0.05	0.10	0.41*	0.43*
4.) DT		0.27*	0.29*	0.10	0.11		0.51**	0.53**	0.25*	0.26*
5.) NP			−0.11		−0.04			−0.10		−0.08
ΔR^2	0.15**	0.06*	0.01	0.07*	0.00	0.13**	0.11**	0.01	0.11**	0.01

Note: MPS-SV = Multidimensional Polychronicity Scale - Standard Version; MPS-VV = Multidimensional Polychronicity Scale - Vignette Version; ST = Preference for Single-Tasking; TS = Preference for Task-Switching; DT = Preference for Dual-Tasking; MT = Preference for Multitasking; NP = No Preference; PAI = Polychronic Attitude Inventory; IPV = Inventory of Polychronic Values; PMTS = Polychronic-Monochronic Tendency Scale; MPI = Multitasking Preference Inventory. Multitasking Preferences was calculated via the items of Single-Tasking Preferences (reverse coded), Task-Switching Preferences, and Dual-Tasking Preferences. Cronbach's alphas are listed on diagonal.

* $p < .05$.

** $p < .01$.

the prior measures and other dimensions of the MPS-SV and MPS-VV (all $p < .05$).

3.5. Study 2 discussion

Study 2 produced several insights. First, the convergent validity correlations of the MPS-SV's dimensions with prior polychronicity measures were very strong, including those of the novel dimension of dual-tasking preferences. While the scale was supported to have three distinct dimensions in Study 1, these results raise some questions regarding whether the MPS-SV sufficiently differentiates task-switching preferences from dual-tasking preferences. Second, the convergent validity correlations of the MSP-VV's dimensions were more aligned with expectations, as the convergent validity correlations for dual-tasking preferences were smaller in magnitude than task-switching and single-tasking preferences. This suggests that the vignette format may have enabled participants to better differentiate their preferences for task-switching and dual-tasking. Third, the internal consistency of the MPS-SV is superb, and the internal consistency of the MPS-VV fell in marginally acceptable ranges. This may be due to the scale's MTMM nature, and differences across vignettes may suppress item interrelationships within traits. Fourth, both scales consistently predicted significant variance in task-switching and dual-tasking behaviors beyond prior measures of polychronicity, supporting their utility beyond these prior measures. The incremental effects of the MPS-VV were slightly stronger than those of the MPS-SV, perhaps because it has a different response format than the four prior measures. Fifth, no preference did not explain significant amounts of variance in any outcomes beyond the polychronicity measures. Together, the MPS-SV and MPS-VV can benefit future research and practice on polychronicity, and both are further investigated in Study 3.

4. Study 3

The goal of Study 3 was to test the scales' predictive and incremental validity in a different field sample. In addition, we sought to address some limitations of Study 2 by avoiding sole reliance on self-reported outcome measures and common source bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Consequently, we examined whether our polychronicity measures subsequently predicted peer observations of participants' task-switching behaviors, dual-tasking behaviors, and contributions to workgroup performance.

4.1. Study 3 participants

Participants ($n = 227$, Age $\bar{x} = 43.8$, Age SD = 11.32, 86 % female, 67 % white) were registered nurses from the South region of the United States. We restricted participation to those working a minimum of 30 h per week who agreed to recruit "the coworker who typically has the most opportunities to observe" their actual work behaviors. To maintain data quality, we removed nurse/coworker pairs that failed any attention checks or had duplicate IP addresses. This sample size again exceeds the requirements of our analysis with the largest sample size demands (Hair et al., 2019).

4.2. Study 3 method

Participants were recruited via publicly available contact information obtained from state nursing boards, and this information was used to verify that respondents had active nursing licenses at the time of data collection. Registered nurse participants completed an online survey, which included the polychronicity scales. They were also asked to provide a survey link to their coworker, who subsequently completed information about focal participants' multitasking behaviors and contributions to group performance at work. Both nurse and coworker respondents were compensated for their efforts via a $5 gift card to a large online retailer.

4.3. Study 3 measures

Participants completed the MPS-SV, MPS-VV, and Polychronic Attitudes Index (α = 0.89) (Kaufman et al., 1991). We chose to administer the Polychronic Attitudes Inventory as a relative comparison because it is the most commonly used measure of polychronicity in prior research (Howard & Cogswell, 2023). Each participant nominated a peer to provide assessments of participants' task-switching behaviors, dual-tasking behaviors, and work performance. Notably, we assessed dual-tasking and task-switching behaviors again via the scales validated in Study 2, but we changed the referent based on our use of peer ratings. Rather than referencing "I…", the task-switching and dual-tasking scales referred to "this person…". We measured task-switching ($\alpha = 0.87$) and dual-tasking behaviors ($\alpha = 0.89$) using modified versions of the task-switching and dual-tasking measures from Study 2 to obtain peer assessments. Example items include "When given the opportunity at work, this person decides to switch between multiple tasks before completing any" and "When given the opportunity at work, this person typically chooses to perform multiple tasks at the exact same time." Additionally, we used a three-item scale to assess nurses' contributions to group performance (Leroy, Shipp, Blount, & Licht, 2015). Sample items include "This individual helps the group perform well" and "This individual contributes to the group's performance." This scale demonstrated appropriate internal consistency ($\alpha = 0.85$).

4.4. Study 3 results

Table 7 provides correlations and Cronbach's alphas. The MPS-SV (α = 0.94–0.98) and MPS-VV (α = 0.76–0.91) dimensions produced stronger Cronbach's alphas than found in Studies 1 and 2. Polychronicity, as measured by the MPS-SV ($r = 0.66$, $p < .05$) and its dimensions ($r = -0.59$, 0.69, 0.60; all $p < .05$), and polychronicity, as measured by the MPS-VV ($r = 0.43$, $p < .05$) and its dimensions ($r = -0.41$, 0.45, 0.30; all $p < .05$), produced strong correlations with the PAI. The MPS-SV and the MPS-VV produced strong convergent validity correlations with each other, with the respective dimensional correlations ranging from 0.59 to 0.72 (all $p < .01$). Polychronicity as measured by these two created scales had a convergent validity correlation of 0.70 ($p < .05$).

Table 8 provides regression results. We included the PAI alone in the first step, the three dimensions of either the MPS-SV or MPS-VV in the second step, and no preference in the third step. We repeated the analysis for each created scale (two) and studied outcome (three), resulting in six regression analyses. Our primary goal with these analyses was to assess the additional variance explained by the three dimensions beyond the prior polychronicity measure, and our secondary goal was to assess the additional variance explained by no preference beyond the measures of polychronicity. The VIF statistics for these regression analyses fell below the recommended cutoff of 10 (Hair et al., 2019; Kennedy, 1992; Neter et al., 1989), with the largest VIF statistic being 5.45 across all the analyses. Thus, we solely interpreted the change in R^2 to assess the incremental validity of the newly created measures, as this helped to, in part, alleviate multicollinearity concerns and avoid the over-interpretation of individual beta coefficients.

Although the PAI explained significant variance in task-switching behaviors alone ($R^2 = 0.02$, $p < .05$), it did not significantly relate to dual-tasking behaviors ($R^2 = 0.00$, $p > .05$) or work performance ($R^2 = 0.00$, $p > .05$). In contrast, the MPS-SV dimensions explained a significant amount of variance beyond the PAI for task-switching behaviors ($\Delta R^2 = 0.12$, $p < .01$), dual-tasking behaviors ($\Delta R^2 = 0.15$, $p < .01$), and work performance ($\Delta R^2 = 0.17$, $p < .01$). Moreover, no preference as measured by the MPS-SV did not explain significant variance in any outcome beyond the polychronicity scales (all $p > .05$).

Regarding the vignette polychronicity measure, the MPS-VV

Table 7
Correlations and Cronbach's alphas of Study 3.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.) SV ST	0.98													
2.) SV TS	−0.81**	0.97												
3.) SV DT	−0.82**	0.87**	0.96											
4.) SV MT	−0.93**	0.95**	0.95**	0.98										
5.) SV NP	−0.28**	0.30**	0.33**	0.32**	0.94									
6.) VV ST	0.72**	−0.56**	−0.62**	−0.67**	−0.21**	0.82								
7.) VV TS	−0.58**	0.66**	0.70**	0.69**	0.30**	−0.76**	0.80							
8.) VV DT	−0.40**	0.50**	0.59**	0.63**	0.33**	−0.57**	0.79**	0.76						
9.) VV MT	−0.63**	0.64**	0.71**	0.70**	0.32**	−0.86**	0.95**	0.88**	0.91					
10.) VV NP	−0.28**	0.31**	0.37**	0.34**	0.55**	−0.34**	0.36**	0.33**	0.38**	0.90				
11.) PAI	−0.59**	0.69**	0.60**	0.66**	0.20**	−0.41**	0.45**	0.30**	0.43**	0.18**	0.89			
12.) O TS	−0.25**	0.33**	0.22**	0.28**	0.16*	−0.20**	0.19**	0.07	0.17*	0.09	0.14*	0.87		
13.) O DT	−0.23**	0.22**	0.34**	0.28**	0.07	−0.14*	0.16*	0.11	0.15*	0.12	0.06	0.29**	0.89	
14.) O Perf	−0.23**	0.22**	0.29**	0.26**	0.06	−0.17*	0.17*	0.17*	0.19**	0.08	−0.05	0.20**	0.43**	0.85

Note: SV = Multidimensional Polychronicity Scale - Standard Version; VV = Multidimensional Polychronicity Scale - Vignette Version; ST = Preference for Single-Tasking; TS = Preference for Task-Switching; DT = Preference for Dual-Tasking; MT = Preference for Multitasking; NP = No Preference; PAI = Polychronic Attitude Inventory; O TS = Other-Rated Task-Switching Behaviors; O DT = Other-Rated Dual-Tasking Behaviors; O Perf = Other-Rated Performance. Multitasking Preferences was calculated via the items of Single-Tasking Preferences (reverse coded), Task-Switching Preferences, and Dual-Tasking Preferences. Cronbach's alphas are listed on diagonal.
* $p < .05$.
** $p < .01$.

Table 8
Regression results of Study 3.

	PAI	MPS-SV		MPS-VV	
Other-Rated Task-Switching					
1.) PAI	0.14*	−0.16	−0.16	0.05	0.05
2.) ST		−0.06	−0.05	−0.11	−0.10
3.) TS		0.66**	0.65**	0.24	0.23
4.) DT		−0.31*	−0.33*	−0.19	−0.19
5.) NP			0.08		0.03
ΔR^2	0.02*	0.12**	0.01	0.06*	0.00
Other-Rated Dual-Tasking					
1.) PAI	0.06	−0.17*	−0.17*	−0.02	−0.02
2.) ST		0.04	0.04	−0.06	−0.05
3.) TS		−0.15	−0.15	0.14	0.13
4.) DT		0.60**	0.61**	−0.02	−0.03
5.) NP			−0.04		0.08
ΔR^2	0.00	0.15**	0.00	0.02	0.01
Other-Rated Performance					
1.) PAI	−0.05	−0.39**	−0.39**	−0.16*	−0.16*
2.) ST		−0.04	−0.05	−0.14	−0.14
3.) TS		0.12	0.12	0.07	0.06
4.) DT		0.38**	0.40**	0.09	0.08
5.) NP			−0.04		0.02
ΔR^2	0.00	0.17**	0.00	0.06**	0.00

Note: MPS-SV = Multidimensional Polychronicity Scale – Standard Version; MPS-VV = Multidimensional Polychronicity Scale - Vignette Version; ST = Preference for Single-Tasking; TS = Preference for Task-Switching; DT = Preference for Dual-Tasking; MT = Preference for Multitasking; NP = No Preference; PAI = Polychronic Attitude Inventory. Multitasking Preferences was calculated via the items of Single-Tasking Preferences (reverse coded), Task-Switching Preferences, and Dual-Tasking Preferences. Cronbach's alphas are listed on diagonal.
* $p < .05$.
** $p < .01$.

dimensions explained significant variance beyond the PAI for task-switching behaviors ($\Delta R^2 = 0.06$, $p < .05$) and work performance ($\Delta R^2 = 0.06$, $p < .01$) but not dual-tasking behaviors ($\Delta R^2 = 0.02$, $p > .05$). Further, no preference as measured by the MPS-VV did not explain a significant amount of variance in any outcome beyond the polychronicity measures (all $p > .05$).

4.5. Study 3 discussion

Study 3 similarly produced several insights. First, the convergent validity correlations of the MPS-SV's dimensions with the PAI were strong, including those of the novel dimension of dual-tasking preferences. Second, the convergent validity correlations of the MSP-VV's dimensions with the PAI were also strong, and they showed greater differentiation than the MPS-SV. Again, the vignette format may have enabled participants to better differentiate their preferences for task-switching and dual-tasking. Third, the internal consistency of the MPS-SV and MPS-VV both reached appropriate ranges. Fourth, the MPS-SV explained significant variance in task-switching and dual-tasking behaviors beyond the PAI, whereas the MPS-VV explained significant variance in task-switching behaviors alone. These results support the validity of both scales. Fifth, both scales also related to peer-rated work performance beyond the PAI, supporting the predictive validity of both measures. Sixth, no preference did not explain additional variance beyond the other scales, but our results did support the distinctness of this construct from polychronicity. Taken together, Study 3 provides further support for both polychronicity scales, which may have utility for future researchers and practitioners.

5. General discussion

Our research sought to integrate developments in multitasking research, specifically the distinctions between task-switching and dual-tasking, into the assessment of polychronicity. We also investigated whether monochronicity and/or no preference are antipolar dimensions of polychronicity, and explored the necessity of novel measurement techniques to distinguish these potential dimensions. To achieve these goals, we conducted a three-study scale development process following modern guidelines (Brown, 2015; Clark & Watson, 2016; DeVellis & Thorpe, 2021; Hinkin, 1995, 1998).

Our studies demonstrated that both newly created measures reliably distinguish between task-switching and dual-tasking, as evidenced by distinct factors in our CFAs. The preference for single-tasking (i.e., monochronicity) emerged as an antipolar dimension of polychronicity, with its first-order factor loading onto a common second-order factor alongside task-switching and dual-tasking. However, no preference was not supported as an antipolar dimension of polychronicity. Instead, it was found to be a conceptually related but distinct construct. Both the Likert and vignette scales explained significant variance in outcomes (i.

e., peer-reported task-switching behaviors, peer-reported dual-tasking behaviors, and peer-reported contributions to group performance) beyond prior measures of polychronicity.

In addition to their incremental predictive utility, the newly created scales offer notable benefits. Specifically, the MPS-SV is more concise and straightforward, with strong internal consistency estimates across all three studies. The MPS-VV, while longer, may better distinguish between polychronicity dimensions, demonstrating greater variation in their associations with prior measures. Although the MPS-VV produced smaller internal consistency estimates, these still met traditional cutoffs for reliability in Studies 2 and 3.

5.1. Implications and future directions

Identifying preferences for task-switching and dual-tasking as separate dimensions suggests that prior investigations into polychronicity should be reinvestigated. Pertinently, researchers may benefit from reinvestigating relations that may be expected to differ between preferences for task-switching and behavioral outcomes. Also, our results demonstrated that respondents could differentiate preferences for task-switching from preferences for dual-tasking when completing both measures. This suggests that motivational differences in pursuing these task-completion strategies exist. For this reason, multiple theoretical perspectives may be necessary to expand existing knowledge on polychronicity.

To further advance our understanding of polychronicity, future researchers should integrate theoretical perspectives associated with both task-switching and dual-tasking, now that measures exist to assess preferences for these distinct multitasking strategies. Notably, theories of dual-tasking, such as those addressing cognitive bottlenecks (e.g., Pashler, 1994), can provide valuable insights into why individuals might prefer or avoid dual-tasking behaviors. Specifically, Pashler's (1994, 2000) research demonstrates that there is a central bottleneck in cognitive processing that limits one's capacity to select responses or retrieve information from memory for two tasks simultaneously, which helps explain why attempting to multitask often results in performance costs and may feel effortful or unnatural to many individuals.

Hommel's (2020) Theory of Event Coding also offers a framework for understanding how individuals manage multiple task demands simultaneously. When applied to polychronicity, this theory might explain individual differences in multitasking preferences. Those with high polychronicity may perceive less conflict in how they mentally represent multiple tasks, contributing to greater comfort with multitasking situations. This perceptual difference could influence the development of multitasking preferences, even if actual performance does not necessarily align with these perceptions.

Furthermore, Wickens' (2002) Multiple Resource Theory (MRT) provides insight into why individuals develop different preferences for dual-tasking, task-switching, and monotasking. MRT posits that human cognition utilizes multiple, independent pools of resources rather than a single, undifferentiated reservoir. Individuals with a greater preference for dual-tasking may have developed this preference due to more efficiently utilizing different resource pools simultaneously. Those who prefer task-switching may be particularly adept at quickly reallocating their attention and mental efforts between different tasks. Conversely, individuals with a preference for monotasking may be more comfortable focusing their attention and mental efforts on one task at a time, perceiving that this allows them to use their cognitive resources more effectively.

These preferences may develop based on individuals' subjective experiences of how they best manage multiple tasks, influenced by individual differences in how people desire to allocate and utilize their cognitive resources across different types of tasks. However, these perceived preferences do not necessarily reflect objective performance outcomes. Future studies should explore how perceived self-efficacy in managing cognitive demands might influence the development of multitasking preferences.

Researchers have also applied perspectives tied to cognitive flexibility to understand task-switching (Ravizza & Carter, 2008). While cognitive flexibility suggests the ability to shift mental schemas (i.e., organized patterns of thought or behavior) between tasks, our new scale focuses on preferences for engaging in such behaviors. This distinction is important, as preferences for task-switching may not necessarily reflect ability but rather a willingness or desire to engage in such behavior, which may be key to predicting success in certain contexts. For instance, Howard and Cogswell (2023) demonstrated that polychronicity is positively related to creativity. Given that the creative process is not necessarily linear (Madjar & Oldham, 2006; McKay & Gutworth, 2021), individuals who prefer task-switching may be more comfortable navigating and integrating different parts of the creative process.

Our research on registered nurses in Study 3 highlighted contexts where preferences for both task-switching and dual-tasking may be particularly relevant. Our polychronicity measures produced moderate positive relations with work performance, which were stronger than prior meta-analytic relations of polychronicity (generally measured via task-switching only) and work performance (Howard & Cogswell, 2023). Specifically, nurses' preferences for dual-tasking and task-switching were positively associated with greater contributions to workgroup performance and engagement in these behaviors, as perceived by coworkers. However, it is crucial to note that our research focuses on preferences for multitasking rather than the ability to multitask effectively. While nurses with higher levels of polychronicity were perceived to exhibit greater contributions to group performance at work, this does not necessarily imply that preference directly equates to ability. The relationship between multitasking preferences and actual multitasking performance is complex and warrants further investigation.

While our results suggest that in certain contexts, such as nursing, individuals with higher polychronicity may perform better in roles that require multitasking, we should be cautious about generalizing these findings to all occupations or contexts. Previous meta-analytic research has found that polychronicity positively predicts job performance across various jobs (Howard & Cogswell, 2023), but given our expanded conceptualization of polychronicity to include both task-switching and dual-tasking preferences, these relationships may need to be re-examined. Due to data collection constraints, we were unable to collect additional information about nurse participants' multitasking performance on specific sets of tasks within their jobs. As such, inferences regarding polychronicity's relationship with multitasking ability, outside of general work performance evaluations, are limited and warrant future research.

Additionally, our suggestion that individuals who can more effectively manage cognitive demands may be more likely to develop a preference for multitasking requires further investigation. While repeated success in multitasking situations could lead to increased preference, individuals might prefer multitasking for reasons unrelated to their actual ability. This influence of preference, perceived ability, and actual performance in multitasking situations presents an important avenue for future research.

Koch et al.'s (2018) research on multitasking behavior offers insights into why individuals might prefer task-switching or dual-tasking. Their emphasis on factors such as structural limitations and cognitive plasticity could unknowingly influence individuals' preferences for specific multitasking behaviors. Relatedly, our new measures allow for a more nuanced investigation of these theoretical perspectives by separately assessing preferences for task-switching and dual-tasking. This explicit distinction allows researchers to explore how motivations to engage in different multitasking strategies may contribute to various behavioral outcomes, independent of actual capability.

By measuring these preferences separately, we can better understand their interactions with contextual factors (e.g., job characteristics, work demands, team climate), and their incremental influence on work

attitudes (e.g., job satisfaction, organizational commitment) and performance. That is, based on our newly developed measures of task-switching, dual-tasking, and single-tasking, researchers can now assess whether preferences for a certain task-completion strategy predict outcomes beyond the effects of others. This was a limitation of prior measures. However, future work can now more easily employ this methodological rigor when assessing hypothesized relationships to make more informed inferences about polychronicity's effects.

Additionally, our findings indicated that monochronicity is an anti-polar dimension of polychronicity, which does provide some assurances for prior research. Most extant polychronicity measures use items representing monochronicity as reverse-coded indicators (Bluedorn, Kalliath, Strube, & Martin, 1999; Lindquist & Kaufman-Scarborough, 2007; Poposki & Oswald, 2010; Slocombe & Bluedorn, 1999), and our findings suggest that these items do not represent construct contamination. Further, having "no preference" for dual-tasking, task-switching, or single-tasking was not supported as a dimension of polychronicity. Instead, it was found to be a theoretically related but distinct construct. Future researchers should explore the role that having no preference can play within the broader study of polychronicity. Interestingly, no preference produced moderate correlations with preferences for task-switching and dual-tasking. Thus, it is possible that, in some circumstances, this lack of preference may be tied to some level of comfortability with both task-switching and dual-tasking. Pertinently, evidence suggests that 'no preference' is a separate variable that may interact with polychronicity in complex ways. Thus, future research can investigate this possibility, to determine when a lack of preference is likely to predict desirable and undesirable outcomes.

From a practical standpoint, while organizations might consider polychronicity as one factor in selection processes, particularly for roles known to benefit from multitasking abilities, it should not necessarily be the sole assessment used. Although preferences may imply some level of motivation, their relationship with ability is not straightforward. Thus, other applicable factors, such as content knowledge and job-related skills, should also be considered. Most importantly, we recommend that measures, such as those used in our study, are validated in the hiring contexts in which they intend to be utilized (Farr & Tippins, 2013).

6. Conclusion

The importance of polychronicity is believed to be ever-growing, as the modern world increasingly expects people to multitask. As the criticality of multitasking in organizations increases, researchers and practitioners alike may seek to better understand employees who prefer to engage in either task-switching or dual-tasking, two unique multitasking behaviors. For these reasons, it is necessary to ensure that polychronicity measurements appropriately capture both. Via three studies, we showed that the MPS-SV and MPS-VV are appropriate measures of polychronicity, accurately gauging their three dimensions: preferences for single-tasking (reversed), task-switching, and dual-tasking. Future researchers can utilize these scales to obtain more accurate and complete assessments of polychronicity, sparking a new era of research on the already popular and important construct.

CRediT authorship contribution statement

Matt C. Howard: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Kent K. Alipour:** Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Data curation. **Melissa B. Gutworth:** Writing – review & editing, Writing – original draft.

Declaration of competing interest

None.

Data availability

Data will be made available on request.

Appendix A

Multidimensional Polychronicity Scale – Standard Version

Please indicate the extent that you disagree to agree with the following statements using the scale provided.

1 – Strongly Disagree
2 – Disagree
3 – Slightly Disagree
4 – Neither Disagree or Agree
5 – Slightly Agree
6 – Agree
7 – Strongly Agree

Task-Switching

1.) When given the opportunity, I prefer to complete parts of different things than one whole thing at a time.
2.) I like to switch between multiple tasks before finishing any of them.
3.) I have a preference for switching between multiple tasks before finishing any.
4.) When working on things, I like to switch between each of them before finishing any.

Single-Tasking

5.) I like to dedicate my entire focus to one task at a time.
6.) I have a preference for working on one thing at a time.
7.) When working on things, I like to finish each one in its entirety before starting the next.
8.) When given the choice, I would rather focus on one task rather than multiple tasks.

Dual-Tasking

9.) I would rather work on multiple tasks at the exact same time than focus on one task.
10.) I like to give my focus to multiple things at once.
11.) When working on things, I like to work on each of them at the exact same time.
12.) When given the choice, I would rather work on multiple tasks at the exact same time than focus on one task.

Note: When administrating scale, do not include dimensional labels or the present note. The single-tasking dimension is reverse-coded when creating total polychronicity scores. Below are the four items used to assess the conceptually-related but distinct construct of no preference. It should not be included in the calculation of a total polychronicity score.

No Preference

1.) I do not care about the timing that I complete my tasks.
2.) I do not have a preference for the timing that I complete my tasks.
3.) When working on things, I do not care about the order that I finish them in.
4.) When given the choice, I do not have a preference for the timing that I complete my tasks.

Appendix B

Multidimensional Polychronicity Scale – Vignette Version

All of the following scenarios use the response format below.
1 – Strongly Disagree
2 – Disagree
3 – Slightly Disagree
4 – Neither Disagree or Agree
5 – Slightly Agree
6 – Agree
7 – Strongly Agree

1.) Imagine that you are working an office job. You are tasked to both write a brief report and monitor incoming customer emails. Please rate the extent that you disagree to agree that you would prefer to complete these two tasks in the following manners.
   a. I would prefer to complete one task in its entirety before starting the other.
   b. I would prefer to continuously switch between writing the report and monitoring the customer emails before fully completing either.
   c. I would prefer to arrange my work setup so I could write the report and monitor the customer emails at the exact same time.
   d. I would not have a particular preference regarding the timing that I complete these tasks.
2.) Imagine that you are a server at a casual restaurant. During a lunch rush, your manager asks you to obtain orders from several groups of customers and clean several tables, which will take multiple trips to the kitchen to complete both. Please rate the extent that you disagree to agree that you would prefer to complete these two tasks in the following manners.
   a. I would prefer to complete one task in its entirety before starting the other.
   b. I would prefer to continuously switch between taking the orders and cleaning the tables before fully completing either.
   c. I would prefer to take the orders while I am cleaning the tables.
   d. I would not have a particular preference regarding the timing that I complete these tasks.
3.) Imagine that you are working for a history museum. Your boss asked you to record all names mentioned in a stack of handwritten notes as well as record all places spoken in a set of audio recordings. Please rate the extent that you disagree to agree that you would prefer to complete these two tasks in the following manners.
   a. I would prefer to complete one task in its entirety before starting the other.
   b. I would prefer to continuously switch between recording the names and recording the places before fully completing either.
   c. I would prefer to record the names and places by reading the handwritten notes and listing to the audio recordings at the exact same time.
   d. I would not have a particular preference regarding the timing that I complete these tasks.
4.) Imagine that you are a car mechanic. You need to repair the engine of a car, but you also need to give lengthy instructions to a coworker on how to fix a different car. Please rate the extent that you disagree to agree that you would prefer to complete these two tasks in the following manners.
   a. I would prefer to complete one task in its entirety before starting the other.
   b. I would prefer to continuously switch between repairing the engine and giving the instructions between fully completing either.
   c. I would prefer to repair the engine while I am giving the instructions.
   d. I would not have a particular preference regarding the timing that I complete these tasks.
5.) Imagine that you are a student. You have a history paper to complete, and you also need to listen to a recorded psychology lecture. Please rate the extent that you disagree to agree that you would prefer to complete these two tasks in the following manners.
   a. I would prefer to complete one task in its entirety before starting the other.
   b. I would prefer to continuously switch between writing the history paper and listening to the psychology lecture before fully completing either.
   c. I would prefer to listen to the psychology lecture while writing the history paper.
   d. I would not have a particular preference regarding the timing that I complete these tasks.

Note: When administrating scale, do not include the present note. The first option for each scenario represents single-tasking; the second option represents task-switching; the third option represents dual-tasking; and the final option represents no preference. The single-tasking dimension is reverse-coded when creating total polychronicity scores, and the no preference responses should not be included in the calculation of a total polychronicity score.

Appendix C. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2024.112909.

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